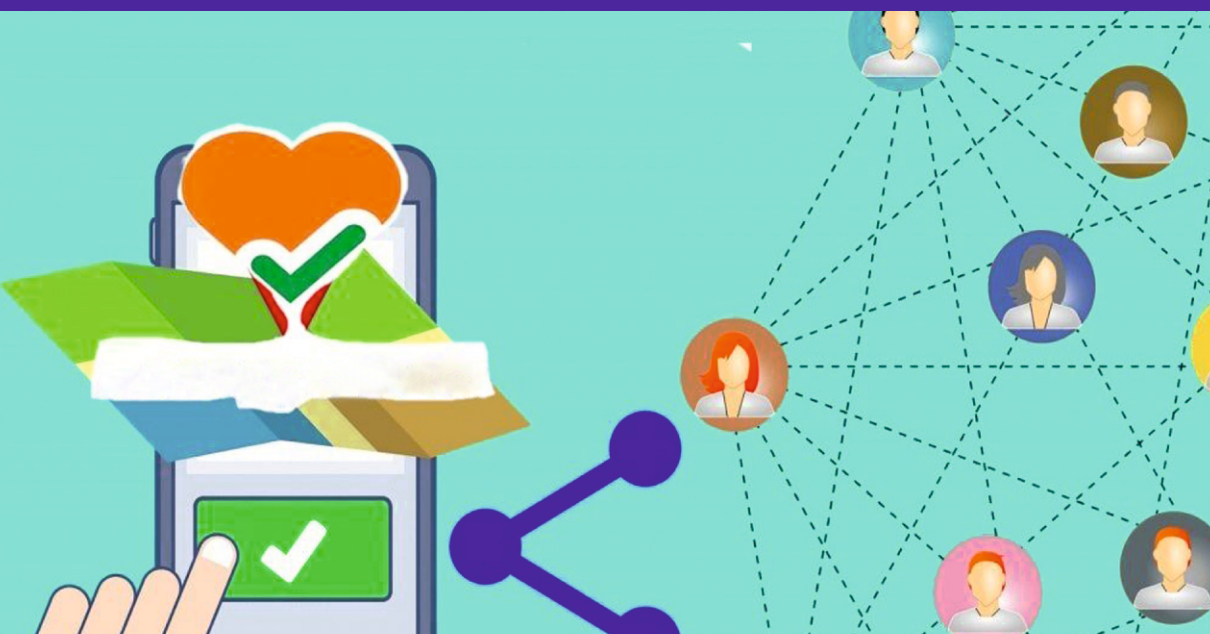
Prof. D. K. Dwivedi
Prof. G. P. Sahu

New Era in Digital Governance

Selected eGovernance Initiatives - 2020



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About Computer Society of India (CSI)

Formed in 1965, the Computer Society of India (CSI) has been instrumental in guiding the Indian IT industry down the right path since its formative years. The organisation has grown to an enviable size of 100,000 strong members consisting of professionals with varied backgrounds including Software developers, Scientists, Academicians, Project Managers, CIO's , CTO's & IT vendors to just name a few. It has spread its branches all over the country. Currently having 488 student branches and rooted firmly at 75+ different locations, CSI has plans of opening many more chapters & activity centers in smaller towns and cities of the country.

The mission of the CSI is to facilitate research, knowledge sharing, learning and career enhancement for all categories of IT professionals, while simultaneously inspiring and nurturing new entrants into the industry and helping them to integrate into the IT community. The CSI is also working closely with other industry associations, government bodies and academia to ensure that the benefits of IT advancement ultimately percolate down to every single citizen of India.

CSI regularly organizes Regional and National level Seminars, Conferences, Competitions, Workshops and Annual Conventions on topics related to current and futuristic ICT for its members and general public. Through its permanent membership of international forums such as IFIP, CSI successfully collaborates with other ICT institutions across the world to formulate international trends and standards.

CSI has a number of Special Interest groups and CSI SIG eGov is one such group with focus on sharing eGovernance best practices & knowledge. CSI eGovernance Awards activity is one of such efforts in that direction, recognizing some of the successful eGovernance initiatives in the country.

About the Editors

Prof. D.K. Dwivedi is having 32 years professional experience in Academics & Government. In July 1988, Prof. Dwivedi started his career as a Scientist/ Programmer/ Tutor in Defence Research & Development organisation (DRDO), Ministry of Defence, Government of India Project at Allahabad University. He was responsible for design & development of softwares, teaching and practical training to the students of B.Sc. (Computer Sc.), M.Sc. (Computer Sc.), B.Tech. & M.Tech. Courses. In the year 1989, he was selected for undergoing CICC Practical Programmer Course at Centre of International Cooperation for Computerization (CICC), Tokyo, Japan with full sponsorship by Consortium of giant Computer manufacturers of Japan & Government of Japan where he got wide exposure of programming knowledge and practical operational training on advanced Mainframe Computers of Hitachi, NEC and Fuzitsu. He was trained programmer on ECIL make Cyber Medha-180/ 360, Mainframes and CDAC's PARAM Super Computer also. In Sept.1991, he joined as Software Designer in Project entitled "**Technology Development for Indian Languages (TDIL)**" of Department of Electronics, Government of India at Sampurnanand Sanskrit University, Varanasi. Responsibilities included design and development of Corpora of 13 million Sanskrit words in machine readable form to be used for automatic interpretation and analysis as per different traditional schools of Sanskrit Education i.e. Vyakaran, Mimansa & Nyay, design of software for automatic generation of forms from Sanskrit words and roots, building lexicon for Natural Language Processing of Sanskrit text. In June 1996, he joined Allahabad High Court and served in various capacities such as System Analyst, Senior System Analyst, System Manager. He was nodal officer for computerization of Courts of Uttar Pradesh. His responsibilities included System Analysis, establishment of high end infrastructure for Computerization of Courts at High Court level & all courts subordinate to it, design & development of G2G, G2B, G2C application softwares for administrative and Judicial business of the Courts, sensitization as well as customised training to various user groups/ stakeholders (Judges of High Court and Subordinate Courts, Staff of the Court, Advocates) in the Courts. He was presenting officer in various Committees of Judges for recruitment/ promotion, purchase of IT equipments items, establishment of infrastructure and processed all related matters. He established State of the Art Data Centre, Digitization Centre, Information Technology Centre in Allahabad High Court and its Bench at Lucknow. In Sept. 2016, he joined as Professor of Computer Science & Engineering at Shambhunath Institute of Engineering & Technology affiliated to Dr. A.P.J. Abdul Kalam Technical University, Uttar Pradesh. He also held various other responsibilities such as HOD-CSE and Director (Corporate Resource Centre, Capacity Building & Entrepreneurship Cell).

Prof. Dwivedi is Senior & Life member of Computer Society of India. He has been actively involved in the activities of CSI Allahabad Chapter and represented Chapter as Chairman, Vice Chairman, and Hony. Secretary from 2004-2008. He was awarded Chapter Patron Award by CSI in its Annual Convention in the year 2012. Prof. Dwivedi has organised number of National Conferences/ Seminars/ Workshops, Faculty Development Programmes (FDP's), Technical programmes under the aegis of various professional

societies such as IEEE, CSI, IETE, ISTE, EUPCCI, Allahabad Management Association, AIMA etc. He has been Co-Convener, CSI Young IT Professional Awards 2013-2014. He represented CSI on various Statutory Committees from time to time. He is actively involved in CSI-SIG-E-Gov Awards activities since 2009-2010 and has evaluated 200+ e-Governance Projects nominated by Central/ State Governments. He is Convener of CSI-Special Interest Group on E-Governance Awards 2020.

Prof. G. P.Sahu is Professor and former Head, School of Management Studies, Motilal Nehru National Institute of Technology Allahabad, India. He has more than 23 years of teaching and research experience. He completed his one-year Post-Doctoral Fellowship program from California State University Monterey Bay, California, US, He was Visiting Professor at California State University Monterey Bay, US during year 2014-2015 for one year. Prof. Sahu holds a PhD in Management from Indian Institute of Technology Delhi, India. His research interests are in the areas of MIS, E-governance, Green Information Systems, Digital Marketing etc. Prof. Sahu has published around 95 research papers in international journals and conferences. He has coordinated a few international conferences. He has also edited nine books in the area of MIS and E-governance. Prof. Sahu has acted as a reviewer for international journals and has served as Guest Editor of International Journal of Electronic Governance.

Prof. Sahu has been on the jury for the CSI-E- governance National Awards, India since 2006, he has served as Convener, CSI SIG Award 2009-10 District Category. He has edited a book titled “Leveraging Technology Towards Digital Transformation: Selected E-Governance Initiatives – 2016 as part of SIGeGov Publications. Prof. Sahu has served as Vice Chairman (Chairman Elect) (April 1, 2018 – March 31, 2019), CSI Allahabad Chapter and Chairman (April 1, 2019 – March 31, 2020), CSI Allahabad Chapter and presently serving as Convener, CSI SIG eGov (2020-2022).

Contents

Acknowledgements	
Messages	
Preface	
SECTION - I **Invited Articles**	
e-Governance during COVID-19 and beyond *Nagesh Shastri*	**3**
Critical Success Factors for Payment Banks Services: Adoption and Government Perspective *Somya Gupta and G.P. Sahu*	**8**
Goods and Service Tax (GST) – A new E- Governance initiative in India *Vikas and Somya Gupta*	**20**
A Digital Transformation in Teaching and Learning (T&L) Platform: A COVID-19 Perspective *Charu Awasthi, Pragati Singh and Naveen Kumar Singh*	**27**
SECTION - II **State Initiatives**	
State of Haryana *** *V. Umashankar and Munish Chandan*	**43**
State of Uttar Pradesh *** *S.P. Goyal and R.H. Khan*	**69**
SECTION - III **eGovernance Projects**	
1. Administration and eOffice Tools	
e-Mantrimandal*** *Gopan Department, Govt. of Uttarakhand* *Amit Singh Negi, Ajeet Singh and Arun Sharma*	**89**
eOffice* *National Informatics Centre, New Delhi* *Rachna Srivastava and Prashant Kumar Mittal*	**101**
eOffice MMP Implementation for Government of Madhya Pradesh* *General Administration Department, Madhya Pradesh* *Shrinivas Sharma, Lalit Dahima and Sucheeta Kak*	**110**
NICDSign *National Informatics centre, Kerala* *T. Mohana Dhas and T. Edward Sam*	**117**
2. Agriculture, Animal Husbandry, Forests and Environment	
Animal Husbandry Management System*** *Animal Husbandry Department, Govt. of Andhra Pradesh* *T. Damodar Naidu, Kodali Harshavardhan and Bodgari Balakishore*	**120**
Crop Loan Waiver Scheme-2018 *Department of Agriculture, Govt. of Telangana* *B. Janardhan Reddy, R. Sivanand and N Suresh Kumar*	**128**

	Digital Transformation: A road drives towards Quality Seed Production *Uttarakhand State Seed & Organic Production Certification Agency (USS&OPCA), Govt. of Uttarakhand* *K. C. Pathak and Sarita Sahoo*	**133**
	E-Licensing for Agri-Input: The spine of a comprehensive supply chain for Seed, Fertilizer & Insecticide *Department of Agriculture and Farmers Empowerment, Govt. of Odisha* *Sourabh Garg, M. Muthukumar and Kabita Ray Das*	**144**
	Ensuring Digital Agricultural Extension through Uzhavan Mobile application* *Agriculture Department, Tamil Nadu* *Thiru. Gagandeep Singh Bedi and Thiru. V. Dakshinamoorthy*	**152**
	Farmers Life Insurance Scheme (Rythu Bima) *Department of Agriculture, Govt. of Telangana* *B. Janardhan Reddy, M. A. Masood Khan and N Suresh Kumar*	**163**
	FRUITS - Farmer Registration and Unified Beneficiary Information System* *Govt. of Karnataka* *Rajeev Chawla*	**167**
	Implementation Of Bhavantar Bhugtan Yojna *M.P. State Agricultural Marketing Board* *Sandeep Yadav and Musharraf Sultan*	**178**
	Online Farmer Wise Crop Booking System *Department of Agriculture, Govt. of Telangana* *B. Janardhan Reddy, M. A. Masood Khan and N Suresh Kumar*	**184**
3.	**Citizen Services, Social Welfare & Grievance Redressal**	
	Antyodaya Saral Haryana* *Department of IT Electronic and Communication, Haryana* *V Umashankar and Deepak Bansal*	**191**
	Ente Jilla (My District)* *National Informatics Centre, Kerala* *T. Mohana Dhas and Andrews Varghese*	**201**
	Jansunwai-Samadhan*** *Chief Minister Office, Uttar Pradesh* *S P Goyal, Surendra Singh and Hemant Arora*	**204**
	MADAD Portal* *Ministry of External Affairs, New Delhi* *Devesh Uttam, Vishnu Kumar Sharma and Rajesh Dogra*	**214**
	Mukhyamantri Vishesh Sahayata Portal *Chief Minister's Secretariat, CM Office, Bihar* *Chanchal Kumar, Shailesh Kumar Shrivastava and Rajesh Kumar Singh*	**230**
	Price Statistics in Rajasthan (PSR)* *Directorate of Economics and Statistics, Rajasthan* *Om Prakash Bairwa, Ranveer Singh and Amit Agarwal*	**238**
	Telangana State Mana Isuka Vahanam (TSMIV, My Sand Taxi in English)**	**243**

	Department of Mines and Geology, Telangana *D Ronald Rose, Rajani Vishwanath and Rajendra Nimje*	
	The Performance Dashboard Empowering Tribals Transforming India through various ICT initiatives** *Ministry of Tribal Affairs, Govt. of India* *Dr. Naval Jit Kapoor*	**263**
	Uttar Pradesh Chief Minister Helpline 1076** *Uttar Pradesh Development Systems Corporation Limited* *Neha Prakash*	**280**
4.	**Ease of Doing Business**	
	Ease of Doing Business in Assam** *Commissionerate of Industries and Commerce, Govt of Assam* *Oinam Saran Singh, Suchitra Pyarelal and Kakoli Chaudhury*	**286**
	Nivesh Mitra*** *Department of Infrastructure & Industrial Development, Uttar Pradesh* *Neena Sharma, Mohammad Wali Abbas and Hemant Arora*	**290**
5.	**Education, Training & Employment**	
	Banglar Shiksha Online 2.0* *School Education Department, West Bengal* *Manish Jain and Debashis Sarkar*	**294**
	ICT in Department of School Education and Board of Secondary Education Uttarakhand *School Education Department, Uttarakhand* *R. Minakshi Sundaram, Sanjay Gupta, Pushpanjali and Mukesh Bahuguna*	**299**
	Karmobhumi Portal* *Department of Information Technology & Electronics, West Bengal* *Sanjay Kumar Das*	**310**
	Madhya Pradesh State Mid Day Meal Portal *Rural Development Department, Madhya Pradesh* *Deleep Kumar and Sunil Jain*	**319**
	Padhai Tunhar Duar* *Department of School Education, Chhattisgarh* *Alok Shukla, A. K. Somasekhar and Jitendra Shukla*	**333**
	ROJGAAR SANGAM** *Directorate of Training and Employment, Uttar Pradesh* *Kunal Silku, Pramod Kumar Pundir and Hemant Arora*	**337**
	Shaala Darpan : An end to end e-Governance solution for school and office automation* *Centre for development of Advanced Computing, Noida* *Vivek Khaneja and Aparna Ramamurthy*	**343**
	Telangana State Board of Intermediate Education Services *Board of Intermediate Education, Govt. of Telangana* *Syed Omer Jaleel, Neeluri Ravindranath and Rajendra Nimje*	**354**
	Uttar Pradesh Skill Development Mission** *Uttar Pradesh Skill Development Mission* *Kunal Silku, Rajeev Kumar Yadav and Hemant Arora*	**364**

6. Election	
Te-POLL- Election Management System, Telangana State Election Commission* *Telangana State Election Commission* *C Partha Sarathi, Purushottam Maramamula and Rajendra Nimje*	**369**
Voter authentication through Real-time digital verifiability (RTDV) in Kompally Municipal Elections* *Telangana State Technology Services (TSTS)* *G T Venkateshwar Rao*	**387**
7. Energy, Water, Food and Civil Supplies	
Digital Transformation & Automation of Fair Price Shop operations in Public Distribution System of Uttar Pradesh *Food & Civil Supplies Department, Uttar Pradesh* *Maneesh Chauhan and Sunil Kumar Verma*	**391**
Just-in-Time Payment Platform (JIT) *Department of Food, Civil Supplies and Consumer Protection, Madhya Pradesh* *Tarun Kumar Pithode, H.S. Parmar and Sunil Jain*	**403**
National Power Portal* *Ministry of Power, New Delhi* *Mritunjay Kumar Narayan and Dilip Kumar*	**413**
Panchayat Nischay Soft Portal* *Panchayati Raj Department, Bihar* *Amrit Lal Meena, Shailesh Kumar Shrivastava and Rajesh Kumar Singh*	**419**
Smart Water Management System under Drink from Tap Mission in Puri City*** *H & UD Department, Odisha* *G. Mathivathanan, P. K. Swain, Sarat Chandra Mishra, Lalatendu Dash and D K Jena*	**429**
8. E-Procurement & E-Auction	
Central Public Procurement Portal (CPPP)*** *National Informatics Centre, Chennai* *Raman V and Sivarama Selvan S*	**443**
PM Mementos Auction Online Auction of mementoes presented to Hon Prime minister** *National Gallery of Modern Arts, Ministry of Culture, New Delhi* *Adwaita Gadanayak, Nagesh Shastri and Usha Saxena*	**449**
Tenders Madhya Pradesh - The Madhya Pradesh Government eProcurement System *Madhya Pradesh State Electronics Development Corporation Ltd.* *Nand Kumarum, Anju Pawan Bhadoria, Arvind Soley and Awantika Varma*	**456**
9. Health & Wellbeing	
Aarogyasetu*** *National Informatics Centre, New Delhi* *Seema Khanna and Hariharan M*	**461**
Arogya Darshak Maps GIS Mapping of Containment Zones	**467**

and Hospitals* *National Informatics Centre, Maharashtra* *Dharmendra Rupchand Jain and Surendra Purushottam Patil*	
CoVID Odisha project* *E & IT, Odisha* *Aditya Mohapatra, Sohan Lal Nautiyal and Pradyut Das*	**471**
Covid19 Jagratha* *District Administration Kozhikode, Kerala* *Seeram Sambasiva Rao, Rolly T D and Mercy Sebastian*	**477**
Covid19 Jagratha Mobile Application* *Kannur District Administration, Govt. of Kerala* *Subhash T V, Andrews Varghese and Rijisha K V*	**485**
eHospital Project *National Informatics Centre, New Delhi* *Sunil Kumar and Naveen Kumar*	**488**
eSanjeevani National Telemedicine Service** *Ministry of Health & Family Welfare, Govt. of India* *Sachin Mittal and Sanjay Sood*	**494**
Healthy Haryana Portal and Mobile App** *Department of Information Technology, Electronics & Communications, Haryana* *V. Umashankar and Munish Chandan*	**504**
KHUSHI *Department of Health & Family Welfare, Odisha* *Yamini Sarangi, Puspalata Sahoo and Nirupama Mohapatra*	**508**
MEDHAS-Medical Education Health Administrative System *National Informatics Center, Andhra Pradesh* *Madhusudhana Rao Sanaboyina and K Shankar*	**511**
RT-PCR/RATI mobile apps and https://Covid19cc.nic.in Portal for Real Time Tracking and Record of every RT-PCR, Rapid Antigen and Antibody Test being conducted in India* *National Informatics Centre, MeitY, Govt. of India* *Neeta Verma and Ajay Singh Chahal*	**512**
10. Housing, Urban & Rural Development & Transport	
e-Recording & Service-Delivery System *Land & Land Reforms and Refugee Relief and Rehabilitation Department, Govt. of West Bengal* *Manoj Pant and Manas Kumar Bhattacharya*	**534**
Maharashtra State TRAVEL e-PASS System* *Raigad Police, Maharashtra* *Anil S. Paraskar and Kovid Sawla*	**539**
Pradhan Mantri Adarsh Gram Yojana – MIS *Department of Social Justice and Empowerment, New Delhi* *Kalyani Chadha and Anand Kumar Verma*	**545**
11.Law, Judiciary & Police	
e-Petty Case App - An Evidence Based Enforcement Tool* *Telangana State Police* *M. Mahendar Reddy and K. Srinath Reddy*	**548**

NCLT Online Tribunal System *National Informatics Centre, New Delhi* *SB Singh and Manoj Tuli*	**552**
Tele-Law for Rural India* *CSC eGovernance Services India Limited, New Delhi* *Rishikesh Patankar and Lay Smrity*	**562**
12. Revenue, Finance & Audit	
Audit Online *Ministry of Panchayati Raj, New Delhi* *Khushwant Singh Sethi, Deepak Chandra Mishra, Manie Khaneja, Adesh Chand Gupta, Sanjay Joshi, Ankit Panday, M. Venkateshwar Rao, D. Srinivasa Rao*	**568**
BPoST Blockchain Protection of Streenidhi Transactions** *Information Technology, Electronics & Communications Department, Telangana* *Jayesh Ranjan, Rama Devi Lanka and Murali Duvvuru*	**573**
CMIS (Project Monitoring System)** *Chief Minister Office, Uttar Pradesh* *S P Goyal, Vishak G and Hemant Arora*	**576**
Digidhan Dashboard for monitoring Digital Transactions* *Ministry of Electronics and Information Technology, New Delhi* *Archana Dureja, Om Pradyumana Gupta and Inder Pal Singh Sethi*	**583**
eAudit (Online Audit Management System)* *Finance Department, Uttarakhand* *Amit Negi, N. S. Negi and Rajat Mehra*	**591**
e-PAUTI *Revenue and Disaster Management, Odisha* *Bishnupada Sethi, Usharani Sahoo and Pabitrananda Patnaik*	**594**
iORA (Integrated Online Revenue Applications)* *Revenue Department, Gujarat* *Pankaj Kumar, Rinkesh Patel and Amit Shah*	**597**
PRERNA (Property Evaluation and Registration Application)* *Stamps & Registration Department, Govt. of Uttar Pradesh* *Rakesh Shrivastav, R.H. Khan and Vinay Kumar Singh*	**602**
ReLIS *Land Revenue, Govt.of Kerala* *K. Biju, Sreelatha. L and T. Mohana Dhas*	**609**
SPARK (Service and Payroll Administrative Repository For Kerala)* *Finance Department, Kerala* *Rajesh Kumar Singh and Girish Parakkat*	**614**
13.Travel & Tourism	
Integrated Business Solution for Shri Ramraja Temple Orchha *Shri Ramraja Temple Orchha, Madhya Pradesh* *Ashish Bhargav and Avinash Pathak*	**627**
Portal for Online Booking of Tickets for Helicopter	**631**

Services to Kedarnath Dham Uttarakhand *Tourism Department, Uttarakhand* *Dilip Jawalkar, Sanjay Gupta and Shivani Gothi*	
Sikkim Tourism Portal for Tourists and Stake Holders Services with Health and Safety Compliant features* *Department of Tourism and Civil Aviation, Sikkim* *Dr. K. Jayakumar*	**637**
14. Others	
APSBCL Retail Outlet Monitoring System *Andhra Pradesh State Beverages Corporation Limited* *D Vasudeva Reddy and Bodgari Balakishore*	**646**
Contractors Labour Information and Management System (CLIMS)* *NTPC Limited,* *Akhil Raizada and Saurabh Banaudha*	**653**
Odisha Human Resources for Health *Department of Health & Family Welfare, Odisha* *Shalini Pandit, Guru Prasad Rath and Nirupama Mohapatra*	**658**
Online Event Management Portal *Department of Information Technology & Electronics, West Bengal* *Sanjay Kumar Das*	**661**
SECTION - IV **Sustenance Initiatives**	
Key Performance Indicators for Sustaining eGovernance Projects *Kasturi S Vijaya Sekhar* *IIIT Hyderabad*	**669**

Award of Excellence ***
Award of Appreciation **
Award of Recognition/Special Recognition *

Acknowledgements

CSI SIG e-Governance Awards (CSeGA) team has been bringing out compendium of the selected nominations of each category of Awards which qualify for the Stage-3 (also referred as finalists) assessment. It has been our sincere effort on behalf of the CSI SIG eGov team to compile the contributions of best eGovernance practices from those who are at the helm of affairs for policy framing, its execution and implementation for the benefit of the citizens and other stakeholders. Compendium of selected eGovernance initiatives of the country showcases knowledge and awareness on projects to eGovernance practitioners, industry and researchers.

This book **New Era in Digital Governance : Selected eGovernance Initiatives 2020** is a result of the untiring efforts of the nominees comprising senior bureaucrats & technical professional teams from Ministries/ Government Departments & other institutions from across the country who have successfully implemented the eGovernance initiatives at their jurisdictional space, submitted nominations for CSI SIG eGovernance Awards 2020, accorded consensus to include their eGov initiatives in our publication on successful presentations of these initiatives before the experts in Digital Dialogure for Field Validations to reach the finalist stage. On behalf of CSI SIG eGov, we wish to appreciate and acknowledge the contribution of bureaucrats, policy pundits, officials and staff for envisioning Information and Communication Technology (ICT) as a means to achieve the goals for entering into a new era of digital governance and enabling us to share their experiences. Each of the initiatives presented in this book have their own learnings - at every stage of project life cycle.

CSI SIG eGov team also realized the need of process-reengineering in award process life cycle this year due to challenging circumstances. New portal was launched within a timeframe of less than month to cater the requirements of all the stakeholders involved in the Award process. This portal will also help in building repository of the eGov best practices for future reference by the eGov practitioners. Whole award process starting from submission of nominations, assignment of nominations to experts, submission of scores, shortlisting based on weighted scores on each of the parameters listed under the different heads of the nominations for various categories of Awards, e-communications to the experts as well as nominees was completed by using various features of the new portal. All the stages of assessment were completely virtual this year.

This compendium book contains invited articles and the efforts of the authors in bringing out the analytical details on emerging trends in e Governance space are worth appreciation.

CSI SIG eGov team is inspired with the vision of (Late) Maj. General Dr. R.K. Bagga who had been a driving force to take the SIG activities forward for so many years at IIIT, Hyderabad.

CSI SIG eGov Core Committee members Dr. Ashok Agarwal, Shri Surendra Kapoor, Sri Prabhu Gollamudi, Dr. K.S. Vijaya Shekhar, Prof. Harish P Iyer, Dr. Piyush Gupta, Dr. C.V. Ramamohan, Ms. Ayaluri Sridevi who nurtured this group from Hyderabad for the last more than 17 years were always available for whatever help was required during Award cycle this year. All requisite

inputs were provided by the Conveners of preceding years to the current team for the smooth transition of the SIG eGov activities from Hyderabad to Allahabad this year. We would like to express our gratitude to the Core Committee members for reposing the faith in the current team.

On behalf of CSI SIG eGov, we would like to express our gratitude to the team of our experts drawn from different sectors viz Government, Industry, Academia, Research Institutions, independent eGov consultants whose voluntary association have helped us to complete the assessment of nominations in multistage shortlisting process for the Awards. Following team of experts associated in the assessment of nominations this year brought a rich perspective to the assessment of the nominations with their rich experience and association with Academia, Industry and other institutions connected with e-Governance practices & processes:

Title	Name	Affiliation	Email Address
Dr.	A K Srinivas	Ex- Air Force, Ex-World Bank	aksri69@gmail.com
Smt.	A Sridevi	MCRHRD Institute, Hyderabad	sridevi.ayaluri@gmail.com
Prof.	Ambuj Anand	IIM Ranchi	ambuj@iimranchi.ac.in
Er.	Apoorva Agha	Allahabad High Court	apoorvaagha@gmail.com
Prof.	Arunabha Mukhopadhyay	IIM Lucknow	arunabha@iiml.ac.in
Prof.	Ashok Agarwal	Founder Member, CSI SIG eGov	agarwal.ashok.k@gmail.com
Dr.	Ashok Jetawat	Pyrotech Electronics Ltd, Udaipur	jetawatashok@gmail.com
Shri	B G Gupta	IT & eGov Consultant	bggupta1@gmail.com
Prof.	B P Joshi	Cummins College, Nagpur	principal@cumminscollege.edu.in
Prof.	Bipin Mehta	Past President, CSI	bvmehta.egov@outlook.com
Dr.	Brijendra Singh	Lucknow University	drbri_singh@hotmail.com
Dr.	C V Ramamohan	Past Convener, CSI SIG eGov	cvramamohan@gmail.com
Prof.	Dipti Prasad Mukherjee	ISI, Kolkata	diptiprasadmukherjee@gmail.com
Prof.	DK Dwivedi	Convener (Awards) CSI SIG eGov	dwivedi.devesh@gmail.com
Shri	D.P. Sinha	Fellow, CSI Kolkata	devaprasannasinha@rediffmail.com
Shri	G S N Prabhu	Past Convener, CSI SIG eGov	snp.gollamudi@gmail.com
Prof.	G. P. Sahu	MNNIT Allahabad	drgpsahu@gmail.com
Dr.	Gayatri Doctor	CEPT, Ahmedabad	gayatri.doctor@cept.ac.in
Prof.	Harish P Iyer	Past Convener, CSI SIG eGov	pharishiyer@gmail.com
Dr.	Harshita Bhatnagar	IIT Delhi	harshita.moia@gmail.com
Col	Inderjeet Singh	New Delhi	inderbarara@gmail.com
Grp Capt.	Jaidev	Ex. Army	pjnair61@yahoo.com
Dr.	Jyoti Prakash Singh	NIT Patna	jps@nitp.ac.in
Dr.	K.K. Mishra	MNNIT Allahabad	kkm@mnnit.ac.in
Prof.	K.S. Rajan	IIIT, Hyderabad	rajan@iiit.ac.in
Dr.	K.S. Vijaya3 Sekhar	IIIT Hyderabad	ksvsekhar@gmail.com
Shri	Krishna Raju	Ex HP	krrishh@gmail.com
Shri	M S Rama Rao	Ex APSCOB	msakethu@yahoo.co.in
Sri	Manoj Singh	AICTE, New Delhi	ad1egov@aicte-india.org
Dr.	Manoj Wairiya	MNNIT Allahabad	wairya@mnnit.ac.in
Sri	MD Agrawal	Past President, CSI	murliagrawal@gmail.com
Ms.	Mini U	Cochin University	mini.ulanat@gmail.com
Dr.	Monika Singh	MNNIT Allahabad	monika2286@gmail.com
Shri	N.V. Subrahmanyam	JK Technosoft Hyderabad	nv_subbu@yahoo.com

Shri Nagesh Shastri	NIC, New Delhi	nagesh@nic.in
Prof. Narsi Bolloju	BITS, Hyderabad	narsi.bolloju@gmail.com
Dr. Navjot Singh	MNNIT Allahabad	navjot@mnnit.ac.in
Dr. Neelesh Modi	BAOU, Ahmedabad	drnileshmodi@gmail.com
Prof. Nityesh Bhatt	Nirma University	nityesh@nirmauni.ac.in
Prof. P Krishna Reddy	IIIT, Hyderabad	pkreddy@iiit.ac.in
Shri P V Srinath	Mumbai	sreenathpv@rediffmail.com
Prof. P. Thrimurthy	Past President, CSI	profpt@rediffmail.com
Shri P.N. Jain	R & B Dept, Govt. of Gujarat	pnjce@yahoo.co.in
Ms. Pallavi Kabde	BRAOU	pallavikabde@gmail.com
Shri Phaneendra V	Ex. NISG	neendra@gmail.com
Shri Piyush Goyal	SAIL	piyushkgoyal@hotmail.com
Dr. Piyush Gupta	CSC Academy	piyushgupta.egov@gmail.com
Shri P N Rao	Ex. MiTY	pnrao@nic.in
Dr. Prajna Paramita Mishra	University of Hyderabad	prajnamishra@uohyd.ac.in
Shri Praveen Dwivedi	STPI, Lucknow	prv.dwivedi@gmail.com
Dr. Rajitha B.	MNNIT Allahabad	rajitha@mnnit.ac.in
Shri Rajnish Malhotra	IT & eGov Consultant	rm3411@yahoo.co.in
Shri Raju Chakradhar	eGov Consutant Hyderabad	ropolu.ch.dhar@gmail.com
Dr. Rakesh Agarwal	aXess Academy at Standard Chartered Bank, Bangalore	agarwal.rakesh@gmail.com
Dr. Rakesh Kumar	MNNIT Allahabad	rakesh@mnnit.ac.in
Shri Rama L Sastri M	IT & eGov Consultant	sastrylm@gmail.com
Shri Ranga Rajgopal	ACENET Technologies	rangagopal1@gmail.com
Shri R K Vyas	President, CSI	rkvyas05@gmail.com
Prof. S. J. Pawar	MNNIT Allahabad	sjpawar@mnnit.ac.in
Dr. Sandeep Inampudi	Central University of Karnataka	sandeep.inampudi@gmail.com
Shri Satish Babu	Past President, CSI	sb@inapp.com
Prof. Shatrunjay Rawat	IIIT, Hyderabad	shatrunjay.rawat@iiit.ac.in
Dr. Somen Dey	MNNIT Allahabad	somen@mnnit.ac.in
Dr. Sonal Mobar Roy	NIRD & PR Hyderabad	smobar2@gmail.com
Dr. Sridaran Rajgopal	Marwadi Education Group, Ahmedabad	sridaran.rajgopal@gmail.com
Wg Cdr. Srikumar	Ex- Air Force	gsri1250@gmail.com
Shri Subimal Kundu	Fellow, CSI, Kolkata	
Shri Sudhir Aggarwal	Microsoft Corporation (India) Ltd.	sudagg@gmail.com
Shri Surendra Kapoor	EX CMC	kapoorsurendra@yahoo.com
Shri Surya Patnaik	STPI, Lucknow	suryapatnaikstp@gmail.com

It was a privilege to have galaxy of previous and current Presidents of the Computer Society of India – Prof. P Thrimurthy, Shri Satish Babu, Sri M.D. Agrawal, Sri Bipin Mehta, Sri R.K. Vyas helping us in the assessment of nominations as well as other CSI SIG eGov activities in their own capacity.

We would also like to express our gratitude to senior authorities from the Government Departments/ Ministries, and specially Dr.(Mrs) Neeta Verma, Director General, NIC for encouraging nominations for the CSI SIG eGov Awards from respective departments as well as nominating Sri Nagesh Shastri, Dy. Director General from NIC in the panel of experts committee.

Finally, we want to thank all the IT Secretaries, Project In-charge Officers, nominees who enabled CSI SIG eGov team to complete nominations assessment at all stages successfully within the timelines. Without their support – we would not have achieved this rigorous multi-stage evaluation process and bring out this Compendium, in time.

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We appreciate the extraordinary support to our Publisher Rishikul Prakashan for their desktop publishing support in bringing this compendium out under tight deadlines.

Prof. D. K. Dwivedi & Prof. G. P. Sahu

Editors

Message

Year 2020 has disrupted the way we think and initiated many changes in digital world: More and more utilization of Digital services is happening and working from Home has become almost de-facto standard. These disruptions have also brought new challenges for Implementation and change to new technologies, requiring recurring skill up gradation on an ongoing basis and urgent need to define a strategy of change from old to new technologies. Current Pandemic has demonstrated the effectiveness of Information Technology in addressing issues in all areas to improve the quality of life of a common Citizen of India.

Computer Society of India (CSI) as the oldest and largest voluntary professional body has taken on itself the initiative of promoting e-Governance. Towards this, CSI had constituted a Special Interest Group on e-Governance (known as CSI-SIGeGov) and has also been providing recognition through annual awards for excellent work done with positive impact on the citizens for the last two decades. I am happy to know that CSI-SIGeGov awards will soon be reaching the eighteenth year in succession. Having been a part of these awards from the inception in the year 2002, I am delighted to see the positive responses from all concerned covering projects from Central government, States, Districts, Municipalities and Panchayats. This demonstrates the clear direction by the government to move towards effective digital transformation in all areas.

I congratulate the CSI-SIGeGov team for taking on the mantle and move forward during this year with the eGov awards in spite of Corona Pandemic in the Country. The team with Prof. D.K. Dwivedi and Prof. G.P. Sahu, introduced portal-based evaluation and a changeover to Digital processes for the awards, it called for dedicated efforts, long hours and focused attention for successful conclusion of the various processes set. My personal congratulations to them for such an excellent work done, it would not have been possible to complete the award process timely especially during the COVID Pandemic without the active participation from the nominees who came forward and participated in the event in large numbers. Our gratitude to all of them for submission of nominations.

The immense timely support provided by our team of experts has been the back bone for the success, my heartiest congratulations to all of them and I am deeply thankful for their support.

e-Governance has been able to significantly improve participation of citizens in the governing process through effective feedback on services given by the Government and promote democratic values to that extent.

CSI-SIGeGov continues to focus on eGovernance space and facilitate sharing of knowledge across the stakeholders through recognizing excellent work done in this area and publishing the case studies on successful eGovernance projects. I am glad that CSI-SIGeGov is bringing out another compendium with the title **“New Era in Digital Governance – Selected eGovernance Initiatives 2020”.** Such compendium in the past has become a good reference and source of knowledge for both practitioners and researchers over the years.

With the various initiatives of the governments taking a firm shape, leading the country towards good governance, we surely have to look at eGovernance from a digital convergence approach. I am sure that the CSI SIGeGov team works towards setting the trend in the coming years in tune with the changing perspectives of eGovernance.

I congratulate the editorial team consisting of Prof. D.K. Dwivedi and Prof. G.P. Sahu for excellent work done. The winners of this year awards truly deserve the recognition and are becoming torch bearers to all of us for the future. My personal congratulations to all winners.

With Best wishes,

Dr. Ashok Agarwal

Founder CSI SIGeGov and CSI Fellow

Preface

New Era in Digital Governance:

Selected eGovernance Initiatives 2020

Government is implementing various eGovernance initiatives to ensure efficiency, transparency, ease of use in the G2G, G2B, G2E, G2C areas. New era of Digital Governance requires adoption of digital convergence, ubiquitous technologies, and framing new policies based on existing data, knowledge and past experiences to enable devise solutions for more connected, personalised and proactive forms of the governance. An evidence-based policy design is a potent tool to deliver the promise of inclusive growth and sustainable development. Formulation of policies resilient to the uncertainties of the future is need of the hour.

For Digital Governance in digital society, data is the backbone of the system. Government have citizen-related data in the form of details pertaining to their eligibility/ entitlement for various socialschemes, Aadhaar and other proof of identity while Facebook, Twitter and Amazon store data about people's preferences as well as their social and financial behaviour. The advent of data analytics in governance is inexorable. There is need for synergy between government and private data to create a single robust ecosystem that is connected, interoperable and secure. Social media platforms are now being used as tools of dissemination of Government schemes, seeking feedback/ opinion of the citizens as well as for other governance activities, and the future may see even greater convergence. In this new era of digital governance, collaboration and mutual compatibility, we need to ensure acceptability and adaptability.

Designing & implementing new egovernance initiatives, leveraging emerging technologies- Artificial Intelligence (AI), Machine Learning, Blockchain, Use Cases of advanced analytics is finding relevance in the Government ecosystem in almost each domain area. Government has already taken initiatives to put in place requisite infrastructure, policies and processes that can drive country into the next era of digital-driven governance-related reforms.

The Central Government and State Government ministries/ departments have already started moving forward with innovative initiatives using emerging technologies identifying their own priority areas, digitally transforming the processes, framing policies, collaborating with other entities for the overall development and good governance in the domains of agriculture, animal husbandry, environment, water, energy, ease of doing business, education, training & employment, grievance redressal, housing, urban development & transport, revenue, finance, social and citizen welfare schemes.

In a bolt from blue situation like Covid-19, our governments made extensive use of technology to aware citizens about the precautionary measures and safeguard their life. Although such circumstances never desired, but Covid-19 has given all stakeholders in the governance space; business & e-commerce; common citizens; a boost in exploiting the optimum benefits of the use of technology and other related tools. Various e-Governance applications such as "Aarogyasetu, - contact tracing App, "eSanjeevani", RT-PCR/RATI mobile apps

and https://Covid19cc.nic.in Portal for Real Time Tracking and Record of every RT-PCR, Rapid Antigen and Antibody Test being conducted in India, other COVID-19 related initiatives such as Covid19 Jagratha App, Arogya Darshak Maps GIS Mapping of Containment Zones and Hospitals at the level of different States and District Administration, use of help lines for citizen awareness, feedback, grievance redressal Social Welfare Schemes, e-pass systems and web/ video based monitoring systems innovated due to the emergent necessity have helped survive crores of our citizens especially migrant workers & elderly people. E-governance has brought the governance to the doorstep of citizens, with an integrated doctrine of non-discrimination; it manages to drive systems to provide a ubiquitous environment. Despite divergence in demographic, socio-economic and geographic profiles, every citizen has a unique interface with the government for their entitlements. This makes e-governance both necessary and desirable.

CSI SIG eGov adopts multistage shortlisting process to evaluate the e-Governance/m-governance projects implemented by Ministries/ Departments of the Central/ State Government and Local Government with the help of experts having rich experience in academia, industry, software project consultancy, policy formulation, governance practices. Keeping in view the submission of nominations of eGovernance initiatives from diverse domain areas and to take care of the biases of experts, well designed AHP system is applied where weights are applicable for each of the parameters of the Result Enablers and Value Indicators and thus keeping a appropriate balance amongst the overall impact of documentation, usage of technology, result enablers and value indicators in the assessment results.

This compendium contains the rich information of the Award winning eGovernance initiatives in various categories which are marked with stars (*) as well as of those initiatives which reached upto the Finalist Stage. Compendium will be very useful and great value to the decision makers, policy makers, practitioners and researchers in the field of eGovernance. We on behalf of the CSI SIG eGov made our sincere effort to validate the information provided through submissions made by the by the Government Departments, however it is advised for the prospective readers to make their own assessment while deriving inferences. We acknowledge the efforts put in by the Government Departments for submission of the nominations and also the efforts of the CSI SIG eGov experts who scrutinised the nomination documents; validated the facts from respective nominees/ stakeholders during the presentations; and experts deliberations.

Prof. D.K. Dwivedi & Prof. G.P. Sahu
Editors

Section-I
Invited Articles

e-Governance during COVID-19 and beyond

Nagesh Shastri

Corona Virus 2019 (COVID-19) pandemic has disrupted the normal life and citizen services globally. The Indian IT landscape has not been left untouched by this global phenomenon and this has altered IT functioning. The novel coronavirus has accelerated the demand for applications and services which enable the Government, Employees and Industry to work seamlessly and efficiently in these changed circumstances.

The rapid spread of COVID-19 has forced many countries to use cutting edge technologies to fight against the pandemic, keep an eye on the citizens and keep them indoors to contain the deadly disease.

During nation-wide lockdown, most of the government officials discharged their duties by working from home, except those whose physical presence were essential at office, by adopting new techniques and technologies. In the process, stereotype image of the bureaucrats for taking their own time to adopt to the new technologies was shattered for good and pace of service delivery went up by many notches. Various dedicated COVID-19 war rooms were established where senior government officials monitored and reviewed COVID-19 preparedness and planned further course of action in their respective regions.

While established services such as Video Conferencing, Mail and Messaging etc. witnessed unprecedented increase in their usage, many new services and applications took shape to facilitate Government to citizen connect and alleviate the hardships of the citizens. Some of these are highlighted below:

Video Conferencing

As soon as the lockdown was announced, services such as video conferencing, started creating a huge positive impact across Ministries and Departments both at the Central and State Government level. Hon'ble Prime Minister led the way by using **videoconferencing** service extensively to connect with the administration at all levels and the citizens at large, thereby monitoring the entire COVID-19 situation closely and assuring them of all possible support by the Government.

Apart from direct interactions such as mobile/ telephonic calls, various video conferencing tools such as NIC's Video, WebEx, MS Teams, Google Meet, Skype etc. were used by officers for instant interaction with each other and groups to carry out their duties efficiently and seamlessly. NIC's videoconferencing services were used extensively by Cabinet ministers to Chief Ministers, Cabinet Secretary, State Ministers, other Secretaries and government officials. These were used for meeting, training, events, monitoring activities/projects etc. In March 2020 alone, NIC helped in facilitating over 2,300 video conferencing sessions of over 60,000 hours across the country, held at all levels of governance. By the end of 2020, 3.5 Lakh+ VC sessions and over 15 lakh VC hours were clocked. At a time, when staying at home was the need of hour, videoconferencing services helped government officials to connect effectively with each other, thereby ensuring minimum physical contact and exposure.

Mail and Messaging

NIC's eMail services form the primary backbone for all communications in the

government catering to a userbase of over 2.7 million users. Since the day the government announced a nationwide lockdown and employees started working from home, NIC's email services ensured smooth communication for the government with features such as communication of messages, sharing of files both as attachments (allowed file size of 25 MB) and briefcase (allowed size of 1 GB).

Business continuity was ensured even when daily email transactions zoomed from 2.13 crore on March 21 to 4.58 crore on March 24, recording an increase of about 115% in the overall traffic. Similarly, as the government launched significant awareness campaigns through SMS for preventing the spread of corona virus, the average SMS count per day after lockdown climbed to 7.2 crore from around 3.3 crore a day before lockdown.

Cloud Services

As many new applications developed needed to be deployed quickly, requirement for resources on the cloud climbed up rapidly. NIC through its cloud services provided resources for most of the COVID-19 related applications which were further augmented by resources on other cloud service providers such as AWS, Azure etc. Most of these applications were hosted on multilocation NIC National Cloud being offered from NIC National Data Centres located at Delhi, Hyderabad, Pune and Bhubaneswar under "GI Cloud" Cloud Initiative MeghRaj of MeitY.

e-Office – A Game Changer during the lockdown to facilitate work from home

During the period of lockdown induced by COVID-19, Work from Home became the new Mantra in public as well as private sector. Governments whether Central or State, had traditionally followed paper-based office. While the seeds of switchover to a less paper office were sown much earlier, eOffice, a fully functional digital workplace solution, aimed at quick disposal of files and receipts in efficient and transparent manner, emerged as a game changer by facilitating unhindered work and unfettered access to the files by the bureaucracy. Most of Government of India Ministries/Departments, States Secretariats, Districts in States like West Bengal, Andhra Pradesh, Karnataka, Tamil Nadu, Madhya Pradesh etc. continued to function seamlessly during the complete lockdown state, undoubtedly aided by eOffice.

As the processing of files in a secure manner is necessary, the application was made accessible for officers working remotely using webvpn. This enabled officers to work on files 24x7 from confines of their homes and thus kept the wheels of the Government moving.

Direct Benefit Transfer (DBT)

Direct Benefit Transfer (DBT) played an important role during the crisis to provide sustenance to the effected population by transferring cash benefits directly to their bank accounts. DBT had established itself prior to the COVID-19 crisis leveraging on the Aadhaar and banking infrastructure. The crisis enabled the Governments both at the Central as well as States to utilize its reach to provide emergency financial support to people, efficiently and in quick time thus facilitating them to pull them through the hard times.

Thus, DBT became a true SAMBAL and ray of hope for the affected sections:

Simplify process

Aid in cash and in-kind

Minimize levels involved in benefit flow
Benefit intended segments of society
Augur transparency
Lessen delay in payment

The following are the highlights of cash benefits transferred by the Central Government using PFMS for making DBT payments during COVID-19 period (25th March 2020 till 14th June 2020) :

- The DBT payments under all the Central Sector/Centrally Sponsored Schemes through PFMS amounted to **Rs. 63564.26 crore** in the accounts of nearly **29.32 crore beneficiaries** through schemes like PM KISAN, Mahatma Gandhi National Employment Guarantee Scheme (MNREGS), National Social Assistance Program(NSAP), Prime Minister's Matru Vandana Yojana (PMMVY), National Rural Livelihood Mission (NRLM), National Health Mission (NHM), Scholarship Schemes of various ministries through National Scholarship Portal (NSP).
- Taken together with funds transferred by State Governments under their welfare schemes, state linked schemes, UT schemes, total of Rs. 78,428.99 crore covering nearly 41.01 crore beneficiaries were disbursed through DBT during this period.

AarogyaSetu

It is a mobile application which was launched on 2-April-2020, to aid the COVID-19 efforts of the Government. The App works based on contact tracing method and helps the Government in identifying, monitoring and mitigating the spread of COVID-19 across the country. The App proactively reaches out and informs the users of the app regarding risks, best practices and relevant advisories pertaining to the containment of COVID-19. Its multi-lingual interface (12 languages) enabled citizens across the country to gain quick familiarity and number of downloads of the app galloped away rapidly with currently more than 16.9 Crore downloads.

RT-PCR/RATI mobile apps

Development of real-time Reverse Transcription–Polymerase Chain Reaction (RT-PCR) and Rapid Antigen Test of India (RATI) application for sample collection and their integration with ICMR lab software played an important role in identifying the COVID patients. These were used by sample collectors and testing labs across the country which were enabled through Covid19cc portal.

ePass Systems

These were quickly developed using NIC's ServicePlus framework for generating passes for easy movement of vehicles during the lockdown. These solutions also facilitated in movement of residents, stranded in other parts of the country amid lockdown. Many states implemented NIC's ePass solutions within a short span of time – some solutions getting developed almost overnight due to configurable features of ServicePlus framework which required little coding.

Paperless Union Budget

In a first, Hon'ble Finance Minister presented paperless Union Budget before the Parliament for financial year 2021-2022 on 1st February, 2021. All the budget documents were hosted on the web site indiabudget.gov.in and made accessible through Akamai CDN within 15 minutes of conclusion of Budget Speech of Hon'ble Finance Minister. A Union Budget mobile app was

developed which had bilingual interface and disseminated the budget documents in Hindi as well as English.

Other Important Initiatives

NIC supported the government at Centre, State and district level to help in monitoring & management of different aspects of pandemic right from the dissemination of information, advisories, guidelines to ePass systems, quarantine management, complaint management systems, travel history registration systems, hospital management, COVID-19 tests management, telemedicine, tele-education, helpline portals and dashboards.

Some critical applications to support Government during COVID-19 include PM Dashboard for COVID-19 Status/Updates, Covid19cc portal, COVID-19 Data Hub, LifeLineUdan to transport essential medical cargo, COVID-19 Volunteers Database of MSME, Special Surveillance System(S3) for tracking COVID-19 patients, Nurses Registration & Tracking system, Management of Migration, Home Quarantine, Containment Zones, Hotspots, Management of Surveys, reporting systems to monitor supply of essential goods, essential services, distribution and e-commerce, Travel History Registration system, dedicated relief package portals and many more.

Emerging technologies such as AI also played an important role in some of the initiatives. Development of a model to detect the symptoms of novel coronavirus infection by looking at a person's chest x-ray was one such attempt. Though the model is still in nascent stage, training of the model on more X-ray images can help as there is dearth of doctors and qualified para medical staff in rural India and early detection can help in isolation and recovery. Chatbot for the Meghalaya government in three languages – English, Khasi and Garo – to answer any queries of the locals related to COVID-19 was a step to reach out to masses and address their concerns.

Thus, ICT led initiatives played an important role in facilitating the Governments – both Central and States to combat the pandemic more effectively. While services and applications such as Video conferencing, mail and messaging, eOffice etc. ensured that Governments could function as close to usual as possible despite the lockdown, other measures such as DBT helped the Governments to reach out to people most affected by the lockdown and provide them sustenance during this difficult period.

Changing landscape of Governance beyond COVID

As the end point and mobile devices used for remote access to office applications are more vulnerable to security threats, protocols for secure remote access will further evolve to cater to these requirements. Streamlining due diligence, governance and procurement processes, for example, could lead to increased danger of waste or fraud.

Emerging technologies such as AI will have a major role to play specially in healthcare. AI model using Chest X-Rays for early detection of COVID symptoms, has the potential to revolutionize diagnosis as it will make it possible for radiologists and doctors to detect infection even in asymptomatic patients and prioritize treatment. Virtual OPD facility using Interactive Voice Response System is taking shape. This will enable patients to call the doctors/ specialist at a time provided by the hospital to get medical advice related to their illness on a landline or a mobile. Telemedicine solutions facilitating virtual consultations through video interface will have a large role to play in future to

enable easy access of healthcare to rural masses.

As administration of vaccine gathers steam, applications such as CoWin will have a major role to play and facilitate the roll-out of the vaccine in the country. It will facilitate access to real-time information on the vaccine stock, storage temperature and individual status of the beneficiaries and will also provide details on helplines to address queries.

Digital certificate to the vaccinated patients to enable them to keep a track of dosages, vaccines used etc.will be a game changer in health care.

As the pandemic struck the world, most enterprises and Government offices were compelled to switch over to work from home and shift some or all of their workforce to function remotely. Whether or not remote work was part of their pre-COVID-19 long-term and well-thought workforce strategy or emerged as a knee-jerk reaction to the crisis, one thing is now certain- there is no going back now, with the workplace being transformed forever. Work from home is likely to become the new norm, thus cutting down on travel time and fuel consumption and thus enhance productivity. In this new normal for the workforce and the workplace, making informed decisions involving the right people in the shortest possible time would be the new Mantra.

Though the culture change required to work from home, engage with new partners and roll out innovative ideas have been largely embraced by Government and Industry alike, the shift brings along with it some potential hazards also – most notably the absence of personal interaction and intrusion of private space. Easy availability of Work from Home tools has led to extended working hours and encroached on even otherwise ever shrinking time families spend together. While this approach worked well during the pandemic period, there is a need to rationalize the use of technology as it shows signs of abating. Pace of service delivery has been transformed. However, the next challenge would be to understand which of these changes bring about benefits, and which come at a cost.

Shri. Nagesh Shastri, *Dy. Director General, National Informatics Centre, New Delhi, nagesh@nic.in*

Critical Success Factors for Payment Banks Services: Adoption and Government Perspective

Somya Gupta and G.P. Sahu

Abstract. *Present context banking all about digital and technical innovation. As government moving ahead with e-governance for delivering various e-services to people for fast response and ease, banking is also more about banking on mobile devices. After Automatic teller machines, mobile banking and internet banking introduction of Payment banks is one of the most strategic change in Indian banking platform implemented by the Indian government to promote financial inclusion among the Indian economy but Payments banks can't undertake lending activities. The purpose of this study is to explore the factors that influence the acceptance of payment banks by customers. Through, various dimensions and theories of adoption a comprehensive research model of the current study is established with seven factors i.e., social influence, facilitating conditions, user interface, trust, usability, banking charges and adoption. Data was collected by questionnaire from customers of various payment banks. The results mainly showed that out of six factors analyzed, adoption of payment banking is significantly and positively influenced by facilitating conditions, user interface, trust and social influence. As data is being collected from a few respondents, this becomes one of the limitations of this study.*

Keywords: Payment Banks, Mobile Banking, UTAUT, TAM

INTRODUCTION

Banking system has undergone various prompt changes, as economy has enlarged and progressive towards adopting technology in every domain for its expansion. Information technology has played major role behind these expansions. There is potential change in the technique financial services are deliberate and dispensed in any country [25]. Starting from physical banks, to paper cheques, upgrading to ATMs and mobile banking and most recently announced payment banks are all about banking modernization. Technology has unlocked various channels for customers to operate their banking services from anywhere at any time.

Presently, Indian banking is in its most active phase. Payment banking is one of the most planned change of the government and RBI in Indian banking as it not only helped urban people but also helped tribal people. They have not only increased competition but also made banking services at affordable cost [27]. India is currently moving ahead in use of digital technologies in everyday life. But in case of financial services rural sector of country still operates more through traditional banking, but a latent growth is been witnessed towards use of digital payments and even Indian government has took several initiatives to promote digital payment through various schemes, as they facilitate easier and cost-effective transfer of money. Traditional banking i.e., place centric banking has only been left for complex situations, whereas equipment centric banking is generally used for day-to-day transaction through various digital payments mode. In India, prime intent of implementing technical aspects and introduction of payment banks is to extend feasible and flexible financial services to every sections of the society.

Concept of "digital India" cannot be considered to be properly implemented until every Indian adopts digital channel to attain financial and no- financial services

[14]. As main agenda of Government of India (GoI) for implementing "Digital India" scheme in 2015was to digitally empower citizens of India, by providing education, health and financial services with ease of time and place [14]. Moreover, with the increasing number of Internet and Mobile subscribers in India, mobile banking being an evolutionary step, has widely contributed in business growth and connect to masses.

Payment banks are not only boon for rural India, which will give them better access to banking facilities at their door step but payment banks are also effective for urban planning, as due to busy working schedule, people can enroll new account and can operate them from their compatible device. Payment banking is available both in traditional and digital platforms for public convenience. Payment banks are mainly in operation through postal department, and telecom companies, as these departments are in better reach to people as well as technologically advanced. This empirical research focuses on intension of individuals to adopt payment banking model suggested by Reserve Bank of India in 2015 and study the factors which drive customers to use payment banks. Payment Banks can be evaluated as next extension of the Indian banking phase, with that they can be considered as the mode of financial inclusion.

LITERATURE REVIEW

Bill gates in 1994 said that "banking is necessary, but banks are not". Banking has been transformed from place centric to equipment centric, which resulted into shorter transaction time, feasibility and flexibility towards various banking services. Society has started increasingly giving preference to various service through electronic medium of delivery but every individual respond to new technologies in different manner [12, 24]. M-banking became popular concept due to certain advantages it offers to the customers in form of better user interface, ease of performing transaction, better market and marketing technique of new service and provide advance features and functionalities at low cost [21,4,34,8]. Mobile banking as mode of delivery of financial services and information has also enabled the users with the facilities to transact and mange financial activities in efficient and less costly manner without the restriction of time and geographical area, which has also opened up new world of possibilities [26].

With increasing usages of smart mobile devices resulted in the increased demand of mobile banking services [12] even some banks are into existence only on mobile based platform to enable the customers to gain enhanced command over their financial transactions (British Telecommunications, 2017). But the focus of survival and growth of m-banking is based on increasing Service quality [18,31] and adoption and usage of new banking technology based on Internet, respectively [33, 1]. M-banking has not only provided boost to banking industry but also acted as platform for m- commerce [23].

As India being a developing nation, people in various sectors of the economy are not enough familiarised with digital technology, so an alternative model for providing financial services to poor clients, which stimulates economic growth and rural development [10]. As reaching customers in various emerging markets and rural areas, [2] banks have to invest huge cost for opening, and operating bank branches, as agent banking being cost- effective, substitute to traditional banking for the rural & unbanked population. Transactions in agent banking takes place as its takes place in any bank branch, so it is comfortable

and secure mode of banking. Agent banking can be one of the solutions to overcome challenges such as delivering services swiftly and covering distances quickly [19]. Payment banks were majorly implemented on the digital platform to promote 'Digital India' movement in rural areas but to connect rural and uneducated poor, they preferred agent banking over mobile and internet banking. Thus, through payment banks model, Government of India (GoI) is trying to provide financial services through internet banking, mobile banking and agent banking and connect unbanked and rural population to banking services [30]

Theoretical base for this study has been borrowed from mobile and internet banking as payment been newly born and payment banks are much based on mobile and internet base. Various researches have contributed various models and theories in information technology and information systems IT/IS i.e. Innovation Diffusion Theory [29], technology acceptance model (TAM) [13], theory of planned behaviour [5] and Unified Theory of Acceptance and Use of Technology (UTAUT) [35].

Hypothesis Formulation

On the basis of the theories and models discussed above following hypothesis has been framed for this study.

Social Influence. Social influence is "the extent to which an individual perceives that important others believe he or she should apply the new system" [35]. Social influence is defined as "the influence of people important to the user on the adoption behaviour" [37]. User intention got influenced profoundly by various social factors such as values and preference of society including family, friends and peers and other users [6,7]. User generally switch to technologies which are socially recognized from socially unrecognized technologies [8]. Social influence has been a successful predictor of behavioural intension in UTAUT and UTAUT2 model whereas in the extension of TAM, social influence, subjective norms and social image has positive effect on perceived ease of use and usefulness.

H1: Social influence will positively influence adoption of payment banking services.

Facilitating Conditions: Facilitating conditions are defined as "the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system" [35]. Customers feel motivated to adopt technology, if they haveresources, support service and compatibility to other technologies which are already in use. As an extension of UTAUT model, it was found that user adoption and usage of an information technology are influenced mainly by facilitating conditions. Impact of facilitating conditions on the adoption of technology has been supported by different online banking studies. [37].

H2: Facilitating conditions will positively influence adoption of payment banking services.

User Interface: It was found that adoption of mobile banking gets influenced by perceived user interface [25]. Many internet-based services do not have user-friendly interface, it results into negative attitude to adopt and negative intention to use mobile and internet banking service [22]. While development of user-friendly interface for common people to use the internet-based products and services increased rigidness to adopt new technological services and products by users [12]. Designers of the technological services do not give proper consideration to the need of users which results to various obstacles in using and adopting of technology, to overcome this challenge users switch to other

technology or alternative banks' easy to operate interface. It was found that user find themselves connected to a service if they are appropriate and easy to use [8]. User interface has the predictor of adoption of any technology [3].
H3: User interface will positively influence adoption of payment banking services
Trust: During initial adoption phase, Trust plays crucial role towards intention of adopting a new innovation [25]. The required trust at initial level to adopt any new technology and service referred to as initial trust [38], this trust is crucial to lead the user to adoption of online banking service [15] and presence of initial trust later get developed to as continuous trust.
Privacy of detailed statements and encryption of collected information leads to development of trust among the users [7, 32]. Result obtained using various models that trust work as a significant driving force to drive the intention of user to adopt online banking [17]. User prefers the personalised services which have security as well as confidentiality of data shared due to focus on a trust-based relation with the services provider [34]. Trust leads to user's behavioural intention to adopt the service. [32]
H4: Trust will positively influence adoption of payment banking services.
Perceived Usability has been extracted from classical theory i.e. theory of planned behaviour. Usability is defined as " It is a measure of the ease with which a system can be learned or used, its safety, effectiveness and efficiency, and the attitude of its users towards it" [28]. Usability includes both perception and attitude of the customer. Usability includes both perceived ease of use and relative advantage to use that system.
H5: Usability positively will positively and significantly influence adoption of payment banks services.
Banking Charges: Charges paid for services plays a crucial role that determines the user intention to use the technological products [21]. Rewards in the form of Discounts also leads to level of usage of the service [21,8]. Intention to use of technological service depends on that benefits derived from such technological service should be greater than cost associated with that technological service.
Services though internet-based medium results low cost [12]. Apart from this, technical adoption is cost to banking institution, so to plough in cost, retain and sustain customers, online banking must be practiced thoroughly to recover invested cost in technology [21]
H6: Banking charges will positively influence adoption of payment banking services.

Research Model:

Constructs of model were adopted from the UTAUT & TAM model, and constructs selected explains the intension of customers to adopt payment banking. Social influence and facilitating conditions were taken from UTAUT model whereas, usability and user interface were from TAM model. In prior literature of Mobile banking, trust has been found as crucial factor determining user's intension and perception to adopt any technology. In the research model it is assumed that all the variables social influence, facilitating conditions, usability, trust, banking charges and user interface are identified as the predictor of the adoption of payment banking.

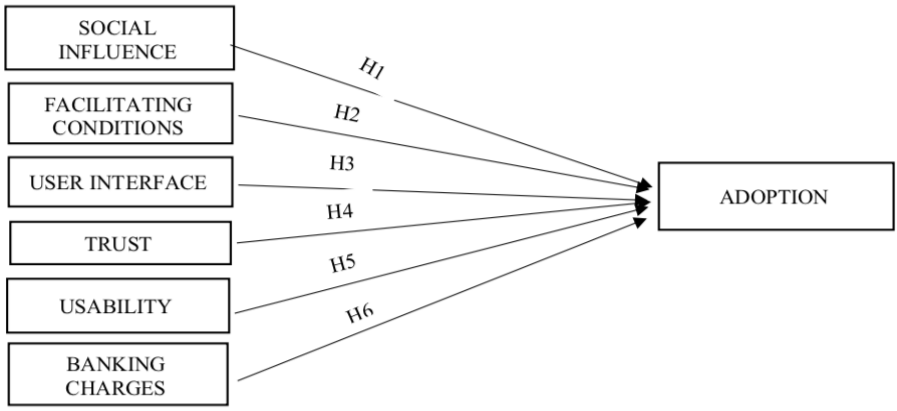

***Figure 1**: Proposed Conceptual Model*

RESEARCH DESIGN

The items of various constructs to measure payment banking customers perception used in this study has been adopted from previous studies of [35,36,16]. Items were measured using five-point Likert scale where '1' for strongly disagree, '3' for neutral point and '5' for strongly agree. Respondents of the questionnaire were mostly from Allahabad, Auraiya, Kanpur, Delhi-NCR, Pune regions. Questionnaire was divided into two sections, part one includes demographic questions and part two consist of items (questions based on constructs)

Respondents of the questionnaire were current customers of payment banks i.e. Graduate & Post graduate students and corporate & government personnel's from India. As these respondents have easy access to internet and have basic computer skills required for conducting online banking. Out of total of 209 responses received, 11responses were removed because of incompleteness, and thus leaving 198 valid and complete responses. Before hypothesis testing, confirmatory factor analysis (CFA) was employed to verify the model fit and reliability of measures. Regression analysis was used to generalise the model.

RESULTS

Respondents Profile and Characteristics:

One hundred and ninety eight valid questionnaire of payment banking were completed by current payment banking customers 69.9% of the respondents were male whereas 30.1% of the respondents were female. Relating to the respondents age, it was noticed that the age group of 21-30 captured the largest part of the total valid sample (75.3%) with reference to the annual income level, whereas the majority of respondents have annual income less than 3,00,000, followed by income group of 5,00,000-10,00,000 with 35.36%, 29.30% respectively.

Normality:

Using SPSS 23.0, Normality of the univariate distribution was estimated using skewness and kurtosis approach, statistical values of skewness and kurtosis were found and tested, they were within their respective levels. All values of skewness were recognized to be below their cut off point of '3' as well as all the values of kurtosis were found to be not more than "8" [20].

Confirmatory Factor Analysis (CFA):

Table 1: Model Fitness

FIT INDEX	CMIN/DF	GFI	AGFI	TLI	CFI	RMSEA
CUT-OFF POINT	≤ 2.00	≥ 0.90	≥ 0.80	≥ 0.90	≥ 0.90	≤0.08
Measurement values	1.431	.858	.827	.951	.957	.047

The x2 (CMIN) divided by the degrees of freedom (DF) leads to the computation of the relative x2 (CMIN/DF), which has a value of 1.431, and indicates a good fit (as >2.00) represents an inadequate fit [11]. Other indicators of model fit are the Goodness of Fit Index (GFI) minimum value should be >0.90, and goodness of fit adjusted for degrees of freedom (AGFI) minimum cut off point is >0.80 [18], as mentioned in Table: 1 GFI value is below the level of 0.90 but as per [18] GFI value more than 0.850 is considered as appropriate fit. The calculated GFI is 0.858 and the AGFI is 0.827. Both are seen as moderate but this might be an effect of the sample size. And as per [18] GFI value above 0.850 is said be moderate fit.

The Comparative Fit Index (CFI) [18] calculated is 0.957, which indicates acceptable fit. The Root Mean Square Error of Approximation (RMSEA) that measures the difference between the fitted model and the covariance matrix in the population is calculated as 0.047 which indicates a close fit of the model.

Table 2: Construct Reliability*:*

Latent Construct	Cronbach's alpha	Composite Reliability (CR)	AverageVariance Extracted (AVE)
SI	.889	.898	.686
FC	.844	.889	.616
UI	.852	.850	.587
TR	.859	.853	.593
BC	.898	.811	.517
US	.810	.859	.551
AD	.808	.812	.590

All constructs are tested to ensure an adequate level of scales reliability using Cronbach's alpha, composite reliability (CR) and average variance extracted (AVE). All Cronbach's alpha value are above the cut-off point of 0.70 ranging between .810 for usability and .898 for banking charges [18]. For composite reliability all constructs are above the minimum cut off level of 0.70, while the highest value is for social intension i.e. 0.898, whereas for AVE average value range between .517 (banking charges) to .686 (social influence), which all are above the cut- off value of 0.50 as recommended by [18].

Testing of Hypothesis with Linear Regression Analysis:

Theoretical frame work implies testable predictions about various factors involved in adoption of payment banking, the predictions are being hypothesised, and for their testing linear regression method is used.

Model Summary: Table 3 shows the value for R square as .628 which means that model explains 62.8% variance in the model. The adjusted R square value for model is .616 which indicates that the model explains 61.6% of the variance in the dependent variable. The value of R Square should be close to Adjusted

R square indicating the fitness of the model. it is found that the value of F is 53.744 and is significant (p<0.05). Since the value of F is much greater than 1, it may be concluded that such high value cannot happen by chance alone. It can be inferred that Usability, User Interface, Social Influence, Trust significantly affect adoption

Table 3: Model Summary

Model	R	R Square	AdjustedR Square	Std. Error of the Estimate	F	Sig.
1	.792	.628	**.616**	.49614	53.744	.000[b]

The beta value as indicated for model shows individual contribution of each predictor to the model the absolute values of beta are obtained for (.246) for social influence, (.202) for User Interface, (.169) for Facilitating Conditions and (.166) for Trust. The corresponding t-values for all the predictors are significant at (p<.05) as per the recommendations of [18]

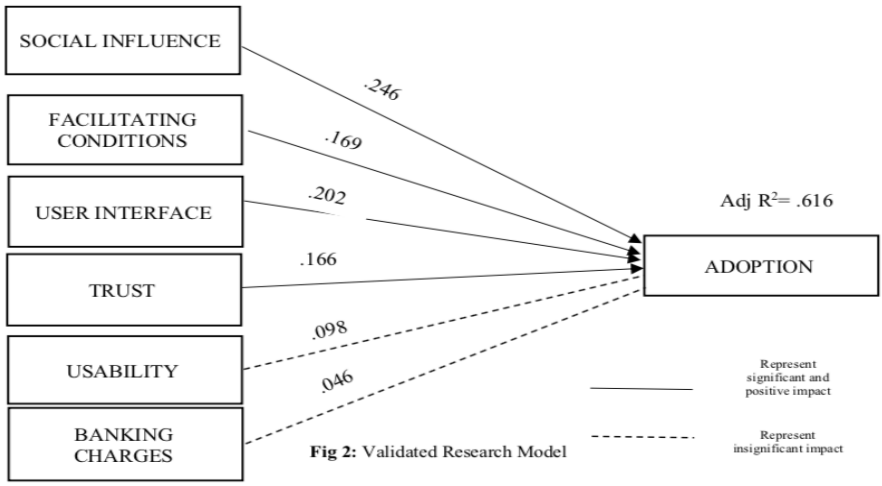

Fig 2: Validated Research Model

Table 4: Coefficients

Model	Unstandardized Coefficients		standardized Coefficients	t	Sig.
	Beta	Std. Error	Beta		
(Constant)	.381	.202		1.889	.060
SI	.246	.068	.246	3.647	.000
FC	.166	.075	.169	2.209	.028
UI	.199	.084	.202	2.375	.019
TR	.174	.075	.166	2.312	.022
BC	.042	.054	.046	.780	.436
US	.104	.086	.098	1.214	.226

Findings indicate that the customers of payment banking are influenced by major four factors. These are the factors which lead customers to the adopt payment banks. The user interface, facilitating conditions, trust and social

influence have direct impact on the customers, which influence them to adopt payment banking. As the inferences drawn from the literature supported that the banking charges and usability have impact on adoption of technology, analysis shows that these factors are the aspects of technology adoption, but not considered influencing in case of payment banking.

DISCUSSION

According to the statistical survey results key constructs that determine adoption of payment banks are social influence, facilitating conditions, user interface and trust, since their coefficients are significantly positive at 5% ($p < 0.05$) as mentioned in Table 4.Out of seven factors that has been considered for the two of them are found to have positive influence but they are not found to have significant impact on adoption of payment banks. Social influence is found to be the major predictor of payment banks in the current study. As the literature also supports that social influence is found to have impact on adoption of technology [35,37], as customers get influenced from their family members, friends and their peers to use payment banks services [6]. People those who are already connected to mobile banking and people who has newly joined payment banks recommend others to use it.

As statistical results support facilitating conditions are found to have significant and positive impact on adoption of any technology [37]. This represents that respondents believe that they have all resources that are required to use payment banks. In web interaction, user interface is first point contact between bank and client, while performing any financial transaction. Therefore, user interface is found to have positive and significant impact on adoption in the current study [25]. As payment banks are designed for the benefit of rural or unbanked people, they tend to be less educated and interactive with the ongoing web technologies, so user interface should be as such they find it convenient to use that technology [22].

In path coefficient analysis, trust is found to have significant impact on adoption to use payment bank services [12]. Trust has been considered as the main component in online banking context due to high risk associated with financial transaction [7,32]. If people will not trust payment banks services, there will be no use of this technology and further will not lead to adoption of payment banking. As in the current study banking charges and usability are found to be insignificant, because customers do not consider banking charges as the driving force to adopt this technology. Customers compare the utility derived with the cost paid to use of that technology, so customers find payment banks' charges as minimum as possible because Government of India (GoI) implemented payment banks with the motive of financial inclusion not with the motive of profit earning. And by using this particular technology rural and uneducated customer could have been facing difficulty in operating payment bank services through mobile platforms.

THEORATIAL IMPLICATIONS

Having studied the scenario of digital banking and various factors that predict customer intension to adopt payment banks, thus current study contributessubstantially to the existing knowledge of online payment channels and technology acceptance in general. This study provide direction by examining payment banking and its acceptance among Indian youth as they are not properly explored as being new to Indian economy.

As being inferred from prior studies customers perception towards technology

adoption can accurately be explained both by UTAUT and TAM model. Existing variables of the study are extracted from these model and banking charges which is added to the study has been found insignificant. But the model in whole explains 61.6 per cent of the intension to adopt payment banks services.

IMPLICATIONS FOR PRACTICE

The statistical results support the crucial role of the following factors: social influence, facilitating conditions, user interface and Trust whereas in Indian context banking charges and usability were not found influencing in case of payment banks. Hence various aspects relating to this study should be focus of attention of currently functioning payment banks to motivate customers to use their services at a wider scale. From previous studies it has been concluded that in the early phase of banking people used to prefer bricks and mortar banks, but later customer gave preference to internet and mobile banking due to ease of place and time. Service providers should provide facilities with support centres which function 24*7, so that new customers and existing customers can improve their skills to use payment banks as mode of banking. Payment banks have to keep their interface interactive, so that people with less compatible in using new technology, can find it easy reliable and interesting. If necessary, then service providers should also provide basic training through online or offline sources to people those who are not much compatible to use mobile phones or their applications.

Payment banks being new concept, was initiated in India as the motive of financial inclusion. The results of the study indicate payment bank serviceadoption is influenced by trust, therefore, service providers of payment banks have to be sure that they proceed financial transaction efficiently, securely and within optimum time. Payment banks can also utilize social media for creating and increasing their customer base in more influencing and cost-effective manner. As social media now a days is very active in influencing and shaping minds of customers to use any technology. As this study also indicate that people perception to use payment banks are not affected by banking charges as there is not much difference in charges levied by normal banks providing online banking and payment banks. So, payment banks if reduce the transaction cost or provide special price discounts to use this technology then more customers might be attracted to switch over payment banks for their day-to-day transactions.

CONCLUSION

In order to improve banking penetration, RBI and Government of India (GoI) gave license to 11 entities to start payment banks. Riding on technology, these banks are expected to make banking more convenient for the customers. Government started this initiative to facilitate migrant workers, and various lower income household. With the motive payment bank implementation government wanted every household of India to be connected with the formal financial system, so that technology transaction can easily be tracked and can don't contribute to black money.

Being embryonic, there are few studies which have been conducted on payment banks. This study is conducted to know the adoption of payment banks, which will further help service providers to adopt the required changes for the growth of currently operating payment banks. This study is based on various factors that lead to technology adoption were considered, from TAM model user interface and usability, whereas from UTAUT model social influence and facilitating conditions were considered and from previous study

trust and banking charges have positive effect on technology adoption. On the basis of statistical results, it was found that social influence, facilitating conditions, user interface and trust are the key determinant factors for adoption of payment banks. Whereasusability and banking charges were not found significant with adoption of payment banks. Through statistical approaches, validity of the conceptual model by about 61.6% of variance in the customers' intention to adopt payment banking.

As the data of the study was obtained using convenience sampling, only 5 cities were considered for data collection, which can negatively affect the generalizability of results across other cities of India. For the data of the study was obtained using convenience sampling, only 5 cities were considered for data collection, which can negatively affect the generalizability of results across other cities of India. As payment banks being recently introduced, so various other constructs, which affects customers behavioral intension to use any technology i.e. performance expectancy, hedonic motivation, effort expectancy can also be measured.

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Ms. Somya Gupta, *Research Scholar, Motilal Nehru National Institute of Technology Allahabad, somya@mnnit.ac.in*

Prof. G.P. Sahu, *Professor**,** Motilal Nehru National Institute of Technology Allahabad, gsahu@mnnit.ac.in*

Goods and Service Tax (GST) – A new eGovernance initiative in India

Vikas and Somya Gupta

INTRODUCTION

Goods and Services Tax being tax of indirect nature bears a crucial importance in the revenue generation for the nation. Though Indirect Taxes in India has undergone various reforms since its initial introduction, but introduction of GST (Goods and Services Tax) was a major step of the government in the journey of reform of indirect taxation.As with the implementation of GST, India took a quantum leap towards the goal of establishing 'One Nation, One Market, One Tax' by subsuming various indirect taxes in a unified one and become a stepping-stone for 'One Nation, One Tax.

The introduction of technology-based tax regime and an online single service portal for the taxpayers was never a cakewalk especially in a country as diverse as India. Indirect Taxpayers in India was having no uniformity as entity in scales of business activities and information technology maturity. The challenge was to design and develop a technological infrastructure that can cater to the last common denominator.

In the pre-GST era, there were numerous taxation structuresprevailing across various states, which further created unhealthy competition on central level, further leading to cascading effect of taxes. Ideal taxation system should not be hampered with such issue as they hold the overall growth. Multiple taxation system also increasecompliance cost to the business environment.

This article discusses the measures taken by the Government of India for the indirect taxation system reforms together with the challenges faced in its implementation. This study also mentions, how e-governance is helping in implementation of various measures for convenience of taxpayers, minimisation of human interaction and ease of compliancesfor overall economy development.

The way in which the implementation of GST law has been envisioned is very much dependent on the technology. All the key phases commencing from registration till filing of the return, generation of e-waybill, filing of the refund claim, etc. and cumulatively all these aspects on the PAN India basis are totally dependent on the technology. Goods and service Tax Network (GSTN) is IT Backbone of GST implementation in India, which was entrusted with the responsibilities of development and maintenance of IT infrastructure and hence handle the entire tasks of GST on the common portal. It is also a gateway for more than 1 crore taxpayers. All the taxpayers need to file their GST return periodically at a single platform i.e. www.gst.gov.in.

The most recent measure taken by the government in October 2020, in the indirect taxation system is a milestone in the journey of transparency and ease of doing business as it insists on generation of E-Invoice for all B2B transaction. This policy is applicable to those, whose turnover was more than 500 crores in any of three preceding financial years and extending it to the taxpayers having turnover more than 100 crores. This system is a path-breaking initiative taken by the Government which will lead to revolutionize the manner business interact with each other.

Generation of E-Invoice was not mean that invoices should be generated from governments portal, but it implies that the reporting of details of the specified

GST documents must be made to government portal i.e., 'Invoice Registration Portal (IRP)' and obtains a reference number regarding each document for which the reporting was made which is available with the use of APIs.

E-Invoice has various advantages for business such as inter-operability, standardisation, reduction in disputes, auto-population of invoice details into GST-returns and other forms such as e-way bill; and improving overall efficiency of business. It also has benefits for the indirect tax department as the reporting of the invoices are done as it being generated so, destroy and manipulatingand changing and intentionally misstatement can be minimised.

IMPLEMENTATION AND EFFECTS OF GST

Sub summation of different tax at various level

The implementation of one nation one tax system as well as single service / interaction portal for the business and departmental officials.

The indirect taxation system in India before the introduction of GST was divided into various taxation system and laws in which both state and central government levied and collected taxes on goods and services separately according to respective Acts and rules. This was leading to cascading effect, complex and multiple compliances procedure also leading to high legal and compliance charges.

Under GST regime most of the indirect taxes got subsumed under on tax named GST which was having a dual model under which both state and central government shares the revenue generated according to the Acts. For implementation of GST, The Constitution of India was got amended and powers to levied and collect taxes are so harmonised that a single indirect tax can be imposed to the whole territory of India which is beneficial for both the taxpayers and the government officials and increasing ease of doing business as well as ease of administration of taxation system.

Seamless flow of Input Tax Credit and low price of products/services:

Input Tax Credit is seamlessly available to retailer and to the suppliers of services and or manufacturer of products. Thus, leading to reduction in the overall tax burden and hence leading to bring down final price of goods and services. This enhances the make in India initiative by boosting the domestic production and hence resulting in the overall growth of the economy.

Higher threshold for registration and composition scheme:

In pre-GST era, in case of sales of goods the limit of registration was five lakhs (under most states), it varies from state to states; and for service tax was ten lakhs. Alter the introduction of GST this threshold was raised to twenty lakhs in case of services and forty lakhs in case of goods for most of the states. It leads to the benefits to the small-scale business by keeping them aside from the purview of Goods and Services Tax Act and gave the opportunity of composition scheme to small scale taxpayers which give the benefits of less legal compliances procedure of indirect taxation.

Enhancing economy growth with zero rated exports:

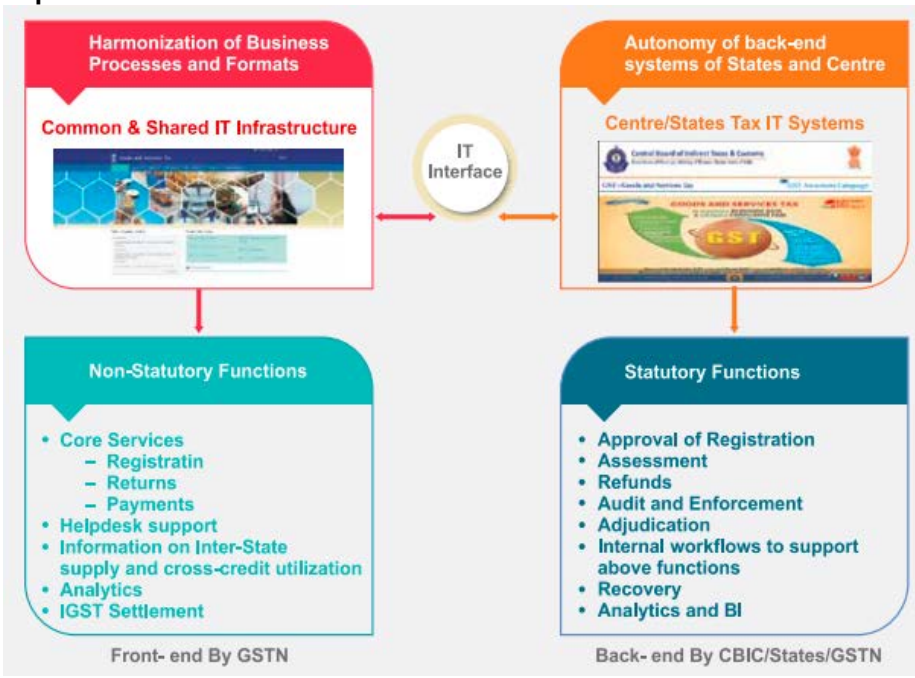
With the elimination of cascading effect of Indirect Taxes with the implementation of GST in India. The exports of goods became truly zero-rated. With the truly zero-rated taxable goods, the domestic goods will become more economically competitive in the international markets and this will lead to exports of the domestic goods and which in turn the overall growth in the foreign currency reserve and enhanced economic growth of the country.

Elimination of physical submission of documents to the department of government:

With the introduction of GST, the submission of records in the physical or paper form was put out of the system. In GST-regime, no physical paper submission is being allowed, all the compliances starting from registration to filling of returns and notice and their compliances are through the common GST portal as developed and maintained by GSTN even the acknowledgement is not allowed to be submitted on paper as being done under income tax returns.

INFORMATION TECHNOLOGY (IT) IN GST

Development of Information Technology Infrastructure for GST implementation



GST being a historical indirect tax reform subsumed large number of central and state indirect taxes, so a need of a common interface or portal to the taxpayers for all the compliances arose in place of different 36 portals on which the taxpayers had to report during the pre-reform era. Pre-GST era, used to allow both the method of manual and electronically documents, returns and application filling by the taxpayers to their concerned department. So, on the other hand, the department officials had to separate the application to work of registration/returns etc. submitted by taxpayers. Keeping this in view the government decided to develop, maintain, provide a common portal to the taxpayers and well as to tax department for smooth transfer of two-way data.

The GST system's information technology infrastructure is dived in parts one is Common & Shared it infrastructure i.e. common portal for the taxpayers for harmonization of business process, the other is centre/states tax it systems. The core of GST system is not directly connected to internet, but it is connected through Multi-layered security architecture. The GST IT infrastructure system is not tightly coupled, the exchange of data takes place using APIs.

Common GST Portal for the nation

In GST reform the government developed a common portal for all indirect taxpayers of nation, with the introduction of the common GST portal the

government eliminated the need of even a single physical paper to be submitted to GST officials, it is a faceless convenient and completely online portal that caters all the need of taxpayers and stakeholders of GST.

GST self-service portal was designed in such manner which is simple and can be assessed by using any devices irrespective of operating system platform used by it and can be easily operated by the users of various information technology understanding levels. The GST Portal interface is playing a crucial role in empowering entrepreneurs and businesses by increasing Convenience of taxpayer by easing returns filling, tax paying procedures, minimisation of human interface and other compliances and improving ease of doing business in India.

Beside the G2B portal i.e., GST Portal (www.gst.gov.in); of GST system for taxpayers, there are also an option for taxpayer to choose his choice of third-party application which will also provide a user interface such as desktop, mobile and other convenient platform to interact with GST system. All these applications are developed by the third-party service provider which are given a generic name GSP i.e., GST Suvidha Provider. Such developed application by GSP will connect to GST System via secured GST System APIs.

Distribution of Free of Cost Accounting Software package

India being a country of diversity where the indirect taxpayers holds different scale of business transaction and different level of information technological maturity. To cater the need of such taxpayers who falls the threshold limit of annual turnover of less than 1.5 crores are being made eligible for free accounting and billing software with GST return filling feature by the Government by way of Empanelling software companies and accounting software products which runs on either on-premises model or cloud model or both. As per gst.gov.in various accounting and Billing software that are listed on the website are:

- uBooks (Adaequare Info Pvt Ltd.)
- Cygnet Face (Cygnet Infotech Private Limited)
- FocusLyte (Focus Softnet Pvt Ltd)
- Vyapari (IRIS Business Services Limited)
- Marg GST pro (MARG ERP LTD)
- Saaral Accounts (RelyonSofttech Limited)
- GenieBooks (Seshaasai Business Forms Private Limited)
- Zoho Books (Zoho Corporation Private Limited)

GST Helpline

Government has setup 24*7 GST helpline, to which taxpayers or tax-practitioners can reach either by a telecall or via email, which provide support regarding GST portal and guide the way to perform various tasks on it from initial registration to downloading of certificate to filling returns, responding to notices, and downloading acknowledgement etc. The presence of GST helpline is a measure taken by the government to fill in the gap between the various level of information technology knowledge of the stakeholders of GST.

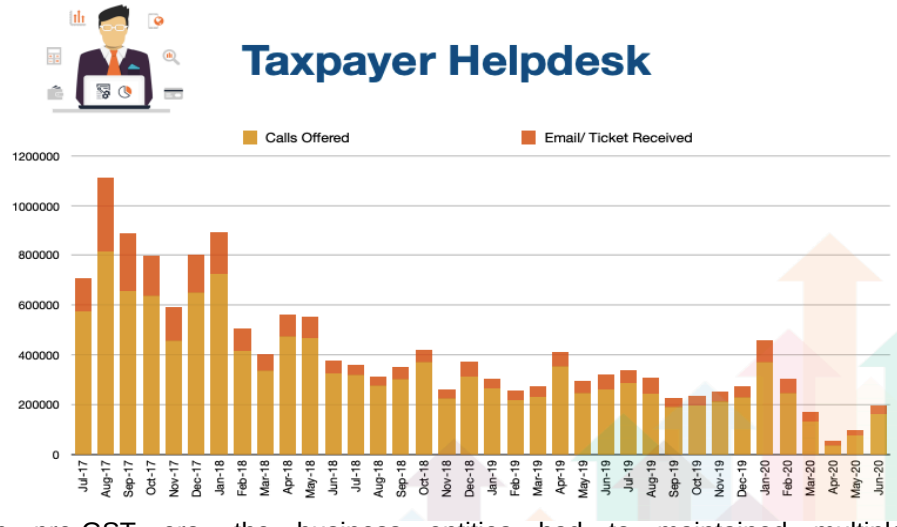
YouTube Channel: GSTN has YouTube channel to guide their customers as well as to empower their employees. Total 432 short introductory videos, webinars etc are floating on their dedicated YouTube channel. Channel has around 117K active subscribers. Most of the informative videos are in Hindi and English whereas 200 webinars are in other cultural language for customer ease.

GITA(GST interactive Technical Assistant(Chatbot): GSTN launched its 24*7 chatbot GITA on 26th June,2020, which is based on Artificial Intelligence and loaded with pre-drafted responses to the queries asked by taxpayers on common topics e.g.: registration, refunds and returns, Payment etc.

Grievance Redressal Portal: to file grievances on GST they have maintained a Grievance portal as well which is supportive on Mobile interface as well. tax payers has to raise tickets for their problems and they can check the status of their tickets. Where this grievance portal is very user-friendly and responsive.

Tele Calling/ Email- whereas for taxpayers those who are not technology friendly can take help on Regular Calling and email.

Improved efficiency of logistic system:



In pre-GST era, the business entities had to maintained multiple warehouses/stores across multiple states so that it would not attract the CST (Central Sales Tax) and state entry taxes on interstate movement of goods. The warehouses/stores were normally operated below their capacity hence leading to increased operating cost.

With introduction of GST, these restrictions on interstate movement of goods have been lessened and hence leading to increasing profits and efficiency of logistics companies as their unnecessary logistics costs have been reduced.

TECHNOLOGIES FURTHER TO PLAY ROLE

*Artificial Intelligence :*Artificial Intelligence can be helpful in data analysis with the data from the income tax department, exports and imports and e-invoices and GST returns to evaluating where the tax has not been paid and can curb tax evasion. Use of machine learning and artificial intelligence against tax evasion and fraud is already a popular norm among European countries, including Norway, Denmark, France. India is keen on joining the Artificial Intelligence movement, and as it does enter in the Artificial Intelligence technology to trace and eliminate tax-evasion, the Indian economy should hopefully see a drop in tax frauds and evasions in the coming future.

Artificial Intelligence tools will be helpful in automation of implantation of checks on input tax credits (ITC), refunds and auto-population of transaction details to the other party of the transactions. AI will also lead to early detection of invoice fraud and ITC frauds. AI tools will also lead to increase the credibility of data and will be helpful in the improvement of GST collection.

Blockchain: Blockchain technology can record transaction in the real time in immutable, tamper free manner and can provide up to date information promptly. Blockchain technology can be useful in the immediate tracing of the origin of transaction of goods and services as recorded Realtime.

As databases of GST for each state are separately maintained. Goa being a Model -1 state, those have developed their own backend system for GST; have incorporated the blockchain technology in their backend database system of GST for making the GST records immutable, temper free as data can be appended-only no prior data can be deleted even by database administrator.

As the Blockchain technology implemented in the GST backend database records of Goa tend to increase the durability, reliability, better ability to withstand malicious attacks, it became the domain which can be implemented in the GST on PAN India wide. All the transaction of business, if recorded in Realtime in a blockchain which cannot be altered or manipulated, so it will lead to increase in the transparency, interchangeability, inter-operability, standardisation and reduction in disputes, auto-population as well as most in the credibility of data stored.

Technological challenges

India being an economy of a billion plus and sixth largest economy of the world, creating a new indirect system, which is one the world's most complex and largest indirect tax system; from scratch was a challenge as at the time of development of information technology infrastructure the Law, Rules and Forms were also a work in progress. It was required to develop application and process for smooth transition of old taxpayers from 36 Sates/UTs and CBIC from Service Tax or VAT regime to new GST system through an online process which allowing need of even single physical document.

GST mechanism requires collection of granular level business data i.e. invoice data; and providing features such as auto-population and auto reconciliation. The infrastructure was needed to able of storing, scaling and processing of large amount of data and sharing on near real time basis with various tax authorities and banks.

GSTN (Goods and Services Tax Network) is been entrusted with the responsibility of development and maintenance of Information technology infrastructure and common GST portal. GSTN, a not-for profit company registered under the companies Act; was originally a company incorporated on March 28, 2018 under PPP model in which 49% share was held by government (24.5% by central government and 24.5% with all states put together) and 51% shareholding with private financial institutions where no one can have more than 11% shareholding. The GST council in its 27th meeting held on 4th May 2018 decided to make GSTN a 100% Govt. owned company, but this process has not been completed yet.

Common authentication mechanism for e-portal:

Due to the diversity in entity's legal nature and scale of information technology maturity among the indirect taxpayers in India. It was a challenge for the GSTN to develop a common authentication factor using which the forms can be authenticated on single online portal. The challenge was been overcame by adopting Compulsory authentication of all forms filed on GST portal either by Digital Signature Certificate or through Electronic Verification Code (EVC) based on OTP sent to registered mobile number of the taxpayer.

CONCLUSION

Changes are never easy so is with technologically motivated indirect tax reform

in India with introduction of GST and continuously improving and enhancing its process and effectiveness. GST being a milestone in the journey of e-governance which is achieved after overcoming of various hurdles in the path of developing, implementing, maintaining. GST together with delivering the benefits of convenience to taxpayers, minimisation of human interaction and ease of compliance as well as overall ease of doing business in India, it is also signifying that single online service portal of GST being a unified platform for the nation denotes the integrity in the diversity. Faceless system of GST is leading to reduction in corruption and biasedness in decisions, no physical paper allowed policy of GST is a step future towards 'Green India Clean India" movement and digitalisation.

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Mr. Vikas, *Student, Institute of Chartered Accountants of India (ICAI), vikas.tiwari13@gmail.com*

Ms. Somya Gupta, *Research Scholar, Motilal Nehru National Institute of Technology Allahabad, somya@mnnit.ac.in*

A Digital Transformation in Teaching and Learning (T&L) Platform: A COVID-19 Perspective

Charu Awasthi, Pragati Singh and Naveen Kumar Singh

Abstract
During the pandemic situation by the severe spread of COVID-19, it is important to know that all the study resources are still available for each student. Lucky for us, more institutions are quickly moving these study resources online, including hosting more online classes. As most of the countries go on Lockdown, in-person classes are being cancelled to avoid the spread of COVID-19, and students are required to stay home and move towards digital learning platforms available for online learning. Online Teaching and Learning (OTL) platforms are a great resource for learning new career skills from the comfort of your own home and pretty much anywhere in the world. All you need is your laptop or phone with internet connectivity, and you are ready to learn. Our paper covers all-immersive electronic learning models (Web-enabled, and based on software) in which the content is, however, a fact represented using multimedia and hypermedia for its advantages and disadvantages.
Keywords: *COVID-19, digital transformation, web-enabled interactive models, e-learning, online teaching and learning tools, virtual classroom*

INTRODUCTION

Director-General World Health Organisation (WHO), on 30th January 2020, stated, "As per the advice of International Health Regulations (IHR) Emergency Committee the outbreak of novel coronavirus (2019-nCoV) lead to a Public Health Emergency of International Concern (PHEIC)". Nine thousand seven hundred twenty confirmed cases and 213 deaths have been reported in China on 31st January 2020. The epicentre of the outbreak was initially in Wuhan City, Hubei province, but was rapidly extended not only to China country but also outside China in 19 countries with a total of 106 confirmed cases. They were found most with the travel history of China.On 30th January 2020, India has confirmed its first case in Kerala. After that, most of the steps taken by Central as well as State governments to control the virus. 22nd March 2020, Hon'ble PM of India Mr. Narendra Modi called for "Janta Curfew." That time India having 360 cases confirmed in a total of 23 states with seven death. All the commercial activity has been abandoned till 31st March 2020 except essential services such as hospitals, telecom, pharmacy, provision stores by exercising the powers under section 6(2)(i) of the Disaster Management Act, 2005, issued an order for State/UTs prescribing Lockdown (restrictive access due to security measures) for restricting COVID-19 epidemic in the country 21 days with from 25th March 2020 which is also known as Lockdown 1.0. Due to this pandemic and Lockdown, all the activity, including education services, has been closed in Lockdown 1.0. With the increasing cases, Lockdown was extended till 31st May 2020 in different phases like Lockdown 2, Lockdown 3, and Lockdown 4.The education sector has also shut down temporarily. But COVID 19 has presented challenges and opportunities both (Usak, 2020; Yan, 2020).The major challenges are:

- Students can not have access to the school and their teachers because of their own alienation and social gap patterns for instructional consultation.
- Government to find innovative alternatives for continuing the education of students away from schools and colleges.

The opportunity provided by COVID19 is:

Research has indicated that COVID-19 could be a gateway to digital learning that would include the use of the OTL platform in India (Mulenga & Marban, 2020).

E-learning (Toquero, 2020) has emerged as an innovative option in the current COVID-19 era and beyond due to the increase in the need for learning models for institutions like schools, colleges (Bao, 2020; Basilaia, 2020; Naciri et al., 2020). Thus, the introduction of the E-learning and smart revision portal will lead to opportunities for the use of mobile devices like smartphones and tablets in accessing lessons. The central, as well as the state-level government, have encouraged and provided support for online education. Various schools and colleges in the country are now providing online classes to help and support students to continue their educations from the comfort and ease of their homes. Online learning is an umbrella term under which various online classes, webinars, virtual programs which are further expended to web meeting (Sun & Chen, 2016).The meaning of e-learning is to facilitate the usage of the network for providing proper interaction, facilitation, and delivery. The various mediums of e-learning are as follows:

- Distributed learning: It means usage of various multimedia methodology for teaching purpose
- Distance learning: It means teaching is conducted by correspondence without the need for school and college.

The term CBT in e-learning stands for Computer-Based Training, which is provided over the computer. It is:

- Computer-based: It means teaching is conducted over an online medium such as laptops, smartphones, etc.
- Synchronous /Asynchronous: Communication between presenters and students can be a single way or duplex.
- Instructor-based: The teaching methodology is totally dependent on the choice of instructor.

Webinar

"Interactions made possible by the Internet have caused us to re-examine our concept of community: It is now possible for individuals physically separated by continents and oceans to come together and 'sit around the electronic campfire' to discuss topics that bind them together as a community" (Tavani, 2004, p. 286). The term webinar originates from the word "web-seminar." Web-seminar stands for the conference, meeting, or training done utilizing the Internet. The main idea behind this is to connect the people who are geographically remote from each by just clicking a link which is provided by the person who has scheduled the meeting and joins an online venue to connect like a classroom (Cook, 2019).Webinar provider facilitated recording, sound, and image connectivity. The presenter during webinar used any software provided in the market, which is user friendly and effective. This software has various interactive options, like Question & Answer section, polls, and chat room (discussion forum) for the participants to share their ideas and quarries. The presenter can share the required information to the participants and use the whiteboard as a writing area. The main objective of the webinar is to bring people together for:

- Information sharing, &
- Lecture, update, or discussion, on some common topics.

The majority of the organizations state that webinars are the most important part of their marketing techniques during this lockdown period. The formats for

webinar-session delivery are as follows:

- Presenter vs. Multiple participants (from one site)
- Presenter vs. Multiple participants (from multiple sites)
- Multiple participants from one site vs. multiple participants (from one or multiple sites)

Virtual Classroom

A virtual classroom is a place where people meet live to learn different things by allowing people of different locations to interact with each other and the help and engage in various learning activities. The "Virtual classroom" simulates the classroom environment (participants can communicate, see, download, and upload the Teaching Learning Material (TLM)) (Anand, 2019). The virtual classroom also includes slides for a presentation, chatbox for sharing text, web camera for view, and whiteboard for writing. Webinars and virtual classrooms are the emerging technology which uses very frequently in this pandemic period. There are various software available that is user-friendly, free/economical, with low memory capacity, and easy to learn. Some of the webinar & virtual classroom (not limited to) software are as follow:

- *VEDAMO:* A virtual classroom and learning management system for a successful online tutorial.
- *BigBlueButton:* It is a free software web conferencing system for GNU/Linux servers.
- *WebinarJam:* It is a cloud-based broadcasting technology.
- *Demio:* It provides a simple, no-download webinar platform.
- *Adobe Connect:* It is a software for
  i. Remote training
  ii. Web conferencing
  iii. Presentation and desktop sharing.
- *Zoho Meeting:* It is a secure online meeting platform and webinar solution.
- *Cisco Webex:* It is a web conferencing and videoconferencing application.
- *Zoom:* This platform provides
  i. Videotelephony and online chat services (using a cloud-based peer-to-peer software platform)
  ii. Teleconferencing, telecommuting, distance education, and social relations.
- *Google Classroom:* Google has developed a free web service known as Google classroom. It is used in schools to simplify creating, distributing, and grading assignments.
- *Google Meet and Jamboard:* The video communication service made by google is google meet. It is a replacement for Google Hangouts, and Jamboard is an interactive whiteboard developed by google.

System Design and Modelling of Virtual Classroom

The design of the system is described using data flow diagrams (DFD). The user validation module is illustrated in Fig 1, where the users are at the top in the hierarchy, and the remaining three different categories of the user (i.e., system administrator, lecturer, and student) are all the same-level process.

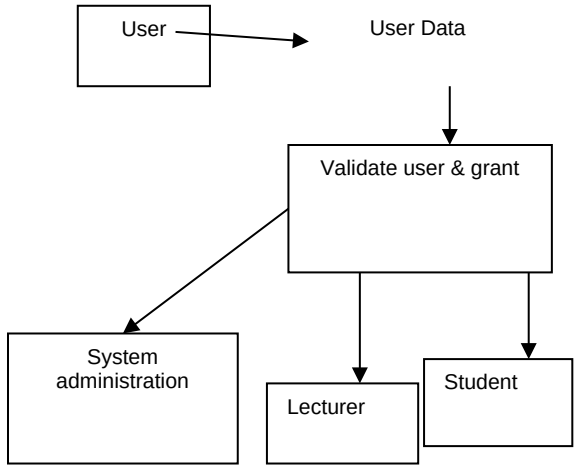

Fig1: DFD of user validation module

The DFD showing the information exchange between the lecturer and user module is illustrated in Figure 2.

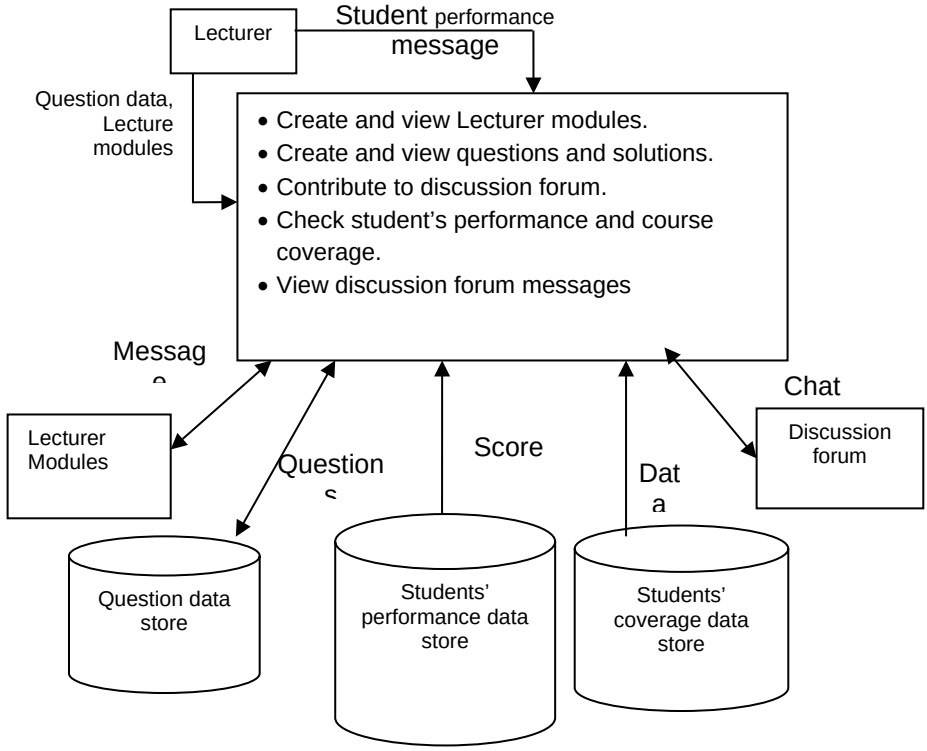

Fig 2: DFD of lecturer & user module

The DFD illustrating information exchange at the student user level is shown in Figure3. The diagram contains:

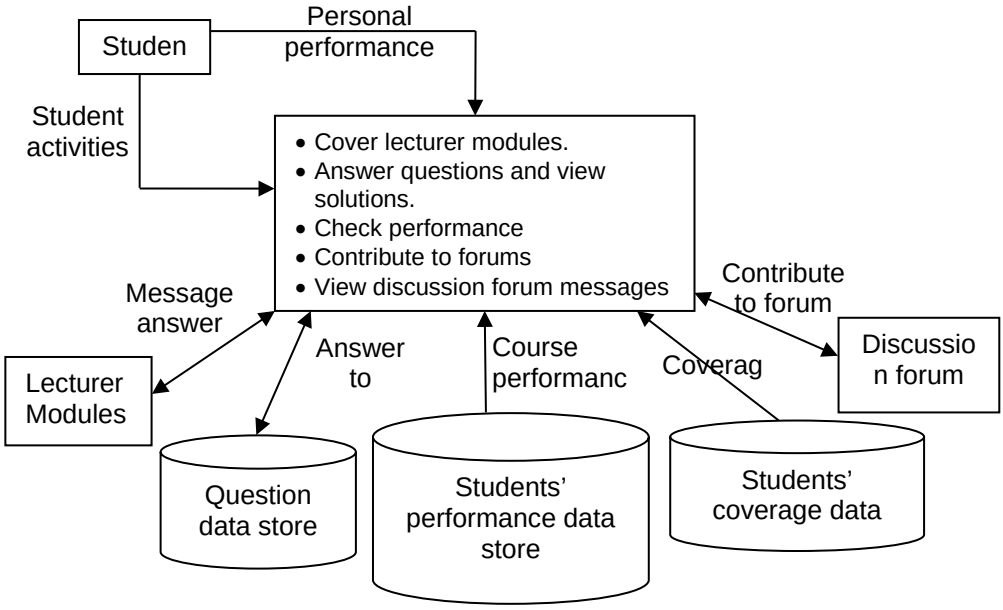

Fig3. Data flow diagram showing the Student user module

Technology that fuels apps like Google Meet, Google Handout, Facebook Messenger

The answer is "WebRTC," a Real-time communication for the web; it is a free open-source project, which is basically a collection of APIs (Application Programming Interfaces) that allows direct inter-browser communication. In simple words, you do not need a server here to communicate with the other client.The direct communication between browsers facilitates a real-time exchange of information with ultra-low latency or ultra-low delay. If we try to use servers for such information exchange, there will be a noticeable delay. Though small but they are sufficient to derail concepts like online classrooms, multiplayer gaming, video calling, voice calls, etc.WebRTC constantly sends data; it does not worry about whether the other client is receiving the entire data or not, which means that there could be some data loss too. Hence this can be used for things like video chatting where you can lose a few frames without being noticed. The issue occurs in the case of file sharing, where even a little loss of data could be troublesome (MyOwnConference, 2019).

Types of APIs

There are mainly three types of APIs which are as follow:

- Media Stream
- RTCPeerConnection
- RTCDataChannel

Media Stream

It helps in accessing the webcam and audio of the system. This is done using the getUserMedia () method of a navigator. When we call the getUserMedia () method, the permission pop up appears on the screen asking for the camera and microphone access explicitly. The method takes three parameters, out of one, which are constraints. This parameter controls the content of the media stream, i.e., media type, resolution, frame rate, etc. There are different

constraint objects for different resolutions; therefore, the resolution that appears on the screen depends on the constraint object being passes as the parameter (Bruce, 2017).

RTCPeerConnection

It is all about making a connection to the peer. The captured media stream of audio and video from getUserMedia () is sent to the other client, who receives it as a new media stream on their peer connection, which can be viewed on their video element. Both the clients get their data using the getUserMedia () method, which they further forward it to the other one with the help of this connection (Agarana, 2016).

How is this connection created?

We use abstract signalling, to set up a peer-to-peer connection, clients need to exchange session description objects. After they do so, direct communication is possible.Note that we do need servers to do this task initially. The two servers are Session Traversal Utilities for NAT (STUN), and Traversal Using Relays around NAT (TURN). Before going into detail about them, we will learn about Network address translation (NAT).

NAT: In an organization where there is an innumerable number of devices that use the Internet, it does not have a public IP address. Private IP addresses are assigned to each of them, which means they cannot access the Internet. The Internet can only be accessed by devices with public IP addresses. The router has a connection to the Internet with a public IP. The NAT in the router helps a device on the internal network to use the public IP address to access the Internet.

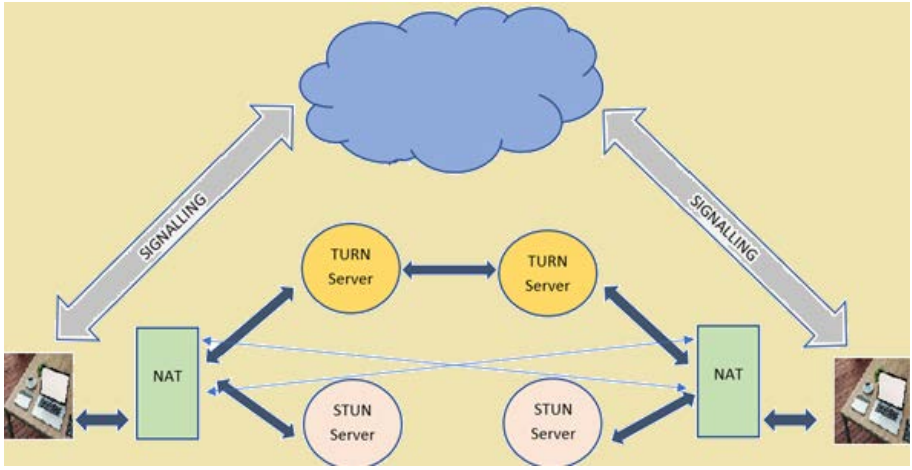

Fig 4: RTCPeerConnection working

STUN Server: Like NAT, In the case of peer-to-peer connection, the two browsers cannot communicate with each other unless they possess public IP addresses. The client can ask STUN servers their public IP addresses, and after receiving them, one of the clients conduct an attempt to set up the connection. If everything goes right, the information can be exchanged directly. A Server will not be needed anymore.

TURN Server: The addresses acquired by the STUN server may not be put into use by all the clients. In such cases of peer-to-peer communication failure, the TURN server provides a cloud fallback. It ensures that the peer call works in all environments. The only problem here is the operational cost. It takes resources into use and hence advised to use only when there are no options left.

Internet Communications Engine (ICE) Framework: What if we create a way that uses the STUN server for every call that it can handle and uses the TURN server for remaining calls. Thus, we can say that the ICE framework finds the most suitable path for each call.

RTCDataChannel

It is a bi-directional communication of data between peers with no noticeable delays or low latency. There are two modes, Reliable and Unreliable. Reliable mode guarantees the correct sequence of data with no loss. At the same time, Unreliable mode's only objective is to send data as fast as possible without worrying about little data loss that occurs on the way (What Is a Webinar, 2020).

Var clientConnection = new RTCClientConnection ()

Var informationChannel = clientConnection.createDataChannel (“my channel”, {reliable: true}).

In the first line, we set up a peer-to-peer connection, and after that, we use createDataChannel () method to create an RTCDataChannel for letting the media streams to flow both the directions without further much ado.The reliability is passed as true, which means the data transfer is reliable, but with noticeable delays, when passed false, the data transfer is unreliable with low latency. To send any data to the other client, you just need to call the send () method that sends data across the data channel to the remote peer.

Other API's used for meetings during COVID19

WEBEX Meet

The foundation of the Webex application, at the time of its possession by cisco, was MediaTone network. Shaun Bryant, a Webex chief architect, had designed this network along with the help of Zaid Ali, sir, a network architect. Webex meets originally named as cisco Webex is a collection of instruments created for personal and corporate collaborations. Webex is delivered as a Software as a service (SaaS) through the web; we do know that SaaS can be very helpful, especially when you have such a large amount of media exchanges going on. SaaS troubleshoots problems of purchasing servers, maintenance management, support, etc. It reduces the workload and so the investment. It makes Webex highly scalable, so even if tomorrow we see an escalation in the number of users, there will not be a need to worry. The working will remain well ordered. Organizations can easily dilate web usage to other people, locations without a lot to do. The Cisco collaboration cloud is a purpose-oriented worldwide carrier-grade network, a network with infrastructure that has very high reliability, is meant to convey only Webex media streams? The cloud provides us fault-tolerant, smooth and scalable service. It also provides safety, security, and speed over any sort of communications.If we talk about security, there are excellent encryption options that Webex provides. Encryption of every type of media occurs during communication. We also have ended to End (E2E) encryption options available when we need to have a high level of security. Note that in case of E2E encryption, the media is not even decrypted by the Webex servers that is why end to end. In case of normal communication, when a client sends media streams to another client, they first go to the Server. The decryption of media streams takes place after they travel through the Server's firewall and is re-encrypted before sending it to the other client.

Tech stack:

The many technologies on which Webex is built are Lodash, Webpack, Amazon Web Services (AWS), Amazon CloudFront, Amazon s3 (Amazon

simple storage service), Tiger Prism (Business Intelligence for unified communication)

Lodash: It is a utility module that establishes a collection of methods that executes common functions that are reusable. It helps programmers write short and maintainable Javascript code.

AWS: A leading, highly secure cloud service platform. It contains a vast collection of servers and a large storage capacity. Cisco and AWS collaboration, makes it possible for developers to now develop new applications faster. They can now develop in the cloud and deploy it in the AWS or in the local servers.

Amazon Cloudfront: It is a Content Delivery Network (CDN) service that aids Webex. CDN is a content delivery network that accelerates internet content delivery. Let us say there is a site whose Server is in India. Now, if somebody from Australia tries to access this site, it will take too long to bear. CDN solves this problem; see whenever there is a request to access this site, the content is first fetched by the CDN service and distributed all around the world. So, when next time a person from Australia tries to access the content, it is delivered to him from the nearest Server (Ahrens et al., 2016).

Now Amazon Cloudfront is a worldwide network of data centers and is integrated with AWS. Its infrastructure and process provide a wide range of standards that checks the transfer of highly sensitive data. Amazon Cloudfront CDN service helps Webex exchange information worldwide. 10s of millions of users now reach out to the data in almost no time.

Zoom

It is a video communications company that provides services like video conferencing and online chat services. It is a SaaS that comes up with a smooth, free platform for virtual collaboration. People use it for various purposes like online classes, distance education, video chats, and telework. Zoom, just like Webex meet, and others have cloud-based computing as its backbone for offering such services to its users. As per the reports of CNBC, Zoom had 17 data centers by 18th March 2020. Zoom has also integrated with two leading cloud service providers, i.e., AWS and Microsoft Azure, to boost up its capacity. Zoom also provides facilities like Recording session screen sharing and whiteboard sharing facilities (Lee, 2017).The most interesting part is that Zoom can also directly be used from our own websites. Zoom APIs and software development kit (SDK) can be used for integrating Zoom into the websites, which means now we can have Zoom meetings using our own site. You do not need to switch to the Zoom app or to their website. The Representational State Transfer (REST) APIs and JavaScript (JS) APIs are the ones that help us integrate Zoom into our website, whereas Mobile SDK helps to enable Zoom into our mobile apps, i.e., for Android and iOS devices for now. We can manage user meetings and reports. We can also create or delete users as well as meetings. It also provides us the feature of making reports on those. Although we can use Zoom directly from our site, there will always appear a Zoom logo on the top left corner for branding purposes. We cannot remove this logo anyhow.

REST APIs

It allows us to create any sort of web application having any of the operations like create, delete, update, or retrieve. REST recommends us to use a specific HyperText Transfer Protocol (HTTP) method for servers' calls. In Zoom, our browser interacts with servers using HTTP post calls, and this happens in

cases like filling out a form and clicking the submit button, creating a user, creating a meeting or a report, etc. That kind thing travels to our Web servers, which further create an API call to the Zoom server. The returned information will traverse back from the Zoom server to our Web front end (Ferriman, 2019).

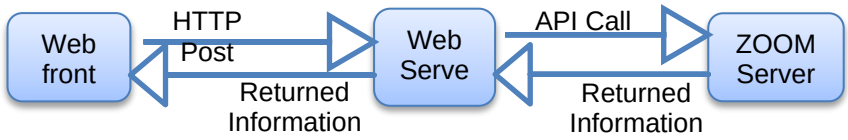

Fig 5: REST APIs Zoom Server

JS APIs

It is very similar to the REST APIs; the right-hand side (see fig. 9) is almost the same as the REST APIs ZOOM server (see fig. 8). The only difference is that now we will be making a JS call first, which will do the remaining work.

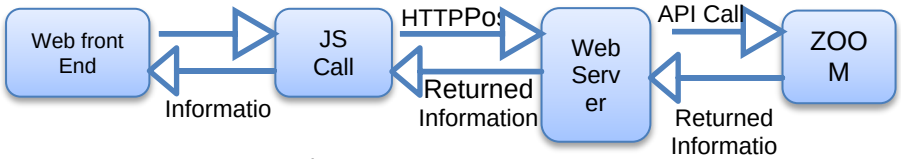

Fig 6: JS APIs ZOOM Server

Advantage of T&L

With the fast-growing development of internet and the world wide web (www) education system is hugely benefitted and in this pandemic situation webinars and e-learning are making a huge impact on educations to help faculty and student both to make communication and complete their study work in time and making available all study resources needed. Coursera, Massive Open Online Courses (MOOC), edX, Udemy, Unacademy, Byju's, and MITx are the popular Online Education Initiatives that provide online courses for different levels and fields, which can be used by students and faculty to enhance their skills.The prime intension is to let the online learning (e-learning) experience more flexible, simulating, and easy usage at different places and people by utilizing facilities provided by the Internet. The students or participants can, first, freely navigate inside the virtual classroom environment, and second, Improve the resources of information.Students can ask questions and give answers through a chat window. In a chat window or discussion forum, students can interact in real-time with the instructor and other participants. It also improves the skills of using technology in the right way to save time and perform their task by using limited resources. The major advantages of educational resources, existing educational structures, and the educational system are explained below: -

- Educational resources → Do cost-effectiveness
- Existing educational structures → Improves quality
- Educational system → Enhances the capacity

The availability of the OTL platform helps many universities to complete their sessions within a specified time so that it does not make much effect for upcoming sessions (Lee, 2017).Another feature of online teaching software is, the sharing of screen and application, which facilitates the participants or students to see anything that the presenter has currently displayed on the screen. It allows conducting polls and surveys. For future use, the

presentations can be recorded. It enables to display of Multimedia files, Digital Video Camera, and Full Motion Webcam.So, we can say that a few notable advantages are:

- The online teaching can be conducted in real-time
- The teaching session can be recorded from any point.
- The class size can be decided upon the need.

Disadvantage of T&L

Interaction between the participants and the presenter

- The teacher is little more than a voice from the other side; hence the instructor cannot judge the level of understanding among students.
- When it comes to reinforcing the subjects, it is not very successful because it puts the restriction on the potential to acquire and refine new skills.
- If different students have different learning style (which generally happens), then the teacher cannot gauze the different learning styles of people, and hence they all cannot be addressed properly.
- Brainstorming as well as sharing of thoughts are particularly minimal.

Internet Connectivity Disruptions

The online teaching relies on the effectiveness of internet connectivity and reliability. If people are in an area that experiences poor internet connection or disruptions in the network, then this mode of learning and communication are not appropriate because the quality of the class will not be up to the mark due to poor connectivity people find the loss in audio, video distortion and lags in the transmission.

Security

It is the primary aspect of the user because they are afraid during sign-in on any digital platform that their information is not leaked, for example, recently, there is news of selling the information of the users who are using Zoom platform (Tripathi, 2020).

How long should the Session Run

It depends on the software which we are going to use some of them allow 2 to 4hour lecture while some allow 15 to 30 minutes. Hence making a choice for the user is difficult.

Future Implication of T&L

A report released by KPMG India and Google (KPGM, 2017) states that the online education market in India can have a growth of eight times in the three years, i.e., from USD 247 million in 2016 to USD 1.96 billion in 2021. India has displayed a great zeal towards online education with the collaboration with emerging technologies in recent times. Many students and working professionals have enhanced their skills by joining various e-learning platforms in the last years. According to reports, India is at a native state of development in online education and is visualizing different Undergraduate and Post Graduate e-learning courses are utilizing this platform very effectively. Post-graduation courses dominate the demand for online education in comparison to graduation and diploma courses. Figure 10 depicts the course-wise preferences of online higher education by the users, whereas figure 11 gives view courses opted by tier 1 and tier 2 city's students and working professionals.

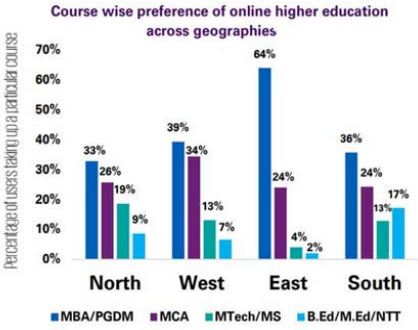

Fig 7: Online Education in India: 2021 (Source: KPMG Report)

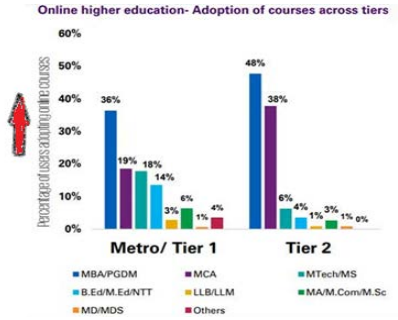

Fig 8: Courses opted by tier 2 and tier 1 students and professional

As we can observe from the above analysis, the future of online teaching is very emerging and convincing. So, it is expected that (a) the quality of OTL will increase, but the duration of the session can decrease, (b) OTL is for both students and faculty, (c) in future OTL will become automated, (d) the lecture conducted on OTL platform, can stream live or upload the pre-recorded videos on YouTube so that those who are not attending the lecture can avail the benefits, (e) the teaching knowledge and ability of the teacher will be more focussed than the content of the lecture, (f) the security issues related to information leakage will be resolved with the time, (g) the OTL system will become compatible for poor internet connection area.

CONCLUSION AND DISCUSSION

During the pandemic situation in COVID-19, it has been deduced that various educational studies that have observed challenges have also got numerous opportunities for developing innovative approaches using technology that can be adopted by educational and training institutes across the world far in education. T&L platform plays a vital role in the education sector to complete their courses in time and enhance the skills of the students. As technology is increasing day by day and the Internet providing companies making their efforts to provide a good internet facility all over the country, the use of webinars and online study will significantly increase. This pandemic situation can make a revolution to the e-learning industry in the country. "Distance learning courses . . . offer learners a wide range of choices so that they can find the right mix of interaction and learning style to enhance their individual capacity to learn or be trained". Few decisions need to be taken while using OTL:

Step 1: Deciding that live online session is right for your needs (Cook, 2019).

Step 2: Deciding the number of people using the T&L platform. There is webinar-style learning sessionsmethodology, where the group of participants is quite big, and the presenter not focusing on every individual. Whereas on another side, there is classroom-style learning, where the teacher can observe the activity of each child. "To build a successful community, you'll want to set up gathering places that reinforce your purpose and meet the needs of your target audience" (Kim, 2000, p. 27).

Step 3: Depending on the choice of group size, you have options to choose the T&L platform. "If asynchronous meeting or seminar is being conducted, the

group should be small enough to allow for full participation and to prevent information overload. Asynchronous groups, however, can be much larger [depending] on the skill of the instructor as facilitator" (Palloff and Pratt, 1999, p. 55).

Online learning is a fantastic alternative for students as well as faculties learning as it is generally focussed on critical thinking and creation. It is hard to say which tool or software is best among all of them, but they can be used according to the need and requirements of the teacher. Thus, researchers should study the role of a variety of technological tools which has an important role in upholding the needed social interaction for the enhancement of the learning community.

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Ms. Charu Awasthi, *Assistant Professor, Computer Science and Engineering Department, PSIT Kanpur, charuawasthi@gmail.com*

Ms. Pragati Singh, F*ield Investigator, Project-ICSSR, School of Management Studies, Motilal Nehru National Institute of Technology Allahabad, singhpragati2312@gmail.com*

Mr. Naveen Kumar Singh, *Research Scholar, School of Management Studies, Motilal Nehru National Institute of Technology Allahabad, rajput.naveen07@gmail.com*

Section-II
State Initiatives

State of Haryana

V. Umashankar and Munish Chandan

Key aspects of the State's e-Governance Road Map for the next five years

The State of Haryana has aligned its vision to the three focus areas of Digital India Program given as under:

Digital Infrastructure as a Utility to Every Citizen

- High speed internet
- Cradle to grave digital identity-unique, lifelong, online, authenticable
- Mobile phone & Bank account enabling participation in digital& financial space
- Easy access to a Common Service Centre
- Shareable private space on a public cloud
- Safe and secure Cyber-space

Governance & Services on Demand

- Seamlessly integrated across departments or jurisdictions
- Services available in real time from online &mobile platform
- All citizen entitlements to be available on the cloud
- Services digitally transformed for improving Ease of Doing Business
- Making financial transactions electronic &cashless
- Leveraging GIS for decision support systems & development

Digital Empowerment of Citizens

- Universal Digital Literacy
- Universally accessible digital resources
- All documents/ certificates to be available on cloud
- Availability of digital resources/ services in Indian languages
- Collaborative digital platforms for participative governance
- Portability of all entitlements through cloud
- In line with the above-mentioned focus areas, Government of Haryana has notified four policies i.e. IT & ESDM policy, Cyber Security Policy, CCIP and Start-Up & Entrepreneur policy to facilitate the implementation of the projects under these focus areas.

Examples of State level Institutional partnership plans

Government of Haryana aims to foster the Innovation & entrepreneurial ecosystem by providing necessary support to the young entrepreneurs as per provisions of policy/ schemes and establishing connect with industry/ academia while providing access to industry experts in the field of emerging technologies. In this direction,

- HARTRON Multi Skill Development Centre (HMSDC) has been established with a total area of 1,20,000 Sq. feet wherein incubators have been made operational to boost the Innovation & entrepreneurial ecosystem in the State.
- The GoH 10x Mobile Hub with IAMAI has been created to foster Haryana's Innovation, Entrepreneurial & App development eco-system and further make Gurugram a global Hub for apps innovation, development & testing.
- A Centre of Excellence for Internet of Things (CoE-IoT) has also been established since 5th October 2018 with NASSCOM as knowledge partners to create the physical infrastructure labs for IoT domain for

development & validation of solutions in the field of Health, Agriculture, water, transportation, energy etc. from designing to prototyping in collaboration with Government, Industry & Academia along with a full-fledged operational 'IoT lab'.

- In addition to this, the NASSCOM 10K Start-Up Warehouse aims to make the state a global start-up destination. It shall also facilitate early stage technology start-ups through incubation, acceleration & academia link.
- For encouraging Women entrepreneurship, the United Nations Technology Innovation Lab (UNTIL) is being established which shall also enhance digital inclusion through – 'Global venture capital/ investment in women in technology', 'Support local women start-up eco system with global collaborations' and 'Promote global technological opportunities for women in Haryana'.

Government of Haryana is making consistent efforts in building up a dynamic & concrete Start-up Ecosystem in the State that stimulates independent thinking, innovative ideas and helps Start-ups in different stages of their entrepreneurial journey. Innovation and Start-up Hub in Gurugram has been fully operational with a total area of 1,20,000 Sq. feet providing world class infrastructure and facilities to the Start-up Ecosystem Stakeholders. Three Government owned Incubators NASSCOM 10K Start-up Warehouse', 'IAMAI-GoH Mobile 10X Hub' and 'Center of Excellence for Internet of Things (CoE-IoT)' are providing facilitation to more than 40 Start-ups (having 30 % women entrepreneurs) with 100+ team members in-house and multiple external start-ups from across the State. United Nations Technology Innovation Lab (UNTIL) to promote culture of entrepreneurship and innovation among women entrepreneurs is setup and ready for operations. Incubator with Software Technology Parks of India (STPI) for Block chain technology is set up and ready for operations. BSC BioNEST Bio-Incubator Incubator in Faridabad has been associated with the State Start-up Ecosystem to create a robust incubation network in the state.

- DITECH with a view to ease the start-up entrepreneurship is strengthening the foundation of the start-up ecosystem in the state by associating academia through establishment of Incubation Centres across 07 (Seven) State Universities campus for which Grant of INR 30 lakhs to each State Universities has been provided by the State Government to encourage the Student entrepreneurs in the State.
- The State Government also provided a special financial relief measures to its Start-ups working in Government owned Incubators in the form of rental waiver for a period of 02 months i.e. from 15thMarch 2020 to 15thApril 2020 in view of the COVID-19 situation.
- Government of Haryana is setting up a Centre of Excellence for "Block Chain" Technology at STPI Gurugram with State of Art Incubation facilities admeasuring approximately 10000 Sq. ft. CoE will use IBM Block chain platform built on Linux Foundation's hyper ledger Fabric and Hyper ledger Composer. The IBM Block chain Platform provides a managed, full stack block chain-as-a-service (BaaS) offering delivered through the IBM Cloud. The CoE shall explore other emerging platforms for block chain technology and not be restricted to IBM platforms only.
- Hon'ble Chief Minister of Haryana has signed six MOUs with different companies in London on 12th May 2019 to facilitate investments in

Haryana in diverse fields, including fintech, smart cities, emerging technologies, transfer of advanced technology and setting up of an IoT Innovation Centre in Gurugram.

- The MOU with UK India Global Business Limited (UKIGB) seeks to promote development of smart technology infrastructure (STD), especially focused on aero-space and defense companies
- The MOU with Pontaq, a UK India Innovation Fund, aims to focus on Fintech, Smart Cities and Emerging Technologies.
- The MOU with Xelba Limited, under which Xelba will provide intellectual property and knowledge and hardware and software tools to deploy such a project, along with the creation of an IoT innovation centre in Gurugram.
- The MOU with Relmatech Limited, a leading provider of Remote ID and Tracking Systems for unmanned aircraft systems or drones, would increase development activities in the field of remote ID and tracking of unmanned aircraft systems in Haryana.
- The MOU with Good Box will offshore a multitude of functions, including both manufacturing and services.
- The MOU with ZapGo Limited, developer of a new generation of fast-charging energy storage devices would help in establishing a manufacturing site for ZapGo in Haryana

Key challenges faced in eGovernance journey

Haryana Cashless Consolidation Portal (HCCP)

Haryana Government identified that the State needs to reduce its unusually high dependence on cash to bring in much needed transparency and efficiency in the system, which necessarily does not mean advocating a cashless society, however a less-cash society would be a fairer and safer place. Today, Haryana along with India is moving persistently towards a less cash economy or digital economy since encouraging cashless transactions has the potential to curb tax evasion, corruption and the use of hard cash in crime.

This is being achieved by having most of the G2C services using online mode & accepting / disbursing any kind of payment in digital way; however, to achieve the desired results and less cash society, it was most important to monitor the progress of different modes of digital payment transactions.

The biggest challenge that was faced by the Government was the absence of any single view of all digital transactions taking place in the State. The need was felt to create a Consolidation Portal to consolidate the various transactions and their modes taking place throughout the State to ascertain the Progress vis-à-vis Target of Digital Transactions being assigned to the State by Government of India. The key challenges faced were:

- Consolidation of Cashless transactions from different stakeholders
- Integration of Cashless Portal with different stakeholders
- Designing the data exchange formats, the financial institutions are familiar and comfortable with
- Consistent follow ups with the departments, banks and wallets for collection of information
- Ideal way would be to integrate the API of the portal with the department to create a seamless data updation process
- Often the data may have to be collected manually through e-mails
- Use technologies that allow for seamless data updation and permit for

changes in portal functionalities, look and feel so customization is possible, if required

Keeping this in view, the initiative was envisaged and an integrated monitoring tool i.e. “Haryana Cashless Consolidation Portal (HCCP)” was developed to monitor the progress and penetration of different modes of digital payment transactions in the State. HCCP is a digital payment transaction monitoring & tracking system helps in increasing transparency, enhancing financial inclusion and ensuring a healthy financial ecosystem in the state. It provides an easy & seamless way to on-board any new/ existing payment agencies to share cashless transactions data with HCC Portal and various analytical reports such as prevalent modes of payment for utility bills, commodities payment, etc. This platform provides in-depth analytics and supports decision making for taking various steps to promote cashless payments & achieve less cash society. The portal also serves to facilitate digital literacy and financial literacy for citizen. A total of 357.14 Cr+ digital transactions from April 2017 till September 2020 have been reported. Even states such as Tripura, Daman & Diu, etc. have agreed to replicate the same portal in their respective states and their replication is in progress.

Haryana Information Security Management Office (ISMO) Portal

Earlier, Information Security Management Office (ISMO) was being contacted by the State Govt. Organizations for their Information Security related requirements. Many of the queries of the departments stakeholders can be resolved in they have knowledge and awareness cyber security concepts. Hence, there was a need to provide a platform to such stakeholders to enable suitable dissemination of cyber security related content and information. The following were the on-ground challenges:

- Regular awareness and sensitization of stakeholders on to cyber security concepts and threats
- Conducting IEC activities at ground level for public awareness
- Continuous management of vulnerabilities at department level applications due to lack of knowledge and awareness
- Continuous Monitoring of Security threats on Cyber Space
- No centralized platform for address the above issues

With a view to address the above challenges, the Haryana ISMO portal was conceptualized. The ISMO’s web portal acts as a platform for information dissemination on latest trends on cyber-attacks, preventive measures, awareness materials, policies, guidelines, creating awareness among the masses about cyber security and hygiene factors. The portal acts as a first level interface for cyber security related knowledge and initial level preventive steps one can take to mitigate cyber-attacks.

As part of the portal a full fledge e-learning module is under implementation, once operational the e-learning module will provide course on cyber security to various stakeholder (Students, working professionals, Govt. officers, IT professional (Govt. and private sector) etc.) such that they can adopt best practices with respect to cyber security, information security and data privacy etc. and apply these in there day to day life. The user after completion of the e-learning course will also be provided with a completion certification from ISMO, Haryana.

Toll free number 1800 180 1234 for facilitating the Citizens on their Information Security Needs & reporting of the incidents with a procedure to provide remedies, counter the attacks and follow-up with police & national agencies for

appropriate escalation (if required).

B1 Online Lower School Entrance Test Portal

The B1 project is an online test system (https://b-1test.haryanapolice.gov.in/) It is an initiative of Government of Haryana to streamline the promotion of police staff at the ranks of Constable of Haryana Police Department.

This project (Online Lower School Entrance Test-2018) was envisaged in line with the requirement of Government of Haryana to promote the Constable Rank of Haryana Police Department. The police department already had a legacy application for conducting examinations for promotion of police staff from the rank of the constable. Since, the exams were conducted in a decentralized manner, no real-time evaluation and reporting mechanism was in place for the senior management at the head office to make prompt decision-making and have better control over the proceedings of the exams. Presence of the invigilating officer was mandatory to conduct a fair examination and the result of the individual centre was collated at the head office to eventually derive the exact outcome of the examination. The result generation was also limited to the centre where the exam was getting conducted which in return added to the overall processing time for conducting the examination and declaring the results.

To overcome these challenges, the Department of Information Technology, Electronics and Communication, Haryana (DITECH) with the help of police department created a cloud based online solution to conduct online lower school entrance test. The B1 Online Lower School Entrance Test Portal completely automate the old decentralized procedure of conducting exams.

- Online examination is designed for Haryana Police Department for the promotion of their constable level rank on regular basis.
- Test Application is a web-based application and it can be used anywhere any time (as per user preference)
- Minimal restriction of the invigilator is required in the exam centre as every candidate will get random set of questions.
- Login attempts restricted for candidate to cross check any mischievous attempt in the exam.
- Real Time Dashboard of every centre/ candidate/ results available to the User

Due to COVID-19 pandemic, multiple applications have been developed in the State and a few of them have been given in the detail as under:

Haryana Covid-19 Sangharsh Senani Portal

Haryana Covid-19 Sangharsh Senani Portal (https://covidssharyana.in/) was launched by Hon'ble Chief Minister of Haryana to enable the registration of any utility shops i.e. any interested shop/ store owner (Kiryana/ vegetable/ milk/ chemist, etc.) can register to supply the required items and to enable anyone who wants to help people as a volunteer by contributing to the fight against Coronavirus. This Portal also has a feature to collect donations from volunteer/ shop owners/ citizens for Haryana Corona Relief Fund. This portal also gives a feature to seek the consent and details of potential Plasma donors i.e. the citizens who have recovered from COVID-19 and are in between the age of 18 to 65 to donate convalescent Plasma. In addition to that, Tele consultation for Mental Health are being conducted by 240 Psychologists registered as volunteers on this portal, to handle stress using a toll-free no. 1100 through call centre. As on date, more than 89,680 people have registered to help the government in its fight against the spread of coronavirus in Haryana through

this portal and more than 77,470 shop registrations have been received on this portal till date. Additionally, more than 360 citizens have provided their consent and details to donate Plasma.

Haryana Atmanirbhar Portal - Financial and Banking Services of Haryana Government

Government of Haryana, on 22nd June 2020 has launched a portal named "Haryana Atmanirbhar Portal" (https://atmanirbhar.haryana.gov.in/) for extending Financial and Banking Services of Haryana to the residents of the State.

- *Haryana Interest Waiver Scheme*: The portal caters to the 'Haryana Interest Waiver Scheme' of the Finance Department. It will act as a facilitator platform for people of the State who will be able to take loans without any collateral and 2 percent amount of interest will be borne by the State Government under the said scheme. Three types of loans can be availed, which include Differential Rate of Interest Scheme (DRI) Loan, Shishu Loan (Mudra Scheme) and Education Loan. Under the Differential Rate of Interest Loan Scheme (DRI), people from rural areas having a family income of Rs. 18,000 per month and people living in urban areas having a family income of Rs. 24,000 per month will be given loans without any collateral. The requirement of a family income certificate has been simplified by linking Aadhaar with Parivar Pehchan Patra.
- *Haryana Bank Slot Booking:* This application shall enable the citizens of Haryana to book an appointment/ slot to visit their respective bank branch and/ or get the cash delivered to their home using Home Postal Bank Service. Using this application, the citizen shall be able to select their preferred data and time of the appointment/ slot for availing the service. In case the appointment/ slot is not available, they would have an option to choose the next available slot. The portal also has an option to enable the citizens with feature phones to avail the facility of banking services via sending SMS to Long code 9779630630. Here the citizen will get auto time slot/ appointment from the bank of the next working day.
- *Cash Delivery at Home:* The portal enables the citizens of Haryana to get the cash delivered to their home using Cash Delivery at Home by Postal Bank Service. The citizen can enter/ search IFSC CODE of the branch and select date and slot for visiting the bank branch. After successfully booking the slot, the citizen can download the receipt of the same. The citizen can enter required details by entering his address/ Pin code and place a request to withdraw amount from the Aadhaar Linked Account with minimum amount of Rs 1,000 up to a limit of Rs.10,000. After successfully filling in the details, citizen can also download the receipt. The Post Office will contact the citizen and facilitate delivery of cash at home. The portal is user-friendly and the same can be used by customers using internet on the smartphone or through computer/ laptop.

Haryana Bank Slot Booking and Cash Delivery at Home features were earlier launched on 21st April 2020 by Hon'ble Chief Minister of Haryana. As on date, the statistics are as under:

- Total Banks: 39, Branches: 4,770
- Bank Requests processed: 9,830+

- Total Post Office Requests: 2,590+

Haryana Covid Sample Report Portal

Covid sample is a Web based portal (https://covidsample.haryana.gov.in/) having dashboard for capturing the data of test results of COVID-19 samples done by COVID-19 labs for the entire State of Haryana. All labs shall be given user credentials to enter the data of the test results done and to visualize it centrally at the Hon'ble CM Haryana Level. The application is live since 15th Apr 2020. Users: Health and Medical Education Department & Food and Drugs Department. The dashboard is being monitored directly by Hon'ble CM. As on date, 22 Labs (14 Government Labs + 8 Private Labs) have been registered on the portal.

Healthy Haryana Portal and Mobile App

Healthy Haryana is web based as well as mobile application for door to door household survey of ILI symptomatic patients using android based mobile App and Data entry of physical surveys done previously. Using survey data, required reports can be generated and heat maps can also be generated on map of Haryana to visualize the spread pattern COVID-19 patients across State and define the containment zones as red, green etc. accordingly. The application has been made live; district admin users have been created for Panchkula & Gurgaon. As on date, the statistics are as under:

- No. of Surveyors registered: 21,570+
- No. of households for which health survey data has been recorded through mobile app: 6,72,580+

A few more projects have been given below which were developed during COVID-19 lockdown:

S. No.	Name of the Initiative	Brief Description
1.	Jan Sahayak – HelpMe App (**https://play.google.com/store/apps/details?id=com.ofb.sahayak**)	The Jansahayak HelpMe App is designed in order to provide Government Services and facilitate the citizens of Haryana State during the crisis of Covid-19. Citizens can make requests for Dry ration or Cooked Food, Book an LPG cylinder, Seek shelter at a Relief Camp, Call for Ambulance, Consult a Doctor, Seek Movement Pass from District Administration, Seek an appointment with a Bank, Book a slot to sell crops at any Anaaj Mandi through e-Kharid, access the e-Learning resources, etc.
2.	Sahayak Haryana (**https://sahayak.haryana.gov.in**/)	Sahayak Haryana is an android based mobile application (downloaded from Google App store & https://sahayak.haryana.gov.in/) for the awareness of the public and dissemination of correct information to the citizens on the growing pandemic of the Corona Virus. The mobile app includes Haryana COVID dashboard, details of confirmed COVID cases in the vicinity, quick self-health checkup, locating nearest COVID medical facilities, location of nearest essential commodity shops, and latest advisories &

S. No.	Name of the Initiative	Brief Description
		guidelines issued by the Central/ State Government.
3.	Haraadesh, COVID-19 portal of Haryana (**http://haraadesh.nic.in/**)	One stop information on COVID-19 related information with links to the various online services launched for the benefit of the citizen during COVID-19 lockdown period. This portal has provision to upload and access all COVID-19 related advisories, instructions, notifications, Government orders and awareness material etc. issued by various departments of Haryana Government as well as various Ministries of Government of India. The uploaded documents have been categorized based on Departments, Offices, Document category and topic/subject category and can be searched on search criterion such as departments, offices, topics and Keywords. The users can also shortlist the documents based on dates of issuance of the document.
4.	Financial support to unorganized workers (**http://poorpreg.haryana.gov.in**)	Govt. of Haryana has taken a step to provide financial assistance to unorganized workers such as street vendors, rickshaw puller, domestic help, street vendors etc. who are not registered with Govt to get any benefit. Basic details such as Aadhaar, Name, DOB, Address, Account details and Occupation are being captured at time of registration. Aadhaar and Name are getting checked in real time from AUA. Citizen can call helpline 1100 to register himself/ herself. After due diligence of information, eligible would be provided Rs. 1000 per week till lock down. A verification module has been developed and given to DC to verify eligible families. Once Verified, sanction officer generates sanction and payment is done to eligible ones.
5.	Covid-19 District Level Management committees (**http://covidunit.edisha.gov.in**)	As per instructions of Chief Secretary Haryana, four levels of committees to be formed at field level. Unit committee, sector committee, zonal committee and then District Committee chaired by DC. Local Unit committee would be assigned 250-300 household to whom they can visit and survey whether family requires Ration Card/Financial Assistance. Dashboard has been provided at district level and state level. All families who say they need ration assistance are being pushed to http://trackpds.edisha.gov.in/ so

S. No.	Name of the Initiative	Brief Description
		that DCs can download list and can distribute dry ration.
6.	Track PDS & Distress Ration Token System (**http://trackpds.edisha.gov.in**/)	This Portal is designed to capture the requirements of free food grains from different platforms such as Track PDS, Unorganized Sector System, Mukhyamantri Parivaar Samridhy Yojna, Building Construction Workers, Jan Vitran Mobile App, Jan Sahayak Mobile App, Distress Ration Token System & Public Distribution System. This portal also provides facility to check if the beneficiary is already availing Ration from PDS or Currently living in Relief Camps. Further, it helps issuance of Distress Ration Tokens to the needy Families of Haryana. This system processes the information based on processed information system auto generates the Distress Ration Tokens (DRT) which are directly being transferred to Unit Committees working at the micro levels to facilitate the Beneficiaries and to maintain the social distancing.
7.	Movement Pass During Lockdown/ Curfew for General Public (**saralharyana.gov.in**)	This electronically generated pass is meant for Citizens facing emergent medical/ non-medical situations, Govt Employees who have been assigned Covid-19 duty and for essential/non-essential service supplier. This service is live on Antyodaya Saral portal (saralharyana.gov.in).
8.	Relief camp management system (**https://haryanareliefcamps.edisha.gov.in**)	This system has been developed for management of the relief camps and stranded persons during covid-19 lockdown. A free text search facility has been provided at the portal to locate the stranded person by their near & dear ones.
9.	"Operations of Industrial/ Commercial Establishment during Lockdown/ Curfew" (**saralharyana.gov.in**)	"Resume Operations of Industrial/ Commercial Establishment during Lockdown/ Curfew". This service has been developed for industrial/ commercials establishment to get approval to resume operations of their units.
10.	Mobile Health Team Information System	This system has been developed for collection of mobile team data and its management
11.	Haryana Essential Reporting System for MHA (twice a	This system has been developed and launched to enable collection, collation, analysis and twice a day reporting of Law

S. No.	Name of the Initiative	Brief Description
	day at 2 PM and 9 PM)	&Order, Health, Food & Shelter to MHA.
12.	Call Centre - COVID 19	1100 - COVID 19 Help Line: • Financial help to unorganized workers (R. 1000/week/ family) • Mukhya Mantri Pariwar Smridhi Yojana (MMPSY) Financial support to families • Help to families in distress (Food/ Shelter) - call transferred to respective Distt HQ/ Control room 1950.
13.	Essential Services Delivery Applications - eMarket Kurukshetra	NIC Kurukshetra has developed a mobile application 'eMarket Kurukshetra' to ensure that the residents get essential items such as groceries, dairy products, vegetables and medicines delivered at their doorstep through the essential service providers who have agreed for home delivery
14.	Essential Services Delivery Applications - Connect Plus App	NIC Hisar in collaboration with the District administration has developed a mobile application 'Connect Plus App' to ensure the home delivery of essential services to the residents. This application has been developed in the timespan of 2 weeks. It shall connect service provider & the consumer and would act as a medium to deliver essential & useful services. This app contains the information about the service providers and has an option to allow the consumer to contact them through WhatsApp or phone.
15.	Covid Appreciation & Management System, Haryana (**http://cm-care.edisha.gov.in:8083/scamp**)	The system (http://cm-care.edisha.gov.in:8083/scamp) is developed for paying double salary to all health workers working in COVID-19 pandemic in Haryana. The system is integrated with HRMS for fetching basic details of all regular health workers. Reports are also present at nodal officer level and at admin level.
16.	Gaushala Survey MIS, Haryana (**http://164.100.137.127:8083/hgsa**)	The system (http://164.100.137.127:8083/hgsa) is developed for registering all gaushalas in Haryana. Further all the surveys are also entered for each Gaushala and verified by 4 levels hierarchy. LGD is used for data entry at each block/MC level. Report module is also developed for Veterinary Surgeon who have to do data entry at field level and for admin.
17.	Covid19 Drug Procurement and distribution	This portal displays online Purchase order, supply and distribution of Covid Related medicine to 436 Medical Institutions

S. No.	Name of the Initiative	Brief Description
	(**www.dpmuhry.gov.in**)	
18.	Information Collection Module	For: Law and Order, Food and Shelter, Construction information etc. This module has been developed and launched to collect various information from district through the nodal officers
19.	District Covid-19 Reporting System (once a day)	This system has been developed and launched to enable daily reporting of important Covid- 19 related indicators on Law & Order, Migrant Workers, Essential Services, Health, Public Awareness & Coordination, Major Achievements in Districts thereby facilitating mitigation actions at State Level
20.	HAFED Additional Purchase Center Management System (APCMS)	Management of 732 Additional purchase Centres / Mandis by Haryana State Co-operative Supply and Marketing Federation Limited (HAFED)
21.	Ticketing System for Covid19	A workflow-based ticketing system has been developed for complaints related to covid19 lockdown where ticket can be raised by state control room, district control rooms and other state through portal which is automatically forwarded to concerned department nodals at the district and they can update the tickets after taking action.
22.	Thematic Maps Service	Thematic Maps created for COVID-19 State Control Centre (Bharat Maps) The COVID-19 State Control Centre receives calls under different categories. These calls are classified into 11 categories by the control centre like Food & Supplies, Health, Labour, Transport, etc. A provision for uploading the daily number of calls district-wise for these 11 categories was made. Thematic Maps for the State of Haryana have been developed using this daily data.
23.	Donation to Haryana Corona Relief Fund	Many portals have been created to accept donations from citizens, employees and volunteers to Haryana Corona Relief Fund

RESULTS INDICATOR - a few Beneficial Outcomes

Citizen Service Delivery

SARAL (Simple, All-inclusive, Real-time, Action-oriented, Long-lasting portal) facilitates in aligning with Digital India's vision of faceless, paperless and cashless service delivery model. SARAL has been developed on Service Plus Framework and aims to transform citizen service delivery in Haryana through complete digitization of services. The vision for SARAL is a unified platform to deliver and track Government-to-Citizen (G2C) services across the state. The vision is to deliver all the 550+ services and schemes to the citizens through

the SARAL Platform. As on date, 542 Schemes and services cutting across 39 departments/ boards/ corporations have been brought online on Antyodaya SARAL portal.3.37 Crore applications have been received till date out of which 3.18 Crore application have been processed and 2.68 Crore applications have been processed with RTS.

Durga Shakti App (Police Department, Haryana)

Durga Shakti App is aninitiative from the Haryana Police team for women safety. In case of emergency, the victim can seek immediate help of police through 1091 (Women Helpline Number) through this application. After downloading the app, any women who is in distress can send information including the GPS location to the Women Help Line number of the respective district through WhatsApp by just pressing a red button on the application. Once the button is pressed, the victim doesn't need to speak, her GPS location, blood group and other details shall be sent to Women Helpline number as a WhatsApp message. However, it is mandatory to register once on this application. If required, the victim can also speak to the operator via this application. Once the GPS location is received by Women Helpline, it sends the same to the nearest PCR vehicle. The PCR vehicle can make use of the GPS location received on WhatsApp to determine the victim's location and reach there at the earliest to help. In addition to this, Police can also send messages and tips about woman safety & security to the users of the application. It can also be used by a woman or girl in an emergent situation outside the State wherein it can inform the Haryana Police through the Durga Shakti application. The main aim of this application is to reduce the response time of the Police to provide help to the women or girls in distress.

Public Grievance Management System (CM Window)

CM Window is a grievances redressal and monitoring system which has been implemented in all districts and all departments of Haryana as a Flagship programme. The grievances are registered at the CM Window counters online and the citizens get the SMS on their mobile phone with the grievance registration number. This number is used by complainant for tracking of grievance redressal online. CM Window has been implemented at all Districts at e-Disha Kendras & Sub-Division Offices in Haryana. More than 5.5 lakh grievances have been received and more than 90% of the grievances received have been addressed successfully through the platform.

e-Office project

In order to improve efficiency, effectiveness, turnaround time, transparency and accountability, an official order has been released by CS office with a direction to use e-Office software for electronic movement of files and ensuring compliance. As on date, more than 2 Lakh eFiles and 1.5 Lakh eReceipts have been moved in e-Office in 40 Departments in Haryana.

Litigation Management System

Litigation Management System is designed for Departments, Corporations, Boards and other state bodies to monitor the status of the case related to them. LMS is a Generic, integrated workflow based system to be implemented across Haryana Govt. The user Departments of LMS will enter their cases to them in the system. This software will be integrated with High Court for fetching out the data for cases related to the different departments. AG Office will work as a nodal office. It has been launched across 190 Departments/ Boards/ Corporations etc. of Government of Haryana. As on date, more than 4.235 Lakh cases have been entered related to Supreme Court/ High Court/ District Courts/

Tribunals etc. LMS has been integrated with Hon'ble Punjab and Haryana High Court.

Haryana Real Estate Authority (HRERA)

HRERA portal is successfully implemented in the entire state of Haryana via two authorities, RERA Panchkula and RERA Gurgaon respectively. The Jurisdiction of HRERA, Panchkula is entire Haryana except the revenue district Gurugram. Haryana Real Estate Authority, Gurugram situated at Gurugram has the jurisdiction of entire revenue district Gurugram. Haryana Real Estate Appellate Tribunal (HREAT) has been made functional with automated workflow in the present portal. A new Agent Registration Module for online registration and payment, a new Record Room Module for consigning records of cases which are disposed/dismissed etc. after hearings and a new Quarterly Progress Filing Module for filing quarterly progress by Promoter/ Developers has been added in portal. This filing of quarterly progress by Promoter/ Developers has been made mandatory and if not adhered to, HRERA authorities can penalize them financially and file sou-motu cases on the Promoters. Till date, the total projects registered in Panchkula and Gurugram are 352 & 401 respectively, total agents registered in Panchkula and Gurugram are 591 & 1298 respectively, total appeals registered at Appellate Tribunal are 967 and total Complaints registered in Panchkula and Gurugram are 3737 & 5526 respectively, total appeals disposed/ dismissed at Tribunal are 310 and total complaints disposed/ dismissed in Panchkula and Gurugram are 1903 & 2480 respectively.

Web-HALRIS (Haryana Land Records Information System)

Web-HALRIS is a Web-Enabled integrated solution for Deed Registration and land records management. Major modules included in WEB-HALRIS are Deed Registration, Jamabandi, Mutation, Khasra Gridawari and Reports etc. This software has been implemented in all 142 Tehsils. Salient features of WEB-HALRIS include integration of Deed Registration and land Records, integration with e-GRAS for E-Stamping, appointment for Deed Registration, Online Mutations, etc.

E-Girdawari

E-Girdawari is a mobile app to capture the details of the Khasra-Girdawari (Harvest Inspection) which is an important activity carried out by Revenue Department at least two times a year and special Girdawari is also held as and when exigency arises. During Khasra Girdawari, a register is to be prepared and be kept up by the Patwari. Until recently, the exercise was carried out manually and the record so collected is then entered in the HALRIS Software. No record like the GPS coordinates or the images of the crop were kept in the record. The Khasra-Girdawari is checked by the senior revenue functionaries also to ensure correctness of data so collected. Khasra Girdawari of Kharif 2019 is done using this mobile app. Next Rabi & Kharif Girdawari of 2020 are being performed using eGirdhawari Mobile App.

Workflow Based BPL Entitlement Portal

Since CSC/VLEs are already part of e-District ecosystem in state of Haryana, so it was decided to rollout Workflow Based BPL Entitlement service under e-District framework. Any citizen of Haryana who falls under BPL (Below Poverty Line) criteria can visit nearest CSC (Common Service Center)/ ADC office and submit his application. CSC/ ADC office will feed application online at https://edisha.gov.in/ with his credentials and generate a unique reference/ transaction no. for status tracking. Total BPL 9,72,727 registrations have been

done till now. Department of Rural Development and Urban Local Bodies department have laid down their inclusion/ exclusion criteria based on various socio-economic parameters. All DC approved applications are sent to Food and Civil Supplies department electronically for issuance of the BPL Cards. As per directions of Government, this exercise will continue now, and all approved cases will be sent on Monthly basis.

Meri Fasal Mera Bayora (MFMB)

A web portal (https://fasal.haryana.gov.in/) has been developed NIC Haryana for farmers to self-report crop sown information along with land and bank account details. For this, farmers can visit the web portal from any internet point. Farmers need to authenticate themselves through OTP received on their mobile number before filling-up all details. As per instructions, farmers have been denied reporting crop information on the Government land, but module has been made available to report crop details on panchayat land after farmer enters OTP received on the Sarpanch's mobile number. Farmers can also lodge their grievances as part of this portal. A module for grievance handling is also under process. A dashboard has been prepared on various parameters and is available at https://fasal.haryana.gov.in/dashboard.

e-Kharid system of Mandi Board for procurement has been integrated with MFMB via APIs to fetch real time information of Registered farmers along with Land and Bank account details. Filtered data has already been uploaded by Nodal officer of Agriculture Department daily in prescribed format to PM-Kisan National Portal.

End-to-End Computerization of Targeted Public Distribution System in Haryana

ePDS has been implemented across the State covering for Online Ration Cards Management, Allocation, Supply Chain Management, Ration distribution through PoS devices at FPS using Aadhaar based authentication using both Cash and Cashless (successfully carried out in Ambala and Panchkula on pilot basis) modes. During the COVID Lockdown, 5,94,646 DRTs (Distress Ration Tokens) have been generated for providing ration to the needy people who do not have any valid Ration Card and food grains have been distributed to all these needy people. The total number of Ration Cards in the State are 38,27,653. This system caters to more than 16,29,3419 beneficiaries. The computerization of ePDS has resulted in transparency in the system and thereby adding savings to the State exchequer by carrying out de-duplication of beneficiaries

Sirsi Village Pilot Project under HaLRMP

State Government is implementing the Cadastral mapping project jointly with Survey of India. The Survey of India has started the Large-Scale GIS mapping of entire Rural, Urban and Abadi Deh areas. The SoI has started implementing the prestigious project of Large-Scale GIS mapping of entire Rural, Urban and Abadi Deh areas. The pilot Sirsi village in Karnal has been completed for the Rural and Abadi Deh Area and field verification of Sirsi work has been done. Under the Sirsi pilot project, each property/ land in Abadi Deh (Lal Dora) has been mapped using Drones and uniquely identified. The digital cadastral map of rural/ agriculture land has been integrated with Web-BhuNaksha and Web-HALRIS for online partitions. The ‘Lal Dora’ signifies village land with Abadi (residential houses). The area is alienated from the agriculture land and, therefore, not included in revenue records.

Modernization of Revenue Record Room

To provide a comprehensive document management system for the Haryana

Revenue Department, NIC Haryana has developed a centralized solution for automation of storage and retrieval of scanned revenue records, court cases and official files. M/s CBSL has been engaged for digitizing the manual records of the Department, which includes scanning and storage of scanned pdf along with metadata. The developed solution has a mechanism in place for verification of the digitized record by the concerned official. It also has the provision to search and issue/ print the digitized records. The scanning, storage, verification & approval of scanned pdf file has been implemented at district level revenue record rooms. Search, print and issue module is under development.

RTI Web Portal

Digital delivery of Government services provides ease of access to the citizens. Faceless and paperless governance is a key to reduce physical contact of public with the Government. To confer to the Haryana Right to Information Rule 2009, Government of Haryana has developed a web portal to enable citizens to upload their RTI queries online. In the backend, a role bases access mechanism is established for each concerned Department through which the respective departments will be able to process and reply the RTI queries pertaining to their Departments.

Common service delivery

- Haryana has become the first state in to launch online delivery of 503 Govt. Schemes and Services via a single platform (SARAL). Citizens can also access these services through approximately 4000 Atal Seva Kendra and 115 Antyodaya Kendras throughout the State through SARAL. The vision is to deliver all the 550+ services and schemes to the citizens through the SARAL Platform.
- 390 Services of 33 Departments of Government of Haryana have been integrated with Rapid Assessment System (RAS) which empowers citizens to submit transparent feed-back of the services they have availed. As on date, more than 47 Lakh+ feedback communications have been sent through RAS. RAS – IVRS Integration is in the final stages of Go-Live.
- Implementation of Digital Locker is being carried out in the state. 19 documents of 7 departments already integrated with Digital Locker have been made available through the Digi Locker. A Government Order is being issued for integrating all certificate related documents over Digi Locker platform

e-Governance best practices of the state

- CM Dashboard is established on which monitoring of different departments on 391 KPIs/parameters is carried out on a regular basis
- Haryana has become the first state in to launch online delivery of 503 Govt. Schemes and Services via a single platform (SARAL). Citizens can also access these services through approximately 4000 Atal Seva Kendra and 115 Antyodaya Kendras throughout the State through SARAL. The vision is to deliver all the 550+ services and schemes to the citizens through the SARAL Platform.

ENABLER INDICATORS

e-Governance enabling processes

The Government of Haryana has developed and notified some policies aimed at driving economic growth in the State.

Information Technology and Electronics System Design and Manufacturing (IT & ESDM) Policy

- Focuses on
  i) Dedicated Land parcels allocated to IT/ITeS and ESDM units
  ii) Relaxation in Taxes, Stamp duty and electricity duty to IT/ ITeS and ESDM units
  iii) Cashless, Paperless and Faceless Governance and
  iv) Mobile first and cloud Platforms
- Single window Clarence System has been implemented to facilitate the investors
- New Entrepreneurs have started approaching IT Department for setting up new manufacturing units in the State of Haryana.
- A dedicated Nodal Officer from HARTRON has been deputed in July 2018 in Haryana Enterprise Promotion Centre to facilitate the investors throughout the investment lifecycle spanning from proposal application to approval of licenses/clearances
- 16 Incentive schemes under IT &ESDM Policy have been prepared and approved in principle
- A Memorandum of Understanding (MoU) has been signed with M/s Mitra Medical Services LLP on 5thSeptember 2018 for setting up their manufacturing unit for manufacturing of medical electronics devices in Faridabad. This project will bring 30 crores investment in the State of Haryana with an expected employment of 120+ employees.

Startup Policy

- Provision for infrastructure Augmentation for Startups has been included
- The HARTRON Multi Skill Development Centre (HMSDC) was established with a total area of 1,20,000 Sq. feet to boost the startup eco system in the state
- 3 Incubators 'NASSCOM 10K Startup Warehouse', 'IAMAI-GoH Mobile 10X Hub' and 'Center of Excellence for Internet of Things (CoE-IoT)' are operational
- 45 Start-ups (125 seats) are being incubating at the 3 Incubation Centres
- MOU with United Nations Technology Innovation Lab (UNTIL) for focusing women entrepreneurs is already signed and one with STPI for Block chain technology is under process

Communication & Connectivity Infrastructure Policy

- The CCI Policy amended and notified on 6th October2017 to align with provisions of Indian Telegraph Row Rules 2016, include liberal provisions of Govt. of India and suggestions of stakeholders such as Tower &Infrastructure Providers Associations (TAIPA), Cellular Operator Association of India (COAI)
- The number of undertakings from Telecom Infrastructure provider reduced to one single format each for over and under ground
- Specific guidelines have been added for installing communication/ mobile towers on Govt. land & buildings
- Provisions to form committees at State & District level to address public grievances have been given
- The process of Right of Way has been made online and integrated with invest Haryana portal

Cyber Security Policy

- Focuses on Cyber Security Incident Management, Privacy Management, Compliance, Frameworks and protection of IT/ICT Systems
- Provision for setting up of Cyber Security investigation labs
- Capacity Building in alignment to national requirement

Apart from this, Government of Haryana made changes to the MSMEs Development Act, 2006 to notify preferences and policies for procurement of Goods & Services produced & supplied by Micro & Small Enterprises to the Government Departments/ Agencies from time to time in order to facilitate promotion and development of Medium & Small Enterprises.

The implementation of these policies in the State has been an enabling factor in the progress and growth at the State level.

State level initiatives towards Capacity building for eGovernance

Development and rollout of ISMO e-Learning Portal:

The vision of the project was to provide a platform to the Students of Haryana to learn basic concepts of Cyber Security and develop their cyber hygiene, which will enable building up of safe, secure and resilient cyber space in Haryana.

The Haryana state government has been a key driver for increased adoption of IT-based products and IT enabled services to citizens, Government Stakeholders and businesses. Such initiatives have enabled increased IT adoption in the state which has led to creation of large-scale IT infrastructure with corporate / private participation.

With the evolving IT infrastructure landscape and tremendous increase in number of ser-vices being offered through IT systems, there emerged a need to address the cyber security challenges. In view of the above the Information Security Management Office (ISMO), Electronics & IT Department Haryana initiated proactive measures to increase awareness and understanding of Information security issues among the end user working in State Government domain and Students.

Further, the Cyber Security Policy 2017 of Government of Haryana was launched by Hon'ble Union Minister, Electronics & Information Technology Sh. Ravi Shankar Prasad and Hon'ble Chief Minister Haryana on September 2017. One of the important aspects of the policy envisages building cyber security hygiene among students which are approximately 5 Lakh in number.

In view of the above, Head SeMT/ CISO, Govt. of Haryana through in-house team of developers has developed a full fledge e-learning module under the ISMO portal which provides courses on cyber security, primarily with focus on Students, such that they can adopt best practices with respect to cyber threats, information security and data privacy etc. and apply these in there day to day life. The e-Learning module was launched by the Hon'ble Finance Minister of Government of Haryana on 15thJanuary 2019 at Digital Innovation and Cyber Security Summit at Gurugram.

The e-Learning module presently covers courses on different areas of Cyber Security the list of topics are as follows:

- Email Security
- SPAM
- E-Mail Threats & Tips
- E-Mail & Chatting
- E-Mail Fraud

- Threating E-Mail
- Account Hacking
- Internet Security
- Phishing
- Chatting
- Malware
- Malware
- Virus
- Wi-Fi
- Cyber Bullying
- Key Logger
- Mobile Security
- Ransomware

The content of courses is designed in collaboration with Centre for Development of Advanced Computing (CDAC) an Autonomous Scientific Society of Ministry of Electronics and Information Technology, Government of India

The e-learning module will provide a platform to the Students of Haryana to learn basic concepts of Cyber Security and develop their cyber hygiene, which will enable building up of safe, secure and resilient cyber space in Haryana

There are approximately 5 lakh school students in Haryana and the Haryana Cyber Security Policy envisions creating cyber security awareness among these school students. The e-learning platform is an ideal platform to enable the mandate of the policy to create cyber security awareness among 5 lakh students of Haryana which would have otherwise cost the State Govt. close to Rs 5 Cr. considering per head cost of Rs 100.

The e-learning platform enables the courses are under two categories a) for students from 5^{th} to 8^{th} standard and b) for students from 9^{th} to 12^{th} standard, accordingly students can understand the course content with respect to their standard and use that to develop cyber hygiene.

After completion of the course content the student goes through a multiple-choice question based 'Quiz' and if the quiz is successfully completed a system generated certificate from ISMO is given to the student.

Emerging technologies relevant for the State

Government of Haryana aims to foster the Innovation & entrepreneurial ecosystem by providing necessary support to the young entrepreneurs as per provisions of policy/ schemes and establishing connect with industry/ academia while providing access to industry experts in the field of emerging technologies. In this direction,

- HARTRON Multi Skill Development Centre (HMSDC) has been established with a total area of 1,20,000 Sq. feet wherein incubators have been made operational to boost the Innovation & entrepreneurial ecosystem in the State.
- The GoH 10x Mobile Hub with IAMAI has been created to foster Haryana's Innovation, Entrepreneurial & App development eco-system and further make Gurugram a global Hub for apps innovation, development & testing.
- A Centre of Excellence for Internet of Things (CoE-IoT) has also been established since 5th October 2018 with NASSCOM as knowledge partners to create the physical infrastructure labs for IoT domain for

development & validation of solutions in the field of Health, Agriculture, water, transportation, energy etc. from designing to prototyping in collaboration with Government, Industry & Academia along with a full-fledged operational 'IoT lab'.

- In addition to this, the NASSCOM 10K Start-Up Warehouse aims to make the state a global start-up destination. It shall also facilitate early stage technology start-ups through incubation, acceleration & academia link.
- For encouraging Women entrepreneurship, the United Nations Technology Innovation Lab (UNTIL) is being established which shall also enhance digital inclusion through – 'Global venture capital/ investment in women in technology', 'Support local women start-up eco system with global collaborations' and 'Promote global technological opportunities for women in Haryana'.

Government of Haryana is making consistent efforts in building up a dynamic & concrete Start-up Ecosystem in the State that stimulates independent thinking, innovative ideas and helps Start-ups in different stages of their entrepreneurial journey. Innovation and Start-up Hub in Gurugram has been fully operational with a total area of 1,20,000 Sq. feet providing world class infrastructure and facilities to the Start-up Ecosystem Stakeholders. Three Government owned Incubators NASSCOM 10K Start-up Warehouse', 'IAMAI-GoH Mobile 10X Hub' and 'Center of Excellence for Internet of Things (CoE-IoT)' are providing facilitation to more than 40 Start-ups (having 30 % women entrepreneurs) with 100+ team members in-house and multiple external start-ups from across the State. United Nations Technology Innovation Lab (UNTIL) to promote culture of entrepreneurship and innovation among women entrepreneurs is setup and ready for operations. Incubator with Software Technology Parks of India (STPI) for Block chain technology is set up and ready for operations. BSC BioNEST Bio-Incubator Incubator in Faridabad has been associated with the State Start-up Ecosystem to create a robust incubation network in the state.

DITECH with a view to ease the start-up entrepreneurship is strengthening the foundation of the start-up ecosystem in the state by associating academia through establishment of Incubation Centres across 07 (Seven) State Universities campus for which Grant of INR 30 lakhs to each State Universities has been provided by the State Government to encourage the Student entrepreneurs in the State.

The State Government also provided a special financial relief measures to its Start-ups working in Government owned Incubators in the form of rental waiver for a period of 02 months i.e. from 15thMarch 2020 to 15thApril 2020 in view of the COVID-19 situation.

Government of Haryana is setting up a Centre of Excellence for "Block Chain" Technology at STPI Gurugram with State of Art Incubation facilities admeasuring approximately 10000 Sq. ft. CoE will use IBM Block chain platform built on Linux Foundation's hyper ledger Fabric and Hyper ledger Composer. The IBM Block chain Platform provides a managed, full stack block chain-as-a-service (BaaS) offering delivered through the IBM Cloud. The CoE shall explore other emerging platforms for block chain technology and not be restricted to IBM platforms only.

Hon'ble Chief Minister of Haryana has signed six MOUs with different companies in London on 12th May 2019 to facilitate investments in Haryana in

diverse fields, including fintech, smart cities, emerging technologies, transfer of advanced technology and setting up of an IoT Innovation Centre in Gurugram.

- The MOU with UK India Global Business Limited (UKIGB) seeks to promote development of smart technology infrastructure (STD), especially focused on aero-space and defense companies
- The MOU with Pontaq, a UK India Innovation Fund, aims to focus on Fintech, Smart Cities and Emerging Technologies.
- The MOU with Xelba Limited, under which Xelba will provide intellectual property and knowledge and hardware and software tools to deploy such a project, along with the creation of an IoT innovation centre in Gurugram.
- The MOU with Relmatech Limited, a leading provider of Remote ID and Tracking Systems for unmanned aircraft systems or drones, would increase development activities in the field of remote ID and tracking of unmanned aircraft systems in Haryana.
- The MOU with GoodBox will offshore a multitude of functions, including both manufacturing and services.
- The MOU with ZapGo Limited, developer of a new generation of fast-charging energy storage devices would help in establishing a manufacturing site for ZapGo in Haryana

Memorandum of Understanding (MoU) has been signed between Survey of India, Department of Science Technology, Government of India and Department of Revenue & Disaster Management, Government of Haryana on 8th March 2019 for Large Scale Mapping using UAV (Unmanned Aerial Vehicles)/ Drones for Revenue, Urban and Rural area including Ground control Network and preparation of geo-referenced cadastral revenue Maps for State of Haryana. The project covers entire State of Haryana, approx. 44212 sq. km. Haryana Government has decided on 1st June 2019 to conduct aerial surveys by using drones to keep a check on the illegal encroachment and construction on government properties in the State. To begin with, such survey would be conducted in Karnal, Gurugram and Faridabad. Urban Local Bodies department to take the assistance of Haryana Space Applications Centre (HARSAC) and National Remote Sensing Authority (NRSA) for the satellite imaginary of the areas and for setting up of ground control points necessary for conducting the survey. Haryana is the first State to set up 700 primary and secondary ground control points in the State.

Awards and recognitions at State level for eGovernance initiatives

List of Awards – 2020

- Haryana got Award of Appreciation for Progressive State in Governance at CSI SIG eGovernance Awards 2019 at CSI Annual Convention 2020 Bhubaneshwar
- Haryana Cashless Consolidation Portal (HCCP) has received the award for excellence under Smart Banking Initiative category at elets India Transformation Summit on 10th July 2020
- Infosec Leader of the Year Award to Sh. Munish Chandan, Head SeMT,Haryana–CISO Mag Summit & Awards India on 30th July 2020

List of Awards – 2019

- Haryana Cashless Consolidation Portal has received Technology Sabha Award at 16thFebruary 2019 at Kochi
- Haryana Cashless Consolidation Portal (HCCP) has won the Excellence in E-Governance award at the CISO MAG Award on 26thMarch 2019

- e-learning Platform for Cyber Security, ISMO, Department of Information Technology, Electronics & Communication has won the Best Cybersecurity solution of the year- Education award at the CISO MAG Award on 26thMarch 2019
- Government Department for major digital transformation and services sector to IMC DT Awards 2018 to Haryana Cashless Consolidation Portal (HCCP) in April 2019
- Government Department for major digital transformation and services sector to IMC DT Awards 2018 to Haryana State Portal in April 2019
- Digital Leader of the Year (eGovernance) to Sh. Ankur Gupta, PS (DITECH) - Business World Digital India Summit & Awards -2019
- Haryana Cashless Consolidation Portal (HCCP) for Best Financial Inclusion Initiative - Business World Digital India Summit & Awards -2019
- ISMO e-Learning Platform for Best Education and Healthcare Service Initiative - Business World Digital India Summit & Awards -2019
- Digital Leader of the year to Sh. Manohar Lal Khattar, Hon'ble CM of Haryana - DigiTech 2019 Awards
- IT Excellence Award for Durga Shakti Application Award by Express Computer – 18thSeptember 2019
- IT Excellence Award for Adoption of Technology for various projects to Department of Information Technology, Electronics & Communications, Haryana by Express Computer – 18thSeptember 2019
- The Haryana - Realtime Automated Feedback Dashboard (H-RAFD) won in the category of Analytics/Big Data in the Technology Sabha Award held on 08-10 August 2019
- Haryana got Digital State Award in Governance Now Digital Transformation awards on 6th November 2019 at New Delhi where multiple projects were awarded like Cashless Portal, ISMO Portal & security measures, Real time Automatic Feedback Dashboard, Startup Haryana, etc.

List of Awards - 2018

- The Employee Loan Management System project received Prestigious CSI – Nihilent e-Governance Award of Appreciation – 2017, presented by Shri Rao Rajendra Singh, Deputy Speaker of Rajasthan Legislative Assembly, on 20thJanuary 2018, at the 52ndAnnual convention of Computer Society of India, at Science City Auditorium, Kolkata, West Bengal
- The Online Drug Inventory and Supply Chain Management System (ODISCM) project received Prestigious CSI – Nihilent e-Governance Award of Appreciation – 2017, presented by Shri Rao Rajendra Singh, Deputy Speaker of Rajasthan Legislative Assembly, on 20thJanuary 2018, at the 52ndAnnual convention of Computer Society of India, at Science City Auditorium, Kolkata, West Bengal
- The e-Transport MMP Implementation project received Prestigious CSI – Nihilent e-Governance Award of Recognition – 2017, presented by Shri Rao Rajendra Singh, Deputy Speaker of Rajasthan Legislative Assembly, on 20thJanuary 2018, at the 52ndAnnual convention of Computer Society of India, at Science City Auditorium, Kolkata, West Bengal
- Technology Sabha Award (An Express Group Initiative) presented to E&

IT Department, Govt. of Haryana in the category of Analytics/Big Data at Indore on 22-24 February 2018

- The Haryana – Real time Automated Feedback Dashboard (H-RAFD) won 4thBW Business World Digital India Submit & Awards presented to E& IT Department, Govt. of Haryana in the Category of Most Innovative Citizen Engagement through Technology on 18thMay 2018
- Cashless Haryana Consolidation Portal won 4thBW Business World Digital India Submit & Awards presented to E& IT Department, Govt. of Haryana in the Category of Best implementation of Digital Payments on 18thMay 2018
- The Haryana State cyber Security Policy Framework received Prestigious SKOCH Order of Merit Award – 2018, on 23rdJune 2018 at, New Delhi.
- Haryana Cashless Consolidation Portal received Prestigious SKOCH Order of Merit Award – 2018, on 23rdJune 2018 at, New Delhi.
- Paperless Haryana Implementing Digital Locker (PHIDL) received Prestigious SKOCH Order of Merit Award – 2018, on 23rdJune 2018 at, New Delhi.
- Haryana Cashless Consolidation Portal has received best system Integration solution provider award in 3rdElets BFSI CTO Summit awards on 12th Aug at GOA
- Authentication User Agency (AUA) Haryana has received most Promising IT solution award in 3rd Elets BFSI CTO Summit awards on 12thAug at GOA
- Haryana -Real Time Automated Feedback Dashboard (HREFD) has received best data Analytics Solution in 3rdElets BFSI CTO Summit awards on 12thAug at GOA
- Paperless Haryana Implementing Digital Locker (PHIDL) has received Digital India Excellence Award at Elets Digital India Conclave on 30th August 2018 at Chandigarh
- Haryana Cyber Security Policy Framework Digital India Excellence Award at Elets Digital India Conclave on 30thAugust 2018 at Chandigarh
- Haryana Cyber Security Capacity Building Framework has received award at Awards at Elets Smart City Conclave on 16thNov 2018 at Chandigarh
- Haryana Information Security Management has received eIndia Digital Transformation award at 13theIndia Digital Transformation Summit on 13thDecember 2018 at New Delhi
- Haryana Cashless Consolidation Portal has received eIndia Digital Transformation award at 13th eIndia Digital Transformation Summit on 13th December 2018 at New Delhi
- Haryana State Application Audit Policy has received Skoch Order of Merit award on 22ndDecember 2018 at New Delhi
- Haryana State Cyber Security Capacity Building Framework has received Skoch Order of Merit award on 22ndDecember 2018 at New Delhi
- Haryana State Cyber Security Policy Framework has received Skoch Order of Merit award on 22ndDecember 2018 at New Delhi

List of Awards - 2017

- The e-District Haryana project received Prestigious CSI – Nihilent e-

Governance Award of Excellence – 2016, presented by Dr. Ajay Kumar, Addl. Secretary MeitY, on 24thJanuary 2017, at the 51stAnnual convention of Computer Society of India, at Hotel LeMeridien, Avinash Road, Coimbatore, Tamil Nadu

- Dynamic Integration of Property Registration, Land Records and Cadastral Maps Haryana received Prestigious "Gem of Digital India 2017" award by Coeus Age Consulting & Sify technologies Ltd in collaboration with Ministry of Electronics and Information Technology (Meity) at the Shangri La, New Delhi on 7thJune 2017
- The E-Samarth abbreviated as Smartness and Strength Analysis to Motivate Academically Weak for Rapid Learning Through Highly Efficient Methods": e-Samarth: The E-Learning Classes project received Prestigious SKOCH Golden Award – 2017, on 9thSeptember 2017 at the Constitution Club India, New Delhi.
- The E-Dashboard for Elections: Haryana's Indispensable Route for Monitoring & Enabling Transparency in Polling developed at NIC-Hisar project received Prestigious SKOCH Golden Award – 2017, on 9thSeptember 2017 at theConstitution Club India, New Delhi.
- The CM Announcement monitoring system for Chief Minister Secretariat, Govt. of Haryana received Prestigious SKOCH Golden Award – 2017, on 9thSeptember 2017 at theConstitution Club India, New Delhi.
- The CM e-Dashboard for CM office Haryana project received Prestigious SKOCH Silver Award – 2017, on 9thSeptember2017 at theConstitution Club India, New Delhi.
- The Haryana - Realtime Automated Feedback Dashboard (H-RAFD) received Prestigious SKOCH Silver Award – 2017, on 9thSeptember2017 at theConstitution Club India, New Delhi.
- The Haryana State Rural Livelihood Mission project received Prestigious SKOCH Silver Award – 2017, on 9thSeptember2017 at theConstitution Club India, New Delhi.
- e-GRAS (Govt. Receipt Accounting System) project received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember2017 at theConstitution Club India, New Delhi.
- Medico Legal Examination and Post-Mortem Reporting System with Integration of Laboratories of State of Punjab, Haryana & Chandigarh project received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember2017 at theConstitution Club India, New Delhi.
- Online Drug Inventory and Supply Chain Management System (ODISCM) project received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember2017 at theConstitution Club India, New Delhi.
- Revenue Court Cases Monitoring System (RCCMS), Haryana project received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember2017 at theConstitution Club India, New Delhi.
- Online inviting of applications and Online Entrance Test (OLET) for admission to AICTE approved Technical Courses in Haryana received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember2017 at theConstitution Club India, New Delhi.
- Preparation & Consignment of Jamabandis Karnal for the year 2016-17 received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember 2017at theConstitution Club India, New Delhi.

- Haryana State Information Security Management Office (HS-ISMO) received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember2017 atthe Constitution Club India, New Delhi.
- Redesigning of Budget as Revenue and Capital in Integrated Financial Management System (IFMS), Haryana received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember2017 atthe Constitution Club India, New Delhi.
- Aadhaar enabled Public Distribution System (AePDS) received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember2017 at theConstitution Club India, New Delhi.
- e-Girdawari received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember2017 atthe Constitution Club India, New Delhi.
- Haryana- Social Security Pension Schemes through DBT received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember 2017 atthe Constitution Club India, New Delhi.
- e-District Haryana (e-DisHa) received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember2017 atthe Constitution Club India, New Delhi.
- Agriculture Related License Issuance System received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember2017 atthe Constitution Club India, New Delhi.
- Agriculture Related License Issuance System received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember2017 atthe Constitution Club India, New Delhi.
- e-Stamping of Treasuries & Accounts Department, Haryana received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember2017 atthe Constitution Club India, New Delhi.
- Online Treasuries Information System (OTIS) of Treasuries & Accounts Department, Haryana received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember 2017 at the Constitution Club India, New Delhi.
- e-GRAS- The Virtual Payment Aggregator of Treasuries & Accounts Department, Haryana received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember 2017 at the Constitution Club India, New Delhi.
- Integrated Finance Management & Human Resources Management System (IFM #HRMS) of Treasuries & Accounts Department, Haryana received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember 2017 at the Constitution Club India, New Delhi.
- Integrated e-Municipality System, of Department of Urban Local Bodies, Haryana, Haryana received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember 2017 at the Constitution Club India, New Delhi.
- Visitor Pass Management System integrated with Security Check-in Mobile App, Haryana, received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember 2017 at the Constitution Club India, New Delhi.
- Migration of all the Authorities of Haryana to Sarathi on Web (SOW4) – Online Services for Driving License related service to Citizen Haryana, received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember 2017 at theConstitution Club India, New Delhi.

- Migration of all the Authorities of Haryana to Vahan ver. 4 Online Citizen Centric Services related to Vehicle Registration, Fitness, Tax and Permit of Private and Commercial Authorities,received Prestigious SKOCH Order of Merit Award – 2017, on 9thSeptember 2017at theConstitution Club India, New Delhi

List of Awards - 2016

- SRDB (State Resident Data Base) Establishing One-State One-View for all its residents. Aadhar is the primary key. De-duplicating the beneficiaries received Skoch Order of Merit Award-2016 at HICC Hyderabad on 8thSeptember 2016
- Extensive ICT interventions in EoDB (Ease of Doing Business) with SWCS (Single Window Clearance System) & Investor Web Portal for industrial clearances, Integration of various regulatory services of different departments on Investors portal, and Online Service for Grievance Redressal and Dispute Settlement and extensive interactions with the consulting teams has helped Haryana to achieve rank 6thin EoDB ranking of Govt of India in October 2016. During pervious ranking, Haryana was at rank 14thin EoDB
- The e-Governance & digital Haryana initiatives have been recognized at national level. The State received the India Today's prestigious Award 2016 of Most improved State in e-Governance for the outstanding performance in e-Governance during last 2 years. The award was received by APSCM Haryana on behalf of Hon'ble CM on 5th November 2016 at New Delhi from Hon'ble Union Finance Minister of India
- Received Digital India "Web Ratna State Silver" Award 2016 on 19th December 2016 from Sh. Ravi Shankar Prasad, Hon'ble Minister MeitY

State specific eGovernance success stories case studies Publications - references

"Journey of Haryana State towards Less Cash Economy" was selected and published in the "Compendium of Selected Papers 2019" booklet published by Dept. of Administrative Reforms & Public Grievances (DARPG), Ministry of Personnel, Public Grievances & Pensions, Government of India

Specific gap areas – Policy level, process level, Technology level that State plans to pursue and improve

Haryana State Data Centre 2.0:

The overall objective is expansion and creation of a new data centre which will be created exclusively and dedicatedly as a Tier-II HSDC 2.0. It is envisaged that HSDC 2.0 will provide better operations & management control and minimize overall cost of Data Management, IT Management, Deployment and other costs.HSDC 2.0 would provide many functionalities out of which some key functionalities are Central Compute & data repository, Secure Data Storage, Active-Passive Disaster Recovery, Online Delivery of Services. HSDC 2.0 project will offer to the various departments of the State to host their services/ applications on a common infrastructure leading to ease of integration and efficient management, ensuring that computing resources, support and the connectivity infrastructure is adequately and optimally used. This shall include State-of-the-art Hyper Converged Infrastructure (HCI), upgradation of the overall cyber security infrastructure of the SDC and setting up of (SoC), etc.

IT Cadre:

To support implementation of the approved IT Plans/ e-Governance Initiatives of the various Departments/Boards/Corporations, it has been considered

prudent to create IT Cadre in the State to have a uniform set of competent IT Manpower. A total of more than 500 resources shall be hired as part of this initiative. This shall help the State Government to ensure to create a common pool so that there areenough technically qualified resources/ manpower in each Department and District for the implementation of various eGovernance/ IT projects. This has been done to streamline the IT resource usage, reduce the dependency of hiring manpower for each project separately and identify the common IT needs of various Departments which has always been a challenge for the State Government. The first phase of hiring the resources for the positions of CITO, Jt. CITOs and SEOs has been completed and the team has been working with DITECH for last 1 year.

Startup ecosystem:

The Startup Policy of Haryana was notified in October 2017 to provide excellent infrastructure, access to markets, industry experts, fiscal thrust as a basic ecosystem for Entrepreneurs. By virtue of the provisions made in the policy, Haryana Government intends to facilitate entrepreneurs and startups through a strong network of Incubators by leveraging the existing infrastructure present in the state. As per the Entrepreneurs and Startup Policy 2017, the Incubators are expected to provide Multi-tenant facilities, center of knowledge transfer and stakeholder network with on-site management and business support strategies that direct diverse business incubation programs while working towards achieving the overall objective as under:

- Execute partnerships with global accelerators, private companies, trade associations, think tanks etc. for building a model mentorship platform offering a range of expertise that can make the centre a creative and innovative powerhouse
- Facilitate partnership with globally recognized startups based in the state with the intent to create a learning system that can help local startups scale globally

There has been steady progress in creation of new incubation centres and utilization of existing incubation network. However, to bring the State of Haryana among the top few states in the country, there is a need to establish strict timelines and a comprehensive policy implementation plan.

DITECH with a view to ease the start-up entrepreneurship is strengthening the foundation of the start-up ecosystem in the state by associating academia through establishment of Incubation Centres across 07 (Seven) State Universities campus for which Grant of INR 30 lakhs to each State Universities has been provided by the State Government to encourage the Student entrepreneurs in the State.

The State Government also provided a special financial relief measures to its Start-ups working in Government owned Incubators in the form of rental waiver for a period of 02 months i.e. from 15thMarch 2020 to 15thApril 2020 in view of the COVID-19 situation.

Shri V. Umashankar, IAS, *Principal Secretary to Government Haryana, Information Technology, Electronics and Communication, Haryana, officeapscm@gmail.com, v.umashankar@gov.in*

Shri Munish Chandan, *Head, State eGovernance Mission Team (SeMT), DITECH, Government of Haryana, munish.chandan@semt.gov.in, headsemt-hry@semt.gov.in*

State of Uttar Pradesh

S.P Goyal and R.H.Khan

Key aspects of the State's e-Governance Road Map for the next five years

In Uttar Pradesh the 'E' in eGovernance is for 'EASE' or "Ease in doing Business" and the major thrust of all eGovernance initiatives is to make government processes & services easier for both - the Citizen and the Businesses. It is aimed at extending IT enabled services to the remote and far flung areas of the state benefiting the rural poor and re-engineering, simplifying the government processes to leverage the use technology making system more interactive and transparent. This not only bridges the digital divide to a great extent, but also creates faith and trust in the government system, and facilitates rural prosperity & rural empowerment.

'Efficient, honest, sensitive, simplified and organized' – is how the state government will like to define itself in the modern day world. The ability to provide responsive and friendly government services is the need of the hour and the state government has embraced the concept of eGovernance, undertaking numerous initiatives to turn this dream into reality. It has in place an IT policy, which aims at the creation of investment opportunities and building of a knowledge-based society by the year 2022, An institutional framework has been put in place for development of IT industry in the State with committees headed by Hon'ble Chief Minister & people from IT industry, State & Department mission teams have been formed for identification of projects with public interfaces, ICT infrastructures are being developed and spread right across the state down to the tehsil and block level. The aim is to enhance democratic values, enable access of public information and empowerment of citizens and businesses. The concept of community participation is getting evolved through interactive portals and applications like CM Helpline, CM Dashboard, IGRS, NiveshMitra, eDistricteHospital, eOffice, eProcurement, ePDS, eParikshа, MSMESoft, electronic allotment of liquor shops, ManavSampada, and many others spread across the entire spectrum of G2G, G2B, G2C, G2E, G2S Services.

The IT vision of the state government and some of the key activities planned for the next 3-5 years are:

- Develop Uttar Pradesh as a leading IT/ITeS investment destination and create a conducive environment for the growth of investors, entrepreneurs and start-ups.
- Generate employment opportunities and nurture entrepreneurship among the youths in Uttar Pradesh and create equitable and balanced growth across the state by enabling effective use of technology.
- Establish IT Parks to promote skill development and job opportunities in the area by providing technical courses in Big Data, Cloud Computing, Internet of Things (IoT), Machine Learning, Artificial Intelligence and Cyber Security. Education System will be modified to impart innovative courses for students including latest technologies in the above mentioned courses in curriculum.
- Ecosystem will be created to promote investment in the IT and ITeS sector. In order to attract investors in IT/ITeS/BPO/Electronic sectors, government to give more policy incentives and benefits as compared to rest of the state.

- To develop incubators to foster entrepreneurship culture and promote start-ups, considering the backwardness and lack of opportunities for youth in smaller districts.
- Various incentives to be provided for Incubators such as capital grant, Rebate on Lease/ Rental Space, 100% Reimbursement of paid Stamp Duty and Registration Fee and on electricity duty for a period of five years, Mentorship Assistance and Accelerator Programs.
- To build more efficient Center of Excellences (CoEs) which will promote Big Data, Cloud Computing, Internet of Things (IoT), Machine Learning, Artificial Intelligence, Cyber Security, Clean-Tech, Edu-Tech, Agri-Tech, Health-Tech and other areas of social or national importance
- Host Institutes like Government and Private Technical, Management, R&D Institutes, Organizations/ Non-Profit Organization/ Corporates/ Industry Association or through PPP mode can establish CoEs. It is expected that the CoE would become self-sustainable by the end of 5years.
- To build more efficient Citizen Service Delivery Centers through internet and Common Service Delivery outlets such as Jan Seva Kendra, Lokvani, e-Suvidha etc.
- Development and enhancement of unified and integrated portals such as CM Dashboard, Common Database for DBT Schemes, Integration of Land Records and Land Registry, centralized eServices portal citizen-centric service delivery (eDistrict) and various other sectors as next step towards eGovernance.
- Shifting from manual system of authentication and verification to technology based verifications using Aadhaar, Digital Locker and already automated databases available with the government.
- Using DBT through PFMS for all beneficiary fund transfer schemes in the state to minimize leakages and ensure that the benefit reaches the real beneficiary.
- Build a robust IT infrastructure in the state including State Wide Area Networks, Data, Centres and Application Development Centres to take IT to the masses at a much higher speed.

Examples of State level Institutional partnership plans

Uttar Pradesh has been consistently focusing on developing infrastructure, human capital development and effective policy measures to create conducive environment for the growth of IT-BPM industry and start-up ecosystem. The Uttar Pradesh IT & Start-up Policy aims to tap in the potential of technology sector as a great harbinger of change, reaping in benefits of job creation, innovation and holistic socio-economic development.

The State Government has heralded tremendous transformation by creating an enabling policy environment, in tandem with undertaking proactive initiatives for translating these policies on ground. Uttar Pradesh has developed the twin cities of Noida and Greater Noida as leading software and start-up hubs. Spreading the growth in an equitable and balanced manner, Tier-II and Tier-III cities stand to benefit immensely from all round development initiatives. A state of the art IT City is being established on PPP model in Lucknow. Further, IT Parks are being set up in cities like Agra, Meerut, Kanpur, Gorakhpur, Varanasi, Bareilly etc.

With the goal of nurturing innovation and entrepreneurship and encouraging youth in Uttar Pradesh to become “Job creators” instead of “Job seekers,” the

State is taking laud worthy efforts. An INR 1000 Crore Uttar Pradesh Start-up Fund is being established to provide access to finance, exclusively to UP based start-ups. Incubators have been developed at premier institutes like IITKanpur, IIT-BHU, IIM-Lucknow (Noida), KNIT Sultanpur to inculcate start-up culture among young entrepreneurs and innovators. The country's biggest Incubator is envisioned to be established in Uttar Pradesh to galvanize start-up revolution in India.

In congruence with Digital India vision, the State Government has made quantum leaps in the areas of governance and service delivery with the introduction of single window for all the citizen centric government services under e-District. More than 65,000 CSCs are delivering G2C/B2C services to citizens. Ushering in digital transparency in procurement process, path-breaking initiative of e-tendering has been implemented across all Government departments.

Under Bharat Net, all villages across Uttar Pradesh are set to be connected through optical fibre connectivity. To ensure creation of friendly business climate through ease of doing business reforms, single window clearance mechanism has been instituted at UdyogBandhu. Further, for guiding and facilitating investors, entrepreneurs and start-ups under UP IT & Start-up Policy, a dedicated policy implementation unit has been established at UP Electronics Corporation Limited. The best of industry consultants have been roped in as the policy implementation unit partners.

Events such as the UP Investor Summit have made an impact as 68 MoUs worth more than 55,283 were signed in the Electronics, ITeS and Start-up category that will generate an employment for more than 7.5 lakh people. It also sends a positive signal to the outside world showing the intent of the state government in fostering industries and businesses.

Many policy frameworks have been out in place to help the start-ups and IT/ITeS sector some of which include:

- Various incentives are provided for startups such as Patent Filing Cost, 100% SGST reimbursement, reimbursement to startups for participation in events upto INR50,000 for national events and INR100,000 for international events
- Start-ups are entitled to work across all sectors (e.g. agriculture, health, education, IoT, 3D printing, Big Data etc.) and they should be supported by technology.
- The selected start-ups shall also be eligible to receive free incubation support for a period of 2 years in Incubator/ Accelerator/ CoE supported by State Government under UP Start-up Policy
- Implement office automation systems such as eOffice, eProcurement, GeM in all the State Government Departments to infuse transparency in government dealings and fast tracking the processes. Government Process Re-engineering (GPR) has played a critical role in almost all these initiatives.

Key challenges faced in eGovernance journey

UP is one of the largest and most populous state of the country, and rolling out any project in the state is a Herculean task in itself. In Hon'ble Chief Minister's own words "Our biggest challenge was to change UPs image, to make it a state with Vishwas, Vikas and Sushasan (belief, development and good administration). We are faced with several challenges, like reversing the poor law and order situation, bringing development back on track and restoring the

faith of people in democracy. We have treated these challenges as opportunities to take the state on path of all around development".

Information Technology has played a key role in transforming Uttar Pradesh from IT laggard state to the front runner in implementation of various Digital India initiatives. The journey has been full of hard work, grit and determination of the State Government, NIC, and IT Professionals involved in the projects at the grass root levels which have targeted all the three planks suggested by the Hon'ble Chief Minister. IT projects aimed at ensuring transparency in Government transactions, early and time-bound redressal of grievances, IT based monitoring of various development related schemes and projects, emphasis on eLearning & skill development have all resulted in building faith & trust in Government functioning. It has also resulted in generating employment opportunities for the youth. Many of the technical innovations have been appreciated not only in India but other parts of the world as well. UP is in process of rolling out many eGovernance projects at the National Leve too including eDistrict, eNagarseva, eParikshа& DARPAN. The state has witnessed immense changes and in the most recent Smart City rankings, four cities from UP have featured in the list of 100 with Agra on Top. The state is surging ahead with a mission to take Information & Communication Technology to every village, to every citizen, to every business and to transform the way Government works using ICT.

Some of the challenges faced are:

- **Government Policies**: Most of the earlier government policies were focused on development of IT in software, hardware and networking rather than a holistic approach focusing on social induced development by employing IT in various developmental programmes. There was a need on part of the government to develop an overall strategy for the participation of local institutions to take the ICT to the masses. The government revised the framework of IT implementation by encompassing various sectors such as education, healthcare, courts, industries, MSME, employment and skill development, social pensions, public distribution system, police, public grievances and many others which directly or indirectly impact life of each and every citizen of the State. After accomplishing this the government is now moving towards integration of services and portals, common service delivery mechanisms thereby consolidating the work done in IT so far.
- **Capacity Building & Change Management**: One of the major concerns about these development programmes is that when they are at the pilot stage they work fine but when they are implemented fully the question of sustainability arises because of existence of gap between the training provided to officials at pilot stage. Therefore, there is need for redevelopment or learning in the application of tools for effective implementation of projects. The same is true for the change management – once the project is rolled out the change required in the working at the field level and trust factor needs to be continuously monitored and enhanced. The state government has done considerably well in both these areas. Many Awareness/ Sensitisation workshops have been organised across the state for implementation of eGovernance projects at districts and state level. Workshop/ Training has been organized for Government officials on Social Media and Mobile Governance all this has resulted in better informed citizen and well

trained government official

- **IT Infrastructure:** The IT infrastructure which poses a challenge at all times has been addressed by some of the major enhancements in form of UP State Wide area Network providing connectivity till the tehsil and block level. The U P State Data Centres provides a shared hosting environment to all government departments to fast track their IT deployment. Partnership with citizen centric service providers to extend the fruits of eGovernance right up to the village level with service delivery at the residence of the citizen through CSC, LokvaniCentres, eSuvidha Centres has paid rich dividends in reaching the unreached.

RESULTS INDICATOR - a few Beneficial Outcomes

The benefits that accrued to the targeted stakeholders as a result of an overall strategy driven by ICT interventions are presented here.

Chief Minister's Office

CM Helpline (1076)

Objectives of CM Helpline:

- Uttar Pradesh Chief Minister Helpline is an effort to hear citizen's grievances at their doorstep with a "Single toll free Contact Number - 1076" for public services rendered by various departments of Government of Uttar Pradesh.
- To implement effective redressal mechanism which can deliver in a time bound manner.
- To improve quality of redressal on grievances of the common man and minimize their issues.
- To give the common man a sense of being connected with the government.

Residents of Uttar Pradesh can contact the 500-seater UP CM Helpline call center by dialing toll-free number – 1076 round the clock and can register their references in the form of either Complaints or Demands or Suggestions by explaining their issues on call to trained Call Center Executives (CCEs) of Helpline. These references are registered on Integrated Grievance Redressal System (IGRS) – "jansunwai.up.nic.in", a system developed & maintained by NIC, which acts as the backbone of the Helpline. The CM Helpline references are routed within IGRS to the concerned officials of respective departments. Post redressal of the complaint by concerned official, an outbound call is made to the complainant for feedback. The complaint is closed or escalated to next level official in the departmental escalation matrix based on the satisfaction level of the complainant.

- Jan Sunwaior Sammadhan Portal: It ia an Integrated Grievance Redressal System where a citizen can file his/her grievance anytime referring to the concerned department and can also keep the track the grievances lodged till its final redressal. This portal has brought all public grievance redressal systems implemented in the state on a common platform. It supports tagging of all the similar complaints filed through different redressal systems in a single tag to avoid duplicity and easier redressal. This will amplify the roots of democracy in state, as now citizens will have the power to raise their issues and seek redressal in a time bound approach. They will also be able to track their grievances and also give feedback on quality of disposal.
- DARPAN: It is comprehensive, generic and configurable multilingual Dashboard product for Chief Ministers, Chief Secretaries, Divisional

Commissioners and DMs/DCs across Districts. It facilitates presentation of real time data on Key Performance Indicators (KPIs) of selected schemes/projects to the senior functionaries of the State Government as well as District Administration which can be used for planning, evaluation and monitoring. It enhances analysis through data collection by consolidating multiple data sources into one centralized, easy-to-access platform. Identifying trends in data to gain enhanced perspectives of the projects, the dashboard allows users to personalize their view to prioritize the information they require.

- Anti Bhu-Mafia Portal: In its effort to curb against the threat of land mafia and encroachment in Uttar Pradesh, a complete IT based system has been developed and implemented where any individual can lodge a complaint of encroachment on the portal against encroached land in the village. Complainant can view status of complain and send reminders, can give their feedback and suggestions also. Each complaint has a unique registration no. and is forwarded to DM and concerned SDM in case of Revenue Village and for monitoring purpose it is also forwarded to Pr. Sec Revenue and Board of Revenue till the complaint resolved. This has ensured complete transparency in the system.
- Anti-Corruption Portal**:** The citizens of the state can register a complaint related to corruption against any department or officer through this portal by attaching an audio or video as proof. Complainant can track the status of reference registered by him/her and can also send reminders if action is not taken within given timeline. Complainant can further give the feedback after the disposal of complaint. The references are analyzed at Principal Secretary and District Magistrate Level. Several reports have been developed for monitoring of the Anti-Corruption References at all levels.

e-District (Service Delivery at doorstep of citizen), website- http://edistrict.up.nic.in

The eDistrict project provides 255 services ranging from certificates, pensions, ration card, employment registration etc to the citizens from the eDistrictCentres& Common Service Centres/ LokvaniCentres established in districts and villages respectively. The complete process right from application to final delivery of certificate has been automated. The web based application ensures 100% round-the-clock electronic workflow and application tracking. Dash board based MIS & Escalation matrix ensures the adherence to the service levels defined for each service and technology such as digital signatures has been used for digitally approving the application & issuing the certificates. The beneficiary schemes of social welfare department like scholarship portal, pension portal are integrated with eDistrict Certificate Verification Service, which enabled the department to identify the bogus and duplicates/invalid certificates and in-turn department had saved Cr of rupees which allowed department to serve more beneficiaries:

- Based on Janhit Guarantee Act
- Operational in all 75 districts.
- More than 20crore certificates/ services issued to people through the system since inception
- On an average 1 lakh certificates/ services being issued per day.
- The first eDistrict Centre of the country was inaugurated in Sitapur in 2008.
- Currently 255 services from 38 departments are available on the portal

- 65,000+ Common Service Centres extending services in rural & urban areas to be extended to 1.50 lakh centres by March 2021
- The disposal rate of the applications is around 98%
- Integrated with Digital Locker, more than 11.50 Cr certificates in Digital Locker
- eSathi Mobile App to help citizens

e-Pariksha (Single point solution for Government Recruitment)

PARIKSHA is a web solution that enables the candidates to apply online for various vacancies in the state government. The completely automated process also allows the recruitment agencies like UP Public Service Commission (UPPSC), UP Police Recruitment and Promotion Board (UPPRPB), UP Subordinate Services Selection Commission (UPSSSC) etc. to conduct and complete the recruitment process as laid down by state government to fill the vacant posts in the government departments through the Examination or Direct Mode.

It enables candidates for filling application forms & provides complete technical solution to carry out the commission's internal processes viz. publishing of advertisements, sorting and scrutinizing the submitted application forms, scheduling of interviews based on verification of uploaded claim documents and their academic and professional merit & conducting prelim & main examinations for giving the final recommendation to Government.

The important modules of the system include e-Form, e-Payment, e-Admin, e-Allotment, Admit Card, e-Interview, e-Result, e-Recommendation and e-Communication. Pariksha always communicates with the applicants at various stages through e-Communication only (i.e strictly through SMS and email) and no paper communication is allowed in the commission. SMS and Email alerts are sent at various stages of the recruitment to keep the applicants informed.

It is currently being used by 8 Recruitment Boards in UP – UPPSC, UPSSSC, Police Recruitment, Abdul Kalam Technical University, Allahabd University, and others. Also implemented for Bihar Technical Services

- Total Registrations/ Form Submissions till date: 3.95 Crore
- Total Fee Collected Through PARIKSHA: **430** Crore
- Total Revenue Earned By Recruitment Agencies 45.05 Crore
- Managed 188 Live Recruitment Advertisements and conducted 101 Examinations to finalize suitable candidates against vacant posts in Govt. Departments.

There are many other sectors and departments which have undergone extensive GPR and have been automated in the state. These projects and are not only providing services to the citizens but have brought about a paradigm shift in the working of the Government. To name a few:

- Niveshmitra which has propelled Uttar Pradesh to Number 2 position in Ease-of-Doing Business
- MSMESoftfor Micro Small and Medium Industries & Export Promotion Department
- eHospitalfor Health & Family Welfare/ Medical Department
- eProcurement System for all Departments
- Integrated Social pension System
- ePDS for Food and Civil Supplies Departmennt
- Land Records automation and Khataunti on Web for Board of Revenue
- Propert Registration System for Department of Stamps and

Registraton

- Treasury and Budget Management System for Finance Department
- Homeguard Deployment System
- VidhanSabha and VidhanParishad Automation
- LokSabha, VidhanSabha and Panchayat Elections
- Teachers Recruitment and Teacher's Transfer System for Education Department
- U,P Excise eLottery System for allocation of Liquor and Bhang Shops in the State
- eOffice for all the departments and districts of the state government
- eNagarsewa for Urban development Department
- Vahan&Sarathi applications for automation of the Transport Department
- ManavSampada and an integrated Transfer System encompassing all the departments

Common service delivery

- The first and foremost example of Integrated Common service delivery Platform is the eDistrict Project which has been rolled out in all the districts of Uttar Pradesh. 255 citizen-centric services from 38 departments are being currently offered through the portal under the Janhit Guarantee Act. The services are being offered through more than 65,000 Common Service Centres and Lokvanicentres established in the rural areas in PPP model. On an average 1 lakh certificates/ services are being offered through the system per day.
- DARPAN/ CM Dashboard/ DM Dashboard is another such project that facilitates presentation of real time data on Key Performance Indicators (KPIs) of selected schemes/projects to the senior functionaries of the State Government as well as District Administration which can be used for planning, evaluation and monitoring.
- ePariksha is another such platform Currently being used by 8 Recruitment Boards in UP – UPPSC, UPSSSC, Police Recruitment, Abdul Kalam Technical University, Allahabd University, and others. Also implemented for Bihar Technical Services for Government Recruitments.
- Integrated Social Pension System - The system is aimed to benefit more than 65 lakh pensioners of our society through online dissemination of information and direct transfer of pension to the bank accounts of four pension schemes – old age pension, widow pension, divyangjan pension
- eProcurement (Tender Management System) - The e-Procurement portal designed and implemented by UP allows qualified and registered users to look for buyers and sellers of goods and services. It integrates the components of computerized supply chain management and the entire life cycle of the procurement process has been computerized. The main modules implemented include Registration, Tender Management, Bid Opening, Evaluation & award of contract. The entire process has been secured through the use of digital signatures.
- NiveshMitra - a dedicated Single Window System of Govt. of Uttar Pradesh. The main objective of the system is to enable 'ease of doing business in Uttar Pradesh' through facilitating the entrepreneurs with the electronic based transparent system for online submission and tracking of applications including online fee payment.TheNiveshMitra Portal

provides a single point (online) interface and a time-bound clearance system by acting as a one stop solution for Information/NOCs/Licenses/Approvals from multiple departments.

- eScholarship - The e-Scholarship system provided a common platform to all the departments (social welfare, minority welfare, backward class welfare, education & planning) involved in the scholarship management process. The online availability of information helped in monitoring of enrolment, attendance and drop-out rates. While the MIS helped to analyse the overall impact & outcomes of scholarships being provided to the students.
- Integrated Criminal Justice System - Computerization of Forensics Science Labs in UP (eFSL) and data integration with all the pillars of ICJS like Police, Prosecution, Prision, Court etc was initiated in the state.

eGovernance best practices of the State

Uttar Pradesh is fast moving forward with multi-dimensional ICT innovations both for citizens and businesses. Among them, single window system, niveshmitra, eprocurement, CM Helpline are some of the applications that propagate the idea of ease of doing business in the state – the single window system has integrated 20 plus departments and offers 70 plus services while the eProcurement systems has completely automated the government tendering system which is now 100 percent online. Projects such as MahilaSammanKosh, Anti Bhu Mafia Portal, eTransit Pass for Minerals, Revenue Case Monitoring System infuse a sense of security and show the Governments' resolve of better law and order mechanism necessary for the industries to grow and prosper in the state. e-Allotment of Liquor shops, e-Office, Shashanadesh and automation of entire land records and land registry system with creation of land bank reflect the vision of the government to infuse transparency in the entire system which is a critical element of Government to Business transactions. This entire Gamut of these services and projects is aimed at making the environment in the state more business and industry friendly and let me share with you that this is just a start.

Another shift that has been envisaged by the Uttar Pradesh government is moving from e-Governance to m-Governance (mobile governance) to leverage the mobile and mobile internet penetration in the state. It manifests to provide all e-governance services through mobile in order to maximize its reach to the last person of the state to attain socioeconomic equality and prosperity for every citizen. UP has also established leadership in many e-Governance initiatives. However, the major achievement of the e-Governance initiative of the state has been development of IT Culture in government functioning, quicker and faster delivery of services to the people, change in mindset and attitude of government employees & transparency in government procedures. The e-Governance implementations in the state have effectively showcased how modern-day UP is progressing, how new infrastructure that is being added complements the existing resource base, and how ICT is being harnessed for implementing some of the best initiatives of good governance - the ingredients necessary for the industry to flourish in the state.

ENABLER INDICATORS

e-Governance enabling processes

The state government having a vision to develop IT as a vehicle for holistic socioeconomic development of the state with a focus on creating employment, promoting entrepreneurship, innovation and enhanced quality of life has come

out with various policies and sops for the IT industry. All these frameworks and policies are aimed to develop and promote attractive business ecosystem in UP by offering congenial, business friendly and progressive reforms, initiatives and unique value propositions.

- IT City: A state of the art IT City has been built over 100 acre of land at Lucknow. The project entails an envisaged investment worth INR1500 Crores and aims to provide employment to 75,000 people. It is based on Walk to Work Model. 60% of land is earmarked for core area activities and 40 % land has been designated for non-core activities.
- IT Parks: IT Parks are being established at Agra, Meerut, Gorakhpur, Kanpur, Lucknow, Varanasi, Bareilly etc for encouraging employment avenues in Tier-II and Tier-III cities. They contribute towards significantly boosting the IT exports of the state. Separate guidelines will be released to promote IT Parks in Uttar Pradesh.
- Incubators: With the goal of breeding innovation and entrepreneurship, the state government has collaborated with premier institutes like IIT-Kanpur, IIT-BHU, IIM Lucknow (Noida), KNIT Sultanpur to establish Incubators. The country's biggest Incubator is envisaged to be established in Uttar Pradesh.
- SDC2.0: ISO 27001 certified UPSDC (state data center) has been established as central Page | 5 data repository to which state departments are linked for 24x7 public domain information usage. A centralized green data centre (SDC 2.0) is planned, which would be cloud ready and based on "Pay as per Use" Model.
- E-office: For improving the operational efficiency, reduce turnaround time, enhance transparency and accountability of State Departments, e-Office is being implemented across the state departments.
- Center for e-Governance: Centre for eGovernance (CeG)/State e-Governance Mission Team (SeMT) is the nodal body for implementation of IT/e-Governance initiatives in state. CeG/SeMT in collaboration with different departments shall take up new initiatives in line with the vision of
- Government of Uttar Pradesh. India BPO Promotion Scheme: The government promotes establishment of BPO units under India BPO Promotion Scheme. The state government shall extend additional capital support and incentives under this scheme to BPOs in UP.
- Cyber security: With the rising occurrences of cyber-attacks and cybercrimes, it has become imperative to address the challenge of cyber security. The state government plans to impart training in this arena and formulate a devoted cyber security cell. Also, a dedicated cyber security policy will be framed to strengthen state's efforts.
- Digital Payments: Government of India promotes digital payment options which are an integral part of Government's strategy to transform India into a cashless economy. Uttar Pradesh plans to undertake tremendous reforms, including IT readiness, payment infrastructure and capacity building to achieve state's digital payment target of 312 crore transactions.
- Promotion of IT Cities/IT Parks - Creation and improvement of excellent IT infrastructure development such as establishment of 'state of the art' IT Cities & IT Parks in order to provide thrust on 'Ready to Move in' infrastructure facilities for IT /ITeS units.

The following incentives are offered to IT/ITeS units across the state of Uttar Pradesh:

- An interest subsidy of 5% per annum on the rate of interest paid on the loans obtained from Scheduled Banks/ Financial Institutions for a period of 7 years shall be reimbursed subject to a maximum of INR 1 crore per annum per unit
- 100% exemption of stamp duty on purchase/lease of land/office space/ buildings for IT/ITeS use with condition of commencing operations within 3 years
- 100% reimbursement on Electricity duty for new IT/ITeS units for a period of 10 years post commencement of commercial operations
- Reimbursement of the cost incurred by an IT/ITeS Company operating in the State on successfully securing quality & IT related certifications such as Capability Maturity Model (CMM) level 2 upwards, ISO 27001 for security, ISO 20000 for service management terminology, COPC, eSCM certification with maximum reimbursement of 3 certifications with total limit of INR 25 lakhs per unit. The similar certifications related to this sector shall be included from time to time
- 100% reimbursement of the total EPF amount paid for IT/ITeS Professionals of Uttar Pradesh domicile with employment for continuous 1 year, after start of commercial operation, subject to the Maximum of INR 20 Lakhs per annum for 5 years for a unit.
- Recruitment Assistance @INR20,000 per employee located in Tier-II and Tier-III cities subject to continuous employment of minimum 6 months and annual recruitment of at least 50 students in the field of IT-BPM, recruited from UP based colleges.
- To encourage research and development, reimbursement of up to 100% of actual filing costs on awarded patents, subject to a maximum of INR 500,000 for domestic patents and INR 10,00,000 for international patents
- Reimbursement upto 25% of the cost of land @INR 15,000 per employee, providing employment to minimum 200 people per acre of land. The employment should be for a continuous period of one year. This reimbursement shall be given to IT/ITeS units on purchase of land from state agencies at prevailing sector rates. This rebate would be reimbursed from the State Budget.
- Floor Area Ratio(FAR): FAR 3 and 1 (Purchasable, as per building by-laws prevalent at that time) applicable to IT/ITeS units including IT City and IT Park
- IT/BPO units which employ a minimum of 20 people and a maximum of 50 people shall be allowed to establish anywhere irrespective of the master plan or Land use classification, barring public places, semi-public facilities, traffic and transport, parks and open spaces, green belt and agricultural land usage.
- For promoting ‘Ready to Move In’ facility: Incentives on case to case basis shall be given to developers for establishing more than 5 acres IT Park in Tier-II & Tier-III cities.
- For IT/ITeS Mega Unit investments: The incentives offered on Case to Case basis shall be in the form of interest subsidy, stamp duty exemption, EPF reimbursement, recruitment assistance, land cost reimbursement etc. The maximum limit of financial incentives may be relaxed on the

recommendation of the Empowered Committee, subject to the approval of State Cabinet.

- Incentives offered on Case to Case basis for Mega Projects
- Exemption from the purview of the UP Pollution Control Act, except in case of power generation sets of capacity of more than 25 KVA for IT/ITeS Industry.
- Exemption for IT/ITeS Industry from inspections under the following acts and rules framed there under, barring inspections arising out of specific complaints. Under this provision, units shall be eligible for inspection only once in every 5 years.
- Permission to IT and ITES companies to have 24x7 operations (to run in three shifts) and employment of women in all three shifts
- Industrial Power tariff will be applicable to all IT/ITeS units
- Reimbursement up to 25% of lease /rental charges for the space for MSME IT/ITeS units established in the state operating from leased / rented space in IT cities/IT Parks or any notified location, will be eligible with maximum limit of INR 10 lakhs per year, for a period of 3 years for MSME IT/ITeS units from the date of commencement of commercial operations.
- Reimbursement up to 50% of lease /rental charges on the space for IT/ITeS/BPO units established in the Bundelkhand/ Poorvanchal region operating from leased / rented space in IT cities/IT Parks or any notified location, will be eligible with maximum limit of INR 20 lakhs per year, for a period of 3 years from the date of commencement of commercial operations.
- IT/ITeS/BPO units shall be eligible for 50% subsidy on power bills for a period of 3 years from the date of commencement of commercial operations, subject to a maximum limit of INR 50 lakhs.

State level initiatives towards Capacity building for eGovernance

- Awareness/ Sensitisation workshops has been Organised across the state for implementation of e-Office at Districts and Headquarters Level.
- Awareness/ Sensitisation Workshops has been organized across the state for implementation of CM Helpline (1076). A grievance redressal system where any common man can log his complaints.
- Workshop/ Training has been organized for Government officials on Social Media and Mobile Governance in 2 Batches respectively in the month of October and December 2018.
- Workshop/ Training has been organized fore-District Managers (EDMs) on Social Media, eDistrict& IGRS/ CM Helpline in the month of November 2018.
- Workshop/ Training has been organized fore-District Managers (EDMs) on Cyber Security awareness in 2 Batches in the month of December 2018.
- State Level Workshop on UMANG (Unified Mobile Application for new-age Governance) was organized on 29th Dec 2018.
- Organizing Cyber Security Awareness workshops at District Level.
- Organized Sensitisation Workshops on Social Media, e-Office, e-District &
- IGRS/ CM Helpline at all 18 Commissionaires
- No. of Webinars and VC sessions conducted during the lockdown period to apprise the government officials in various schemes launched.

- A State Level Workshop on Digital Locker was held on 27th September 2019 at Lucknow.

Emerging technologies relevant for the State

- Establish IT Parks to promote skill development and job opportunities in the area by providing technical courses in Big Data, Cloud Computing, Internet of Things (IoT), Machine Learning, Artificial Intelligence and Cyber Security. Education System will be modified to impart innovative courses for students including latest technologies in the above mentioned courses in curriculum.
- To build more efficient Center of Excellences (CoEs) which will promote Big Data, Cloud Computing, Internet of Things (IoT), Machine Learning, Artificial Intelligence, Cyber Security, Clean-Tech, Edu-Tech, Agri-Tech, Health-Tech and other areas of social or national importance
- Host Institutes like Government and Private Technical, Management, R&D Institutes, Organizations/ Non-Profit Organization/ Corporates/ Industry Association or through PPP mode can establish CoEs. It is expected that the CoE would become self-sustainable by the end of 5years.
- NIC has developed Centre of Excellence in the area of Application Security in Lucknow
- Integration of DBT schemes and PFMS based payments to the beneficiaries

Awards and recognitions at State level for eGovernance initiatives

S.No	Name of Award	Project	Year
1	Presidents Medal for eGovernance	Census	
2	Golden Icon Award by DAPRG, GoIOutstanding Performance in Service Delivery	Lokvani-An effort to empower Citizens	2004
3	Oracle e-Governance Award Excellence in eGovernance	ITSANIC-Integrated Treasury SystemApplication by NIC	2006
4	Microsoft award	Lokvani	2006
5	Golden Icon Award in 9th National e-Governance conference	Lokvani	2006
6	The Manthan Award	Lokvani	2006
7	Prime Minister Award for Excellence in Public Administration	Lokvani	2008
8	Stockholm Challenge Award (finalist)	Lokvani	2008
9	Manthan Award	UP e-Scholarship and Fee Reimbursement System	2009
10	CSI Nihilent2009/10	eDistrict	2010
11	CSI Nihilent e-Governance AwardSpecial Recognition	Targeted Public Distribution System (TPDS)	2010

12	The Manthan Award South Asia 2010	Targeted Public Distribution System for food andcivil supplies, Govt of UP	2010
13	NASSCOM Social Innovation Honors 2010	Jan Suvidha Kendra(JSK), Jhansi- An effectivePublic Grievance Redressal System	2010
14	Manthan Award 2010 for e-agriculture and livelihood Category	Public Distribution system of food grains, Lalitpur	2010
15	CSI Nihilent Award	Public Distribution system of food grains, Lalitpur	2010
16	Best state award in IT reforms in election by ECI	Election Computerisation	2012
17	NASSCOM Social Innovation Honours	SAKSHAM – Scholarship Management System	2013
18	E-Maharashtra2013	Scholarship Management System, UP	2013
19	e-Uttara Award by Digital EmpowermentFoundation	MyCity - Mera Shahar Meri Dekh Rekh Mein,Kanpur Nagar	2014
20	e-Uttara Award by Digital EmpowermentFoundation	EasyGas, Kanpur Nagar	2014
21	eINDIA Awards 2014	MyCity - Mera Shahar Meri Dekh Rekh Mein,Kanpur Nagar	2014
22	Skoch Award	NIC UP Sate Centre	2015
23	Skoch Award -2015	Saksham Online Scholarship and Fee Reimbursement Management System,UP	2015
24	Skoch Order of Merit	UPHAAR – Home Guards Department (UttarPradesh Homeguards Allocation an Rotation System)	2015
25	Skoch Order of Merit Award	MyCity - Mera Shahar Meri Dekh Rekh Mein,Kanpur Nagar	2014
26	Skoch Order of Merit (SMART Technology)	e-Pariksha	2015
27	Skoch Award Gold (Highest Independent)	e-Pariksha	2015
28	Governor's Award Exemplary contributions in Lok Sabha 2014 Elections	Election Computerisation	2015
29	CSI Nihilent e-Governance Award	Vidhan Sabha Prashnottar Pranali	2016
30	Digital India Award-2016	eNagarSewa under Urban	2016

		Local Bodies	
31	CSI Nihilent Awards 2015-16 'Award ofExcellence'	VYAS- VanijYakar Automation System, forCommercial Taxes Department, GoUP.	2016
32	Platinum Icon Digital India Award 2016 -Exemplary Online Service category.	VYAS- VanijYakar Automation System, forCommercial Taxes Department, GoUP	2016
33	CSI Nihilent e-Governance Award of Excellence	'AAPURTI' - Uttar Pradesh Public Distribution System	2016
34	State Award for Common Service Centers (CSCs) under Digital India Programme by the Ministry of Electronics & Information Technology (MeitY)	Opening maximum number of CSCs centres in district Ballia in the state of UP.	2016
35	State Award for Common Service Centers (CSCs) under Digital India Programme by the Ministry of Electronics & Information Technology (MeitY)	Opening maximum number of CSCs centres in district Varanasi in the state of UP.	2016
36	Technology Sabha Conference Awards - Outstanding Integrated E-Governance Project	Computerisation of Commercial TaxesDepartment, GoUP	2017
37	eIndia Award 2017 - Innovation Award for Excellance in eGovernace	Computerisation of Commercial TaxesDepartment, GoUP	2017
38	eIndia Innovation Award - Innovation Award for Excellence in eGovernance	Vanijyakar Automation System for Department of Commercial Taxes, UP	2017
39	IIM Word Management Award at IIMLucknow	Soil Health Information System by NIC, UP	2017
40	CSI Nihilente-Governance	Saksham Online Scholarship and Fee Reimbursement Management System,UP	2017
41	Best IT innovation in election by government of Rajasthan		2017
43	Gems of Digital India	Saksham Online Scholarship and FeeReimbursement Management System,UP	2018
44	National Award of e-Governance (Gold)	Digital Land (Comprehensive System of LandManagement)	2019

45	Smart City Digital Payment Award -2019 forbest digital payments	eNagarSewa under Urban Local Bodies	2019
46	Ministry of Expenditure in eProcurement -Best Implementation Under States Category	eProcurement, Uttar Pradesh	2019
47	Gems of Digital India 2019	eDistrict	2019

State specific eGovernance success stories case studies Publications - references

In 2008, Uttar Pradesh was the first state where e-District project was successfully rolled-out in 06 pilot districts. The e-Governance Standards, Compliances, Security measures etc. were adopted under e-District project. Now, it is successfully running in all 75 districts of Uttar Pradesh. The best practices being adopted by Government of Uttar Pradesh has been show cased in various National level Workshops, Conferences & Exhibitions. Few are mentioned below:

- Indian Express Group 'Technology Sabha' conference at Goa on August 17-20, 2017
- Indian Express Group 'Technology Sabha' conference at Kochi, Kerala on February 14-16, 2019
- 22nd National Conference on e-Governance at Shillong, Meghalaya on 8-9 Aug 2019
- National conference on comprehensive development of Bundelkhand at Banda, Uttar Pradesh on 10-11 January, 2020
- 23rd National Conference on e-Governance at Mumbai, Maharashtra on 7-8 Feb 2020

Specific gap areas – Policy level, Process level, Technology level that State plans to pursue and improve.

e-Governance implementations in Uttar Pradesh have had a successful signaling effect for the outside world. They have effectively showcased how modern-day UP is progressing, how new infrastructure that is being added complements the existing resource base, and how ICT is being harnessed for implementing some of the best initiatives of good governance.

A couple of years ago the lack of transparency was a key reason for dissatisfaction amongst the citizens and businesses in UP. Citizens/businesses faced manual government processes with multiple interactions required to obtain a single service. This led to delays and at many occasions, the citizens/businesses would shy from the services because of time necessary to navigate the bureaucracy. Also, for multiple services the citizens/businesses had to interact with multiple offices, multiple times. This was extremely time-consuming & tedious.

However, the digital environment is characterized by multiple and varied technological developments that are constantly posing new challenges to existing and emerging ICT policies and regulations. As new technologies emerge — impacting education, health, entrepreneurship, and governance — ICT policy directions and strategies are required to reflect and respond to these developments. As the saying goes ‘Change is the only constant in life’ and this is true for all eGovernance Projects, policies and framework. The gaps or the areas the state government will like to improve are:

- Integration of projects and services

- Sharing data across enterprises/departments
- Adequate legal and security framework
- Fast tracking of SMART City, Safe City Projects
- Introduce courses/topics on emerging technology in school curriculums

State recognitions

Given this emerging scenario, the Government of Uttar Pradesh decided not to stay behind the wind. The Chief Minister leads from the front in spearheading ICT based E-Governance innovations into daily governance activities in order to provide transparent administration, reciprocal bureaucracy, investment friendly policies and user friendly government. The broader significance lies in the fact that the state government is heavily emphasizing on changing the entire environment from bottom to top.

More than 100 Technical Colleges, Polytechnics &Multi Disciplinary Universities have been institutionalized to offer professional courses in IT disciplines with more than 5000 students graduating each year in IT disciplines. These institutes are developing the skills of youth in Uttar Pradesh and in response; youth is driving the IT revolution in the state. This also has resulted in a collateral benefit of abandoning migration of skilled workforce and nurturing entrepreneurship in the state. It also envisages converting many potential cities and towns into IT cities by building and developing IT parks in the pursuance of providing government services to the doorstep of the citizens. Walking the talk, the state government constructs, develops and spreads the ICT infrastructure right from the state capital to district, tehsil, block level and village level.

Consequently, along with administrative reforms, technological inventions have been translating archaic public service delivery system into state-of-the-art, online and time saving architecture. Thus, empowers the citizens by enhancing the democratic value and enabling access of public services. With multi-dimensional approach, an innovative way has been utilized to conceptualize the roadmap with the intention to make the most of the yield. A proactive IT policy, which offers special incentives for the IT industry such as preferential allotment of land, continuous power supply, 100% exemption from stamp duty, and secure environment for the investors and employees. Given the vast area, skilled workforce and geographical position, Uttar Pradesh are leading the in creating and implementing IT innovations and having a distinct advantage over its counterparts.

Some statistics of the projects being implemented and the beneficiaries/ Transactions:

S.No.	Project	No. of Beneficiaries/ Transactions
1	Citizen Service Delivery (eDistrict)	20.0 Crore since inception
2	Electronic RoR (Khatauni) Distributed	30 Crore since inception
3	Revenue Earned as User Charges through distribution of RoR	Rs. 450 Crore
4	Ration Card Holders (ePDS System)	3.55 Crore
5	Ration Card Beneficiaries (ePDS System)	14.66 Crore
6	ePariksha (Total No. of Registrations)	3.95 Crore
7	ePariksha (Total Fee Collected)	430 Crore
8	DDO Portal (No. of Beneficiaries in Approved Transaction)	8.62 Crore

9	eKuber (Total Transaction)	9.83 Crore
10	eHospital (No. of Registrations in 48 Hospitals)	3.83 Crore
11	Transport (vehicle registration)	3.60 Crore
12	No. of Grievances resolved through Sammadhan portal	2.59 Crore
13	Rajkosh (No. of Transactions)	1.28 Crore
14	Online Property Registration (Documents)	0.98 Crore
15	Income to State Government through Property Registration	29,913 Crore
16	Pension (old age, Widow, Divyangjan etc.)	0.86 Crore per annum
17	Scholarship Distribution (Students)	0.60 Crore per annum
18	eMM11 generation, Geology and Mining Department	1.40 Crore
19	Revenue Court Cases (No. of Cases Registered at Portal)	1.42 Crore
20	MREGASoft (No. of Job Cards issued)	1.87 Crore
21	RAHAT-Disaster Mgmt System (Beneficiaries Registered)	0.29 Crore
22	No. of Household under Jalkal online System	12,59,613
23	eProcurement (No. of Tenders Floated)	7,37,194
24	Value of Tenders published through eProcurement	880542.50 Crore
25	Registration of Migrants on Sammadhan portal during Lockdown	17,37,242
26	NiveshMitra (No. of NoC sanctioned)	2,09,800
27	Online House Tax Payment Nagar Nigam Lko (House Registered)	5,68,768
28	House Tax Realised through online payment	439 Crores
29	Result Dissemination &Counselling	0.60 Crore
30	Mukhya Mantri Sumangala Yojna	14,16,298
31	Sewayojan Portal (No. of Job Seeker Registered at Portal)	35,22,765
32	Homeguard Deployment through UPHAAR Portal	9.6 lakhs every year
33	UP Skill Development Mission Portal	3,73,200

Shri S.P Goyal, IAS, *Addl. Chief Secretary, GoUP, Chief Minister's Office, Government of Uttar Pradesh, spgoyal@nic.in*
Shri R.H. Khan, *Deputy Director General & State Informatics Officer, NIC U.P. State Centre, Lucknow, sio-up@nic.in*

Section-III
State Initiatives

e-Mantrimandal

Gopan Department, Govt of Uttarakhand

Amit Singh Negi, Ajeet Singh and Arun Sharma

PROJECT OVERVIEW

Objectives

The details of objectives behind the initiative and how these have been achieved are as follows:

- *Paper based To Paper free system…. Save 1 Tree for 3 Cabinet Meetings*

  Every Cabinet meeting of Govt of Uttarakhand is estimated to consume 12,500 sheets of Paper. It is estimated that a tree can generate between 25,000 to 80,000 sheets of paper. So, it is prudent to say that, on an average, one Tree may have to be cut for every 3rd Cabinet meeting held.

  With e-Mantrimandal initiative, paper is replaced with Smart Tablets provisioned to Hon'ble Chief Minister & Cabinet Ministers and Senior Officers participating in cabinet meetings. The Proceedings of Cabinet meeting are held in electronic form only, where every participant views details on screen. Cabinet decisions are recorded electronically. All these result in saving huge volumes of paper.

- *Bring online all activities of Pre-Meeting, During-Meeting and Post-meeting*

  In manual system, activities for Cabinet meetings take place disjointedly among many stakeholders & with communication gaps. Information is received from stakeholders & shared with others at last minute, due to which Ministers are not informed. Cabinet meetings are done in High pressure environment in Meet-the-Deadline target. Quite often, Gopan department cannot provide documents for meeting in desired form.

  With e-Mantrimandal initiative, information is updated in portal online by stakeholders (Cabinet Ministers, Senior Officers including Chief Secretary, Additional Chief Secretaries, Principal Secretaries and Secretaries, Heads of Departments) for activities at each stage, ie before the meeting, during the meeting and after the meeting. Information is made available in real-time basis for all stakeholders, which facilitates smooth, structured & organized conduct of cabinet meetings. Ministers are able to come prepared to discuss on the Meeting points.

  Pre-Meeting:

  Meetings are scheduled in Portal by Gopan department and notices delivered by SMS & e-mail to Stakeholders. Departments are asked to provide inputs for including Agenda Items for Cabinet meeting. The inputs received from Departments are scrutinized and finalized in Portal by Gopan and final Agenda sent to all Stakeholders through SMS & e-Mail. The above facilities are also made available in portal to stakeholders with registered access rights.

  Conducting the Meeting:

  All stakeholders attend paper free cabinet meetings with their Tablets configured for e-Mantrimandal. The display screen has two panels:

  1. Left Panel, where Agenda Items are listed one by one, as define.

2. Right panel, where description is displayed for the chosen Agenda Item.

As and when Agenda items are taken up Point wise, status is updated in Portal by Gopan online and same is reflected in LED screen installed in Waiting Room of Cabinet Hall, where Senior officers are seated waiting for their turn. This helps them to be prepared for their turn to enter Cabinet hall.

After the Meeting:

After the completion of meeting, Gopan department finalizes Decision Points, Action Points, Minutes of Meeting in portal and sends it electronically to concerned departments for implementation.

- *Monitor follow up Action taken by departments on Cabinet decisions:*
  In manual system, monitoring of action taken by departments on Action points & Decision points of Cabinet meets is difficult, delayed, time consuming & compiling of information by Gopan is a huge task. Repeated paper correspondences are needed between Gopan & other departments, as many times replies on Action taken are not complete.
  With e-Mantrimandal, Departments online update/ upload the implementation report and action taken on cabinet decisions, which are further online verified by Gopan. Queries are raised in portal by Gopan as well as Cabinet Ministers, till the completion of implementation cycle. The portal automatically generates alerts to departments not filing replies. Also, Action points not implemented by departments are automatically carried forward in portal for next Cabinet meeting, which is reviewed and directions issued, for compliance. The above features ensure that Cabinet decisions of Govt are implemented in letter and spirit by departments and facilitates proper monitoring of Cabinet decisions.
- *Eliminate physical movement of files & share information in Real-time:*
  With e-Mantrimandal, physical movement of files between Gopan & other departments is completely eliminated, files move electronically. This facilitates easy sharing of information and eliminates communication gaps that arise in manual system. The portal functions as electronic bridge sharing information among stakeholders in Real-time mode.
- *Build a generic and configurable system for quick & easy implementation:*
  The e-Mantrimandal portal is designed as a Generic software application which can be customized for Cabinet meetings of State and Central Govt, in fast track mode. The Work flow process can be configured for each instance. The portal is available in Bi-lingual flavour as on date (English & Hindi) and efforts are on to make it multi-lingual.
- *Conduct Cabinet meetings in Virtual Mode:*
  In Covid 19 pandemic situation, Cabinet meetings are now held by Govt of Uttarakhand in Virtual environment, with Ministers participating through Video conference. As e-Mantrimandal portal is completely electronic & Ministers are provided with Tablets configured for the use of e-Mantrimandal portal software, they are able to participate in meetings remotely, eliminating need for physical presence. The benefit of this system is huge, in Covid 19 pandemic situation.

- *Confidentiality of Cabinet meetings:*
  Cabinet meetings and decisions are by nature & design confidential. The Gopan department is nodal office for meetings and prepares notices, agendas &decisions taken. In manual system, there is scope, risk & fear of leakage of details, as multiple sets of information is provided to stakeholders in paper form. The Cabinet decisions affect large section of population (Business & Industry etc), so responsibility is thrust on Govts to ensure safety and security of information.
  With e-Mantrimandal initiative, the risk is greatly minimized. Even though all information is still stored electronically & accessible, the architecture is designed in such a way to separate activities of Gopan department from the other activities in portal. The e-Mantrimandal system has two sub-systems :
  1. Gopan sub-system: Activities performed by Gopan in e-Mantrimandal are in secluded environment, accessible within Intranet (Local LAN) of Gopan & cannot be accessed by others. Desktops in Gopan are authorized to update and their IP Nos are mapped in portal, with tight security feature.
  2. Department's sub-system: Other departments update e-Mantrimandal in Internet environment.

  The concept of Push & Pull features is built as an integral part of System architecture, to integrate the two sub-systems above. The Gopan invokes the features to pull data from other departments into it's sub system, complete activities and then push to departments, as per requirement. The mechanism is done by portal at back end whenever Gopan uses the functionalities. This is designed in User friendly manner, with UI and UX elements.
  Additional layers of security are built in system so that Meeting management and MIS system is activated only on day of meeting & Gopan departments can update decisions taken in meeting within specific timelines.
  The mobile app available as part of e-Mantrimandal system is activated just prior to meeting& displays progress of meeting in visitor lounge in Real-time mode.
- *Building Institutional Memory and Knowledge Bank:*
  With e-Mantrimandal in place, proceedings of Cabinet meetings, decisions taken and action taken on decision parts become part of Knowledge bank. The institutional memory is dynamically built in portal and serves as useful reference to all stakeholders to retrieve past information, which helps in review and further action to be taken

Intended benefits and current status

The visible intended and visible benefits of e-Mantrimandal are summaries as follows:

- *Benefiting the Environment:*
  Moving from paper based meetings to Paper Free meetings of e-Mantrimandal has resulted in huge savings of papers. Every Cabinet meeting of Govt of Uttarakhand is estimated to consume 12,500 sheets of Paper. It is estimated that a tree can generate between 25,000 to 80,000 sheets of paper. So, it is prudent to say that, on an average, one Tree may have to be cut for every 3rd Cabinet meeting held.
- *Instant Availability of Information to all concerned:*

1. With e-Mantrimandal, manual sharing of information is replaced with electronic mode.
2. Now, departments update items for Meeting Agenda Points online, GOPAN finalizes the Agenda points and distributes to all Cabinet ministers and other stakeholders online well before the meeting, with required details.
3. Ministers attend the Cabinet meeting well prepared and with all information in their Tablets and conduct.
4. Decisions of Cabinet are recorded in portal online by GOPAN and which can be seen by the Departments.
5. Actions taken are updated online by departments which are seen by GOPAN and reviewed.
6. Ministers can review total action taken on the points before the next Cabinet meeting and issue directions to concerned secretaries.

The system has made instant availability of information to stakeholders at various stages of Cabinet meeting process. The technology layers of sending of information by e-Mail and SMS have made the system more effective.

- *Effective Follow-up and Timely Implementation of Cabinet Decisions, resulting in good governance by the use of technology:*
  The system has enabled follow-up of implementation of Cabinet decisions, improving Governance, effective monitoring & timely implementation, resulting in benefits to Citizens of Uttarakhand State.
- *Institution Digital Memory:*
  Earlier the activities of the Cabinet meetings were paper based and information was stored in physical files. Search and retrieval of information by Stakeholders was difficult, due to volumes of paper generated at different times by various stakeholders.
  With e-Mantrimandal in place, proceedings of Cabinet meetings, decisions taken and action taken on decision parts become part of Knowledge bank. The institutional memory is dynamically built in portal and serves as useful reference to all stakeholders to retrieve past information, which helps in review and further action to be taken.
- *Effective tool during the Covid19*
  Conduct Cabinet meetings in Virtual mode: In Covid 19 pandemic situation, Cabinet meetings are now held by Govt of Uttarakhand in Virtual environment, with Ministers participating through Video conference. The e-Mantrimandal portal is completely electronic & Ministers are provided with Tablets configured with e-Mantrimandal portal software. All information about Agenda points and details for the ensuing Cabinet meeting are made available to Cabinet ministers and Senior officers well before the meeting and they are better prepared. The stakeholders participate in meetings remotely with their Tablets, eliminating need for physical presence. The benefit of this system is huge, in Covid 19 pandemic situation, reducing spread of the Virus.

Current Status & Success Indicators

The success of the Project is vouched by the fact that around 26 Cabinet meetings, with 400 + plus Agenda Items, have been held by Govt of Uttarakhand using e-Mantrimandal, with not a single paper visible.

The relevance and importance of e-Mantrimandal in Covid 19 situation is very

critical. Combined with Video Conference based meetings, Cabinet meetings are now held on demand with Ministers participating from remote locations through VC and their Tablets with Real time Agenda Items and details. The digital movement and availability of information in place of physical paper movement, before and after the meetings, have helped in preventing the spread of the Virus.

Based on the success of e-Mantrimandal in Uttarakhand, interest was from other states for replicating in their state. As e-Mantrimandal was designed and developed in Hindi for Uttarakhand, being a Hindi State, the need for migrating it to a multi-lingual portal emerged and NIC, Uttarakhand developed the English version of e-Mantrimandal, which is now in process of being replicated in Goa State.

Software

Front End

DOT NET/AJAX/JQUERY/Bootstrap

Back End

SQL Server

Cyber Security

The application was audited by Cert-In Empaneled Agency on 17/04/2020.

Disaster Recovery and service continuity

Application has been hosted in High Availability Mode in State of the Art, State Data Centre, Uttarakhand.

Further to ensure the service continuity setting up of Disaster Recovery at NIC Uttarakhand Mini Data Centre is in progress.

RESULTS INDICATOR

Information

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Online Booking of Cabinet Meeting	Online Preparation & Approval of Cabinet Meeting Notice	-	-	26
Online Cabinet Meeting Notice to CM, Ministers, CS, and Senior Officers	Sending information to all stakeholders about the meeting its venue and participation in form of a Meeting Notice to all Stakeholders by SMS, email and through Online portal	-	-	5000+
Online Preparation of Agenda	Online scrutiny of items submitted by department , preparation & Approval of Cabinet Meeting Agenda	-	-	500+
Online Submission of Agenda Items and Reply by all Departments of	Online submission of the Agenda Items and reply about cabinet decision implementation by all state	-	-	1000+

Govt of Uttarakhand	Govt Departments			
Online Meeting Proceedings	Online preparation & Approval of Meeting Proceedings with ensuring of delivery to concerned stakeholders only	-	-	390+
Online Advice/Orders to Departments	-Online order preparation & approval of Cabinet Decision Advice & Orders to concerned departments. -Online availability of Advice/Orders to Departments	-	-	6000+

Implementation

Implementation Coverage achieved

With e-Mantrimandal, all processes of cabinet meetings are online, starting from issue of meeting notice, agenda preparation and meeting proceedings till monitoring of decision points by Cabinet. This results in visible improvements by way of timely information, less dependencies and delay of delivery of information from one Stakeholder to another.

Government departments are able to improve their procedures and take action on decision points of Cabinet quickly and in organized way, as per timelines given.

Instant delivery of information at various levels of cabinet meetings and thereafter, has increased transparency & trust of stakeholders and improved governance.

With e-Mantrimandal in place, proceedings of Cabinet meetings, decisions taken and action taken on decision parts become part of Knowledge bank. The institutional memory is dynamically built in portal and serves as useful reference to all stakeholders to retrieve past information, which helps in review and further action to be taken.

Improvements / Enhancements

With e-Mantrimandal initiative, a conscious effort is made to make departments feel at ease with computerized system, by implementing UI and UX elements to provide information in User friendly way. With this effort, stakeholders are able to update & retrieve information in the portal quickly and easily.

The e-Mantrimandal system does not only meet requirements of stakeholders but exceeds them. For Gopan department, facilities of automated generation of Notices, agendas, proceedings and decision points orders from portal makes the job far less tedious. The Gopan & other Departments can now update portal in stages with available information, which makes the process easy.

The e-Mantrimandal uses an internal Word Processor system by which all stakeholders update the portal directly. This reduces need for photocopying and papers which otherwise happens always in manual systems and even in many computerized systems.

Electronic movement of files in e-Mantrimandal between Departments, Secretaries and Gopan helps the process of approval easy for the stakeholders. Departments are able to provide details much more quickly to Gopan and Gopan in turn is able to compile and submit information to Ministers in time, with minimum effort.

Secretaries waiting in Lounge hall of meeting can view progress of meeting in LED screens in Real-time mode and are better prepared for their turn.
The Cabinet ministers get list of Agenda points and associated details in their configured Tablets before coming to meeting & till the last minute, which helps them to understand the issues and be prepared. Ministers can also monitor online progress of implementation of decisions of their department and issue instructions to Secretaries through monitoring system built in system.
The e-Mantrimandal has also introduced a new Stakeholder i.e. the Citizens. Facility is built in portal for Citizens to view important decisions of cabinet meetings which are for public, this will be made available shortly, after approval of Uttarakhand Cabinet.

ENABLER

Processes Re-engineered

Before implementation of e-Mantrimandal system, cabinet meeting were held in a traditional paper based environment
In manual system, activities for Cabinet meetings take place disjointedly among many stakeholders & with communication gaps. Information is received from stakeholders & shared with others at last minute, due to which Ministers are not informed. Cabinet meetings are done in High pressure environment in Meet-the-Deadline target. Quite often, Gopan department cannot provide documents for meeting in desired form.
With e-Mantrimandal initiative, information is updated in portal online by stakeholders (Cabinet Ministers, Senior Officers including Chief Secretary, Additional Chief Secretaries, Principal Secretaries and Secretaries, Heads of Departments) for activities at each stage, i.e. before the meeting, during the meeting and after the meeting. Information is made available in real-time basis for all stakeholders, which facilitates smooth, structured & organized conduct of cabinet meetings. Ministers are able to come prepared to discuss on the Meeting points.
Pre-Meeting:
Meetings are scheduled in Portal by Gopan department and notices delivered by SMS & e-mail to Stakeholders. Departments are asked to provide inputs for including Agenda Items for Cabinet meeting. The inputs received from Departments are scrutinized and finalized in Portal by Gopan and final Agenda sent to all Stakeholders through SMS & e-Mail. The above facilities are also made available in portal to stakeholders with registered access rights.
Conducting the Meeting:
All stakeholders attend paper free cabinet meetings with their Tablets configured for e-Mantrimandal. The display screen has two panels:

- Left Panel, where Agenda Items are listed one by one, as define.
- Right panel, where description is displayed for the chosen Agenda Item.

As and when Agenda items are taken up Point wise, status is updated in Portal by Gopan online and same is reflected in LED screen installed in Waiting Room of Cabinet Hall, where Senior officers are seated waiting for their turn. This helps them to be prepared for their turn to enter Cabinet hall.
After the Meeting:
After meeting is completed, Gopan department finalizes Decision Points, Action Points, Minutes of Meeting in portal and sends it electronically to concerned departments for implementation.
In manual system, monitoring of action taken by departments on Action points

& Decision points of Cabinet meets is difficult, delayed, time consuming & compiling of information by Gopan is a huge task. Repeated paper correspondences are needed between Gopan & other departments, as many times replies on Action taken are not complete.

With e-Mantrimandal, Departments update portal on Action taken online, which are verified by Gopan online. Queries are raised in portal by Gopan, till information is complete. The portal automatically generates alerts to departments not filing replies. Also, Action points not implemented by departments are automatically carried forward in portal for next Cabinet meeting, which is reviewed and directions issued, for compliance. The above features ensure that Cabinet decisions of Govt are implemented in letter and spirit by departments and facilitates proper monitoring of Cabinet decisions.

Technologies

The system security &trust, user friendliness and easy access were the main focus area, at the time technology selection. The state of art technology and security mechanism has been used.

For ensuring the security in first layer, for device authentication IP Address and MAC Address based restrictions have been used. In second layer to ensure that only authorized person can access the LDAP based authentication using “Parichay” tool of NIC, which is based on 2 factor authentication has been implemented.

For browser based MAC address authentication Active-X technology has been used.

For providing device independent and user friendly interface Bootstrap 4.0 has been used. Due to which eMantrimadal system can easily be accessed and worked upon on any device with same ease and user friendliness.

Pre tested customized open source word processing tool has been used in the system so that all stakeholders can update the portal directly.

The waiting lounge system is an android based mobile application, designed in such a way that it can be implemented using any Android based device ranging from Android based TV to a smart mobile.

For pre-post-during the meeting operations, smart tablets have been provided to the Uttarakhand cabinet and related officers.

People

The stakeholders of e-Mantrimandal are Hon’ble Governor, Hon’ble Chief Minister, Hon'le Cabinet Ministers, Gopan (Confidential Department) Department and other Departments of Govt.

The initiative was started with a target to change the age old manual processes involved in pre, during meeting and post meeting task, to fully automated paperless system. Following are the details of how the system was made adoptable as per the need of each and every stake holders

Cabinet Approval

As Uttarakhand Cabinet and Department Secretaries are the major stakeholder of the system so before implementationthe e-Mantrimandalsystem was presented multiple time to Uttarakhand Cabinet and Committee of Secretaries for review and approval.

System was reviewed in terms of security, access, data flow and user participation in day to day operations. After multiple round of discussions and testing the approval was given by Uttarakhand Cabinet and system was made live for use on 8th January 2020.

Convincing Gopan Department

Security was the main concerned of Gopan department. Gopan was not ready to expose their activities in Internet based system. Furthermore, Gopan also want to get rid off meeting day hassles of arranging and delivering the information to all stakeholders well before the meeting.

Issues related to security, timely delivery of related information and availability of right tools to managing the meeting and post meeting tasks were addressed .To convince the Gopan department, before go live, multiple trial run with past records of cabinet meeting were organized and all updations suggested during the process were made in the system

Provide user friendly and easy to use system the departments

The Govt department among all the stakeholders of system plays a very crucial and important role in a cabinet meeting. As Govt departments adopt varying degree of computerization within the department, it was not made mandatory in e-Mantrimandal that activities within a department have to be completely online. This flexibility allowed departments to onbaord e-Mantrimandal easily and integrate with their existing systems.

Interface, enriched with online multipurpose Word processing system and language tools have been provided to departments so that they can easily switch over to the new online system.

Training & onsite support to all Stakeholders

Before go live Multiple round of training starting from Hon'ble Chief Minister, Cabinet Ministers to Section officers of the departments were organized. It gave stakeholders a chance to acclimate to any new processes and work out any problems with the system before it is implemented.

This also helps with any resistance coming from stakeholders who are hesitant of change.

Availability of continues support before, during and after the implementation of the system plays a very important role. A group of officers from Goapn Department and NIC has been given responsibility to provide support to stake holders in all stages of a cabinet meeting. The team is always available for extending necessary support and help to all stakeholders

VALUE INDICATORS

Learnings for sharing

It was foreseen that first and foremost issue in making Cabinet meetings online and paperless was Security & Trust. Cabinet meetings are by nature extremely confidential, as they affect a large section of population (Business & Industry, Law and Order etc. The risk of leakage of information before and after the meetings is high in manual systems. The same perception is also applicable in inline systems, as information in online mode is susceptible to unlawful methods (Hacking etc) and even within the Eco-system of the online system.

Gopan department was rightly reluctant to expose their activities in Internet based system. So, it was decided that all activities of the department in e-Mantrimandal will be in Intranet environment, accessible within LAN of GOPAN only. The mapping of IP nos of Desktop systems in GOPAN with the portal ensured that both updation and retrieval of data in e-Mantrimandal can be done only by GOPAN, with tight security. Other departments will work in Internet department and concept of Push-and Pull feature will be an integral part of the system architecture, to integrate the two sub-systems.

Secondly, it was decided that for the e-Mantrimandal to be truly successful, it should not just be Paper less but Paper free for all major activities of GOPAN

which can be automated. The approach was to make e-Mantrimandal as a replacement for manual system and paper based movement will be completely replaced with online for movement between the stakeholders. But as Govt departments adopt varying degree of computerization within the department, it was not made mandatory in e-Mantrimandal that activities within a department have to be completely online. This flexibility allowed departments to onbaord e-Mantrimandal easily and integrate with their existing systems.

The e-Mantrimandal system adopted the methodology of *THINK BIG -> START SMALL -> KEEP IT SIMPLE -> SCALE RAPIDLY*, as multiple offices were associated in Cabinet meetings. Live implementation for major activities was started in first stage within GOPAN department and was extended to other departments in second stage. In third stage, the features of monitoring of decision points of cabinet by departments were introduced in portal.

The e-Mantrimandal system evolved by itself based on successful implementation, with Hon'le Chief Minister of Uttarakhand launching it as part of Cabinet meeting, with entire Cabinet.

The following elements were part of approach that made e-Mantrimandal a success, demonstrated by the fact that around 26 meetings of cabinet from Jan to Aug 2020 have been held completely with e-Mantrimandal, with not a single paper visible in the meetings.

Convince the stakeholders of safety and security of e-Mantrimandal System

- Assure every stakeholder that the system is simple, easy to use
- Configure Tablets provided to Ministers and provide hands on training at their doorsteps and to Senior officers in their offices
- Series of trainings in batches on e-Mantrimandal to Senior officers of Govt and their support staff (PS, Section Officers etc) on all features
- Build portal in Bi-lingual (English & Hindi) along with User manuals
- Provide on-site support during the first Cabinet meetings held with e-Mantrimandal Obtain feedback of the portal from all Stakeholders
- Keep improving and enhancing the portal, based on live implementation

Before developing Online system, a detailed study of working of Cabinet meetings was made with Gopan & other departments. The system architecture was framed and design of proposed system was done. The portal development was started based on above and prototype of portal was completed. The portal was subjected to testing by GOPAN department for functionalities and features and requirements were incorporated in the portal.

Multiple trial runs of e-Mantrimandal portal were done, where entire cycle of Cabinet meetings was done starting from Agenda preparation to completion of meetings. The past records of Cabinet meetings held were used to simulate the Trial runs. The experiences gained in the Trial runs helped to refine the portal by way of functionalities, features, Flexibility, Control and Security.

After successful simulation of Trial runs, the Prototype of e-Mantrimandal was in shape and was presented to Cabinet 3 times. The requirements and advises of the Cabinet ministers were incorporated in the portal to make it complete.

Before going for Live implementation, e-Mantrimandal portal was subjected to Security Auditing as per Cyber security guidelines of Govt. This was all the more critical as Cabinet meetings are extremely Confidential and security issues and loop holes are to be removed before going Live. The process was completed successfully after three rounds of Auditing.

The first implementation of e-Mantrimandal was made with it's successful launch by Hon'le Chief Minsiter of Uttarakhand on 8th Jan 2020, with the entire

Cabinet. The experiences gained during the first few Cabinet meetings helped in improving the portal features and remove issues faced (Network choking etc).

Digital Empowerment

e-Mantrimandal system has digitally empowered all the stakeholders in different ways

Virtual Meetings

In Covid 19 pandemic situation, Cabinet meetings are now held by Govt of Uttarakhand in Virtual environment, with Ministers participating through Video conference. The e-Mantrimandal portal is completely electronic & Ministers are provided with Tablets configured with e-Mantrimandal portal software. All information about Agenda points and details for the ensuing Cabinet meeting are made available to Cabinet ministers and Senior officers well before the meeting and they are better prepared. The stakeholders participate in meetings remotely with their Tablets, eliminating need for physical presence. The benefit of this system is huge, in Covid 19 pandemic situation, reducing spread of the Virus.

Instant Availability of Information

Being a time bound nature of work, instant availability of information to all concerned was a big challenge in manual system. At one side Gopan has to work late night for finalizing the meeting agenda and distributing to all concerned and on other side department were having pressure of timely submission of their agenda item to Gopan for consideration in Cabinet Meeting With e-Mantrimandal in place manual sharing of information has been replaced with electronic mode.

Prior and timely information about the meeting to be held is delivered to all stake holders by SMS, email and through portal. Now instead of printing and providing multiple copies of the documents to Gopan (the department responsible for all the tasks related Cabinet Meetings), departments update items for Meeting Agenda points online, Gopan finalize the Agenda points and after due approval distribute to all stakeholders well before the meeting.

So that the Cabinet ministers and senior officers can be better prepared before the cabinet meeting.

As during the meeting, items are online accessible to all, so pile of files & printed material is replaced by a single Smart Tab.

Meeting day management and progress display system

On meeting day, the meeting is managed by Gopan department using the online interface provided to them. This system not only help Gopan in managing in meeting task& monitoring the progress but also display the current progress in the meeting day progress display system installed in waiting lounge of Cabinet Hall.

The meeting day progress display system help the secretaries to be ready for their turn for presenting the case to Cabinet.

e-Mantrimdnal has proved itself a powerful digital tool for Uttarakhand Cabinet and Gopan department , using which the Cabinet Decision implementations monitoring become easy, efficient and time bound.

After the visible success of e-Mantrimdnal, Uttarakhand cabinet has decided that implementation progress monitoring part of the system will be displayed as the first item of every cabinet meeting.

Digital Archival Tool

Digital archival of cabinet decisions has been enabled after implementation e-Mantrimandal system. With e-Mantrimandal in place, proceedings of Cabinet meetings, decisions taken and action taken on decision parts become part of Knowledge bank. The institutional memory is dynamically built in portal and serves as useful reference to all stakeholders to retrieve past information, which helps in review and further action to be taken.

Green e-Governance

One of the prime objectives of e-Mantrimandal is converting Paper based To Paper free system…. Save 1 Tree for 3 Cabinet Meetings

Every Cabinet meeting of Govt of Uttarakhand is estimated to consume 12,500 sheets of Paper. It is estimated that a tree can generate between 25,000 to 80,000 sheets of paper. So, it is prudent to say that, on an average, one Tree may have to be cut for every 3rd Cabinet meeting held.

With e-Mantrimandal initiative, paper is replaced with Smart Tablets provisioned to Hon'ble Chief Minister & Cabinet Ministers and Senior Officers participating in cabinet meetings. The Proceedings of Cabinet meeting are held in electronic form only, where every participant views details on screen. Cabinet decisions are recorded electronically. All these result in saving huge volumes of paper.

Thee-Matrimandal system has not only bring more transparency, added to good governance initiative but also contributed towards the go green initiative of Govt of Uttarakhand

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Shri Amit Singh Negi, *Secretary, Gopan Department, Govt of Uttarakhand (Uttarakhand), negias@ias.nic.in*

Shri Ajeet Singh, *Deputy Secretary, Gopan Department, Govt of Uttarakhand (Uttarakhand), ajeetsingh.uk@gov.in*

Shri Arun Sharma, *Scientist-D, National Informatics Center (Uttarakhand), sharma.arun@nic.in*

eOffice

National Informatics Centre, New Delhi

Rachna Srivastava, Prashant Kumar Mittal

PROJECT OVERVIEW

e-Office being an integral part of the Digital India Programme, is the medium to achieve a Simplified, Responsive, Effective and Transparent paperless working in Government offices. It provides a convenient way for officials to access information related to every aspect of their working and knowledge sharing by presenting a single gateway to information and services.

It is a G2G/G2E solution automating the government centric services and is being increasingly adopted by central and state Government departments for achieving the objective of Governance with Accountability, Transparency and Innovation (GATI) and to eliminate delays in Government offices. The speed and efficiency of eOffice not only assists departments in informed and quicker decision but also makes them go paperless.

The eOffice system has the potential to bring internal operational effectiveness in the working of Ministries/Departments. e-Office is a product suite possess of several applications for transforming day to day official work of an organization. The components are as follows:

- *File Management System (eFile):* automates the processing of files and receipts.
- *Knowledge Management System (KMS):* acts as a centralized repository of various documents such as acts, policies and guidelines.
- *Leave Management System (eLeave):* automates the leave application and approval process.
- *Tour Management System (eTour):* automates employee tour programmes.
- *Smart Performance Appraisal Report Recording Online Window (SPARROW):* for electronic filing of Performance Appraisal Report (PAR) as per the defined channel of submission.

The intended benefits are

- *Easy Data Retrieval:* With all the data related to an organization available at a single place; it becomes easy for users to retrieve data/records as per their requirement.
- *Efficiency:* As Files/Records are transferred or exchanged between users on few clicks, thus leading to effortless and seamless movement of Files/Records which in turn results in increase in efficiency.
- *Access & Authorization:* Ensures role-based access/permissions to each eOffice user as per the work allocation and the hierarchy of the organization.
- *Assured Data Security and Integrity:* Implementing robust audit trails, role-based access and digital signing assures security and integrity of Files/APARs.
- *Reduces usage of paper:* With Files/Circulars/Leaves and Tours approvals available online, the usage of paper reduces significantly.
- *Access from anywhere and anytime:* eOffice being a Web Based application makes it accessible anytime and anywhere (subject to organizational restrictions/policies) in secured environment.

- *Easy monitoring via MIS Reports:* eOffice provides variety of reports depending on the requirements of the implementing organizations which helps in accessing and monitoring the working in an organization.
- *Transparency and Accountability:* The users working in eOffice are accountable for any action taken in the system which helps in making the system transparent and accountable.

Current Status

As on date, eOffice has been implemented in 603 organizations of Government of India, comprising of 83 Central Government Ministries/Departments, 182 Central Government Other Organizations (Apex/Autonomous/Statutory Bodies, Attached/Subordinate Offices, Public Sector Undertakings, etc.), 27 State/UT Government Secretariats, 188 District Administrations and 123 State Government Other Organizations/PSUs, covering around 4.25 Lakh users, 1.54 Crores eFiles, 4.82 Crores eReceipts, and 31.86 Crores Transactions.

Software

The Open Architecture on which eOffice has been built, makes it a standard reusable product amenable to replication across the Governments, at the central, state & district levels & is also being accepted at international level. It is a web-based and cloud enabled product that brings together the independent functions and systems under a single framework. The aspects of extensibility, scalability, security, interoperability and open standards were also taken into consideration while defining the overall architecture.

- *Web Server:* Apache HTTPD
- *Application Server:* Apache Tomcat
- *Application Development Software:* PHP & Java
- *Database:* PostgreSQL
- *Operating System:* RHEL or CentOS
- *Virtualization Software:* VMware

Cyber Security

Comprehensive Security Audit of eOffice Infrastructure and the Security Audit of each application in eOffice suite is done regularly. Recently audited through M/s SecurEyes Techno Services Pvt. Ltd. (https://secureyes.net/about.aspx).

Disaster Recovery and service continuity

For keeping an organization eOffice data safe, following are in place.

- Cloud and Virtualization enabled environment.
- Near data copy of documents.
- Streaming Replication of databases.
- Storage based replication of entire eOffice data (documents and databases) at identified DR site.
- Offline tape backups as weekly full and daily incremental by DC.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
eOffice	eOffice is an important breakthrough towards strengtheningthe Governmental decision-	59	75	44

	making machinery by extending the use of modern information and communication technology to the Government processes. It aims to contribute significantly in transforming the core of the Government working which eventually would bring desirable values of transparency, efficiency, accountability and faster decision making. It promotes less paper office with greater collaboration and knowledge sharing.			
Sparrow	SPARROW is a web-based application designed specifically for the officials of the Government of India to file and process their APAR (Annual Performance Appraisal Report) electronically. SPARROW has streamlined the process of recording and processing of APARs thus making the system paperless. The system also provides dashboard facility which enables the service controlling authority to monitor the status such as Officers Posted, Pendency at various levels, APARs Processed and Closed, etc. SPARROW helps in reducing delays in submission and processing of APARs and ensures transparency by tracking the movement of APAR. The system has also streamlined the DPC process by providing various data analytics reports such as grading, domain specialization reports, etc.	8	109	16

Implementation

Implementation Coverage achieved in comparison to the plan / target

- Department of Administrative Reforms & Public Grievances (DAR&PG) is the Line Department for implementation of eOffice in Central Government Ministries/Departments and NIC is the technology partner.
- DAR&PG has been entrusted to implement eOffice in Central Government Ministries/Departments and as on date, eOffice has been implemented in 83 Central Government Ministries/Departments.
- eOffice is based on Central Secretariat Manual of eOffice Procedures (CSMeOP) and the Open Architecture on which eOffice has been built, makes it a standard reusable product amenable to replication across the Governments, at the Central, State, District levels, PSUs and also at International level.
- eOffice is getting adopted across the country as ONE INDIA ONE PRODUCT, fulfilling the needs of various implementing organizations.
- eOffice product is rolled out in different kinds of organizations with a huge user base, varying from the lowest level to the highest level decision makers.

Current Status

As on date, eOffice has been implemented in 603 organizations of Government of India, comprising of 83 Central Government Ministries/Departments, 182 Central Government Other Organizations (Apex/Autonomous/Statutory Bodies, Attached/Subordinate Offices, Public Sector Undertakings, etc.), 27 State/UT Government Secretariats, 188 District Administrations and 123 State Government Other Organizations/PSUs, covering around 4.25 Lakh users, 1.54 Crores eFiles, 4.82 Crores eReceipts, and 31.86 Crores Transactions.

Improvements/ enhancements specifically planned out during next one Year

Over a period of time, eOffice evolved as matured platform with products where Government functioning & processing on files were made online in generic & uniform manner. eOffice adapts to ever changing eco-systems around it (technologies, frameworks, operating systems, browsers, changes in the Government policies & processes) in the form of new releases & version upgrades. eOffice is based on Central Secretariat Manual of Office Procedure & hence is easily implementable by any Central/State/District Govt. organization & PSUs etc. As eOffice product is rolled out in different kinds of organizations with a huge user base, varying from highest levels in the Government to the lowest, the feedback & change requests from them enriched the product in unparalleled way.

During the period of lock-down necessitated by COVID-19, eOffice emerged as a game-changer, by facilitating unhindered work, unfettered & secured access to the files, to Govt. officials. There is a significant rise in use of eOffice & eFiles during this period, as paper-based files can be hosts for corona infection where the virus can survive for 24 hrs to 72 hrs. Moreover, it was difficult to continue to work with traditional paper-based file systems during a complete lockdown state, without significant delays in the functioning of any government office.

NIC had come up with a major release of eOffice-eFile application (eFile v7.0) in June'2020 which has been designed & developed by adopting latest tools & technologies. Several new features & functionalities demanded by eOffice implementing organizations over a period of time have been incorporated in eFile v7.0. The salient features of eFile v7.0 are as follows.

User Experience:

- Responsive Design (iPad, desktop, tablet)

- Seamless view of multiple documents (while noting/ drafting)
- Ease in navigating different Receipts/ Issues in the Correspondence List
- Consolidated file creation process
- User Specific Customization (Landing page, View Preferences)
- Elegant Inbox

Processes:

- Working on multiple Files/ Receipts using Tabbed view
- Multiple signing (Minutes of meeting, etc.)
- Flagging of important Files / Receipts / Dispatch
- Quick Access Context menu
- Seamless working across multiple Posts
- Para Referencing
- Dispatch to Receipts
- Localization – Menu in preferred Language
- Provision of Department specific Master data
- Provision of Receipt Number Initialization
- Receipt numbering based on Instance and Department
- Address Book Management
- Department specific Templates for Drafts and Acknowledgements
- Facility of uploading Ink Signed copy in draft

Technology:

- State of Art/ Open Source
- Cloud Native backend and front-end tools and technologies
- Scalable and SAAS based
- Optimized for high transactions
- Efficient storage of documents
- Improved Signer service.

ENABLER

Processes Re-engineered

The eOffice system comprises of different sub modules that are inter-linked to manage the official work flow of the entire life cycle of a Document/DAK from the moment it is received by the organization till the time it is disposed of with the proper set of actions. It involves the following broad processes and details of Process Re-engineering involved in each process.

- *Digitization of inward DAK:* In physical environment, the inward DAK is moved physically, resulting in loosing of information by person handling the DAKs, slow movement of DAKs, registration/diarization of DAK at multiple points, etc. In electronic environment, the DAK is scanned and diarized at Central Registry Unit and moved electronically, resulting in faster movement, no need of diarization at multiple points, uniquely identification of DAK at organization level, no chances of loosing of DAK and information, etc. Email diarization feature is also inbuilt in the system.
- *Acknowledging the Unique Receipt No. to sender:* In physical environment, sending of acknowledgement to sender is a cumbersome task. In electronic environment, an in-built system is in place through which acknowledgements can be send to senders on click of a mouse button, thereby facilitating the participation of the sender in government

business by tracking whereabouts of real-time status of their application/DAK.

- *Electronic Files creation:* In electronic environment, user has been provided with an option to choose functional heads from drop-down fields while opening a file, resulting in better categorization and quick retrieval. This also builds knowledge at departmental level regarding the no. of files opened for a particular subject, etc.
- *Electronic File/Receipt Movement:* Movement of file/receipt in electronic environment leads to elimination of corruption, venal practices & red tapism, as personal priorities/ discretions have been eliminated because of transparency and accountability. Deleting/ replacing the notings or tearing of files etc. cannot be even thought of. Minimized delays, as users working in eOffice are accountable for any action taken in the system which helps in making the system transparent and accountable. Faster movement of files in real time irrespective of geographical locations.
- *Digitization:* eOffice emerges as a Digital Record Keeping platform, as Files/Receipts are digitized and physical files/receipts are weeded out, resulting in saving of Infrastructure (Cupboard, etc.), Real Estate (Office Space is released) and Physical Security (Custodian).
- *Government wide information exchange facility:* Government could visualize a digital platform facilitating a unique way of exchanging information with other departments for consultation, approval, information, etc., resulting in ease in doing business at Government level.
- *MIS Reports:* An effective Management Information System (MIS) having the statistical productivity, monitoring, and information/reports, helps in managing the productivity at individual/ section/ department level.
- *Interface/Portal for Public:* Facilitates dissemination of information meant for public like Office Orders, Notices, etc., thereby building confidence among the citizens towards Government machinery.
- *Access Anywhere Anytime:* It creates an environment where employee can work from anywhere anytime. Natural Disasters cannot impact the Government functioning.
- *Unicode Compliant:* Promotes working Rajbhasha and local language as per guidelines of Government.
- *Assured Data Security and Integrity:* Implementing robust audit trails, role-based access and digital signing assures security and integrity of files.
- *SMS & Email Services:* For sending acknowledgement, dispatching of approved letter (DFA) outside organization, file/receipt movement from one user to another

Technologies

- Common data sets and standards.
- Unicode compliant for local language support.
- Parichay (Single Sign-On based) two factor authentication
- Role based authorization.

- Enterprise-wide central repository for an easy way to locate circulars, office orders, annual reports, etc
- Integration with external dashboards and applications using standard based API approach.
- Digital Signature Certificate (DSC) and eSign enabled.
- WebVPN enabled for accessing eOffice from anywhere.

People

Capacity Building:

A systematic Capacity Building Exercise becomes an important activity for successful and sustained implementation of eOffice. The Capacity Building Programmes on eOffice for various categories (Users, Master Trainers, and EMD Managers and Product Administrators) of 3-5 days duration are regularly conducted as per the calendar released on training site. On an average, 52 CBPs of three days duration having 25-30 participants are organized every year. As on date, nearly 450 CBPs (3-5 days duration) have been conducted covering about 11,070 officials. In addition to this, nearly 900 Non-CBPs (comprising of training programmes, refresher programmes, demonstrations, etc. of half day, 1-2 days duration) have been conducted covering about 21,874 officials.

The Master Trainers identified by user department are responsible for imparting training on eOffice Product to the end users of the department. Master Trainers are also responsible for imparting training on new releases / features, as and when released.

Leadership support: To ensure an effective implementation of eOffice, the leadership is to be entrusted to the top authority for

- Setting the scope, long term goals & targets.
- Providing Project oversight, direction and guidance as needed for the overall implementation of the project.
- Transition to eOffice in the defined time frame, ensuring the absorption and sustainability of the project.
- Change Management & Process Re-engineering, wherever required.
- Establish and notify the required Policies, Guidelines, Best practices and Standard Operating Procedures for eOffice.
- Promote a Participative strategy in the implementation so that the responsibility and ownership is shared across the organization (A System driven rather than a Person driven approach is to be enabled to ensure the sustainability).
- Regular Review of project deliverables & enforcement for smooth implementation.

e-Office allowed for seamless working by government officials during the COVID-19 pandemic, in certain ways:

- e-Office emerged as a game-changer and lifeline, by facilitating unhindered work, unfettered and secured access to the files, to the Government officials. A study was carried out by NIC and it was found that eOffice was extensively used by Central Government Ministries/Departments during lock-down period as compared to the work done in same duration in last year. As a result of this study, it was also found that Ministry of Railways had on-boarded around 1.5 Lakh users on eOffice over last one year to reap the benefits of eOffice and is extensively using eOffice during the COVID-19 pandemic.

- There is a significant rise in the use of eOffice and eFiles during this period, as paper-based files can be hosts for corona infection. Moreover, it was difficult to continue to work with traditional paper-based file systems during a complete lockdown state, without significant delays in the functioning of any government office.
- eOffice product has played a key role in enabling, the concept of work from anywhere in Government Offices, a rather alien and hitherto mode, generally seen in private companies. As we come to terms with physical distancing, major office work of processing of files is getting accomplished in eOffice, by working from home; eOffice has truly stood the test of the time and proved to be a game-changer in the current crisis of COVID-19 pandemic.
- Apart from the fear of Covid-19 infection, two other major factors contributed significantly, towards the smooth transition of the Government, from working from office, to working from home. Firstly, most of the Government of India Ministries/Departments, attached offices, and States with their districts were already working on eOffice and its adoption was on the ascendant. Even several PSUs had also adopted eOffice. Secondly, the availability of interdepartmental file transfers through eOffice.

VALUE INDICATORS

Learnings for sharing

Implementing eOffice in a manner that seamlessly transitions from physical files to electronic files requires utmost care and best practices to be followed. Though each organization has its own way of working but the following best practices have proved to be a key factor in road to successful and sustainable eOffice implementation.

- *Commitment from Top* - eOffice should be mandated by Department. Regular review by Project Steering Committee for project deliverables & enforcement is required for smooth implementation.
- *Change Management* - Moral boosting of employee with appreciation for good performance, guiding them about how the application will help them in their official work and increase in their productivity & efficiency, Give them a feeling of direct/indirect contribution of growth and development of country as well as saving the environment by adopting a paperless working environment.
- Capacity Building of users on regular basis.
- Owning the project and data management by departmental identified users.
- Establishment of in-house support and capacity building team.
- Government Process Re-engineering and Preparation of SOP for dealing with different cases like storage of physical paper/DAK after digitization, digitization of legacy files/receipts, weeding out of files/receipts, etc.
- Closing of files, as & when action on file is completed and Archival of files, as per the guidelines prescribed in Record Retention Schedule by DAR&PG.
- Adequate Infrastructure at client side must be in place before going live.
- Department to use standardized functional heads while file opening for better categorization and quick retrieval.

- Digital Signing in noting and DFA should be made mandatory as a policy before going live, to ensure authenticity, integrity, and non-repudiation of electronic information.
- Emphasize on the concept of "Minimum Government - Maximum Governance".

Digital Empowerment

- Based on Central Secretariat Manual of eOffice Procedures (CSMeOP), standard guideline laid down by Government of India (GOI) to work on core business function of an organization.
- eOffice is Unicode compliant product with localized interface, facilitating to work in local language. Many states are using the existing version of eOffice with noting and DFA in their local language (Hindi, Telugu, Kannada, Malayalam, Tamil etc).
- Facilitates the user to work anywhere anytime on any device any platform.

Green e-Governance

eOffice has contributed to Environment Friendly & Go Green Initiative in following ways:

- Tonnes of papers are saved which in turn saves trees.
- Infrastructure like Printers, Cartridges, Cupboards, and Office Spaces are also saved.
- Saving on Account of travel for transporting of files from one location to other.

Ms. Rachna Srivastava, *Scientist–G (Deputy Director General), National Informatics Centre, New Delhi, rachna_sri@nic.in.*

Shri. Prashant Kumar Mittal, *Managing Director, National Informatics Centre Services Incorporated (NICSI), New Delhi, mdnicsi@nic.in*

eOffice MMP Implementation for Government of Madhya Pradesh

General Administration Department, Madhya Pradesh

Shrinivas Sharma, Lalit Dahima and Sucheeta Kak

PROJECT OVERVIEW

E-Office product is a suite of multiple web-based software applications to automate the Government's day-to-day operations, viz., File Management System (eFile), Online ACR (SPARROW), Knowledge Management System (KMS), eTour, e-Leave, Immovable Property Return (IPR). It is a Mission Mode Project of GoI, being rolled out under Digital India (e-Kranti) Program.

Objectives

To facilitate and support good governance in the state through online functioning of government's administrative processes.

Scope

It is a G2G/G2Ee-Governance solution leading to simplified, responsive, effective and transparent working in offices. Decision has been taken at the Apex Level in the State to carry out project rollout at all levels of government functioning in Madhya Pradesh, i.e., Departments, HODs(including PSUs/Boards), Revenue Divisions(Commissioner office) and Districts (Collectorate and other offices) to bring in operational efficiency.

Key Stakeholders

Project Governing Body

- GAD
- CM Office(Public Service Mgmt),
- Dept. of S&T(MPSEDC)
- NIC

End Users

- All officers/officials of Govt. of MP

Benefits

- Solution is based on paperless files and document management system, encompassing single/standard file movement and tracking across the government/enterprise
- Management of security and access rights as per organizational hierarchy/work-allocation
- Transparency, accountability and traceability in government functioning
- Quick and correct decision making by government/management
- Optimum utilization of human resources
- Remote/mobile office functioning
- Ensuring data security and integrity through transaction audit trails and electronic/digital signatures
- Helps to monitor the working of an organization or gauging the performance of employees

Status

- This product have been implemented in 56 the Departments and 49 HODs (including PSUs, Boards and Autonomous bodies) of the State
- Successful pilot implementation has also been carried out in one Revenue Division and one Collectorate of the state

- Till date 11000 users (approx.) of the state have onboarded this project, 39, 951efiles have been created, 164988 e-receipts have been generated and 9600 eLeave/eTour/IPR transactions have been carried out. 5 State services have onboarded SPARROW through which online PARs of about 4585 users are being processed.

Software

Project has been built on Open Architecture using agile methodology, which includes the following:

- *Hosting environment:* Virtualization mode using VMware
- *ApplicationDevelopment framework:* Java ansd PHP
- *Web Server:* Appache HTTPD
- *Application Server:* Appache Tomcat
- *Operating System:* Linux , Cent-OS
- *Database:* PostgreSQL
- *Services integrated:* eSign, LDAP, Relay/SMS, CRL

Cyber Security

Infrastructure Audit: eOffice instance for Govt. of MP has been deployed in collocation as well as co-hosting environment at State Data Centre where security audit of DC is being regularly carried out each year (latest audit through KPMG)

Application Audit: Each application/module of eOffice Product suite is also Security Audited at regular intervals. Latest audit done through M/s Secure Eyes

Disaster Recovery and service continuity

- Cloud-based Mirroring (IaaS) - DR Model (Application + Database + Storage) with size factor of '1:0.5'at a remote location which is not in the same seismic-zone
- Based on requirement, scale DR expansion upto 2-4 VMs of required specs.
- Recovery Point Objective (RPO) and Recovery Time objective (RTO) of 10 minutes or less and 3hours respectively, looking into the criticality of the application.
- Managed DR services to include tape backups and device monitoring. Should also cover power supply, cooling, rack-space (with rack), Internet Gateway, Firewall, Antivirus, physical and cyber security.
- Conduction of DR-drills after every 6 months

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
eFile	Automates the processing of files and receipts/dispatch, bringing in transparency, traceability and reduction in paper use	56 Depts of Mantralaya + 3 HoDs + Governor's Secretariat	11 HoDs + 1 Rev. Division + 1 Collectorate	35 HODs/PSUs/Boards

SPARROW (Smart Performance Appraisal Report Recording Online Window)	Automates the submission/processing of Annual Performance Appraisal Reports of govt. employees as per defined workflow/channels and set timelines. Increases accountability and aids quick decision-making during promotions	1 (SPS)	1 (JAS-PRC)	2 (JAS-CLR, RI-CLR)
IPR	Facilitates online submission of annual Immovable Property Returns(IPR) by govt. employees for easy mgmt. of office records	-	1 (MP Mantralaya Class I, Class II, Class III)	-
e-Leave	For online submission of different types of leave applications(entitled to govt. employees) including their approval and sanction and status tracking	-	2 IAS, Mantralaya Service	3 CLR, PRC and Govt. Press
e-Tour	Entire Tour process in govt., i.e., submission of tour-log sheets, getting approvals/sanctions and settlement of bills is automated through this module, bringing in transparency and speed	-	1 IAS cadre MP	-

Implementation

Implementation Coverage achieved in comparison to the plan / target

Sr. No.	Target	Achievement
1.	Implementation of eFile Module in Mantralaya and Governor's Secretariat	Initially rolled out in 10 departments, leading towards concurrent implementation in remaining departments of Mantralaya. Also implemented at Raj Bhavan
2.	Implementation of eFile Module in 14 HoDs (pilot)	Rollout completed but took longer due to lack of infra
3.	Implementation in remaining	Rollout in 35 HoDs during Covid

	HoDs of the state	and is still going on
4.	eLeave/eTour implementation for IAS cadre	Both modules working smoothly since Sept. 2019
5.	eLeave implementation-MP Mantralaya Service	Rolled out for Class I, II and III officials since Jan 2020
6.	Pilot eFile implementation at division/district level	Successful rollout in Jabalpur collector/commissioner office and to be rolled for remaining district administration
7.	IPR implementation	Rolled out in MP Mantralaya Service successfully since Jan 2020
8.	SPARROW implementation for SPS	Successful and sustained rollout since October 2018
9.	SPARROW implementation (JAS-PRC)	Implemented for Jr. Administrative Service in January 2020
10.	SPARROW implementation for JAS (Commr. Land Records) & Revenue Inspectors (Commr LR)	Implemented since May 2020
11.	Infrastructure Gap Analysis	Carried out for 56 Depts of Mantralaya in 1 month. Infra requirements were also evaluated for 20 districts, Governor's Secretariat, 11 HOD's and their district offices
12.	Procurement of h/w infra	Procured 160 scanners and 565 computers for Mantralaya staff in a span of 4 months
13.	PMU unit setup	Technical support team for project continuity put in place - with 6 members initially, Team size was gradually increased to 12 looking into spread and criticality of the project
14.	Facility management system	For upkeep of S/W and H/W infrastructure at Mantralaya. FMS in place since July 2020
15.	e-Sign Gateway Setup	Completed setup for e-Sign service for the project in 3 months

Improvements/ enhancements specifically planned out during next one Year
Improvement/Enhancements during the last year

- Adaptation to changing technologies, frameworks, browsers, govt. policies etc. in the form of new releases
- Decentralized admin control for better data management
- Classroom based trainings replaced by online capacity building sessions (during Covid)
- Periodic review of implementation status by the Steering Committee

- Quick resolution of technical issues through well designed escalation matrix
- Incorporation of change requests to enhance the application functionality.
- Establishment of Facility Management System for handling infra related routine system issue in Mantralaya
- Prepared learning materials, manuals and videos in local language to help end users.

Improvement/Enhancements planned for next year

- Rollout at District level (53 districts), including the remaining HODs & their subordinate offices
- Implementation of Records Management System (to weed-out and store/retrieve physical files)
- Inclusion of district NIC officers and e-Governance Managers in project rollout support (PPP Model)
- Ease of access of reports based on various KPIs
- Portal Interface to public for building citizen's confidence towards govt. machinery
- Website development (for publishing eOffice training calendar, sharing resources in local language etc
- Using social media platform for promoting the project usage
- Bilingual availability of product
- Integration of data analytics & single sign on feature/technology

ENABLER

Processes Re-engineered

- Registration of Inward/Outward DAK is carried out only once, electronically, with unique ID, to avoid repetition and for easy searching/tracking. No need to diarise the DAK at multiple locations, as done earlier in manual system
- Functional File Heads and Categories which are common across all state govt. offices were standardized to maintain uniformity across the entire state. Files were primarily categorized based on their functionality and further segregated into Heads and Sub-heads resulting in better search/retrieval and organization of records.
- Digitization of records helped to weed-out old files and release the occupied office spaces and save infra resources.
- Online Inter/Intra-Departmental file exchange saves time and resources, especially for geographically disparate Departments. These processes which used to take weeks/months earlier, can now be carried out with the click of a mouse
- Developed SOPs/guidelines in the form of a booklet (ईऑफिसकार्यप्रणालीपुस्तिका(for ease of carrying out automated office operations using eOffice.
- Gauging productivity at individual/section or department level through MIS reports available in all modules out the applicationsuite. Resulted in responsive office environment
- Government work can be carried out from any place at anytime (no constraints on working from office and no dependency on availability of physical files)

- Alerts are automatically triggered whenever critical transactions in any of the eOffice applications take place which serve as reminders
- Central & Department-wise digital knowledge repository has been created for easy/online access to govt. orders, guidelines, circulars, rules etc. which were earlier available in physical format only

Technologies

- Unicode compliance
- Integration with other applications using APIs
- DSC-enabled and eSign-enabled
- LDAP based authentication
- Role based access/authorization
- E-mail diarization

People

Leadership Support:

- Apex Level approval (from CS and Cabinet) for the implementation of this project
- State Level Project Steering Committee is also in place to provide direction and guidance in implementation of project in defined time-frames and issue guidelines/best practices and SOPs wherever required. Regular review of project deliverables by Steering Committee to enforce smooth implementation

Management of Change:

As regular capacity building sessions are vital for sustained and effective implementation of this project, massive classroom-based as well as online trainings have been held across levels of officials/officers at State Level as well as at the District Level. As of now about 15,000 users have been trained. On-desk trainings and multiple rounds of refresher trainings have also been carried out, especially at Mantralaya. Motivational sessions have also been held for Nodal officers and Master trainers who were nominated from each department for quick, continuous and local management.

VALUE INDICATORS

Learnings for sharing

To overcome the challenges of implementation, following practices were carried out :-

- Framing implementation strategy/plan with set timelines from pre-rollout to go-live stage and further sustenance of the project
- *Filling up of Infra-GAP:* Before project initiation, availability of infrastructure was assessed and procurement facilitated in least possible time. Old/obsolete systems were discarded
- Setting up of project implementation facilitators:
  i. *Project Management Unit (PMU):* A 6-member Team (Frontend and Backend) was established for concurrent project implementation in 56 departments of Mantralya in first Phase. Team size was increased to 12 to cater the implementation requests of the entire state and for rolling out all the modules of project effectively.
  ii. *Nomination of Nodal officers:* Project ownership was increased by nominating nodal officer at each Dept./HoD level for end-to-end monitoring
  iii. *Nomination of Master Trainers:* Master trainers were nominated for timely delivery of the existing/upcoming product features to the

departments' end users and escalating the issue/bugs to the core PMU Team.

- *Optimization of Server Resources:* For better/efficient usage of infra-resources, virtualization technology was opted over physical server environment
- *e-Sign Gateway Setup:* First integration of eSign service to the project was facilitated in the state as digital signing in eOffice was dependent on the same
- Training on eOffice has also been included in the curriculum of various induction/refresher courses held at the Academy of Administration, Bhopal for quick and easy adoption at all govt. levels
- Establishment of 24X7 helpdesk support via email , telephone through core team at Mantralaya
- Launching pilot implementations, assessing the rollout and then replicating in others offices
- Provisioning of demo eOffice instance to enable ample hands-on experience (feel of the application) to onboarders
- Scanning/digitization of physical files initiated in phased manner (based on their usage)
- Continuous trainings imparted to users till they become proficient

Digital Empowerment

Being Unicode compliant, eOffice facilitates working in local language. This enhances easy onboarding by end-users and makes adaptability/change-management easy Finance, Home and Law are key departments for any state govt, as all other departments send files to them for necessary approvals/comments/opinion. Success of eOffice Project implementation in MP was also, therefore, based on their onboarding. Though implementation in Home and Law departments was gradual, Covid pandemic necessitated Finance department &it's HODs (Treasury etc.) to onboard eOffice, forcing all other departments/HODs to move finance related files electronically, facilitating unhindered work. Corona lockdown proved to be a boon from the point of view of eOffice rollout in MP, as there was a significant and sustained rise in number of users and eFile transactions

Green e-Governance

Paperless office working using Office product has drastically reduced the consumption of paper in offices, thereby contributing to preservation of environment by saving millions of trees from felling. Government has also saved on expenses related to provisioning of infra like printers, cartridges, storage-cabinets, office-spaces etc.

Shri. Shrinivas Sharma, *Secretary, General Administration Department (GAD) (Madhya Pradesh), shrinivas.sharma@mp.gov.in*

Shri. Lalit Dahima, *Deputy Secretary, General Administration Department (GAD) (Madhya Pradesh), lalitkumar.dahima@mp.gov.in*

Shri. Sucheeta Kak, *Technical Director, National Informatics Centre (Madhya Pradesh), kak.sucheeta@nic.in*

NICDSign - Digital Signature Solution for Government

National Informatics Centre, Kerala

T. Mohana Dhas and T. Edward Sam

PROJECT OVERVIEW

Vision & Objective

- To develop a platform and browser independent tool for data, pdf and xml sigining.
- Provide a facility to sign pdf files in a batch, which will be useful when the user is required to sign more than one document in a single session.
- To provides 'See what you signing' feature that enable the user signing a pdf/xml data to see a preview of the content to be signed.

Scope

Government offices are issuing many certificates through online in the form of PDF documents and it is very much essential to ensure the integrity of these certificates. Similarly, xml documents are shared across various eGovernance applications to enable seamless integration. Earlier these pdf/xml documents were digitally signed using the applet based digital signature solution by many eGovernance projects. Once the applet support was withdrawn from browsers, it was essential to find an alternative to the applet based digital signature solution. Hence the NICDSign was developed as a Cross platform, browser independent solution for digital signature.

Stake Holders

Central Government Ministries/, Department, State Government Departments and any eGov solution requiring cross platform browser independent DSC solution. This indicates that the product is available for national level adoption.

Key Features/benefits

- Browser independent and plug-in free solution for digital signature
- Supported by all major client operating systems like Windows, Linux and macOS.
- Support data, pdf and xml signing
- The signature is generated in PKCS#7 Cryptographic Messaging Standard, the signature is interoperable across various applications.
- Can be easily integrated with any applications irrespective of the technology used for development.
- Supported by all major browsers like Google Chrome, Mozilla Firefox, Microsoft Internet Explorer and Apple Safari.
- The DSC Server-side API service can be hosted centrally and shared across different applications.
- Certificate Revocation Management

Current Status

The NICDsign solution has been integrated by many eGovernance application developed for various states and Central Government agencies.All eGov applications in Kerala state have integrated NICDSign solution.

Software/Hardwars

Developed using Java Technologies

Can be deployed easily in any web server

The client application is provided as exe, deb and dmg for windows, ubuntu and iOS

Certification (Certifying Agency)

Centre of Excellence (CoE) for Application Security
National Informatics Centre
Trivandrum, Kerala

Data Recovery/ Service Continuity

The NICDSign solution is a service-oriented solution which facilitates data, pdf and xml signing and verification. It supports verification of both online and offline certificate revocation. In case the offline verification mode is enabled, the software implementer should download manually the certificate revocation list from the respective providers and should retain in the stipulated folder for offline certificate verification.

In case of disaster, the server-side DSC API should be redeployed and the revocation files should be manually copied into the stipulated folder. Since NICDSign does not store anything in Database/Server, data loss does not occur. During installation, depending on the requirement, respective eGov solution providers may configure in a clustered environment and also provision DR facilities.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
GST Kerala	Digitally signing bills, documents, certificates and government proceedings and orders etc	1,36,331	4,45,463	84,101
State		2,90,883	4,65,413	4,07,236
eTreasury		29,217	13,99,721	8,62,435
SparkPEARL		Nil	5,36,633	4,70,618
RR Online		Nil	2,26,206	33,340
There are other projects like eAnumathi, ServicePlus, PRICE etc from NIC, C-DIT, IKM.				

Implementation

NICDSIgn can be easily integrated with applications developed using Java, PHP, .Net Technologies across different services of government. The solution can be used for online delivery of services and also to collect digitally signed documents. This solution is integrated with many central and state government applications.

Developed as a project and later converted into a product based on popular request from stake holders across the country, the product has evolved as a standard cross platform browser independent DSC signature solution for any eGov application.

Improvements / Enhancements

Project converted into a product and rolled out in all eGov projects in Kerala and also provided to various central projects and state government department over the last two to three years.

- Batch signing of PDF documents was introduced
- Multi part, multi document DSC solution
- Facility to place the signature in designated position was introduced.

- Periodical technology upgrade and security audit and source code analysis.

ENABLER

Processes Re-engineered

Earlier the government departments were using applet-based DSC solution. When the applet support was withdrawn there was a crisis in government as well as in NIC for an alternative solution.

NIC Kerala took the challenge and developed an alternative solution taking into account the cross platform and browser independence requirements.

Once the product was realized the eGov solution providers had to simply plug the NICDSign solution in their web/application servers and the end users had to download the client tool on their respective systems.

Technologies

DSC Signing is an important requirement in any enterprise. NICDSign has been positioned as an enterprise solution for authorized signatories for signing digital documents and Government orders/certificates. Hence NICDSign has become an integral part of any enterprise IT solution.

The solution was designed as a cross platform browser independent product so that it can be easily adopted for any eGov platform with any OS or browser support. We in NIC Kerala, continuously upgrade the NICDSign product taking into account the technological advancements as well as challenges from time to time and manage the product centrally with a version control and download center. A mailing list is maintained for announcements on new versions and releases.

People

NICDSign product can be adopted by any eGov solution provided using a simple integration document. There are not many challenges for the solution integrators. The training requires for end users are also minimal and with our experience users are able to download and install the client tool without any intervention from government entities. Online user manual is available for integrators and end users

VALUE INDICATORS

Learnings for sharing

NICDSign is a cross platform browser independent solution and is based on open-source technologies. The product has been developed as a generic DSC Signer for use by any eGov solution including those supported by NIC Kerala.

Digital Empowerment

The product is available for any eGov applications both in central and state government. Language demography and cultural differences do not affect the product as it can be adopted globally.

Green e-Governance

NICDSign once implemented generates digitally signed bills, certificates, documents etc. This promotes green computing practices.

Shri. T. Mohana Dhas, *Dy. Director General & State Informatics Officer, National Informatics centre, sio-ker@nic.in.*

Sri. T. Edward Sam, *Sr. Technical Director, National Informatics Centre, Kerala State Centre, edwardsam@nic.in*

Animal Husbandry Management System
Animal Husbandry Department, Andhra Pradesh

T. Damodar Naidu, Kodali Harshavardhan and Bodgari Balakishore

PROJECT OVERVIEW

Andhra Pradesh has some of the richest livestock resources in the country and has one of the most advanced eco system regarding Animal Husbandry activities. Department's activities are oriented towards increasing the production of livestock products like Milk, Meat and Eggs, besides providing adequate health care and control of diseases aiming to improve the economy of rural poor through livestock rearing.

Objectives

Department provides different type of inputs to farmers at subsidized rates. This practice of providing subsidy is highly decentralized and is handles at local level. This practice is vague and opaque resulting in not a very good use of resources and finance.

To overcome all these, department has decided to put in place a robust ICT online workflow system involving locals as entrepreneur and making the inputs procurement centralized at state level.This will make the whole system very transparent and will result in effective utilization of funds and deliver the benefits to the right farmer.

Brief Description of Project

- Animal husbandry is related with the care and management of Livestock. The department monitors the feeding, breeding, housing and health care of Livestock for getting maximum benefits.
- The activities are reoriented towards increased production of livestock products like Milk, Meat and Eggs, besides providing adequate health care and control of diseases aiming to improve the economy of rural poor through livestock rearing.
- The Livestock play a vital role in socio-economic and cultural life of our people.
- Animal Husbandry Department is established with the main objective of providing treatment and prevention of diseases in livestock.
- Initially the emphasis was on health care only, but subsequently several schemes have been taken up for overall growth of livestock sector.

Brief description of Applications developed

For Farmers

Livestock Loss Compensation Scheme (LLCS) (Cattle/Buffalo, Sheep/Goat: The call center screen collects the request of the dead animal and raises a request in the LLCS screen through the veterinarian. It also has approvals at various levels and the Joint Director has the final approval authority. The note file and proceeding documents will be transferred at the JD level and the JD will be Process the farmers amount using CFMS portal.

Farmer and Animal Register: Registration will be displayed under VAS login , all the registered farmers will be displayed including with a search option.All animal details of the farmer, list of registered animals will be displayed and VAS can add new animal details for the farmer.Treatment option for the animal which has to be treated, all the treatment details to be entered.In treatment details all the details regarding SYSTEM, DIAGNOSIS and TREATMENT

should be entered based on the input type and click on submit button to save the details.

Sheep & Goat Deworming (SGD): ICT Android app was put to use effectively for capturing the data of the sheep and Goats possessed and Dewormed along with the geo-tagged photos of the sheep and goat and Aadhaar numbers of the Farmers.

All Vaccinations: The application records all the vaccination of bovines for Anthrax, Blue Tongue, Brucella, Goat Pox, Sheep Pox etc. Government runs this program at periodic intervals.

Medicine Management System (MMS): The application will handle indenting, dispatch and distribution of Medicine by/to the veterinary dispensary and veterinary hospital. The vendor dispatches the medicine to corresponding hospitals. It also has approvals at different levels.

Suphalam: The main objective of Suphalam is to achieve a calf birth once in a year from each animal. Under each doctor there will be a one Para vet/Pashu Mithra/ VAS/ Gopala Mithra to monitor and follow up the conditions of the animal and should report to doctor concerned. A list of Non- Pregnant Animals will be carried and advice will be given.

OPGK (OoruraaPashuGraasaKshetralu): The system captures Land owner details, Entrepreneur Details and consumer details. Different types of fodder produced by entrepreneurs are sold to consumers.

Mobile Veterinary Clinic (MVC): The application has provision to register the doctors and attenders. Medicine received details, attendance details and vaccination details are also captured.

Medicine Management System (MMS): The application will handle indenting, dispatch and distribution of Medicine by/to the veterinary dispensary and veterinary hospital. The vendor dispatches the medicine to corresponding hospitals. It also has approvals at different levels.

Animal Induction: The Government has approved Animal Induction policy for grounding of animals from other states under various weaker section programme in the state.

- Increase the number of High -Yielding Animals
- Provide sustainable livelihood opportunities to youth belonging to SC / ST/ BC / EBC / Minorities / kapu categories.

Animal Husbandry Institution Management System Application (AHIMSA) Mobile App: The application captures the details like animals treated, De-worming, Surgeries, Vaccination, Artificial Insemination performed and calves born.

Foot-and-mouth disease Control Program (FMDCP): The application records the vaccination of bovines. Government runs this program at periodic intervals.

Check post: Live stock check-posts Management application is used to record the health condition of animal migrating from one state to other states at the border after thorough check up of the animal. If any disease is found accordingly vaccination is being given/suggested and same is recorded.

Estrus synchronization programs (OSP): Capturing the beneficiary details of Oestrus synchronization is used to facilitate breeding by artificial insemination

Fodder Seed: ICT application was put to use to capture the details of farmers who all are used for making and delivering the feed and fodder by using Azolla, Cattle Feed, Chaff Cutter, Fodder Seed, Hydroponics, Milk Machines, Silage and TMR.

PasuSevaKendalu (PSK): Capturing the Gopala mitra indenting without

payment, Indent JD assgined to supplier, supplier dispatched to Gopala mitra, Gopala mitra distributed to farmers and finally gopala mitra amount paid to JD.
Farmer Producers' Organisations (FPO): These Organizations are created at the cluster, block, district or state level depending upon the needs of the producers considering the demand potential to adopt value chain approach to enhance farmers'/producers' economic and social benefits.
In state level Farmer's Interest Group (FIG) will be under FPO in village level.
Janmabhoomi-maa vooru (JBMV): ICT application was put to use for effectively capturing the details of Janma Bhoomi – Maa Vooru activates performed during scheduled in the Villages
Shandies: Shandies is conducting program at village level for purchasing and selling animals. At each Shandy a veterinary doctor will be assigned to check whether the Animals has any disease. Many animals are sold and bought sold here. All the details are recorded in the application.
Schemes: The application captures details of all the 19 types of schemes. Some of the schemes are Azolla, Cattle Feed, Chaff Cutters, Fodder Seed, Hydroponics, Milk Machine, Ksheera Sagar, Sunandini, Silage, TMR, Mini Sheep & Goat Units, Rural Back Yard Poultry Units, SCSP, TSP, SDP and RKVY.
Live Stock Census: This web and mobile apps have been developed to capture the livestock data which will help in quick analysis of trends and provide the insights into the data collected.
For Veterinary Doctors:
Fodder Contingency Plan: Based on entered census data animals required fodder calculated. Enter fodder availability and action plan for fodder adjustment for animals. Fodder Availability and action plan should match with Fodder requirement. Fodder Contingency Plan Quarterly based.
Animal Husbandry Saturday (AHS) Day: Capturing the details of Animal Husbandry Day activates performed during scheduled in the Villages.
Animal Husbandry Request Tracking System (AHRTS): The application will handle Raise tickets at field level, resolve the tickets at technical teams and provided tickets tracking system.
Employee Details: The login-based user or employee is already registered. The rest of the employees have to register using this application and also provided Employee transfer option.
Annual Confidential Reports (ACRs): Annual confidential reports of the government servants are written with a view to adjudge their performance every year in the areas of their work, conduct, character and capabilities. This application will primarily maintain each employee wise ACR document in the database and if required the data download the ACRs. Use Quick and Easy Online Collaboration and Sharing, Easier Access to Data – Past and Present, Data Becomes Portable and is Accessible from Anywhere.
Vigilance: The application will handle Vigilance Cases details, documents and tracking at head office level.
Grievance: Grievance is a system of formal complaint that is raised by an employee towards an employer in the workplace.
For Government:
Monthly Progress Reports: The application will capture monthly achievements updated by institutions.
Annual Administration Reports: The application will Capturing annual target and achievements updated by institutions.

Village Secretariat (AHA) Mapping: The application will handle Mandals Mapping, AHA post available or not, AHA/Incharge (Paravet, GopalaMitra, LSA, VA, VLO, JVO and Gopala Mitra Supervisor) mapping details collected.
Call Center: The application will handle requests from farmers. Farmer calls designated number and provides his details along with type of disease, location and type of animal. System will send SMS to corresponding doctor. Doctor will visit the farmer location and provides the treatment
Issue Order: In this application HOD of AHD will send the memos or Proceeding to all or some the officers. Once the officers or doctors logged into the system they can see their memos or Proceeding.
Cadre: This application has provision to enter number of posts sanctioned, GOs and recruited by Permanent or Temporary details those are updated by Institution wise, Designations wise.
Jurisdiction Mapping: Villages, habitations and wards mapping to institutions. Based on the mapping famers and under institutions mapped respective institution.
Rural Infrasture Development Fund (RIDF): The application will handle indenting hospital infrastructure items, based on the institution allocated budget.
Recruitment: Initially the applicant has to register through the registration screen by providing the basic mandatory fields and the applicant gets the application ID for his registered mail ID. After registration applicant must provide personal details, local status, qualifications obtained, other details, MVSC and work experience details and upload the documents. Provides the Grading system to the Department based on applicant details.
Infrastructure Requirement: The Department provides ideal requirement for the field office and collects the actual requirement from field offices.
Current Bills: The application will collect the current bills due details from field offices.
Key Performance Indicators (KPI): Targets to districts for different indicators like Milk Production, Meat Production, Egg Production, Vaccinations Done, Preventive Treatment, Silage Distribution, specimen Examined blood etc are set. For each target the achievement values are entered for each indicator
Budget Management System: Budget will be allocated to department and where in department allocates it to the filed level offices in the district. Field level offices can utilize the budget given for the purpose of salaries, medical equipments etc. All the details are captured as part of the system.
AHI: The application is used to capture the Location details, working status, officer details and facilities like printer, internet, scanner and computer of the Area Veterinary Hospital.
Institution management (IM): Institution details like geo coordinates, type of institution and photo details are captured. All the institutions locations are shown in geo map.
Livestock Census: This web and mobile apps have been developed to capture the livestock data which will help in quick analysis of trends and provide the insights into the data collected. Department is one of the earliest in India to adopt the IT system to conduct the census.
Multi purpose Dairy Extension Assistant (MPDEA): In MPDEA (Multi Purpose Dairy Extension Assistant) application all the MPDEA details are captured.

Key Stakeholders

- Farmers

- Veterinary Doctors
- Department of Animal Husbandry

Intended Benefits and Current Status

- Effective Management of PIA/ Centres
- Automation of subsidy calculation, Compensation & other benefits
- Stopping of pilferage & money leakage
- Interfacing with Multiple Systems

Key highlights/achievements

- *Livestock Loss Compensation Scheme:* Breed based financial compensation in case of death of livestock.
- *Animal Induction:* Increasing the quality of Livestock by bringing in better breed of animals from outside the state and providing Insurance cover, Feed & Fodder.
- *Vaccination:* Includes 9 types of vaccines including Brucilla& Anthrax.
- *Annul Administration Reports:* Performance assessment of Veterinary Dispensary/ Clinics/ Hospitals
- *Suphalam:* Treatment of milk producing animals not able to conceive.
- *First state to adopt online system for tracking FMDCP and to be declared 'Foot & Mouth Disease Free'.*
- *RIDS:* Leveraging the scale of volume by aggregating demand from across state and centrally place orders for fodder & silage. Later delivering it at doorsteps of farmer.

Software

- *Software Environment:* C#, asp.net &, Microsoft SQL Server Database
- *Tools:* Microsoft Visual studio
- *Application Server:* IIS
- *Hardware:* VM Hosting

Cyber Security

Andhra Pradesh Technology Services Limited (APTS)
APTS/AHMS/Assurance/ SO /2O2O

Disaster Recovery and service continuity

APTOnline has in place a system for disaster recovery to handle the worst case scenario. It takes regular backup (daily incremental & weekly full back up for database and daily backup for application). These backups are stored locally as well as on tape media which are stored outside the physical periphery of APTOnline hosting environment. Animal Husbandry technical team keep performing the regular back up restoration exercise to ensure the integrity of backed up data and the ability to restore the data with a defined RTO (Recovery Time Objective) & RPO (Recovery Point Objective).In addition DB HA Log shipping has been implemented in Animal Husbandry project. This feature helpsthe secondary database to continue providing the delivery of requested services in case primary database is not available for whatever reasons. To ensure the availability of host servers VMware HA cluster has been implemented in Animal husbandry project. This feature provides High Availability for virtual Machines by pooling them and the hosts they reside on into a cluster. Hosts in the cluster are monitored and in the event of a failure the virtual machine on a failed host are restarted on alternate hosts. Thus it is safe to assume that Animal Husbandry project has taken all the necessary measures to ensure that its system is recovered in case of any eventuality within defined timeline and 'business as usual' can continue.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Livestock Loss Compensat-ion Scheme	Breed based financial compensation in case of death of livestock	0	16,284	22,026
Vaccination	Records all the vaccination of bovines for Anthrax, Blue Tongue, etc. Government runs this program at periodic intervals	98,71,324	24,51,884	1,51,865
Sheep and Goat Dewormed	ICT Android app was put to use effectively for capturing the data of the sheep and Goats possessed and Dewormed along with the geo-tagged photos of the sheep and goat and Aadhaar numbers of the Farmers.	4,77,94,629	3,62,97,451	2,19,34,186
Foot-and-mouth disease Control Program (FMDCP):	Records the vaccination of bovines. Government runs this program at periodic intervals.	1,66,33,105	91,04,211	0

Implementation

Implementation Coverage achieved in comparison to the plan / target

- 100 % Achievement was completed in the activities planned / targeted till now.
- All the Departmental Institutions are Geo-Mapped.
- All the Monthly performance indicators were being tracked.
- Functionalities to all the stakeholders (Farmers, Departmental Staff, Entrepreneurs, Banks and Government) have been developed and integrated and are being used effectively

Improvements/ enhancements specifically planned out during next one Year

Last One Year

- Livestock Loss Compensation Scheme (LLCS)

- Monthly Progress Reports (MPR)

Next One Year

In the next 1-year department is planning to integrate the online systems and databases with other Departments systems and Databases to create a Data Highway to achieve a integrated and Unified Interface for the sake of Public convenience.

ENABLER

Processes Re-engineered

Recruitment

Previously recruitment use to happen in a traditional manner and was a laborious and time taking process. At some times it almost tool 3-4 months to process the applications. However with the advent of Recruitment application the processing time was brought down significantly to 1 week time. Application interface was simplified and the calculation of Merit List was automated to achieve this.

Live Stock Loss Compensation Scheme (LLCS)

A standardized procedure was conceptualized and the same was developed as an application in order to have a uniform and time bound processing of all the Compensation claims under this scheme rolled out by Government of AndhraPradesh. Checks and balances have been incorporated in the system in order to drive all the stakeholders in the right direction.

Institution Management (IM)

All the institutions are remapped and as a result of this a birds eye view of the Instituional network was achieved. This also helps in ensuring optimal geospatial distribution of the departmental network.

Monthly Progress Reports (MPR)

Previously monthly progress reports need to be manually obtained and consolidated from the entire departmental institutions (>3000). Enabling the entry of the Monthly progress reports in Online system saves a lot of man hours which were previously spent on consolidation. This also helps in assessing the ground reality of the departmental activities

Technologies

Developing these robust online systems combined with data analytics have enabled the department to monitor the activities, staff and schemes implementation in a real time basis.

People

Initially the digital literacy is relatively less and it was difficult to adopt to these new systems.Careful and meticulous plan was executed through trainings to all the stake holders and the apps were also developed in a way to minimize the data entry and to select from the dropdowns. Overtime a significant positive approach was also noticed from all the stakeholders as they have embraced the change in the best interest of the farming community.

VALUE INDICATORS

Learnings for sharing

- Implementing Bio-metric system for farmers to identify the real beneficiary and remove duplicates, which ensured the benefit was received by the authentic beneficiary. Resulting in a transparent system.
- Masters were created by following central government district codes

Digital Empowerment

Direct benefit transfer to farmers through aadhar authentication has been implemented.

Green e-Governance

- As most of the processes involved has been automated resulting in shift from manual processes which used to consume lots of paper. Now the use of paper has been minimum, a big step towards green e-Governance.
- Also, department has been using the related IT Infrastructure (servers, network equipments etc used in hosting) along with in house IT equipments at its offices, depot in a very judicious manner helping in extending their life. So, through the efficient use of IT equipments, department is achieving green e-Governance.

Dr. T. Damodar Naidu, *Director, Animal Husbandry Department (Andhra Pradesh), ap.ahdir@gmail.com*

Dr. Kodali Harshavardhan, *Veterinary Assistant Surgeon, Animal Husbandry Department (Andhra Pradesh), harsha.vardhan@gov.in*

Shri. Bodgari Balakishore, *Head Technology, APT Online Ltd (Andhra Pradesh), bala@aptonline.in*

CROP LOAN WAIVER SCHEME-2018

Department of Agriculture, Govt. of Telangana

B.Janardhan Reddy, R.Sivanand and N Suresh Kumar

PROJECT OVERVIEW

Overview

The Department of Agriculture, Government of Telangana has been implementing various e-Governance & Digital India initiatives in the recent years. As a part of these initiatives, the Government of Telangana had decided to waive off all the outstanding Crop Loans and Gold Loans for Agriculture purpose of the farmers in the State as on 11.12.2018 from the Scheduled Commercial Banks, Cooperative Credit Institutions and RRBs. The eligibility for the waiver will be up to Rs.1.00lakh (Principal together with applicable interest) per family. All Crop Loans Sanctioned/renewed on or after 01.04.2014 and outstanding as on 11.12.2018 are eligible.

Objective

The Government of Telangana taking into plight of the farmers in the state, while giving priority to Agriculture sector has decided to waive off the outstanding loans of all the farmers in the state as on 11.12.2018 to provide relief to the farmers from their debt burden and provide direct support to farmer thereby increasing his financial capacity and the Concreting their social status in the society

Scope (Functional)

This scheme will cover short term production loans and crop loans against gold, disbursed to farmers in the Telangana State by scheduled commercial banks, cooperative credit institutions (including urban cooperative banks) and regional rural banks, collectively called as the “lending institutions”.

- The Apex office is Commissioner of Agriculture, Hyderabad
  i. In State Level, SLBC and All Banks Controlling Officers and Department Officials of the Scheme
  ii. At District Level District Collectors, Lead District Managers and District Agriculture Officers, Chief Managers of All Banks
  iii. At Divisional Level Assistant Directors of Agriculture and Joint Mandal Level Bankers Committee (JMLBC) members
  iv. At Mandal Level Mandal Agriculture Officers, Branch Bank Managers
  v. At Cluster/Village Level Agriculture Extension Officers are the Core members at different levels to support the network of the Crop Loan Waiver portal and implementation of the Scheme
- All the officers have their own functional competency to attend their Job duties in implementation of the scheme.

Scope (Geographical)

Based on the farmer’s loan account data provided by the Bankers, all the 33 districts in Telangana state have been covered in this project.

Benefits

The Benefits under the scheme are:

- All the Small and Marginal farmers are completely free from their debt burden by waiving their outstanding loans upto Rs.1.00 lakh
- The farmers can avail the fresh loans from the Banks at stipulated rate of interest and as per the Scale of finance for the year

- The Amounts will be credited into the eligible farmers Loan Accounts directly through NACH payment system
- SMS Alert Messages were sent to the farmers Mobiles after crediting the Amount to their Loan Accounts
- The Eligible farmers Lists are ported in the portal and made accessible to the departmental Officers and Bankers for attending the Queries of the farmers
- The Grievances were addressed through the portal for extending the benefit to the eligible farmers

Current Status:

- The Scheme is initially designed in the year 2019-20 and in first phase, the outstanding amounts upto Rs.25,000/- were credited into the farmers Loan Accounts. An amount of Rs.406.54 crores was credited into 2,95,204 eligible farmers Loan Accounts.
- The Scheme is in continuation for the year 2020-21 for extending further benefit to the farmers as per Government Orders upto Rs.1.00 lakh

Hardware/ Software

- Server: MS SQL Server 2012
- Front End: Dot Net Framework 4.0, C#, Visual Studio 2010. AJAX, HTML5, Responsive J Query

Certification (certifying Agency)

Security Audit was done by the empaneled CERT-In third party agency - LOCUZ Enterprise Solutions Pvt. Ltd, Hyderabad

Disaster Recovery/ Service Continuity

CLW application has been hosted in NIC Network at National Data Center, Hyderabad. NIC, Hyderabad will look after disaster recovery and service continuity by the dedicated and professional team deployed for the same.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Crop Loan Waiver Scheme-2018	Total No. of Farmers enlisted by Bankers (No. in lakhs)	Not Applicable -	42.23	42.23
	Benefitted Farmers (No. in lakhs)	-Not Applicable -	2.95	Under Processing for identification of eligible beneficiaries
	Total Amount Distributed (Rs. in Crores)	-Not Applicable -	406.54	Under Processing

Implementation

- The Beneficiaries Data of 42.23 lakh farmers under the scheme was submitted by the Bankers as per the plan through State Level Bankers Committee.
- After processing of the data in the portal by IT tools, the Eligible Beneficiaries will be identified and extended the Benefit under the scheme.
- In first phase, the project was successfully implemented in the State by transferring the eligible amount of Rs.406.54 crores through NACH payment system to 2.95 lakh Farmers Loan Accounts of their concerned Bank
- After successive transfer of the amount, SMS Alerts were sent to the registered farmers mobile Number through National Informatics Centre

Improvements / Enhancements

No further improvements have been planned by the Agriculture Department as the CLW application portal progress is convenient for the last one year.

ENABLER

Processes Re-engineered

- During the previous Crop Loan Waiver Scheme (2014)announced, there was no online system and difficulties were faced with respect to family grouping and obtaining reports manually from the districts
- During this latest crop Loan Waiver Scheme-2018 the assistance of National Informatics centre, Telangana State was taken in development of Portal and a robust online system for implementation of the scheme
- The raw data existed with the banks in respect to the outstanding of loans issued by various bank branches in districts are submitted to Government through SLBC
- A format was developed and finalized by department in consultation with finance department, Bankers and NIC which was communicated to all the bankers for sharing of data in Annexure-A,B and C
- Such beneficiaries data were obtained through email support-agrits@nic.in from the Nodal officers of the Banks through SLBC.
- The raw data obtained through e mail was ported into the database created by NIC and the data was made available to each of the concerned bank branches by providing Login ID and password
- In the Annexures, the information of Beneficiaries must be ceded with available Aadhar Numbers in the Bank branches
- The Agriculture Extension Officers were instructed to assist the bankers in achieving 100% Aadhar ceding since Aadhar number formed the basis for identification of multiple Loan Accounts
- The process that are automated are:
  i. Aadhaar Ceding for identification of Multiple Loan Accounts of the individual Farmer
  ii. The Ration card Number is the unique identification for the family members as a unit for extending the benefit
  iii. Spouse Aadhaar Number is also ceded as the benefit of Rs.1.00 lakh is extended to the family
- The Eligible beneficiaries identified after the processing of the data were extended the Benefit in single stream through the NACH payment system, which is a ensured and authenticated tool for delivering the Benefit to the farmer

- After successive transfer of the amount, SMS Alerts were sent to the registered farmers mobile Number through National Informatics Centre.
- The Grievances were addressed through Grievance Redressal Mechanism from basic root level in the portal and addressed their Grievances with in short span to confirm their eligibility for extending the benefit to the eligible farmers

Technologies

- WhatsApp messages were sent to the farmers for furnishing the details to the Bankers under the Crop Loan Waiver scheme
- At District Level, Wide publicity is given through Local News papers for furnishing the details of the farmers to their concerned Banks required under the scheme
- The Crop Loan Waiver portal constitutes a Dash Board at Home Level to display
  i. No. of farmers Data submitted by the Bankers in Annexures- A, B and C.
  ii. No. of farmers benefitted under the scheme and the Amount of Benefit extended to them
  iii. The data verified and processed under the scheme with the help of Aadhaar Ceding and Ration Card.
  iv. Error data placed in the Bankers Login for rectification of the errors
- The reports of the Crop Loan Waiver Scheme designed are :
  i. District wise and Category wise Eligible beneficiaries
  ii. Bank wise branch wise data of the Beneficiaries
  iii. Annexure wise data of the Beneficiaries
  iv. Farmer Search option for browsing the farmer by Account No, Customer Id No, Aadhaar No, Bank Name, Ration Card No and CLW Reference ID
- The encrypted Loan Waiver Certificate is enabled in the portal for issuing to the Farmer after extending the benefit by the Loanee Banker
- Grievances were addressed through portal and placed in the Bankers and AEOs login for resolving them
- SMS Alerts were issued to the registered farmers mobile Number through National Informatics Centre after successive transfer of the amount

People

- Meetings were held with SLBC, Bankers and NIC continuously for submission of the data in Annexures under the scheme
- Video Conferences were conducted to the root level officials(Agriculture Extension Officers) for collection and uploading of the Aadhaar and Ration Card Numbers of the Beneficiaries under the scheme
- Teleconferences were conducted regularly with the Bankers for resolving their issues and also with the field functionaries to motivate in uploading the required information under the scheme through portal
- A committee was formed in the office for Grievance Redressal mechanism

VALUE INDICATORS

Learnings for sharing

- With the available domain expertise of Agriculture Dept. officials and NIC Technical Team, many tasks (e.g. Data porting & corrections, Family

Grouping, MIS Reporting etc.) have been simplified and able to transform the huge complex data management processes into online work flow methodology. The knowledge acquired may be shared across multiple projects adding value to the EODB (Ease of Doing Business) program in the state

- Regular feedback from the Agriculture Dept. officials and Bankers the application functionality has been streamlined over the period of time

Digital Empowerment

- The Eligible Beneficiaries were extended the benefit directly to their Loan Accounts
- The Grievances can be applied through the portal for resolution

Green e-Governance

- SMS Alerts were issued to the registered farmers mobile Number through National Informatics Centre after successive transfer of the amount
- The encrypted Loan Waiver Certificate is enabled in the portal for issuing to the Farmer by the branch Manager after extending the benefit to the farmer

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Shri. Dr. B. Janardhan Reddy, IAS, Commissioner of Agriculture, Department of Agriculture, Govt. of Telangana, agriculture.telangana@gmail.com.

Shri R. Sivanand, *Assistant Director of Agriculture, Department of Agriculture,Telangana, purushottam.m@cgg.gov.in*

Shri. N Suresh Kumar, *HOD & Technical Director, National Informatics Centre ,Telangana, sureshkumar.ap@nic.in*

Digital Transformation: A road drives towards Quality Seed Production

Uttarakhand State Seed & Organic Production Certification Agency

K. C. Pathak and Sarita Sahoo

PROJECT OVERVIEW

Vision & Objective

The high power steering committee formed by the Department set the vision of the project, which describes the direction as well as the aspiration of the project. Based on the vision document, a strategic plan for the digital reform of seed certification is contemplated. The quality objective of the project in the form of Seed certification process improvement which is to reduce defects/bugs resides within the manual system and to improve overall stakeholder (internal and external) experience and get effective outcome.

The technical objective is to develop solutions keeping in mind the fragile ecosystem of the state with support for occasionally connected architecture using open source technologies. Technology specifically needs to be deployed which are resilient to power disruption, network failure and short battery life of mobile devices. Compliance objective is to tightly connect to project Regulations, procedures, standards, and policies defined as per the seed Act 1966 and Indian Minimum Seed Certification Standard (IMSCS)

The managerial objective of the project was completely focused to accomplish the defined task within a predefined time frame. The stakeholders are Seed Grower (SG), Seed Producing Agency (SPA), Seed Processing Plant (SPP), Seed Certification Agency (SCA). Uttarakhand State Seed & Organic Certification Agency (USS&OPCA) is the SCA in Uttarakhand Govt. responsible for the seed certification. The stakeholders in SCA are (Senior) Seed Certification Inspector (SSCI/SCI), In charge Regional/Unit Officer (RO/UO), Head Office (ADMIN, Accounts), Seed Testing Laboratory (STL) those interact the system regularly.

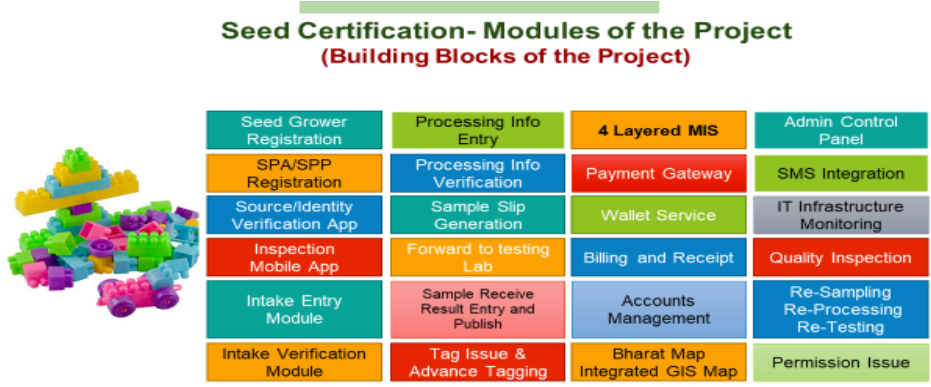
Seed certification process deals with production of Breeder-foundation and Foundation- Certified to ensure that the seed lots finally being approved for certification are true to the variety and confirm to the standard regarding the germination, purity, moisture contents and such other components of seed quality for certification.

The process begins with Seed Producing Agency (SPA) & Seed Processing Plant (SPP) registration then Seed Growers (SG) registration done by registered SPA. Then seed is sown by the registered SG in the registered field under supervision of the registered SPA. At different phases of plant growth, inspections are done by SCI (Seed Certification Inspector) using Mobile based PWA. Under supervision of SCI, seed processing and sampling are done at SPP. Finally, a certificate is issued with Tag No for each LOT after the seed testing result is within the acceptable range defined by IMSC. This process starts from Tag No. and ends with Tag No. Seed bag Tag is the most important enabler for the complete seed supply chain.

As part of the effective monitoring, USS&OPCA along with its technical partner NIC, Odisha has successfully designed, developed and implemented the web & mobile enabled end-to-end solution for Seed Certification on the URL https://asscu.nic.in maintaining utmost accuracy, transparency & accountability

at every level and provide timely service to the stakeholders. In addition to the above major modules many macro modules like down-grading, re-grading, re-inspection, advance tagging, re-sampling, different types of permissions such as Interstate seed production.

Building Blocks of Seed Certification Process



Hardware/ Software

The project has been developed based on a completely Open Source Technological stack to avoid the vender lock-in issue in coming future.

Both during development as well as in production open source technologies were used.

Production:

Web Server: PM2, Ngnix

Programing Language: Java Script for both Client Side and Server Side Execution Engine: V8 JavaScript Execution Engine

Run Time: Node JS Version 12.18

Web Framework: Express 4.17

View Engine: EJS (Embedded Javascript)

Client Side JavaScript F/W: Angular Js (Migrating to Angular-9.0 under process) Others Client-Side technologies: HTML 5, CSS 3, Bootstrap

Database: MongoDB 4.2

Storage Engine: WiredTiger

Development Tool:

Management Console for DB: MongoDB Compass

IDE: Visual Studio Code Community Version

Certification (Certifying Agency)

NIC's Cyber Security Division has given clearance for safe host. CERT-In empaneled auditor 'The AAA Technologies Pvt Ltd' has audited the application and issued clearance certificate.

Disaster Recovery and service continuity

In addition to the DR policy of the NDC, Bhubaneswar the following routine exercises are being done. Three times daily incremental backup by data centre team

- Once in seven days full back up by data centre team
- Once daily incremental backup by development team
- Once in three days full back up by development team

For service continuity, NIC has deployed the application in cluster mode scattered over two data centres NDC Bhubaneswar and Mini data Centre

Uttarakhand. In case of server failure, the failover is activated. Uttarakhand NIC team gets informed about the incident for alertness and reciprocal as per the SOP.

In addition to industry standard DR policy another layer of safety is given keeping eyes on the Himalayan range of Uttarakhand with frequent network disruption. For business continuity plans many critical modules of the project developed as offline friendly. During Phani and Amphan time also even if there was frequent service disruption for some period but business continuity was never hampered. In fact client never realized when the server is unavailable and when it came online due to offline support given in the application out of the box.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	**Brief service description with benefits**	**Volume (Nos) of Services year wise**		
		2018-19	**2019-20**	**2020-21**
e-Registration of SPA & SPP	The seed processing agency and SPP are registered to our system.	366	218	1
e-crop area registration	Registration of crop of SG for the season by the SPA	37536	1922	41498
e-Issuance of Tag Nos	Issue of tag No for the LOT.	37700	4060	0
Permissions online4060	Interstate seed production	2017	1794	0
	Down-grading	81	3	0
	Re-grading	199	58	0
	Re-inspection	0	123	12
	Advance tagging	866	546	0
	Re-sampling	3	2	0

Implementation

Dept designs a Project Implementation Plan which provides a schedule of activities to be accomplished and also Prioritized the required tasks in chronological order, with the beginning and end dates of each task using Gantt chart. The program was rolled out across the state, as a part of Big bang adoption, the instant changeover, moved to the fully functioning new system on 2018. The system was officially inaugurated by Minister, Agriculture, Govt of Uttarakhand on 3rd March, 2019 at Dehradun.

In this digital disruption age and increasing competition, most of the Dept. rush to complete the project at any cost ignoring stakeholder'ssatisfaction. At the time of implementation, our Dept feels the active and sustained participation of all the stakeholders which leads the project success and great satisfaction among all. At the time of rollout, core implementation team was so much attentive so as soon as they receive any issues/ feedback/suggestion from field functionaries, immediately redirected to NIC, Odisha development team to resolve their issues instantly without pausing the job.

Stakeholders

Internal (primary) stakeholders: Project success is determined by the attitudes

of the key stakeholders around the project. Govt Employee, top management, core implementation team are the key internal stakeholders of the Dept ie,. Seed certification Inspector, Regional officer, Head of the circles, seed testing officers are the primary stakeholders responsible for executing the system at field level. Other management stake holders are monitoring and evaluating constructively together to achieve the success in implementation process.
External stakeholders: SPA, SPP, Seed grower, nearby (UP) state SPAs are the External stakeholders responsible for registering the Seed grower for seed production and processing of seeds. Dept took ethical way to influence external stakeholder attitudes through effective communication to achieve optimum success. They are very much attracted towards this reform system fold to get their optimum income.
Uttaranchal comprises of 13 districts (7 in Garhwal region and 6 in Kumaon region). Agricultural Productivity of districts Udham Singh Nagar, Haridwar, Nainital (plain) and Dehradun (plain) is very high.

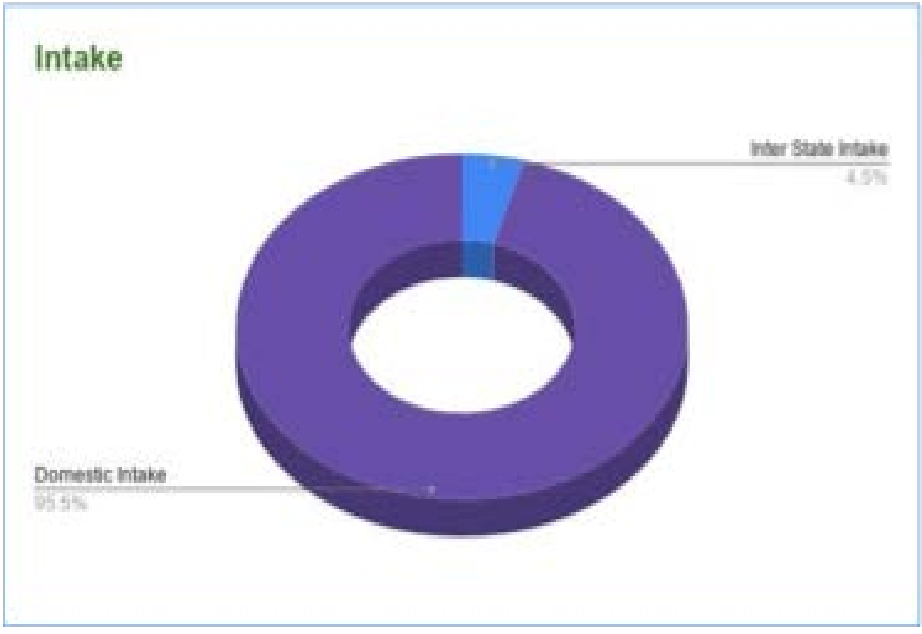
Demographic details and Crop details of the Application season-wise:

Demographic	**Season under operation: RABI (2019-20: November to April)**	**Season under operation: ZIAD (2020: May to June)**	**Season under operation: KHARIF (2020 : June to October)**
Total Blocks: 96 Total Villages: 17106 (LGD = 16789 and Non-LGD 317)	CROP REGISTERED: 39701 AREA REGISTERED: 108234.570ha INSPECTED AREA: 86052.15ha NOT FOUND AREA :0.7 ha LODGING AREA :3.37 ha NOT SHOWN AREA :66.2 ha DAMAGED AREA:192.87 ha	CROP REGISTERED:11 1 AREA REGISTERED: 31.558 ha	CROP REGISTERED:1911 AREA REGISTERED: 4428.409ha INSPECTED AREA:26.6ha NOT FOUND AREA :1.08ha LODGING AREA: 0.3ha NOT SHOWN AREA:10.9ha DAMAGED AREA:8.3ha

Stakeholders Associated with the Initiative:

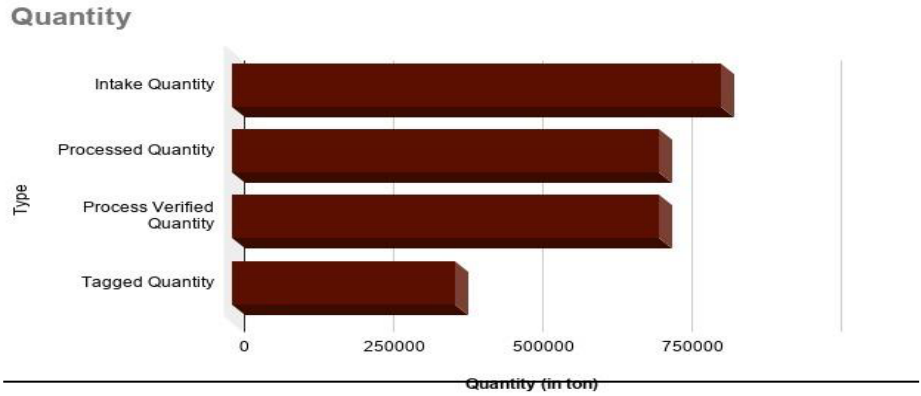
Improvements / Enhancements

- As Uttarakhand and Odisha are the disaster prone area, some more modules have been taken to develop offline mode to continue the software like normal operation for some hours. The web portal is hosted at NDC, Bhubaneswar and synced with Uttarakhand Data centre for good performance. At the time of funny in May 2019, Bhubaneswar was completely black out, our system didn't hamper for even hour as it supports offline mode and transactions continued both for web and mobile/Tab apps.
- Given provision for Wallet facility to the SPA, one need not have to go for online payment gateway frequently for payments to the SCA.
- Use of Blue & Red circles indicating inspection initiated/completed/final along with the number inside the circle indicating the number of inspection covered. This enable the SCI/SSCI to easily identify the inspection status
- Offline/Online Tablet enabled app have been designed for SCI/SSCI for verification and inspection of the field at the time of flowering, milking, maturity and dough.
- Running from Pillar to post concept is completely pulled out .Paperless transaction imposed for all stake holders.
- The job assigned to the concern stakeholder are being displayed on its dashboard with secured credential.
- QR code has been incorporated in Inspection Report, Tag Certificate and Seed bag
- Agencies of Govt of Maharashtra and Andhra Pradesh are shown their interest for replication with changes in few configurable parameter.



Seed Intake since Inception

Journey from intake quantity to Tag Quantity (certified)



ENABLER

Processes Re-engineered

"Quality is never an accident; it is always the result of high intention, sincere effort, intelligent direction and skilful execution; it represents the wise choice of many alternatives." - William A Foster

Transformation is not possible without in depth groundwork and appropriate process re-engineering but the immediate barrier for process re-engineering is the mind block to accept the change. Change brings apprehension of uncertainty and associated risk only if not planned meticulously. So PMU did the ground work heavily before suggesting the GPR.

Due to collaboration with our technological partner NIC, it was well envisioned that change is inevitable to have an effective system in place. Process re-engineering has been started by applying ICT and risk management techniques rigorously throughout the project life cycle.

Seed Certification Inspectors were responsible for recording information daily about the processing done at the Processing Plant whereas the Processing Plant also used to maintain their own stock book. The inspector was spending most of his time maintaining the records rather than enforcing his power to ensure quality.

So processing plants have been provided a software interface to keep their record which will be visible to the inspector in real time. Inspector doesn't need to maintain records separately and only needs to approve the stock after physical verification.

This task of registration deals with two types of information, personal information and crop related information of the grower. Although personal information being the same but SPA records and the inspector verifies the same information each season.

This was envisioned by the PMU that an unique Seed Grower ID may be unavoidable to resolve this issue until AADHAAR is not reached to all farmers. Using identification of Seed Grower (PAN, AADHAAR,EPIC) being captured during registration in the first season into account and internally generated SGID against each seed grower resulted in a win-win situation for both SPA and SCI. Now SPA need not enter the personal information of the Seed Grower each time and SCI need not to verify the identity of the grower each time.

During this journey we have gone through many such GPR not limited to the above and as an outcome we got the following results.

Complete changeover from manual system to online system due to our

reengineering process is fair, transparent, and efficient, All stakeholders got a better understanding out of the key steps involved in the system. The steps listed below succinctly summarize the process:

- Improved processes for better service
  i. SPAs and SPPs details are being captured through online process
  ii. Seed grower registration by SPA , payment from individual wallets
  iii. Bill desk is incorporated as payment gateway
  iv. SCI verifies its seed grower identity and tag certificate through mobile app
  v. SCI inspects different stages of crop condition by mobile app
  vi. Auto forwarding to Seed Testing Laboratory
  vii. Online entry of test result
  viii. Issuance of tag certificate
- Reducing redundant or non-value-added steps
  i. A non-altered Seed Grower ID is retained in the system for reusable in next season
  ii. Secured credential for SPA, SCI and SPP for multitasking work done
  iii. Using Wallet concept for bulk payment by SPA
  iv. Complete withdrawn of manual register used for stock reference
  v. It helps SCI for advance knowing of stock position at SPP point , no need to fear of returning for non-availability of the stock
- Analyse the process for gaps or disconnects
  i. Studied process gaps and disconnect. Identify all the errors and delays resides in flow of the process.
  ii. Less time taken for giving Permission for down grading the class, less packet size, interstate processing and selling in different brand which supersedes the manual system that takes months together.
  iii. No need to solely inform the person, an automated email/sms trigger have been added.
- Design a cutting-edge future-state process
  i. KPIs are designated for every step of the process to add the new process easily that will not affect the whole system. System is highly configurable with latest technology. Ex. Financial growth of the Dept from seed certification sector, Area of the cultivation of seed grower, potential growth of tag issue and etc.
  ii. Offline friendly, non-dependent of OS PWA mobile apps have been designed for each stake holders to receive the data.
- Expanded and Innovated processes to deliver good services.
  i. A well informed dashboard System has been designed to monitor our VM performance from user perceptive.
  ii. Different graphs are designed to see the performance history of the seed certification process.
  iii. The designed PWA app for the stake holders looks both web and mobile view for user convenience
  iv. Integrated with Bharat Map for GIS Powered- Decision Support System for proper monitoring at higher management level.
  v. Verifiable QR Coded have been included for Inspection Report, Tag Certificate and Tag to be attached to the Seed Bag to avoid fraud transaction.

Mobile App of Inspection Module for four different phases of Crop condition:

GIS aed Monitoring Map

Technologies

Our system runs of the following platform
AngularJS based single-page application (SPA)
Service Worker based Offline Friendly Mobile App.
Progressive Web App (PWA) Mobile App.
Open Source Technology i.e. MEAN Stack to avoid proprietary issues.
MongoDB, the No-SQL based database making the system Big-Data ready.
Fastest V8 Engine based NodeJS runtime,
NGINX as Load Balancer and Reverse Proxy,
PM2 as Process Manager.
Redis as in-memory database for state management with faster response as

well as proper monitoring.

People

To sustain the adopted ICT system Capacity-building becomes essential for developing the process and strengthening the skills of each stakeholders for this fast changing of world. An essential ingredient in capacity-building is transformation that is generated and sustained over time.

Selected officers of SCI are trained as master trainer and they are responsible to train the other officers. Many useful feedbacks collected from this capacity building program which leads the positive feelings among the stake holders. All SPAs and SPPs are trained in different phase of the project development. NIC and Dept conducted many physical training programs to explain the newly made system.

The designated leader is active and visible of the change initiative. He is aligned with the vision and reasons for the change. All ROs, HOs, SCI are very much inspired by the leader and acted accordingly in a perfect manner.

VALUE INDICATORS

Learnings for sharing

Richard Stallman says"Sharing *is good, and with digital technology, sharing is easy*" Brainstorming session for implementation was the easy part. But planning and executing ideas was often a huge challenge.

The challenges stand Infront of the Dept follows

Dept feels 'Clarity of change management' is one of the most important requirements for the successful completion of the project and the lack of it creates several issues which can be un-managed by project planning cell, of the Dept. This was a big challenge for the Dept to share the information to all stakeholders in time before the program starts. But it is achieved when master trainers share the information among the users of its locality in an efficient manner. So Dept could attain the realistic deadlines.

Almost more than half of the state is in high altitude area where internet connectivity is available very rarely, online mobile application was also a challenge to implement. NIC, Odisha finds a best solution of offline use of mobile app, as and when mobile network available, auto transmission of mobile data to central server. Regular review of the project by top management or senior officials of the Dept helps all officials and stakeholders be alert for their job.

Almost 400 SPAs and SPPs are already included to this digital fold and show their satisfaction leaving behind the manual laser based system. Wallet based payment is very popular among the SPAs so attracted towards the online payment world. This data is used to plan, monitor and improve programs.

NIC, Odisha IT teams have embraced change and, so execution mode kicks in right away. The final module is the most important i.e. Seed testing process which is to be conducted by Seed testing laboratory. Here four types of testing (moisture, germination, pathogen and impurities having different parameters) are being done on the processed sample collected by SCI. Based on testing result Tag numbers are issued against LOT No.

Digital Empowerment

The Hon'ble Prime Minister launched Digital India on July 1, 2015 to create digital infrastructure for empowering rural communities, enabling digital delivery of services and promoting digital literacy.

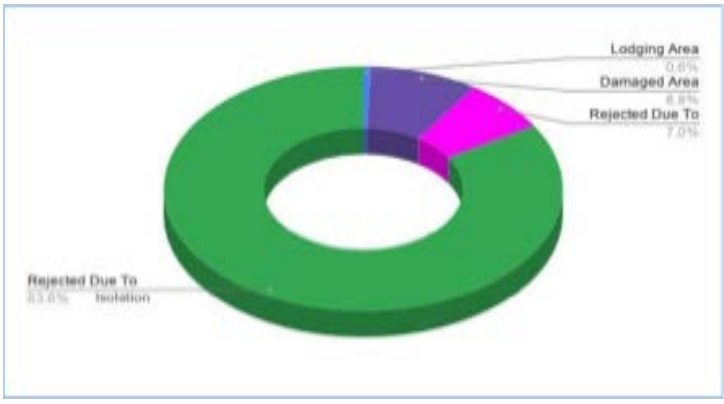
This Dept aims for the transformation towards digital Agriculture within the e-Kranti of Digital India Framework by rendering all the services associated with

seed certification to stakeholders electronically. Uttarakhand being mostly a hilly area and covered with dense forest, amenities like Bank, ATM and other institutions are typically out of reach of major population. Due to online presence of the services, now the government services can be accessed at the doorstep of the people.

Monitoring of Rejected Area with Reason

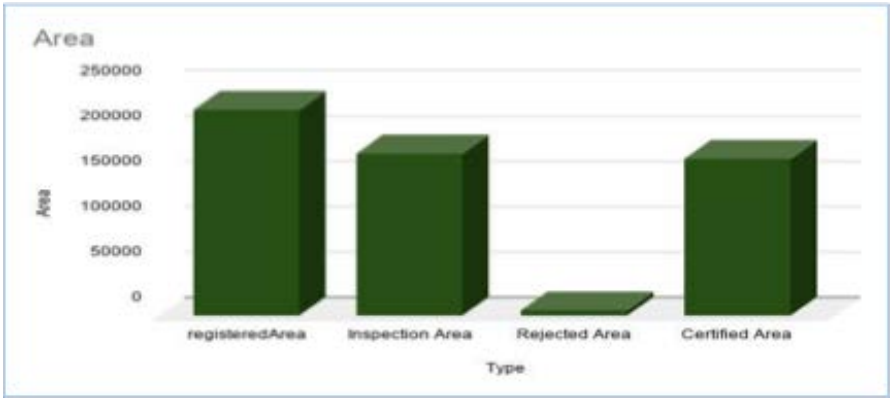
Seed Producing Agency and Seed Processing Plant are not merely a business unit but such Agri enterprises which strengthen backbone of the Agriculture through quality seed production. They deserve that government services should be rendered in a more inclusive and dignified way to them. In the online system SPA & SPP are included cohesively in the digital journey of the Government. All services are rendered to the SPA & SPP in a well- integrated manner.

SMS, Online Payment gateway, Wallet System, Offline Mobile App are used by stakeholders to connect the dots for an inclusive system. Now the system empowers the rural farmers (Seed Grower) , Govt Officials, SPA, SPP and other stakeholders to realize their full potential and make the system sustainable.



Irrespective of the class, section, age, gender disparity, religion and different social sectors, farmers even with the knowledge of regional languages are linked with our system and derive all sorts of benefits offered by the Department of Agriculture, Govt Of Uttarakhand.

Registered Area --- Certified Area



Green e-Governance

Dept achieved a clean, healthy and ecologically balanced system by creating digital environment for the certification process.

Digital agriculture requires transparency and accountability in all activities . No need to keep any document proof or maintaining any laser which is a best example of Green governance adherence. The Green Governance Initiative of the Dept. based on Think-Tank that works to ensure the effective implementation of the project for Sustainable certification process along with India 2030. Towards completely paper less Dept. and NIC always think the concept of adopt and adapt to innovative solutions before program starts. The System is designed such a way that if champion leaves , the online process will sustain.

Designed PWA mobile app which does not drain the user mobile battery. Frequent charging due to overloaded apps may be avoided. MIS/ Dashboard has been designed both for desktop and mobile view to monitor the target achievement in proper way.

Department does not force to keep document proof for this initiative which is in accordance to the Green governance concept. Frequently addition of new technology to the existing system for future sustenance. This initiative is responsive to any device like mobile , tab and desktop. Openness: System is easily accessible and understandable to all stakeholders to improve confidence on Dept. Data storing was a great problem which was resolved by hosting this initiative in National Data Centre, Bhubaneswar.

Shri. K. C. Pathak, *Director, Uttarakhand State Seed &Organic Production Certification Agency, dir-ussopca@uk.gov.in.*

Ms. Sarita Sahoo, *Scientist -F, National Informatics Centre, s.sahoo@nic.in*

E-Licensing for Agri-Input: The spine of a comprehensive supply chain for Seed, Fertiliser & Insecticide *Department of Agriculture and Farmers Empowerment, Odisha*

Sourabh Garg, M. Muthukumar and Kabita Ray Das

PROJECT OVERVIEW

Objective

Seed, fertilizers and insecticides are the power nerves of the Agriculture. Maintaining a good health of the distribution channels for these three critical Agri- inputs is the only way to ensure a healthy ecosystem for the agro economy. So the core objective of the system was to create a workflow automation system to strengthen the distribution channel of Agri-inputs Seed, Fertilizer & Insecticide.

Compliance objective is to adhere to the Fertiliser Control order 1985, Seed Act 1966, Seed Rule 1968, Insecticide Act 1968 and Insecticide Rule 1971.

Stakeholder Participation

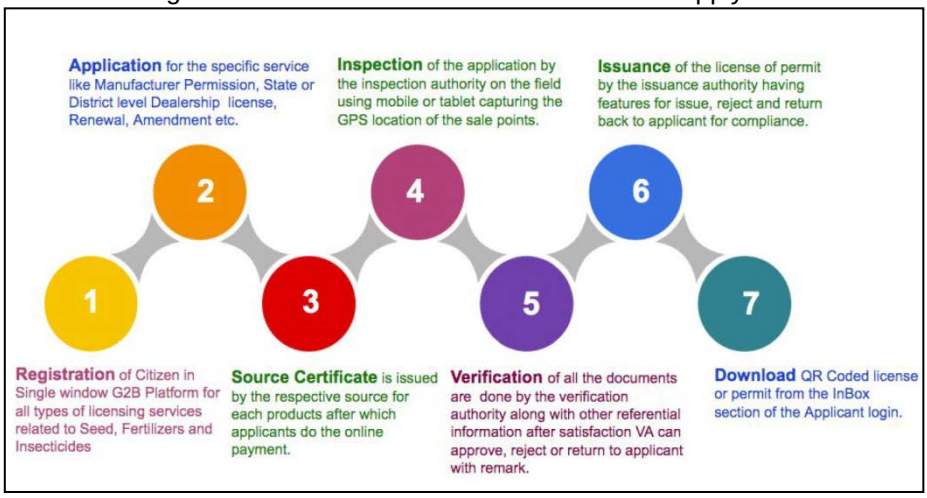
Supply chain Management

Scope and functionalities

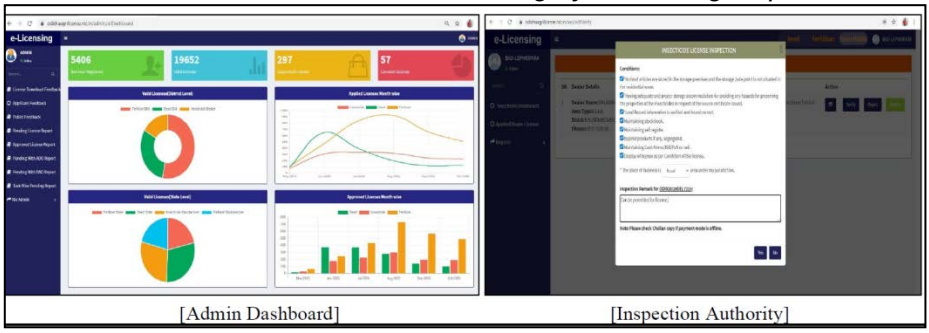
Seed Licensing	Fertilizer Licensing	Insecticide Licensing
Apply/Renew/Amend of state and district level e-License	Apply/Renew/Amend of state and district level e-License	Apply/Amend of manufacturer permission and dealer License
Issue of “O”-form to district dealers	Issue of “O”-form to district dealers/other state dealers	Issue of “O”-form to dealers
Payment of License fee through e-Challan	Payment of License fee through e-Challan	Payment of License fee through e-Challan
On the field Inspection by Inspection authority	On the field Inspection by Inspection authority	On the field Inspection by Inspection authority
On the field Verification by verification authority	On the field Verification by verification authority	On the field Verification by verification authority
Approval/Reject by approval authority	Approval/Reject by approval authority	Approval/Reject by approval authority

Single window portal describes

- It simplifies and streamlines ease of doing processes.
- It reduces paper use as documents are standardized and no need to upload again and again for each process.
- It accepts standardized information and documents in a single entry point.
- With this portal, Dept can easily monitor the dealer network up to GP level.
- Tracking of dealers in each sector from which the supply chain starts.



Abstract Workflow of the e-Licensing System for Agri-Input



[Admin Dashboard] [Inspection Authority]

Software

The project has been developed based on a completely Open Source Technological stack to avoid the vender lock-in issue in coming future. Both during development as well as in production open source technologies were used.

Production:

Web Server : PM2, Ngnix
Programing Language: Java Script for both Client Side and Server Side
Execution Engine: V8 Javascript Execution Engine
Run Time: Node JS Version 12.18
Web Framework: Express 4.17
View Engine: EJS (Embedded Javascript)
Client Side Javascript F/W: Angular Js (Migrating to Angular-9.0 under process)

Others Client Side technologies: HTML 5, CSS 3, Bootstrap
Database: MongoDB 4.2
Storage Engine: WiredTiger
Development Tool:
Management Console for DB: MongoDB Compass
IDE: Visual Studio Code Community Version

Cyber Security

The project has gone through the Cyber Security Audit process and certified as safe. But during covid time it has gone through some process re-engineering as well as change of URL so the recommended fresh cyber security audit is already initiated which will be completed soon.

Disaster Recovery and service continuity

In addition to the DR policy of the NDC, Bhubaneswar the following routine exercises are being done.

- Three times daily differential backup by data centre team
- Once in seven days full backup by data centre team
- Once daily full backup by developer team

RESULTS INDICATOR

Information

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Seed State Level Dealer	Firms having state level dealer license can issue O-form to district level dealers, amend and renew license	**22**	**45**	**20**
Seed District Level Dealer	Firms having district level dealer license can apply for O-form ,amend and renew license	**2110**	**2230**	**1676**
Fertilizer State Level Dealer	Firms having state level dealer license can issue O-form to district level wholesalers, amend and renew license	**32**	**18**	**14**
Fertilizer District Level Dealer	Firms having district level dealer license can apply for O-form ,amend and renew license	**4304**	**2446**	**2713**
Insecticide	Firms having	**83**	**104**	**97**

Manufacturer	insecticide manufacturer permission can issue O-form to dealers, amend permission			
Insecticide Dealer	Firms having insecticide dealer license can apply for O-form ,amend license	**1387**	**1444**	**1261**

Implementation

Implementation Coverage achieved

Implementation started as three modules and separately considered them as three systems in silos and later integrated as a micro service based architecture. It was envisioned that the roll out of all the three verticals may start separately but each rollout will be across the state observing the scale of the implementation. So the rollout started as mentioned below:

Roll out	Start Date	Remarks
Fertilizer Licensing Module	08-04-2011	Implemented pan Odisha with complete online mode
Insecticide Licensing Module	18-07-2012	Implemented pan Odisha with complete online mode
Seed Licensing Module	20-12-2014	Implemented pan Odisha with end-to-end integration with other verticals of the seed.
Single window Service	21-01-2020	As the government of Odisha envisioned to link all business units to single platform, so this major revamping came to picture

Improvements / Enhancements

- Services related to all the three Agri-inputs are made available through single and common dashboard as well as login which were previously managed separately.
- Tracking the MPR of each business unit is one of the critical aspects for enforcement division of the government so this vital aspect of report business unit to Government has also been covered in the last one year.
- Issue of “O” form or Source Certificate by the business unit down the supply chain has been converted to complete paperless and integrated.
- In the coming one year we have planned to develop a predictive system to suggest the dark areas where demand and supplier chain is weak and need to be strengthened.
- In addition to that, seamless integration with e-Sign and UIDAI is also in the action plan blueprint.

ENABLER

Processes Re-engineered

It is observed that seed, fertilizers and insecticides are such agri-inputs whose demands arrive more and less in a sequential manner as well as they are seasonal. So many edge level business units prefer to have business with

heterogeneous nature. It was difficult to manage the G2B services for such small business units as the system was treating them as separate entities forcing them to login separately for each vertical.

So all the three verticals of the system are integrated through a single sign on process and a composite dashboard has been provided to business units for all the three agri-inputs. Now any person can use a single platform linked to his identity to manage multiple types of Agri-input G2B services.

Paper document submission and physical visit to the office could not be eliminated during phase1 of the implementation. But honourable CM's instruction to all the departments for ensuring zero visit mode of the service delivery along with to adopt policy of "Trust on citizen's claim and strengthen enforcement" trigger re-engineering the system.

The system has been re-engineered to generate as well as validate source certificates online without any physical form but for doing so, all the business units operating from outside of Odisha but doing business in the state are brought under the system without fail. The help of commercial courier systems is also explored in case voluminous paper documents are required for legal action.

Technologies

This is the era of data driven governance where the data integrates with other sets of data and generates information, further integration of information provides insight. This system is interoperable with other systems like treasury, centralised farmer registration system, need based input system, Seed Inventory system etc.

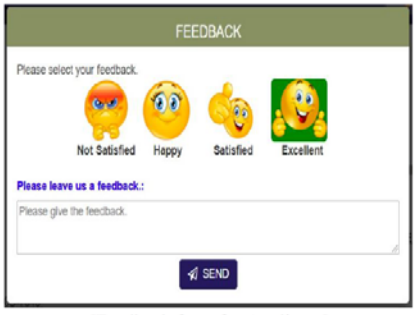
This is envisioned to be fit in the EA for the agriculture department which is already in line. QR coded license, permit, source certificates are being issued by the system which is verifiable in the latter stage by the enforcement.

Geo-tagged sale points are captured during verification of the application.

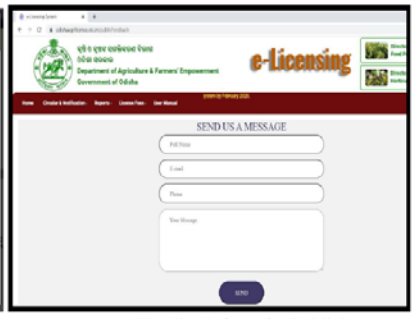
People

Roll out have been planned from the very beginning and always been an important aspectin the project management blueprint of the system. Change is always something whichcreates discomfort and feedback is a solution to understand the exact point of discomfortby the citizen (user).

Feedback management from the general public to the real applicant at different stages have been incorporated which gives us an opportunity to improve and evolve day by day.Continuous monitoring of the negative feedback and taking remedial action on thecriticism is the hidden mantra behind this successful rollout of the system across thestate.



[Feedback form for Applicant]



[Feedback form for Public]

Master Trainer's Training has been conducted in the presence of all BAO, ADO andother responsible officers both in physical as well as virtual mode. All verificationauthority has been given power both technically and legally to resolve the issues of theapplicants at their level only.

All issuing authority, higher officials of the department along with technical personals from our Technology partner National Informatics Centre, Odisha are brought under thesingle umbrella through a Instant Messenger Group.

This forum gives the trust to the next level of leadership of the ground a feel ofconnectedness and their voices will be heard. Immediate response to their queries and Follow up action got easier due to this forum in addition to the support number for thepublic.

VALUE INDICATORS

Learnings for sharing

During the implementation of the project it was a challenge the team has faced to manage the resistance to the change but we prefer to take things slowly with implementation of different modules separately in different time frames giving scope to the people to adapt the change.

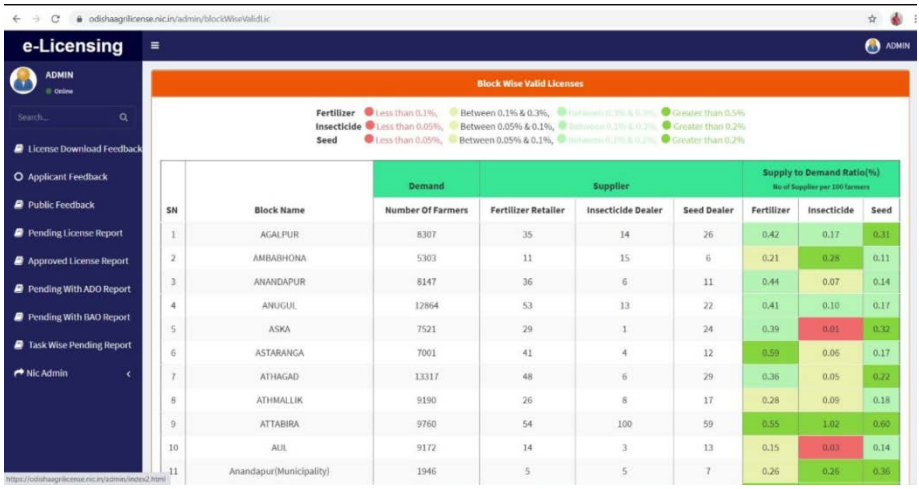
A bi-directional feedback management system is necessary before planning for any successful project. Without addressing the complaint and issue raised due to difference of perceptions of developer and user any project can't achieve it's acceptance.

Rigorous interaction with the different stakeholders before rolling out of any project is very vital for the survivability and successful implementation. Lack of interaction with stakeholders on recorded media will lead projects to nowhere but become a liability on the user.

Should be thorough on The Seeds (Control) Order 1983, Fertilizer Control Order, Insecticide Act 1968, Insecticide rule 1971 adhere to the legal framework.

Digital Empowerment

The core objective is to keep the distribution channel healthy and reach the dark areas for improvement in service. This system is integrated with centralised farmer's registration system to find dark areas where the number of farmers are more but suppliers are less in comparison to other parts of the state which may create an imbalance of growth. Appropriate authority has been provided with a dashboard to take their decision to concentrate the left out areas with better decision support system.



SN	Block Name	Demand	Supplier			Supply to Demand Ratio(%)		
		Number Of Farmers	Fertilizer Retailer	Insecticide Dealer	Seed Dealer	Fertilizer	Insecticide	Seed
1	AGALPUR	8307	35	14	26	0.42	0.17	0.31
2	AMBABHONA	5303	11	15	6	0.21	0.28	0.11
3	ANANDAPUR	8147	36	6	11	0.44	0.07	0.14
4	ANUGUL	12864	53	13	22	0.41	0.10	0.17
5	ASKA	7521	29	1	24	0.39	0.01	0.32
6	ASTARANGA	7001	41	4	12	0.59	0.06	0.17
7	ATHAGAD	13317	48	6	29	0.36	0.05	0.22
8	ATHMALLIK	9190	26	8	17	0.28	0.09	0.18
9	ATTABIRA	9760	54	100	59	0.55	1.02	0.60
10	AUL	9172	14	3	13	0.15	0.03	0.14
11	Anandapur(Municipality)	1946	5	5	7	0.26	0.26	0.36

Green e-Governance

This application has been designed as an environment friendly product. Focusing more on restricting the harmful effects of technological advancement on the environment, it proves to be a very concrete foot step towards Green governance. Due to its complete end-to-end online in nature many services actually applied, verified and rendered with extremely low or zero hard copy. While saving papers means saving a tree, it is also not out of the scope to reduce power consumption, carbon Footprint and e-waste with a vision of Mobile first approach. Zero visit servicerendering being the motto of Government of Odisha this system gives power to business units to bring Government to their door steps, indirectly reducing motor vehicle pollution by using less fossil fuel as well as reducing the spread of the Covid-19 during this pandemic time as there is no requirement of person to person contact. A comparable study has been provided below projecting the quantifying effect of the system on the environment.

Paper Saved during Application Process due to End to End paperless online mode

Process	If not online A4 size paper could have been used per Application	Number of Transaction done through online system	Total A4 Size paper Saved
Insecticide Manufacturing	12 Pages	120 Numbers	1,440 Pages
Insecticide Dealer	16 Pages	1602 Numbers	25,632 Pages
State Seed Dealer	16 Pages	75 Numbers	12,000 Pages
Dist Seed Dealer	14 Pages	1590 Numbers	22,260 Pages
Fertiliser Manufacturer	18 Pages	36 Numbers	648 Pages
Fertiliser State Dealer	29 Pages	39 Numbers	1,131 Pages
Fertiliser Dist Dealer	15 Pages	3591 Numbers	53,865 Pages

	Total Saving:	1,06,176 Pages
	Cost Saving Rs.	46,717/- Only

Power consumption reduce during Verification process due to Mobile First Development

Power consumption per Hour if done through Laptop (Approx)	**Power consumption per Hour if done through Mobile (Approx)**	**Number of devices**	**Total power saved per hour (Approx)**
80 Watts per Hour	11 Watts per Hour	531	**36,639 Watts per Hour**

Carbon footprint reduced during Verification process due to Mobile First Development

Laptop	**Mobile**	**Verification Authority doing verification through Mobile**	**Total Carbon emission prevented**
350 kg CO2eq	16 kg CO2eq	531	**1,77,354 kg of CO2eq** (350-16) * 531

Dr Sourabh Garg, IAS, *Principal Secretary to Government, Department of Agriculture and Farmers Empowerment (Odisha), agrsec.or@nic.in , s.sahoo@nic.in*

Dr. M. Muthukumar, IAS, *Director, Directorate of Agriculture & Food Production (Odisha), diragri.or@nic.in*

Ms. Kabita Ray Das, *SIO & DDG, Odisha State Centre, National Informatics Centre (Odisha), sio-ori@nic.in*

Ensuring Digital Agricultural Extension through Uzhavan Mobile Application

Agriculture Department, Chennai

Thiru. Gagandeep Singh Bedi and Thiru.V.Dakshinamoorthy

PROJECT OVERVIEW

Coverage – Geographical and Demographic

Comprehensiveness of reach of delivery centres

Uzhavan app is a freely downloadable mobile application. About 80 Lakh farm families in the state are the target group. The information flow is designed to provide citizen centric service delivery as a part of e-Governance. The entire state is covered

Number of delivery centres

Uzhavan App is a downloadable open-source mobile app and individual farmer can download the app in his smart phone directly both from the play stores of Android and iPhone.

Geographical

- National level – Number of State(s)covered : 1
- State/UT level- Number of District(s)covered : 37
- District level- Number of Blocks covered : 385

All the farmers in the 385 blocks of 37 districts are sensitized to download, register and use this app. Demographic spread (percentage of population covered) 10% of the Tamil Nadu population (80 lakh farm families out of 7.50 crore population). This mobile app providing citizen centric vital and direct benefiting services has been developed in both Tamil and English. With this app, 18 types of important services are being delivered to the farmers under e-Governance.

Service 1: Information on subsidy schemes of the Government

Information can be availed about subsidy provided to farmers and eligibility criteria for availing subsidy under various schemes implemented by Agriculture, Horticulture and Agriculture Engineering Departments.

Service 2: Registration of Beneficiary

The Ministry of Agriculture and Farmer welfare portal is linked to UZHAVAN app. Farmers can now register to avail the benefits of PM Kisan Samman Nidhi. For availing subsidy extended for High value components of all schemes in Agriculture such as Tractors, Power Tillers and Infrastructure facilities such as shade nets, Green house through their mobile without visiting the offices concerned utilizing this service. After registration, the farmers will be provided with seniority number through SMS to their mobile and their registration and the benefits availed will be ensured.

Service 3: Information on Crop Insurance status

The National Crop Insurance Portal (NCIP) owned by Ministry of Agriculture and Farmer Welfare is linked with UZHAVAN app. About 52.68 Lakh Farmers data who have enrolled under this crop insurance scheme since 2017 is available in this app. About Rs. 7,130 crore compensation was released to the farmers. Being the first initiative at all India level, the Loanee farmers and the Non-Loanee farmers who have insured through Common Service Center (CSC) under Pradhan Mantri Fasal Bima Yojana (PMFBY) shall ascertain their status of enrolment and up to disbursement of computer-generated claims due to yield loss. The farmers can know their policy status by registering their

phone number or land survey number given at the time of enrolment under PMFBY.

Service 4: Information on seed availability

Since all our Government/Private retail sale outlets are strongly networked in the e-Platform, Farmers can comprehend about the availability of seeds in Government and Private Depots nearby to their locality on real time basis. The farmers can ascertain the crop wise, variety wise availability of seeds in 880 Government AEC's functioning under the control of Agriculture Department and 8400 private centres then and there. Farmers can now contact the concerned Manager of the centres to purchase required seeds hassle free as the mobile numbers and Address would be provided through this service.

Service 5: Information about availability of fertilizers

Ministry of Chemicals and Fertilizers DBT portal has been linked to UZHAVAN app to ascertain the real time availability of fertilizers in 12219 co-operative and private fertilizers shops functioning in Tamil Nadu and purchase of crop specific fertilizers from nearby sales point. This would maintain transparency in fertilizer distribution.

Service 6: Farm Machinery Custom Hiring Centre

Farmers resorting to Farm machinery are increasing due to dearth of agriculture labours. This app will enable the farmers to hire Agriculture Machinery from 2259 functioning in Tamil Nadu. As the contact numbers of concerned centres have been given, Farmers can ascertain the availability of Farm Machinery on a specific date, hiring rate and get benefitted accordingly. As to encourage the PPP mode (Public Private Partnership) the J farm services of TAFE (Tractor and Farm Equipments Company) is linked with UZHAVAN app to enable farmer to farmer renting/hiring services of their machineries.

Service 7: Information on Market price of Agriculture Commodities

About 277 Regulated markets are functioning throughout Tamil Nadu to facilitate the farmers to get remunerative and competitive price for their produces. Daily, the farmers can comprehend market prices determined on auction basis in these Regulated markets and price of vegetables from 179 UzhavarSandhais across the State on real time basis. The farmers can sell their products in the Regulated Market where the market price fixed is high and get benefitted.

Service 8: Advisory Bulletin based on weather forecast

Farmers can decide upon important Agriculture activities such as raising Nursery, Fertilization, Irrigation, Harvest, drying of produces based on four days forecast on Rainfall, Wind and other important weather status in their areas. This App is providing weather advisory bulletin for four days.

Service 9: Fixed schedule visit by Agriculture Extension Functionaries

In order to expedite timely advisory to farmers, the name of the Grass root level worker and his mobile number, visiting date of the officers as per the fixed schedule, visit can be known through this mobile app. This will not only help the farmers to keep abreast of Agriculture technologies but also strengthen the bonding between the farmers and extension officers.

Service 10: My Farm Guide

The ultimate objective of the entire mission of Agriculture department is to enhance the production and productivity of the individual farm. Technology, inputs and timely field operation are the vital activities involved in the farm operation from sowing to harvest. "My Farm Guide" service is providing information from sowing to Harvest for both Agriculture and Horticulture crops

besides instantaneous identification of Pest/Diseases and remedial measures using Artificial Intelligence (AI) technology.

Service 11: Organic Products

Information about Organic crop cultivating farmers, Organic crop traders and Organic crops certifying agencies are made available as a tool to motivate organic farmers.

Service 12: Farmer Producer Organization Products

Under TNSCM (Tamil Nadu Supply Chain Management) much focus is being given to integrate the farmer producer groups into Farmer Producer organizations and companies. Information on Farmer Producer organization, manufactured products for sale and the value addition, etc., are provided as a platform in UZHAVAN App.

Service 13: Irrigation water Reservoir level

Information on Daily water position, water outflow details of major reservoirs for timely decision on taking up of crops.

Service 14: Agriculture News

Government subsidy schemes, Trainings, salient technologies, Workshops are informed directly to farmers as push notification.

Service 15: Feedback from users

Farmers can give feedback about the services in this mobile app and also suggestions for further development.

Service 16: Pest and Disease Monitoring

Instantons remedial measures for Pest and Disease of major crops using Artificial Intelligence Technology

Service 17: ATMA training and Demonstration

Farmers can register themselves to participate in Demonstration, Trainings and Exposure visit under Agriculture Technology Management Agency (ATMA) scheme.

Service 18: Uzhavan e Market

Online buyer Seller platform, Where the farmer can register his produce available for sale and interested traders will be contacting the farmers.

Stakeholder Consultation

Type of Stakeholders consulted

- Policy makers
- National, State and district level Administrators
- Management officials
- Implementation staff
- Enforcement authorities
- Farmers associations
- Individual farmers
- Private Agricultural Input Operators

Number of stakeholders consulted

Around 200 and odd were consulted at all levels.

Stages at which stakeholder input was sought

Farmers the target group- on information needed

Implementation and Management Officials– on the data capture

Administrators and Policy makers- on the services proposed for delivery

Enforcement authorities– legal aspects of providing information

Software

MySQL database, PhP (Open source), code Igniter Web framework, HTML, CSS linked to Android Angular JS — Super heroic JavaScript MVW

Framework. Mobile version platform is used for the app

Interoperability

As the state portal is connected to the National Level server maintained at the Central Government and the mobile application is running on this platform by fetching the details, the interoperability is established.

Security concerns

The DB and Application server are kept at State Data Center maintained by NIC under 24/7 technical supervision. Periodical Security Audits and Vulnerability tests are being conducted at fixed intervals

Any issue with the technology used

So far, no major issue is encountered. Smooth implementation is going on

Service level Agreements (SLAs)

Since all the System development life cycle is in-house and with the input of the domain experts, only SLA is available for the server and its related maintenance.

Cyber Security

Vulnerability and Penetration tests are being conducted at a definite interval to maintain the privacy of the end user information and security of the data in the portal.

Disaster Recovery and service continuity

The replication server consisting of database and the application is kept at State Disaster recovery centre, Tiruchirappalli, Tamilnadu.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Subsidy Schemes	Information can be availed about subsidy provided to farmers and eligibility criteria for availing subsidy under various schemes implemented by Agriculture, Horticulture and Agriculture Engineering Departments.	14.2 Lakhs	15 Lakhs	From April 2020 to till date 5.65 Lakhs and expecting 16.5 Lakhs at the end of financial year.
Benefit Registration	The Ministry of Agriculture and Farmer welfare portal is linked to UZHAVAN app. Farmers can now register to avail the benefits of PM Kisan Samman Nidhi.	64,254	2,00,514	1,30,000 till date
Crop Insurance	The National Crop Insurance Portal (NCIP) owned by Ministry of Agriculture and Farmer Welfare is linked with UZHAVAN app. About 52.68 Lakh Farmers data who have enrolled under this crop	8 Lakh	15.4 Lakh	6 Lakhs till date and expecting 17.5 Lakh at the end

	insurance scheme since 2017 is available in this app. About Rs. 7,130 crore compensation was released to the farmers.			of financia l year.
Fertiliser Stock	Ministry of Chemicals and Fertilizers DBT portal has been linked to UZHAVAN app to ascertain the real time availability of fertilizers in 12219 co-operative and private fertilizers shops functioning in Tamil Nadu and purchase of crop specific fertilizers from nearby sales point. This would maintain transparency in fertilizer distribution	3.4 Lakh	3.6 Lakh	1.75 Lakh
Seed Stock	Since all our Government/Private retail sale outlets are strongly networked in the e-Platform, Farmers can comprehend about the availability of seeds in Government and Private Depots nearby to their locality on real time basis. The farmers can ascertain the crop wise, variety wise availability of seeds in 880 Government AEC's functioning under the control of Agriculture Department and 8400 private centres then and there. Farmers can now contact the concerned Manager of the centres to purchase required seeds hassle free as the mobile numbers and Address would be provided through this service.	3.2 Lakh	3.25 Lakh	1.45 Lakh
Custom Hiring Stock	Farmers resorting to Farm machinery are increasing due to dearth of agriculture labours. This app will enable the farmers to hire Agriculture Machinery from 2259 functioning in Tamil Nadu. As the contact numbers of concerned centres have been given, Farmers can ascertain the availability of Farm Machinery on a specific date, hiring rate and get benefitted accordingly. As to encourage the PPP mode (Public Private Partnership) the J farm	1.24 Lakh	1.35 Lakh	0.77 Lakh

	services of TAFE (Tractor and Farm Equipments Company) is linked with UZHAVAN app to enable farmer to farmer renting/hiring services of their machineries.			
Market Price	About 277 Regulated markets are functioning throughout Tamil Nadu to facilitate the farmers to get remunerative and competitive price for their produces. Daily, the farmers can comprehend market prices determined on auction basis in these Regulated markets and price of vegetables from 179 UzhavarSandhais across the State on real time basis. The farmers can sell their products in the Regulated Market where the market price fixed is high and get benefitted.	1.78 Lakhs	1.94 Lakhs	0.44 Lakhs
Weather Advisory	Farmers can decide upon important Agriculture activities such as raising Nursery, Fertilization, Irrigation, Harvest, drying of produces based on four days forecast on Rainfall, Wind and other important weather status in their areas. This App is providing weather advisory bulletin for four days.	1.25 Lakhs	1.34 Lakhs	0.54 Lakhs
Assistant Agricultural Officer visit	In order to expedite timely advisory to farmers, the name of the Grass root level worker and his mobile number, visiting date of the officers as per the fixed schedule, visit can be known through this mobile app. This will not only help the farmers to keep abreast of Agriculture technologies but also strengthen the bonding between the farmers and extension officers.	2.56 Lakhs	2.65 Lakhs	1.10 Lakhs
Farm Guide	The ultimate objective of the entire mission of Agriculture department is to enhance the production and productivity of the individual farm. Technology, inputs and timely	0.40 Lakhs	0.55 Lakhs	0.12 Lakhs till date

	field operation are the vital activities involved in the farm operation from sowing to harvest. “My Farm Guide” service is providing information from sowing to Harvest for both Agriculture and Horticulture crops.			
Organic Products	Information about Organic crop cultivating farmers, Organic crop traders and Organic crops certifying agencies are made available as a tool to motivate organic farmers	0.60 Lakhs	0.75 Lakhs	0.24 lakhs till date
FPO Products	Under TNSCM (Tamil Nadu Supply Chain Management) much focus is being given to integrate the farmer producer groups into Farmer Producer organizations and companies. Information on Farmer Producer organization, manufactured products for sale and the value addition, etc., are provided as a platform in UZHAVAN App.	0.50 Lakhs	0.65 Lakhs	0.12 Lakhs
Reservoir Level	Information on Daily water position, water outflow details of major reservoirs for timely decision on taking up of crops.	1.65 Lakhs	1.95 Lakhs	0.75 Lakhs
Agricultural News	Government subsidy schemes, Trainings, salient technologies, Workshops are informed directly to farmers as push notification.	6.5 Lakhs	7.25 Lakhs	2.65 Lakhs
Feed Back	Farmers can give feedback about the services in this mobile app and also suggestions for further development.	2.54 Lakhs	2.78 Lakhs	1.2 Lakhs
Pest and Disease Monitoring	Instanteous remedial measures for Pest and Disease of major crops using Artificial Intelligence Technology	0.06 Lakhs	0.12 Lakhs	0.03 Lakhs
ATMA training and Demonstration	Farmers can register themselves to participate in Demonstration, Traninings and Exposure visit under ATMA scheme.	Implemented from 2019	0.03 Lakhs	0.02 Lakhs
Uzhavan e Market	Online buyer Seller platform, Where the farmer can register	Implemente	Implemente	25, 260 Sellers

	his produce available for sale and interested traders will be contacting the farmers	d from 2020	d from 2020	and 15.478 Buyers register ed

Implementation

Implementation Coverage achieved in comparison to the plan / target

- Details about impact on effort and time invested by user
  The users download is incremental day by day. The popularity of the App can be evidently seen form the Google Feedback which stands on 4.2 rating for a very long period. About 8.62 lakh users have downloaded this app and however the important services have huge number of hits like Pradhan Mantri Fasal Bima Yojana (15.40 Lakh hits) Benefit registration (Around 2.05 lakh hits) etc., All the services have definelty created an impact and reflected in the Agricultural production and productivity of the individual farmer.
- Feedback Mechanism
  An exclusive service is provided in the UZHAVAN App to get the feedback and update mechanism. Periodical midterm corrections are done based on the feedback, enhancements and improvements are also done then and there since the total software has been developed in-house by both Agricultural Domain experts and software engineers.
- Interactive Platform for service delivery
  The UZHAVAN App is 100% interactive platform. Since the farmer i.e., the end user himself is providing the input and getting the information then and there. Quite large numbers of farmers are conversant with the user of this App and hence interactive service is achieved

Improvements/ enhancements specifically planned out during next one Year

- Pest and Disease Monitoring:
  Instanteous remedial measures for Pest and Disease of major crops using Artificial Intelligence Technology
- ATMA training and Demonstration:
  Farmers can register themselves to participate in Demonstration, Trainings and Exposure visit under ATMA scheme.
- Uzhavan e Market
  Online buyer Seller platform, Where the farmer can register his produce available for sale and interested traders will be contacting the farmers.

ENABLER

Processes Re-engineered

S.No	Earlier System	New System
1	Farmer should visit physically the nearby Agricultural Extension Centre to know the available schemes.	Through this app, on his locality itself, farmer can know the available scheme subsidy with eligible criteria under Subsidy Scheme service and he can register using Benefit Registration service. Till date, 2,00,514 farmers have registered to avail benefits.

2	Farmer cannot know the status of their insurance application such as approved or rejected or reverted back and only during the release of compensation they come to know their status.	Now, the farmer can know his status by just feeding his survey number. So far, 15.45 Lakh farmers accessed this service.
3	Farmer has to visit in person to the nearby Agricultural Extension Centre or Private Outlets to know seed stock and fertilizer stock without knowing whether the stock is present or not.	Through Fertiliser and Seed Availability service, farmer will know the real time stock available in nearby depots or shops. So far, 9.87 Lakh farmers viewed this service
4	Farmer has to visit with a sample of pest and disease affected plants for seeking remedial measures to the Agricultural Extension Centre	Through this app, farmer can send the photo of the affected symptom and inturn he will get the remedial measures immediately at the maximum of 24 hours.

Technologies

Artificial Intelligence technology is now being used in Pest and Disease identification. The image captured through this mobile application will be processed with the database having collection of images and suggest the remedial measures instantaneously based on the match with the database. To increase the Production and Productivity, a digital cultivation guide namely "Farm guide" service is available in Uzhavan app. Through this farm guide, farmers may know day wise calendar of operations to be carried out for his crop to get higher yield. The Machine Learning tool is being used in this service, wherein based on the date of sowing given by the farmer, the day wise cultivation practices to be carried will be generated as a personalised advisory. The advisories contained essential information including the optimal sowing date, soil test-based fertiliser application, farm yard manure application, real time availability of inputs like seed and fertiliser in nearest outlets, subsidy schemes, cut-off date for crop insurance along with premium amount to be paid, seed treatment, exact date of fertiliser application in split doses, Projected yield, market forecast and more. The auto system generated SMS will be pushed to farmers mobile as alert message on the stipulated date of every above activity till harvest. Another Machine Learning tool service rendered through Uzhavan app is "Your Crop based Weather Advisory". Based on the selection of sowing date and Crop by the individual farmer, it will suggest weather based agro advisory using Machine Learning technology by analysing the weather parameters like temperature, Rainfall, Relative humidity and Wind speed prevailing in that location and also comparing the past weather parameters of Automatic Weather Station located in all 385 Blocks of Tamil Nadu.

People

At State headquarters, a full-fledged IT wing is functioning consist of one Deputy Director of Agriculture, one Assistant Director of Agriculture, Domain experts of different Agriculture and related fields and in-house software engineers. The software development of different areas is periodically being taken up by duly following the software protocol. Once, development of any software, the knowledge transfer to down below officials in the districts are

being taken up in a systemic manner. Subsequently, the capacity building training programmes are also being conducted to the end users on how to use the services available in this mobile application. Tamil Nadu is demarked into 6 zones consisting of about 5 districts per zone. Each Zone has an ICT coordinator who is all in constant touch with the State e-Team and brings out changes in the system. Each district has one exclusive Coordinator for the implementation of CISMS. He will constantly interact with the person in charge of the sale points and will communicate to the Zonal Coordinators periodically.

VALUE INDICATORS

Learnings for sharing

Initially the manual system was in operation prior to 2010. During 2007-08, Agricultural Information Service Network (AGRISNET) was launched in Tamil Nadu and the entire state up to the block level were networked. In 2011, Tamil Nadu Department of Agriculture was unique with last mile connectivity to serve 80 Lakh farm families and the National e-Governmance Award was conferred for the first time. Subsequently Tablet PCs were provided to the field level functionaries to assist the farmers in Farm planning and by that way Farm Crop Management System (FCMS) was evolved. Tamil Nadu was pioneer in the design and implementation of FCMS project as an incremental innovation in the AGRISNET project. The initiative was also awarded in 2014 under e Governance. Considering the total population, Tamil Nadu farmers are the critical and vital group who contribute to both the rural, state and national economy. They encountered lot of problem in accessing the computer due to their economic condition and nature of living environment. Owing to the faster penetration of Mobile technology, Tamil Nadu stands 2nd position at all India level in usage of Smart phone in rural areas and 100% network penetration to harness the benefit of the mobile based technology, the UZHAVAN App which is unique in its nature is targeting the 80 lakh farmers of Tamil Nadu for directly delivering the citizen centric services uninterruptedly. The time consuming and drudgery reducing mechanism serves farmers very handy as a decision support system during this Mobile Era.

Digital Empowerment

The details of base line study done

- At the village level campaigns were organized to collect and Fine tune the available data.
- Stake holders requirement and long term strategies discussed
- Road map for implementation was finalized in consultation with implementers

Problems identified

- Telecommunication band width
- Non-Availability of smart phones
- Local language compatibility
- Physical movement if the end user to the digital node to avail the benefit

Roll out/implementation model

- Feasibility test done
- Software development done
- Data validation
- Field teasing
- Pilot runs
- Roll out

Communication and dissemination strategy and approach used

- Communication and dissemination strategy and approach used.
- At the stage of data collection and validation village level meeting organized
- Sensitization at the village level done
- Awareness campaigns done
- Facilitation centre owned
- Wider publicity given

Green e-Governance

TamilNadu has an exclusive “e- waste policy” which reveals a set of procedures to dispose the e waste of Government and allied departments by duly following the protocols specified by the Government. The Agriculture Department is also following the norms of “e-waste policy” in disposing the computer and other peripherals without making any harm to the environment.

Thiru. Gagandeep Singh Bedis, IAS, *The Agricultural Production Commissioner & Principal Secretary,Agriculture Department, Chennai, agrisec@tn.nic.in*

Thiru.V. Dakshinamoorthy, IAS, *Director of Agriculture, Department of Agriculture, Chennai, diragri@tn.gov.in*

RYTHU BIMA
(Farmer's Insurance Scheme)

Department of Agriculture, Telangana

B.Janardhan Reddy, M.A.Masood Khan and N Suresh Kumar

PROJECT OVERVIEW

Overview

- The Agriculture Dept., Govt. of Telangana, has been implementing various e-Governance and Digital India initiatives in the recent years. As part of that, they have proposed an innovative idea to automate the Farmers Group Life Insurance scheme launched by Govt. of Telangana on 14th August 2018 through Rythu Bima software. In this scheme, the Agriculture farmers in the age group of 18 to 59 years are eligible for insurance of Rs 5 Lakh each. The entire premium is paid by Government of Telangana.

Objective

- The Primary objective of the Rythu Bima project is to facilitate end to end implementation of Farmers Group Life Insurance Scheme (financial relief ofRs.5 Lakhs) thereby providing social security to the family members/dependents of deceased farmer.

Scope (Functional)

- The apex Office is The Commissioner, Agriculture Hyderabad and the District Agriculture Officials (DAOs) at district level, Divisional level Officials i.e. Asst. Directors of Agriculture (ADAs), Mandal Agricultural Officials (MAOs) at Mandal level and Agricultural Extension Officers (AEOs) at Clusters/Villages,LIC officials & Bankersat State Level.
- All the Officials have their own functional competency to attend their respective responsibilities in the implementation of Rythu Bima software.

Scope (Geographical)

- From State Headquarters (Hyderabad) / District Headquarters / Divisional Headquarters / Mandal Headquartersto AEOs at village level. The scope of the project is entire Telangana State covering all the districts and agriculture divisions. Remote areas and geographically challenged places are also covered for Rythu Bima implementation

Benefits

Overall benefits and intended are: -

- Enrollment of Farmers for Group Life Insurance Policy under the age group of 18-59 years.
- Web and Mobile Apps are provided to capture the data by Agriculture Officers at the field level.
- Registering claim online in case of death of insurer and uploading the required documents by Field level Agriculture Officers.
- Online verification of claim documents by District Level Agriculture Officers.
- Downloading verified claims by LIC officials for processing the payment
- SMS alerts to Farmer at the time of enrolment and to Nominees after the payments successfully made through DBT

Current Status

- Rythu Bima project has been successfully implemented in all the districts of Telangana State for agriculture farming community in the year 2018.

- The scheme has been initiated and ongoing in the current year 2020 also.

Hardware/Software

- *Server:*MS SQL Server 2012
- *Front End:*Dot Net Framework 4.0, C#, Visual Studio 2010. AJAX, HTML5, Responsive J Query

Certification (Certifying Agency)

Security Auditing was done by the empaneled CERT-In third party agency - LOCUZ Enterprise Solutions Pvt. Ltd, Hyderabad

Disaster Recovery/ Service Continuity

Rythu Bima software has been hosted in NIC Network at National Data Center, Hyderabad. NIC will look after the disaster recovery and service continuity by the dedicated and professional team.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	**Brief service description with benefits**	**Volume (Nos) of Services year wise**		
		2018-19	**2019-20**	**2020-21**
RYTHU BIMA (Policy Claim Settlement)	Total Farmers Enrolled (No in Lakhs)	**31.27**	**30.17**	**36.83**
	Total Claims Settled (in No.)	**16,910**	**313**	**175**
	Total Amount Distributed (Rs. In Crores)	**845**	**15.65**	**8.75**

Implementation

- Rythu Bima project has been implemented in the entire Telangana State to improve the Livelihood of the Dependents in case of Farmer's unforeseen death.
- As planned by the Dept., the project has been successfully rolled out in the year 2018 and able to achieve project milestones without any shortfall with smooth coordination with the stakeholders like LIC & Bankers

ENABLER

Processes Re-engineered

- After thoroughly examined the 'AS-IS' processes of Rythu Bima (Farmers Insurance scheme) adhering to the GOs, a work flow-based Web application has been designed, developed and implemented with close coordinationof Principal Secretary and Commissioner, Agriculture Department, Telangana State
- The processes that are automated are: Enrollment of Farmers, Capturing of required data at Field Level, Registration of Policy claims, Verification of Documents and Payment to Farmers,Data Sharing to LIC authorities and for further processing.

Technologies

- With the help of Public Announcements, Brochures, Flyers, and through various digital media channels, the scheme highlights have been

publicized in the entire Telangana State and obtained tremendous response and support from the farmer community
- Social media channels are also used as part of awareness programme

People
- Process trainings and application work flow demos were given to the concerned stakeholders below and ensured high value addition to the project:
- Farmers in the age group of 18 to 59 years are eligible for Rythu Bima insurance coverage
- Registering claim online in case of death of insurer (farmer) and uploading the required documents, capturing of nominee details etc. are done by Agriculture Officers at the field level.
- District Level Agriculture Officers are responsible for Online verification of claim documents
- LIC officials will download the verified claims for processing the paymentCapturing status of the disbursed amount by the dependents of farmers

VALUE INDICATORS

Learnings for sharing

Key learning's
- Insurance domain knowledge is acquired and may be implemented in other project across Depts.
- With the experiences during Application implementation process, the Dept. is coming up many innovative digital initiatives

Best Practices
- Dash boards and analytical reports have been provided to external Stakeholders i.e., LIC officials for transparency
- GudApps & GTGW concepts have been implemented in the development of the software

Process Changes
- Application workflow process designed and implemented for District/Mandal/AEOs.
- Easy identification of beneficiaries to cover under group life insurance scheme.
- Mobile App was also developed for updating the nominee details (Bank Account details, Aadhaar number and mobile number) of farmers.

Digital Empowerment
- The nominee of the deceased farmer need not go to any office and submit application for claim amount.
- Farmers staying in remote villages also are getting benefitted without spending their money & time
- Proactively AEOs capture the nominee details and upload relevant documents in time for claim settlement.
- A Mobile App has also been developed for capturing the Nominee details for policy settlement process. The beneficiaries are not required to visit the Insurance office for claiming insured amount

Green e-Governance
- Sending SMS Alerts to Farmers during enrolment and to Nominees regarding status of claim status and finally deposit of amount of Rs. 5.00 Lakhs in to their Bank account.

- Rythu Bima features in both Web and Mobile applications have been developed to ensure Online Submissions& Verifications at every level of work flow and therefore it is being considered as an efficient user-friendly software.

Shri Dr.B.Janardhan Reddy IAS, *Commissioner of Agriculture, Department of Agriculture, Telangana, agriculture.telangana@gmail.com*

Shri. M.A.Masood Khan, *Assistant Director of Agriculture (IT), The Commissioner and Director of Agriculture (Telangana), dda-infocell-agri@telangana.gov.in*

Shri N Suresh Kumar, *HOD & Technical Director, National Informatics Centre (Telangana), sureshkumar.ap@nic.in*

FRUITS - Farmer Registration & Unified beneficiary InformaTion System

Government of Karnataka & National Informatics Centre

Rajeev Chawla

PROJECT OVERVIEW

Karnataka state implements several schemes for the benefit of farmers. Farmers undertake different Agriculture and Agriculture related activities like growing Agriculture crops, Horticulture crops, Sericulture, Dairy, Poultry, Fishery etc. Each of these activities requires specialised knowledge and experience. Therefore, the state has established specialised and specific department to assist farmers in carrying out farming activities effectively and efficiently. While establishment of exclusive departments brings focused approach for development of each of these activities, farmers need to approach different departments for availing any type of assistance and benefits. It is common practice that department officials seek documents from the farmers for providing benefits under any schemes. Farmers end up submitting same set of documents to different departments every year. A well organized and scrutinized farmer database will help the departments in aspects such as transparency in selection of beneficiaries, avoid same beneficiary (ies) availing multiple schemes, avoid same beneficiary (ies) availing benefits for existing units, avoid availing benefits using fake/ fudged land records / impersonation, and enable genuine and weak farmers to avail be benefits which they were deprived of all these days due to opaque system of beneficiary selection.

Objective

Main objectives are list below:

- Build a farmer's database that caters to the entire agriculture sector as a common data repository and provide unique Identification to each Farmer.
- Creates a 360-degree data view of farmer by creating single farmer identity populated by data fetched using backward linkages with other legacy systems and automatic synchronization.
- Design to cater to different line departments cutting across different admin departments but servicing agriculture sector.
- Acts as a single point for delivery of all services to farmers, including subsidies, insurance support, Financial assistance under disaster, etc.
- Achieve entitlement based services instead of demand based.
- Benefit to reach right person without pilferages - Cash benefits directly transferred to farmers using Aadhaar number as Financial address – Aadhaar Enabled Payment System (AEPS).
- Inclusive Growth - Informed decisions while sanctioning benefits keeping facilities availed by farmers from other departments.
- Facilitate self-service to farmers and provide weather data, forecast and soil health parameters for location where farmer owns the land.
- Location and crop specific advisories to farmers

Scope

DPAR (e Governance), Government of Karnataka in association with National Informatics Centre (NIC) has developed a software application called FRUITS (Farmer Registration & Unified beneficiary InformaTion System – FRUITS).

The application facilitates registration of farmers/persons who want to avail any benefit from the Government. In addition, details of benefits availed get recorded in FRUITS and thus, it becomes an inventory of farmer's land and benefits extended to them. Farmer Registration & Unified beneficiary Information System is a unique IT solution for registration of farmers by all farming related departments. The FRUITS is a web-based software system with authenticated Database of a farmer/beneficiary where Data authenticity is ensured through following electronic integrations:

- The software aims at one-time registration of farmers/individuals who wants to avail benefits from the government, so that farmers need not submit the documents repeatedly. The registration is based on Aadhaar with demographic authentication with UIDIA.
- The software is integrated to ''Bhoomi'' the land data base of Karnataka for fetching and validating the land details and compares owner's name with the Aadhaar name. Thus, it helps preventing others to avail benefits in the name of the farmers.
- Connects to ATALJI JANASNEHI KENDRA (AJSK) of Revenue Department for Caste Certificate authentication.
- Connects to Food and Civil supply department for Ration card – Family Details.
- Connects to Election Commission's Web site for EPIC details.
- Capturing of Bank Account Details (as a backup information as Aadhaar is used as financial address and bank account number is used only if Aadhaar based Payment system fails).
- Integrated to DBT for making Aadhaar based payments through banks / Treasury.
- Linked to crop survey to display the crop details of particular survey number.
- Facility to update farmers' details.
- Connects to Karnataka State Natural Disaster Monitoring Centre (KSNDMC) database for weather data.
- Connects to Karnataka State Remote Sensing Application Centre (KSRSAC) for GIS based analysis and dashboards.

Building agriculture eco-system using FRUITS

Objective of building any eco-system is to ensure that schemes planned to achieve vision and mission of the department is monitored and measured. Following are some of the example of the ultimate goals those achieved or in pipeline through FRUITS;

- Estimation of production of particular crop and decide on MSP and location of procurement centres and fix procurement cap.
- Study the impact of benefits/schemes provided to farmer vis-à-vis the production.
- To use farmer database for registering EOI for bringing the produce to procurement centre for claiming MSP.
- Informed decisions can be made while providing benefits like seeds, seedlings and fertilizer using soil health card and benefits already provided in the past.
- Target farmers can be identified for agriculture extension program.
- Data collected through this portal can be used for planning purpose which will help ultimate goal of agriculture department objective of

increased production, doubling the farmer's income and sustainable agriculture.

Farmers' Registration

- Once in a life time activity – no need to submit documents again and again
- Provision to update the details periodically
- Connects to UIDAI for validation of Aadhaar,
    i. Aadhaar Number is encrypted and saved – no chances of leakage/ mis-use
    ii. Name as in Aadhaar is captured as farmer name
- Connects to Bhoomi – the land record data base
    i. Ownership of land authenticated
    ii. Extent of land is authenticated
- Name comparison tool to compare Aadhaar name and land holder name as in Bhoomi
- Connects to AJSK of Revenue Department for
    i. Caste Certificate authentication
    ii. SF/MF certificate authentication of electronically issued certificate
- Connect to Food and Civil supply department for
    i. Raton card – Family Details.

Government process re-engineering

- Farmers need not anymore submit documents multiple times for different schemes,
- Transparency in selection of Beneficiaries,
- Entitlement based system – no application, no scrutiny and no selection of beneficiary.
- Inclusive growth

Improvements in processes

- MSP (Minimum Support Price) scheme implemented with the help of FRUITS helped in identifying eligible farmers, crop grown and extent of cultivation so that one can weed out unscrupulous middlemen who were mis-using the scheme in manual system. The time lag between procurement of produce and payment to farmers was reduced to 15 days compared to 4-5 months in manual system. Aaadhaar based payment ensured that right person gets the benefit. MSP scheme has been implemented for procurement of Ragi, Paddy, Jower, Tur, Groundnut, Bengal gram, Maize and Bal copra.
- PM-KISAN benefit given under state sector scheme was directly transferred to eligible farmers using Aaadhaar based payment system.
- Horticulture and Agriculture departments used facility provided in FRUITS for transfer of fund to beneficiaries under various schemes both in Treasury mode and Bank mode.
- Financial assistance was extended to Flower, fruits, vegetables and maize growing farmers using FRUITS during pandemic covid-19, an entitlement based system implemented. It took just 2-3 days to design and implement the system with the help of FRUITS eco system.
- The Government of Karnataka had announced assistance to distressed coconut farmers affected due to continuous drought. A manual joint survey had estimated requirement of Rs. 172 crores and the cabinet had approved the same. By using FRUITS and crop survey data

beneficiaries were paid assistance through FRUITS-DBT system. The Government saved around 40 crores by eliminating ineligible claims.

Approach and methodology

Following principals were kept in view for designing efficient, effective and sustainable system.

- Build for all
  Description: Any IT system that is developed should be built keeping in mind all stakeholders in the given sector and not just few of them. In FRUITS project, all Agriculture and allied departments were kept in mind while designing the system.
  Advantage: Such an approach will help in securing buy-ins of all important stakeholders, for the IT system, which in turn makes it sustainable.
- Maximize the reuse
  Description: The IT system should ensure reuse of data, keyed in at any given point, for building information required across all services in the ecosystem.
  Advantage: This reduces the burden of repeated data entry from users and enhances usability of the system. In FRUITS famers need not submit documents every time while availing benefit. Ex. MSP operations carried out without asking any documents from Farmers.
- Develop 360-degree view
  Description: A 360-degree view of the beneficiary of the system (focusing on benefits only) should be built by using data linkages across all available data sets.
  Advantage: This will give a full view of the beneficiary that can help in targeted service delivery. FRUITS enables entitlement based system wherever feasible.
- Leverage National level APIs
  Description: Service quality can be improved by leveraging national level APIs such as Aadhaar, DigiLocker, LG Codes, etc. to enrich the services.
  Advantage: Such an approach standardizes the development process by creating a uniform framework. FRUITS rides on this concept to maximum extent.
- Identify Outcomes
  Description: Outcomes have to be identified upfront and needs to ensure positive convergence of goals of all stakeholders.
  Advantage: This will bring in larger participation of all stakeholders and objective of inclusive growth and FRUITS is best example of this.
- Create backward & forward linkages
  Description: The IT system should enable backward linkages to capture data from legacy systems and also have forward linkages to share its analysis with other systems.
  Advantage: Such an approach will help enable the development of a larger ecosystem built around the IT system. In FRUITS backward linkages with BHOOMI, Nada Kacheri, PDS, Weather data, Soil health and forward linkages like DBT and crop survey has built wonderful agriculture eco system.
- Develop as a single point for all Services/Data
  Description: The IT system should become the hub of all services and

information needs for the beneficiary.
Advantage: This will make the IT system useful for the beneficiary and draw them into using it. FRUITS facilitates departmental officials with the information on click of button. Farmers & departmental officials are enabled with weather, forecast, and soil health specific to their location/Jurisdiction. It also enables to check demographic authentication and NPCI seeding status. All stakeholders are enabled with a facility to view benefits availed, applying for benefits, request for change in personal or land related parameters.

- Make services accessible with ease
  Description: Accessibility of services through multiple modes, mediated or self-service, covering all strata of the society should be an important goal.
  Advantage: Ease of access makes any IT system popular, which in the longer run ensures sustainability of these systems. Responsive design of FRUITS and availability of android based mobile app in FRUITS helps in achieving the same.
- Develop in a federated manner
  Description: IT systems should be developed in a federated manner such that responsibility of managing data is delegated to the level closest to its generation.
  Advantage: This will ensure timely updating of data thus making it reliable. For Ex. Land Records data continues to be managed by Revenue department, automated schedulers will ensure the synchronization between land records data and FRUITS data. Similarly Crop Survey data and FRUITS data is synchronized as and when changes occur any side.
- Retain a vision for future evolution
  Description: Create a vision for growing the system in the future with the objective of increasing the coverage and also meeting future needs.
  Advantage: Having a vision in place ensures the system remains relevant throughout. With long term vision, FRUITS is evolving over time covering more and more agricultural related areas.

BENEFITS

Inefficiencies Prior to FRUITS

- Farmers need to submit documents multiple times for different schemes,
- Chances of same beneficiary (i.es) availing multiple schemes;
  i. In same land or different land
  ii. In same year or different year;
  - Under different Components.
  - Under same components in different schemes.
- Chances of same beneficiary (i.es) availing benefits for existing units
- Chances of availing components beyond upper limit;
  i. Individual limit,
  ii. Family limit,
- Benefits reserved for SF/MF availed by other farmers– by partial land record submission,
- Instances where people have availed benefits with
  i. Fake/ fudged land records,
- Impersonation,

- No transparency in selection of Beneficiaries,
    i. Results in genuine and weak farmers getting deprived of benefits,
    ii. Lack of 360º view of farmers makes comprehensive and inclusive development difficult.

Benefits to Farmers

- One-time registration for lifetime – self registration enabled- facilitates updation requests also.
- Crops grown details as per crop survey.
- Check the status of National Payments Corporation of India (NPCI) Seeding and Aadhaar Demo authentication.
- Know the Weather and forecast information specific to farmers Grama Panchayat/ Hobli (Sub-Block)
- Check the status of Direct Benefit Transfer based on Farmer Id and Aadhaar Number & Details of benefits availed.
- Facility to apply online for schemes of different department.

Benefits to Government Functionaries

- Authentic farmer information.
- Elimination of bogus and ghost beneficiaries.
- Helps in identifying most eligible beneficiaries.
- Identification of genuine Small and Marginal Farmers.
- Helps in comprehensive implementation of schemes.
- Availability of jurisdiction wise weather data and forecast for Government functionaries.
- Government will have 360º view of farmer

Stakeholders

The FRUITS framework has a multi-stakeholder architecture, below is the list of stakeholders which capitalises on the competencies of various departments and institutions to develop a holistic, end-to-end unified farmer database.

- Agriculture Department
- Farmers
- Horticulture Department
- Sericulture Department
- Animal Husbandry
- Food and Civil Supply
- Fisheries
- CeG (Centre for e-Governance) Government of Karnataka.
- ATALJI JANASNEHI KENDRA (AJSK) of Revenue Department
- Co-operative departments.

The following figure explains how different stakeholders work across the departments to deliver benefits.

Key Aspects

How FRUITS help other applications?

- Provides validated ready to use farmers information.
- Validated crop information based on crop survey.
- FRUITS handles complexity of connecting to different data bases, collecting data, validating data.
- Ability to keep data updated.
- Departmental application need not worry about connecting to various data bases.

- At the same time other application need not integrate with multiple departmental application.
- FRUITS also provides forward linkage to financial management system (K2/ Dept. bank A/c). – Aadhaar issued as financial address.

RESULTS INDICATOR

The benefits that accrued to the targeted stakeholders as a result of an overall strategy driven by applications on which FRUITS rides-on.

FRUITS is being extensively used for implementation of various schemes across the departments listed in stakeholders and some of significant outcomes are listed below.

- It was used for providing financial assistance by Horticulture department to coconut farmers whose coconut palms had dried up or become unproductive due to continuous drought. 1.50 lakh farmers benefitted and around 40 crores saved by eliminating ineligible claims and de-duplicating.
- PMKISAN scheme was also implemented with FRUITS in the back ground by the agriculture department. Besides Government of India scheme, additional Rs. 4000.00 paid to farmers under state scheme. More than 55 lakh farmers benefitted.
- MSP programme was implemented for Paddy, Ragi, Jowar, Tur, Bengal gram, ground nut, Ball copra by respective departments/ agencies using FRUITS. Approximately Six lakh farmers benefitted and payment was done directly to farmers account within 15 days, either to it was taking 4-5 months in manual system.
- Financial assistance was provided to farmers affected due to Covid-19 related lock down by Agriculture and Horticulture department. Around ten lakh farmers benefitted.
- Karnataka Ksheerasiri: A subsidy of Rs.4 per litre of milk will be given to dairy producers and families across Karnataka.

Implementation

The Government of Karnataka had announced assistance to distressed coconut farmers affected due to continuous drought. The Government decided to implement the scheme by using Crop Survey and through HASIRU – FRUITS –DBT - K2

The process followed as:

- The farmer was registered in FRUITS: *eliminated fake land records*
- Beneficiary application raised in HASIRU
- HASIRU was linked to Crop Survey – crop details with photo displayed**:** *Only farmers who has grown coconut and with damaged trees were considered.*
- Farmers with FID directly processed and pushed to through Payment made to Aadhaar seeded account through FRUITS – DBT - K2
- Benefit reached directly to eligible farmers account – 1.50 lakh farmers were extended benefits.
- Government saved around Rs. 40 crores.

The Government of Karnataka has announced assistance to distressed farmers growing Flowers, Fruits and Vegetables as well as Maize during covid-19 situation. The scheme is being implemented through HASIRU – FRUITS – DBT - K2. Maize is handled through K-Kisan - FRUITS –DBT - K2

The process followed as:

- The plots having affected crops identified based on crop survey
- The list of farmer taken from FRUITS by integrating crop survey - Kharif and Rabi-2019: *Separate List with FID and Without FID*
- Farmer list is displayed in HASIRU with all survey numbers having crop
- Farmers with FID directly processed and pushed to DBT through FRUITS
- Payment made to Aadhaar seeded account through K2
- Farmers without FID are extended benefits by creating of FID in FRUITS

The Government of India announced Minimum support price (MSP), as usual. The state Government decided to implement the scheme using FRUITS with DBT. MSP application of FCSD was linked to FRUITS.

The process followed as:

- FRUITS provided data based on FID farmers' details, crop details – crop name and extent objection handling through Bele Darshak.
- Registration of farmers for MSP based on FRUITS data
- Procurement of MSP produce be respective departments/ agencies
- Payment to farmers through FRUITS and DBT
- Implemented MSP for
    i. Paddy, Ragi, Jowar – FCSD
    ii. Tur, Bengal gram – Cooperation Dept./ NAFED
    iii. Ground nut – KoF
    iv. Ball copra – Makfed/ NAFED

Implementation of FRUITS in the following departments:

Department	No. schemes for which FRUITS data used	No of Beneficiaries handled through DBT	Amount transferred through DBT in Rupees
Agriculture	9	1,03,55,218	2329,92,49,227
Horticulture	9	2,51,050	194,11,44,890
Animal Husbandry	4	11,169	72,37,17,048
Sericulture	5	236	4,43,60,000
FCS	3	1,22,637	746,01,04,211
Co-operative	8	4,73,292	2401,13,62,283

Intergations Using Fruits

CROP Survey

Karnataka state conducts crop survey of each plot using GIS based mobile app every year in three seasons. FRUITS is electronically integrated with crops survey and fetches crop details of land belonging to each farmer and provides to implementing departments.

Weather Data

Karnataka state has established KSNDMC (Karnataka State Natural Disaster Monitoring Centre) which has installed and maintaining AWS (Automatic Weather Station) and TRG (Telemetric Rain Gauge Station) across the state. The FRUITS is integrated with KSNDMC and fetches daily weather and rainfall data and provides to users based on the location of the land.

Soil Health Data

State under SHM (Soil Health Mission) has collected and tested the soil sample across the state. The same has been provided to GoI. The same data is obtained from GoI and displayed in the FRUITS based on the location of land a farmer owns (full-fledged integration is under way)

Technologies

- Responsive design using bootstrap in ASP.net.
- Dot net framework 4.5
- N-tier architecture
- SQL Server 2019 ad database with Always –on enabled
- Data exchange through WEB APIs with open standard (XML)
- Cutting edge technologies like JQuery and HTML5 for better user interface and experience.
- Physical Survey –Mobile based Geo fenced Images.
- Use of mobile App option – Physical visit with Geo tagging.
- GIS integration for better data analysis and dissemination of information

Achievements& Current Status

- Record number of 65,54,544 farmers have been registered in FRUITS portal till now, this amounts to almost 100% when compared with 2011 census figures of cultivators (65,80,649). Each farmer has been assigned Farmer id which is unique number used across all stake holding departments.
- All the parameters which are required for performing farmers SWOT analysis are captured as part of registration using backward linkages with BHOOMI (land Records database), Aadhaar for demographic authentication, Nadakacheri system of Revenue department to fetch caste and income details, Ration card system to know BPL status, etc., Parameters such as physically handicapped or not and minority status are also captured. Forward linkage to crop survey helps to have complete 360-degree view of the farmer. Automated process has been put in place in the form of operating system level services or schedulers to update the data which has been fetched through backward linkages. People associated with agriculture and allied activity without land also registered and maintained. There are schemes under which benefits are provided even to landless who are involved in activities such as diary, honey keeping, mushroom growing etc.,
- Presently following department are using FRUITS for selection of beneficiaries and also performing DBT to pay subsidy / financial assistance to farmers
    i. Agriculture.
    ii. Horticulture.
    iii. Animal Husbandry and veterinary sciences.
    iv. Food and civil supplies.
    v. Co-operation
    vi. Karnataka Milk Federation
    vii. Sericulture
- All agriculture related services ride on FRUITS database for providing benefits to farmers. Agriculture and Horticulture uses FRUITS data for providing benefits under all schemes executed by them and Aadhaar based DBT is also done through FRUITS wherever benefit is in the form of cash. Food & Civil Supplies and Co-operation departments are using FRUITS to do MSP (Minimum Support Price) registration and payments. Animal Husbandry department uses FRUITS for providing benefits, it also pushes DBT data to FRUITS in case of PASHU Bhagya scheme (assisting farmer by proving milching animals).,

- Entitlement based approach is ultimate goal of any government as this will remove un necessary steps like call for applications, scrutinise the application, select beneficiaries and provide benefit. FRUITS enabled government in making entitlement based financial assistance to farmers by establishing forward linkages to crop survey database during pandemic covid-19. Following are entitlement based services implemented.
    i. Financial assistance to flower growing farmers who could not market their produce due to lockdown.
    ii. Financial assistance to Fruits & Vegetable growing farmers who could not market their produce due to lockdown.
    iii. Financial assistance to maize growing farmers who could not market their produce due to lockdown.
- All financial assistance to the beneficiaries are being done using Aadhaar number as financial address. There are schemes in which payment is from the state treasury and schemes in which payments are done using SBI's payment gateway. FRUITS system ensures that Benefit reaches to right person in right time without pilferages.
- FRUITS IT system enables all the users to query the benefits availed by the individual farmers. This facility helps government functionaries to perform their two critical activities i.e., facilitating and controlling. Fisheries department can get list of farmers having farm pond and target them for fish seed distribution. Compost pits can be sanctioned to those who have been given milching animals. Micro irrigation can be sanctioned to those who have been facilitated by government to drill bore wells.

Way-Forward

- *Crop Advisory*
  By using the crop survey data, FRUITS is planning to provide advisory services to the farmers through various agencies . As a pilot, this has been enabled for Mango farmers. Based on the season and weather, the board is able to provide right information/instruction to the Mango farmers instead of sending to everyone. The same will be replicated to the use of other crops as well.
- *Functionaries Advisory*
  By using the crop-survey data, FRUITS is planning to provide advisory services to the farmers for the right usage of fertilizers to the crop.
- *Soil Health*
  By using the crop survey data, KSNDC data, SSHM data the nutrition level of soil and right fertilizers can be advised through FRUITS data.

Digital Empowerment

- Provides validated ready to use farmers information.
- Validated crop information based on crop survey.
- FRUITS handles complexity of connecting to different data bases, collecting data, validating data.
- Ability to keep data updated.
- Departmental application need not worry about connecting to various data bases.
- At the same time other application need not integrate with multiple departmental application.

- FRUITS also provides forward linkage to financial management system (K2/ Dept. bank A/c). – Aadhaar used as financial address.
- Collect plot level crop data using GIS based mobile app

Green e-Governance

Green e-Governance is about application of Green computing practices to the domain of e-Governance. It involves adoption of environmentally friendly practices.Our Department has focused on the competencies of various departments and institutions to develop a holistic, end-to-end unified farmer database and an organized farmer database will avoid farmers from running pillar to post for availing benefits.

There are several dimensions to green e-Governance in this project and prominent among these relate to Power and Paper consumption, and disposal of e-Waste.

- System is End to End online
- Less paper-work
- No need to submit records again and again, It is one-time registration.
- No need to maintain manual records and hence administrative cost reduces.
- Use virtualization on servers, when available, to allow multiple operating
- Systems to run on each machine.

Shri. Rajeev Chawla, IAS, *Additional Chief Secretary, DPAR (e Governance), Government of Karnataka*

Implementation of Bhavantar Bhugtan Yojna

M.P State Agricultural Marketing Board

Sandeep Yadav and Musharraf Sultan

PROJECT OVERVIEW

Vision & Objective

In a first of its kind scheme in the country, the Madhya Pradesh government launched and implemented on a price differential scheme, popularly known Bhavantar Bhugtan Yojana (BBY), initially for eight kharif crops—soybean, groundnut, sesame, ramtil (all oilseeds), maize (cereal), moong, urad and tur (pulses)—in 2017.Later different schemes have been launched and executed by successive governments for different crops and based upon different guidelines.

Scope Geographical

- 259 APMCs of M.P
- 3500-100 Procurement Centres all over M.P

Scope Functional

- M.P State Agricultural Marketing Board
- Department of Agriculture and Farmer welfare, M.P
- Department of Horticulture and Food Processing, M.P
- 259 APMCs
- ITC

Entities/Stakeholders of the Project

- M.P State Agricultural Marketing Board
- Department of Agriculture and Farmer welfare, M.P
- Department of Horticulture and Food Processing, M.P
- Department of Cooperation ,M.P
- Department of Food & Civil Supplies, M.P
- Procurement Centers(Cooperative Societies)
- Department of Food & Civil Supplies, M.P
- Revenue department(Land Records)
- 259 APMCs of M.P
- NIC
- ITC

Status

- *BBY Kharif 2017*
  i. (Crops- soybean, groundnut, sesame, ramtil maize ,moong, urad and tur)
  (Period 16-10-2017 to 31-01-2018 and for Tur 01-02-18 to 30-04-2018)
- *Mukhyamantri Krashak Samruddhi Yojna Rabi 2018*
  i. (Crops- Wheat, Gram, Mustard, Lentil, Garlic and onion)
  Period Wheat 15-03-2018 to 25-05-2018
  Gram, Lentil and Mustard 10-04-2018 to 20.05.2018
  Garlic – 10-04-2018 to 31-05-2018
  Onion 15-05-2018 to 30-06-2018
- *Summer Season 2018 Moong And Urad*
  ii. (Period 04-07-2018 to 31-07-2018)
- *Flat Bhavantar Bhugtan Yojna- Kharif 2018*

i. (Period- 20-10-2018 to 19-01-2019)
(Crops-Maize and Soybean)

- *Jai Kisan Krushak Samri Uddhi Yojna -Rabi 2019*
  i. (Period 25-03-2019 to 24-05-2019)
  Crop-Wheat
- *Mukhya Mantri Pyaaz Krushak Protsahan Yojna-Rabi 2019*
  ii. (Period 01-06-2019 to 30-06-2019)
  Crop-Onion

Objectives

The system is developed using ICT tools to facilitate hassle free implementation of various schemes under BHAVANTAR BHUGTAN YOJNA. The system facilitates the checks and balances to minimize the leakages and timely payment to the beneficiaries (farmers). The Android App uses the geo tagging and the Application talks with System of Department of Food and Department of Revenue. The system uses Android App/Web App for Gate Entry, Web App for Sales entry, verification and final calculation of Amount to be remitted in account of Farmer. SMS Alert at every stage. Multi factor authentication at login of APMCs operator.

Hardware/Software

- MS SQL Server 2012
- ASP.NET 4.0
- JavaScript
- CSS
- Windows OS
- HTML
- RESTful Web Services
- Android Studio
- Java
- SQL lite
- SMS API Integration

Data is hosted on NIC M. P Servers. One Data Base Server and Production Server for Application and One Report Server. Android App is developed using Android Studio and Data through Web Services

Certification (Certifying Agency)

Madhya Pradesh Agency for Promotion of Information Technology (MAP_IT)
Department of Science & Technology, Government of Madhya Pradesh

Disaster Recovery and Service Continuity

NIC has Disaster Recovery Centre at Hyderabad.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
BBY KHARIF 2017 Farmer Registartion	No. Farmers who were registered on eUparjan Portal	21.86 Lac		
BBY KHARIF 2017 Farmer who sold crops	No. Farmer who were sold crops in APMCs	11.6 Lac		

BBY KHARIF 2017 Sold Quantity	The quantity sold as per the eligibility of farmers	28.764 Lack metric ton		
BBY KHARIF 2017 Amount	Amount distributed to the farmers	1951.32 Cr		
MUKHYAMANTRI KRASHAK SAMRUDDHI YOJNA RABI 2018 Farmer Registartion	No. Farmers who were registered on eUparjan Portal	33.91 Lac		
MUKHYAMANTRI KRASHAK SAMRUDDHI YOJNA RABI 2018 Farmer who sold crops	No.of Farmer who were sold crops in APMCs	21.43 Lac		
MUKHYAMANTRI KRASHAK SAMRUDDHI YOJNA RABI 2018 Sold Quantity	The quantity sold as per the eligibility of farmers	119.31 Lac metric ton		
MUKHYAMANTRI KRASHAK SAMRUDDHI YOJNA RABI 2018 Amount	Amount distributed to the farmers	3313.36 Cr		
SUMMER SEASON 2018 MOONG AND URAD Farmer Registartion	No. of Farmers who were registered on eUparjan Portal	1,16,505		
SUMMER SEASON 2018 MOONG AND URAD Farmer who sold crops	No. Farmer who were sold crops in APMCs	80,162		
SUMMER SEASON 2018 MOONG AND URAD Sold Quantity	The quantity sold as per the eligibility of farmers	1.73 Lac metric ton		
SUMMER SEASON 2018 MOONG AND URAD Amount	Amount distributed to the farmers	163.50 Cr		
FLAT BBY KHARIF 2018	No. of Farmers who were registered on		16.92 Lac	

FarmerRegistartion	eUparjan Portal			
FLAT BBY KHARIF 2018 Farmer who sold crops	No. Farmer who were sold crops in APMCs		10.78 Lac	
FLAT BBY KHARIF 2018 Quantity	The quantity sold as per the eligibility of farmers		43.90 Lac. metric ton	
FLAT BBY KHARIF 2018 Amount	Amount distributed to the farmers		514.45 Cr	
JKSY -RABI 2019 Farmer Registartion	No. of Farmers who were registered on eUparjan Portal		19,98,437	
JKSY -RABI 2019 Farmer who sold crops	No. Farmer who were sold crops in APMCs		12.74 Lac	
JKSY -RABI 2019 Quantity	The quantity sold as per the eligibility of farmers		94.38 Lack metric ton	
JKSY -RABI 2019 Amount	Amount distributed to the farmers		1442.98Cr	
MPKPY -RABI 2019 Farmer Registartion	No. of Farmers who were registered on eUparjan Portal		1,03,500	
MPKPY -RABI 2019 Farmer who sold crops	No. Farmer who were sold crops in APMCs		50,729	
MPKPY -RABI 2019 Quantity	The quantity sold as per the eligibility of farmers		5.75 Lac metric ton	
MPKPY -RABI 2019 Amount	Amount distributed to the farmers		194.08Cr	

Implementation

All schemes implemented at 259 APMCs of M.P within time frame. Android App is used to verify geo location for sale in APMC registration Data from eUparjan Portal through web service using Web App/ Android App land Record Data initially verified from M.P eUparjan Portal land Record Data later verified from Girdawari App sales Entry through Web App by Mandi official approval of Data by Mandi Secretary every scheme has its own set of guideline lines registration done in Procurement Centres or APMCs as per the scheme guidelines registration is done in Procurement Centres or APMCs of the farmer where land existsThe Farmer may sell the crop in any district but the payment will be made by the district where the land of the farmer exists There is a limit for each crop i.e. max yield which is fed in the system with the data of Agriculture Department.

Improvements / Enhancements

e-Sign and Payment Gateway

ENABLER

Processes Re-engineered

Earlier Schemes used to be implemented using manual registers. To implement the scheme smoothly and in a transparent and organized manner, the process has been designed using best use ICT.

- The farmers are used to be registered on M.P eUparjan Portal every year for a particular crop season and the data has been taken through web services. The registration open for a specified in APMCs or Procurement Canters
- Land Record Data has been verified on eUparjan Portal through Tehsildat login
- Land Record Data has been verified on Girdawari App and data taken from App
- An Android App is prepared which is used in the premises of APMCs to generate Gate Entry Slip for the Farmers .Web Application is also used in APMCs for the same . The Android App/ Web Application generate Gate Entry Slip Id for further sales entries.
- For each crop separate Id is generated for the same farmer
- By Selecting the Gate Entry Slip Id generated by App, Mandi official records the sales transactions of the farmer
- The sales transaction include Anubandha Patrak, Taul Patrak, Bhugtan Patrak and Trader to which it is sold
- Sales transactions are moderated and verified by Mandi Secretary
- After the Period of the scheme is over, as per the guidelines of the scheme ,the amount is calculated as per the eligibility of the farmer
- The amount is verified by District level Bhavantar Committee
- After verification the amount is remitted in the account of the Farmer

Technologies

Through WhatsApp Group, Helpdesk we were unable to resolve the difficulties and valuable suggestions from the stake holders.You tube channels used for training purposes.

People

Capacity Building

- Various workshop held in Bhopal where all 259 APMCs officials remained present
- Technical support given through Telephone/WhatsApp group/Email etc. day to day.
- Half-yearly/Yearly training held
- User Manual – Booklet circulation
- Letter/Circular issued time to time
- Video Conferencing done through NIC for time to time with all APMCs and other stakeholders

System is supported by all the top management officers in the department, Quick decision making done the same system is replicated all over India with the name PDPS for Pulses and Oilseeds.

VALUE INDICATORS

Learnings for sharing

- Mandi (APMC) officials had been trained and strong will of higher Mandi officers could make it possible
- Training of Trainers (TOT)
- Various Round of VCs done time to time to review and addressed their difficulties.
- Regular Review through VC to the stake holders
- Support from Higher Authorities
- Process simplified and done step by step.
- Exceptions Report for better monitoring

Digital Empowerment

- System is Bilingual and Unicode Compliant
- Use the local language
- User friendly system
- Conversion of Manual process in Digital platform with using Process re-engineering at every stage
- Minimum entry done manually in the system hence very rare chance of typo-mistake
- Integration with the systems of Revenue(Land records) and Department of Food and Civil Supplies
- Dashboard for Nodal Department (Agriculture ,Horticulture) and M.P State Marketing Board

Green e-Governance

Green e-Governance is about application of Green computing practices to the domain of e-Governance. It involves adoption of environmentally friendly practices with respect to creation, use, and disposal of ICT facilities.

There are several dimensions to green e-Governance and prominent among these relate to Power and Paper consumption, and disposal of e-Waste

- System is End to End online
- Less paper-work

No need to maintain manual records and hence administrative cost reduces

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Shri. Sandeep Yadav, *Managing Director, M.P State Agricultural Marketing Board, mdmandiboard@gmail.com*

Shri. Musharraf Sultan, *Technical Director, NIC M.P STATE CENTRE (M.P), sultan.m@nic.in*

Online Farmer Wise Crop Booking System (OFCBS)

Department of Agriculture, Telangana

B.Janardhan Reddy, M.A.Masood Khan and N Suresh Kumar

PROJECT OVERVIEW

Overview

- The Agriculture Dept., Govt. of Telangana, has been implementing various e-Governance& Digital India initiatives in the recent years. Telangana Government has embarked upon another innovation by introducing the concept of Regulated Farming in this season (Vanakalam 2020) never been done before in any of the states in the country. The Agri Dept. has conceptualized and implemented the RRR (Rythu Bandhu, Rythu Bima and Regulated Farming) the vision ofthe Hon'ble Chief Minister Sri. K. Chandrashekar Rao, who was very particular for 100% Crop Booking which will be the bedrock for better and implementable planning for assessing the requirement of Seeds, Fertilizers, Credit and Storage spaces etc. as well as for timely procurement of produce from farmers.

Objective

- The Primary objective of the farmer wise Crop Booking system is to record Survey Number wise extent of crop cultivated in every Gunta of land by the farmers.Both Agriculture and Horticulture Crops are recorded. Recording of varieties, area under seed production, area under organic cultivation, source of irrigation wise crops cultivated, year of plantation in case of orchard crops etc.
- Generate crop wise, variety wise, source of irrigation wise crop cultivation statistics at State, District, Mandal and Village levels.
- Cross verification of the data entered by Agriculture Extension Officers. The system will pick the records randomly and in such a way that all the villages are covered. The system picked records will be verified by verifying officers. This is an innovative and unique approach of crop booking ensuring that every gunta of land of every farmer is recorded accurately covered under regulated crop planning which is not practiced in any other State in the Country.

Functional Scope

- The Apex Office is the O/o The Commissioner, Dept. of Agriculture, Hyderabad, who continuously monitor the recorded crop sown extent areas.
- The latest land data is obtained from the O/o The Chief Commissioner of Land Administration, Hyderabad, before the starting of Vanakalam season
- The Agriculture Extension Officers at basic level are the officer who will visit every farmer field and digitize the crop cultivation details while recording various other aspects such as variety sown, source of irrigation, whether area is under seed production or organic cultivation etc.
- The District Agriculture Officials (DAOs) at district level, Divisional level Officials i.e. Asst. Directors of Agriculture, Mandal Agricultural Officials (MAOs) at Mandal level – are responsible for verifying the records entered by the Agricultural Extension Officers (AEOs) at their respective Clusters/Villages

- All the user roles involved in the application have their own functional competency to attend their individual tasks.

Geographical Scope

From State Headquarters (Hyderabad) / District Headquarters / Divisional Headquarters / Mandal Headquarters to AEOs) at village level. The project scope is for entire Telangana State covering all the districts and agriculture divisions

Benefits

- It enables the need for updated land records database every season from the O/o The Chief Commissioner of Land Administration
- Web and Mobile Apps are provided to capture the data by AEOs at the field level.
- Online random verification of data (village wise) by DAOs, ADAs & MAOs
- Downloadable and Printed forms for capturing of data
- SMS alerts to the Farmers – 1st SMS at beginning of season for registering the crop sown details. After the AEOs digitized the crop sown particulars a customized 2nd SMS message with farmer name, PPB number, area recorded under different crops, the name and mobile number of the concerned AEO was sent with a request to intimate the AEO if the recorded extents are incorrect and get them corrected.
- 100 % accurate data obtained on crops along with varieties and source of irrigation was obtained at State, District, Mandal, village level and farmer wise.
- The farmers wise data thus obtained was shared with procurement agencies avoiding any scope for pilferages.
- The crop production figures calculated based on the extent sown is helping the policy makers in management of storage in Warehouses.

Current Status

Crop booking project has been successfully implemented in the current season Vanakalam-2020 and in all the 33 districts of Telangana State for the benefit of agriculture farming community**.**

Hardware /Software

- Server : MS SQL Server 2012
- Front End*:* DotNet Framework 4.0, C#, Visual Studio 2010. AJAX, HTML5, Responsive JQuery

Certification

Security Auditing has been initiated and will be done by the empaneled CERT-In third party agency, named BEL, Bengaluru.

Disaster Recovery and Service Continuity

Application hosted in NIC Network, National Data Centre, Hyderabad. NIC Hyderabad will look after disaster recovery and service continuity by the dedicated and professional team.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	**Brief service description with benefits**	**Volume (Nos) of Services year wise**		
		2018-19	**2019-20**	**2020-21**
Total farmers & Crop Sown	Able to know the no.of benefitted farmers with	**-**	Kharif Season: Total: 59,57,946	Summer Season: Total:

farmers registered (Digitally Signed)	comparison to land records		Sown: 59,39,220 Rabi Season: Total: 59,57,946 Sown: 30,68,219	59,57,946 Sown: 15,464 Kharif Season: Total: 60,72,577 Sown: 55,65,757
Total Extent & Crop Sown Extent (in Acres) & Digitally Signed	Able to position seed plan for marketing and support price	**-**	Kharif Season: Total: 51,05,159.95 Sown: 1,29,73,700.13 Rabi Season: Total: 1,51,05,159.95 Sown: 54,28,140.19	Summer Season: Total: 1,51,05,159.95 Sown: 32,584.18 Kharif Season: Total: 1,49,64,292 Sown: 1,36,46,121
Total Farmers & Extent Sown in Acres(Non-Digitally Signed)	Non-registered farmers in comparison to their cultivated land extent	**-**	Kharif Season: Farmers: 4,58,810 Extent: 6,52,418 Rabi Season: Farmers: 1,20,664 Extent: 1,56,445	Summer Season: Farmers: 355 Extent: 337 Kharif Season: Farmers: 4,35,170 Extent: 8,22,624
SMS to Farmers	• Total SMS sent • SMS sent before Crop booking • Customized messages on area sown • Non-Crop Booking farmers	**-**	-	• Total 91,78,590 • Before crop booking 40,50,573 • Area sown message 44,69,289 • Non Crop Booking Farmers 6,58,728

Implementation

- Planned for reaching all farmers in the state regarding the importance of crop booking. The idea of regulated farming has been widely publicized with all possible means.

- An area of 125 lakh acres was planned to achieve under regulated crop sowing and which was achieved.
- Sensitized all the field functionaries with targeted dates and method of collecting data with technology sources. In one go, entire state geared up for the important task of complete crop booking, so as to achieve regulated farming of crops to provide agriculture assistance of beneficiary schemes in coming seasons.

Improvements / Enhancements

Last year, the Dept. has planned for collecting data of the crop sown area with workflow system and control of data from various levels of delegation. As an improvement, before crop season was initiated, with SMS technology farmers have been informed about crop booking method of recording with clear message about the objective of crop booking and achieved the planned target

ENABLER

Processes Re-engineered

- Government has appointed one Agriculture Extension Officer for looking after 5000 acres area. A total of 2604 AEOs are presently working in the field and they are equipped with high configuration Tablet PCs with Internet Connectivity.
- A comprehensive Online Farmer wise Crop Booking System was developed with defined workflow mechanism.
- The latest land holdings data obtained from Revenue department and survey number wise data was enabled in the portal for entry by the Agriculture Extension Officers.
- The pre populated list of farmers to be surveyed was enabled in AEOs logins for printing and surveying farmer wise.
- A mobile app was also provided for recording areas on field during their field visit.
- All procedures simplified and powers are delegated to field functionaries.
- At each user level specific time lines framed and standardized. Any hurdles in crop booking may be resolved with state level special task force and guidelines issued in all possible means of communication.
- A comprehensive set of operational guidelines were framed before start of the season and communicated to all the field level officers.
- The various intercropping systems validated through research along with extent of main crop and intercrops to be recorded was obtained before start of the season from Professor Jayshankar Telangana State Agriculture University (PJTSAU) and Sri Konda Laxman Telangana state Horticulture University (SKLTHU) was obtained and communicated along with operational guidelines.
- The village wise ayacut areas planned under major, medium, minor and lift irrigation projects was obtained from Irrigation Department and uploaded in AEOs login as ready reference for accurate recording of source of Irrigation.
- The contact numbers of Field level Asst. Engineers of Irrigation department were shared with Agriculture Extension officers with instructions to have coordination meetings with them and ensure correct source wise areas are recorded.

Technologies

- Various digital media& social media applications/channels have been

used to bring awareness in the farming community of all the initiatives taken by the Dept. of Agriculture, Govt. of Telangana
- Regular meetings, Video Conferences conducted to fill the gaps in processes.
- Customized data in order to meet future requirements keeping in view of not to deviate with present requirements of crop booking.
- Extensively used technology like SMS integration and social media (e.g. What's App, YouTube videos) to accelerate the work.

People
- At the beginning of the season, the department of Agriculture in association with National Informatics Center has imparted the training on the software module developed, its functionalities etc. to all the Field level officers.
- A help document and video on the software module developed was created and communicated to all the stake holders.
- A WhatsApp group was created with Technical Officers from each district, officers from State HQ, NIC Technical team was created and continuous support was provided with respect to hurdles/difficulties faced during digitization of the areas.
- Another WhatsApp group was created with APC & Secretary to Govt., Agriculture, Additional Director of Agriculture (Designated as Chief Statistical Officer of the state), State HQ officers and All District Agriculture Officers.
- The daily progress of area sown particulars was posted in the group and APC & Secretary to Govt. conducted daily Teleconference meeting with all DAOs from 21-07-2020 till 05-08-2020 until the target of 125 lakh acres as planned under regulated crop booking was reached.
- Provided helpdesk and offered solutions from State Level Office.
- Acceptance achieved on management change in view of new procedures of getting crop booking data. Informed to all stakeholders regarding high level decision and impact of crop sowing in agriculture community.

VALUE INDICATORS
Learnings for sharing
Key learning's
- With 100% Crop Booking data, better planning for assessing the requirement of Seeds, Fertilizers, Credit and Storage spaces etc. is possible along with timely procurement of produce from farmers
- With the experiences during Application implementation process, the Dept. is coming up many innovative digital initiatives

Best Practices
- AEOs have been instructed to scrupulously follow the operational guidelines and ensure that every gunta of land cultivated under their jurisdiction is correctly recorded.
- A good data base of the mobile numbers was created while implementing the Agriculture Investment Support Scheme (AISS) which was utilized in sending SMS advisory once before start of the season for getting the area sown by the farmers with agriculture department officers. Once the digitization activity was completed a second customized SMS with the name of the farmer, crop sown and extent

recorded in the system was sent to all the farmers with a request to get the areas rectified in case of any discrepancy.

- The system will randomly pick the records for verification by the higher-level officers. Also, the records will be picked up in such a way that all the villages in a Mandal are covered. A target of 200 records was given every DAO, 300 records each for every Asst. Director of Agriculture and 500 records each for every Mandal Agriculture Officer.
- The records randomly picked by the system was locked for editing until verification process was completed.
- Once the field verification was completed, the Verifying officers was given option in the portal to mark and record as correct and incorrect along with reasons.
- The AEOs were asked to correct the incorrect records marked by verifying officers. Thus, ensuring maximum accuracy of areas entered in online system.
- A total of 3,22,173 farmer records were randomly picked by the System. As on date 4-10-2020 a total of 2,22,887 records were digitized out of which 2,06,487 records were marked as correct and 16,400 records were marked as incorrect (along with reasons). The process is still continuing.
- The farmer wise digitized data was shared with procurement agencies like MARKFED (Greengram etc) , Agriculture Marketing Department (Cotton crop) and Civil Supplies department (Paddy Procurement).
- The digitized data was also utilized by the Directorate of Economics and Statistics, Telangana State.
- GudApps concepts are implemented in the development of the software

Process changes:

- Application workflow process designed and implemented for State, District, Mandal, and Village level Dept. users
- Mobile App has been developed to support the AEOs for easy data capturing process.

Digital Empowerment

- AEOs first download and print the farmer wise survey number wise lists (village wise) from the application and visit the farmer's fields to record the extent of crop. The captured same data will then be digitized in the Crop Area Sown module. This approach is implemented to overcome any network related issues especially in remote villages.
- The SMS sent were in local language Telugu, a language understood by every farmer. The customized message contained the name and mobile number of the Agriculture Extension officer of farmers land jurisdiction. The AEOs received calls from the farmers who had doubts which were clarified by AEOs.
- One SMS was also sent to the farmers where no crop was recorded and if they have missed reporting the crop areas, they were requested to call the concerned AEOs and get the areas entered in the online system.
- Secondly, to safeguard the devices being used for capturing the data right at the farmer's cultivated land

Green e-Governance

- AEOs are the main work force who regularly visits the farmer's cultivated land in their jurisdiction to record the extent of crop sown area using the

Web application and Mobile App provided. This activity allows the farmers absolutely Zero visits to the Dept. for submission of land or crop data thereby saving various expenses as well as time.

- Crop Booking features in both Web and Mobile applications that have been developed for online submissions is very eco-friendly software.

Shri Dr.B.Janardhan Reddy IAS, *Commissioner of Agriculture, Department of Agriculture (Telangana), agriculture.telangana@gmail.com*

Shri. M.A.Masood Khan, *Assistant Director of Agriculture (IT), The Commissioner and Director of Agriculture (Telangana),dda-infocell-agri@telangana.gov.in*

Shri N Suresh Kumar, *HOD & Technical Director, National Informatics Centre (Telangana), sureshkumar.ap@nic.in*

Antyodaya Saral Haryana

Department of IT, Electronics & Communication, Haryana

V Umashankar and Deepak Bansal

PROJECT OVERVIEW

Problem statement and scope identification

Currently, when a citizen needs a G2C service/schemes, he/she faces following problems;

- Where can I get a service because different services/schemes are available at different touchpoints?
- Whom should I contact as no dedicated helpline for queries related to Service Delivery?
- How to fill this form due to complex and non-standardized application form.
- What is the status of my application as there is no mechanism to track the status of the services?
- Why is there a delay in service delivery as RTS Timelines are not adhered to in Service Delivery?

Not only the citizen, government officials are also facing one or other problems like;

- How do I manage applications from multiple sources as Application received in different format from different touchpoints?
- How can I avoid unnecessary public interaction because most of the time is spent in dealing with public in offices?
- What is the status of applications in my department as lack of consolidated data or visibility on the process bottle-necks?
- How many applications are we clearing within RTS because no clarity on compliance of RTS Act by the department.
- What is the citizen feedback for our services because no mechanism is established to get feedback from citizens on delivery of services/schemes?

To address the concerns of both citizen and officials, “SARAL” was conceived with following Objectives:

- All G2C services/schemes on an integrated online platform
- Revamp of all citizen touchpoints across the state
- All G2C services/schemes available on all touchpoints (physical as well as virtual)
- Service delivery within RTS timelines
- Active communication b/w citizens & government
- Better visibility to both citizens & officials

Scope and Objective

There are two main components of Saral initiative; Saral Platform & Citizen Touchpoints. Saral platform consist of five main features, three for citizen 1. Online application submission 2. Online status tracking 3. Proactive status SMS, and two for officials 1. Review dashboard 2. Department notifications.

All G2C services and schemes will be provided across all touchpoints through SARAL which includes Mobiles/Computer at home, Atal Sewa Kendras also known as CSCs in the vicinity, State of the art equipped centres like Antyodaya Sewa Kendra at District level which would be delivering schemes only,

Antyodaya Saral Kendra at all sub division level delivering of services as well as schemes and Saral Kendras at independent tehsils for services only. It has been envisaged that all these centres will have state of the art infrastructure, token system for crowed management, availability of all services at all counters and a help desk to assist the citizen. All these buildings should have modern amenities like AC, water cooler, wi-fi, toilets and waiting rooms.

SARAL implementation is being monitored by Additional Principal Secretary to Chief Minister from Chief Minister Office. Electronics & IT department is providing resources in terms of infra and manpower. NIC has been entrusted the job of development, hosting, implementation, training & support of SARAL. District administration has setup the infrastructure and implemented the project at the service delivery points. Additional Deputy Commissioner has been made nodal from district administration. Social Justice & Empowerment has been made nodal for providing schemes through Antyodaya Bhawans created at each district centres. Two nodal officers one for technical and other one for domain from each department has been nominated for development of services/schemes and operational support.

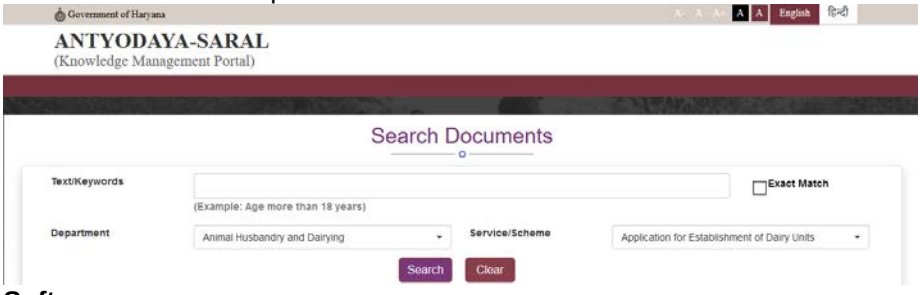
Digital Haryana Cell of Chief Minister Office is overall coordinator of this project along with NIC Haryana and Chief Minister's Good Governance Associates (CMGGA) is coordinating the activities at ground level along with NIC District Cell.

Now as the services/schemes are available at every touch point, the citizen can apply on mobile, ASK and Antyodaya SARAL Kendra. A SARAL call centre has been established which caters as helpline for all queries, complaints & requests. SARAL ensures delivery of services within stipulated time defined under RTS. Full Visibility on application status, which can be tracked online as well as on SMS and through Helpline. We are inline to achieve the Paperless, Faceless & Cashless G2C service delivery.

Current status and project metrics as per date

- Total Districts covered- 22

- Total Number of Schemes - 232
- Total Number of Services – 310
- Total Number of Schemes/Services – 542
- Total Number of Departments onboarded - 39 (Including Boards, Corporations)
- Saral portal- Total 71,60,463 applications received as on Dec 4, 2019 from Saral portal.
- Tracking System- As on date 3,34,98,447 application received, 3,15,19,918 (94%) processed and 2,65,73,961 (79.32%) processed with in RTS limit.
- Number of SMS Sent –In 2020 over 10 crores proactive SMS sent to citizen (From Saral gateway, earlier departments used to send from their own portal)
- Kendras - 117 SARAL Kendras/Antyodaya Kendra/ Antyodaya SARAL Kendras have been made operational. More than 50,000 applications per week are received through these Kendras
- Atal Seva Kendra (CSCs) - 10,000+ CSCs have been enabled to provide all the scheme and services
- e-Token: Token system enabled in all 117 Centres, Avg. tokens per day= 10000, Avg. waiting time= 30 min
- Call Centre Helpline - More than 4000 unique calls are made to the helpline every day which runs with a capacity of 80 people. Avg. Call pickup rate= 70%, Avg. Rating by citizen: 4.2 (max 5)
- e-Ticketing: Total Tickets generated= 1019304, Resolved= 1005367, Resolution rate= 98.6%, Avg. per day tickets: 6000
- IVRS Calls: Average 11 lacs per month IVRS call are made to citizen. Average ratings given by citizen is 4.3 out of 5.
- KMS: Average visitors' rate is 3000 per week
- (KMS system on Saral Haryana in Public domain for transparency of fees, attachments and other application requirements)
- SMS: 10 crores proactive SMS sent to citizen



Software

To implement SARAL in a very short time, a configurable scalable system was required with collaborative development environment, 24x7 support and very less development cost. NIC developed solution ServicePlus was found suitable for this work, which offers online configurable platform on which workflow based services can be developed in a collaborative environment which is scalable and requires no special expertise of any language or IDE and no high end client m/c. ServicePlus is developed in Java and uses PostgreSQL as backend. Apache Tomcat has been used as application server. In house applications e-token(for queue management), e-ticketing for grievance

management and dashboard reports for analytics were also developed.

Cyber Security

Cyber Security Division, National Informatics Centre, A-Block, CGO Complex,Lodi Road, New Delhi - 110003
(Ref ID:NIC/CSD/IA/11471)

Disaster Recovery and service continuity

The site is hosted on Meghraj cloud at Shastri Park Data Centre whose DR site is at PUNE.

Two database server configured for high availability and two application servers and two report servers are on load balancing.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
SARAL Services / Schemes (*List of all schemes & services enclosed as annexure-A)	Schemes are those where government provides benefits in terms of cash or kind to the citizens and in services government provide some authorization to the citizen like approvals, licenses, certificates etc	229	526	542

Implementation

Implementation Coverage achieved in comparison to the plan / target

The main motive of SARAL was to provide all G2C services/schemes to all touchpoints whether virtual or physical. These touchpoints are online portal/mobile app, Atal Sewa Kendras (10000+), Antyodaya Bhawans at each 22 district centers (only schemes), Saral Kendra at each 22 district centers (only services), Antyodaya Saral Kendras in remaining 71 sub-divisions & Tehsils (Schemes & Services both). We have been able to achieve the targets.

Online portal/mobile app: Saral portal (saralharyana.gov.in) has been developed & deployed for citizen and officials. This portal provides both front end and back end functionality. The citizen or kiosk operators can apply for any service or schemes at this portal and officials uses this portal to process the application. This portal also provides tracking facility.

Atal Sewa Kendras: Also known as Common Service Centre (CSC) based on PPP model and run by VLEs (Village Level Entrepreneur). More than 10000 such ASKs are running in the state and providing G2C services apart from other B2C services.

Antyodaya Bhawans: Government wants to give benefits of schemes to the last mile person who is very poor, doesn't know about the government schemes and also doesn't know from where he can get those schemes. Keeping this in mind government has newly setup Antyodaya Bhawans at district headquarter level to offer all schemes under one roof at this center. Helpdesk has been setup at these bhawans for such people to not only tell the schemes available for them based on their eligibility but also helps to apply for the schemes. These centers are managed by Social Justice & Empowerment Department.

Saral Kendra/Antyodaya Saral Kendras: 22 saral kendras have been revamped to state-of-the-Art centres at each headquarter which offers services to the citizen. 71 Antyodaya Saral Kendras have been revamped at remaining sub-divisions and tehsils which offers both schemes and services.

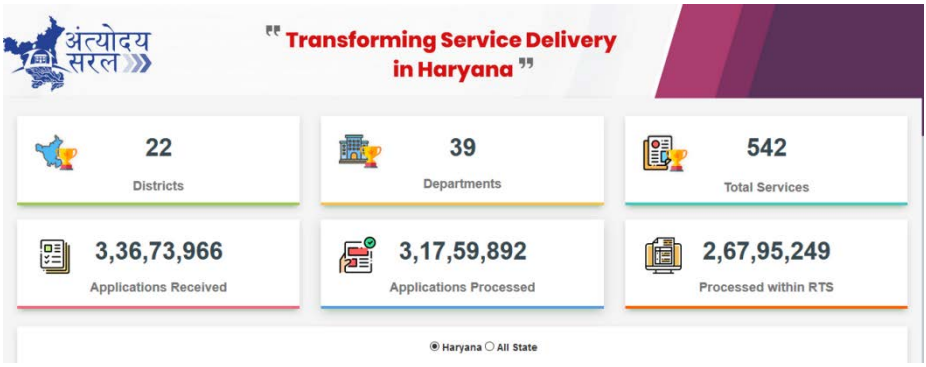
Stake Holders: SARAL is planned and monitored by Chief Minister's Office along with Digital Haryana Cell. Chief Minister himself showing keen interest for implementation of SARAL project and convened two meetings of administrative secretaries to make this project success. APSCM taking fortnightly review meeting of all stakeholders and pushing this project very hard through NIC & District Administrations. ADC has been made nodal for implementation in districts with the help of NIC district centers and CMGGA.

Tollfree Helpline (1800-2000-023): An 80-seater tollfree helpline has been established operating Monday to Saturday from 8:00AM to 8:00PM to answer citizens queries and get resolve their grievances through e-Ticketing system

Whatsapp: This tool is extensively being used for monitoring, instant resolution and information dissemination by the officers/officials and operators. More than dozen such groups are active at state levels, division levels & district levels

IVRS calls: Automated IVRS calls are made to citizens twice, once at application submission and another after delivery of the service to get their feedback.

Public Dashboard: A public dashboard has been provided where each service, district and department's performance are displayed through charting and tables.



(Real time public dashboard view)

Mobile App: An Antyodaya Saral Dashboard mobile app has been made available at play store which are being used by Citizen as well as officials for dashboard reports and tracking of application

SMS/emails: Proactive messages are sent through SMS and emails on registered mobile no. and email of the citizen on each steps of processing of their application

Service Level Agreements: Focus is to deliver services in-time, RTS timeline have been notified under RTS Act – 2014 for most schemes/services included in Saral platform and being closely monitored by HODs & CM Office to improve service delivery.

Reviews and Monitoring: Antyodaya Saral is planned and monitored by Chief Minister's Office. Chief Minister himself has keen interest for effective implementation of this project and convened multiple review meetings with relevant stakeholders to make this project a success. PD CMGGA takes regular review meeting of all stakeholders and pushed this project through Administrative Secretaries, Deputy Commissioners & NIC.

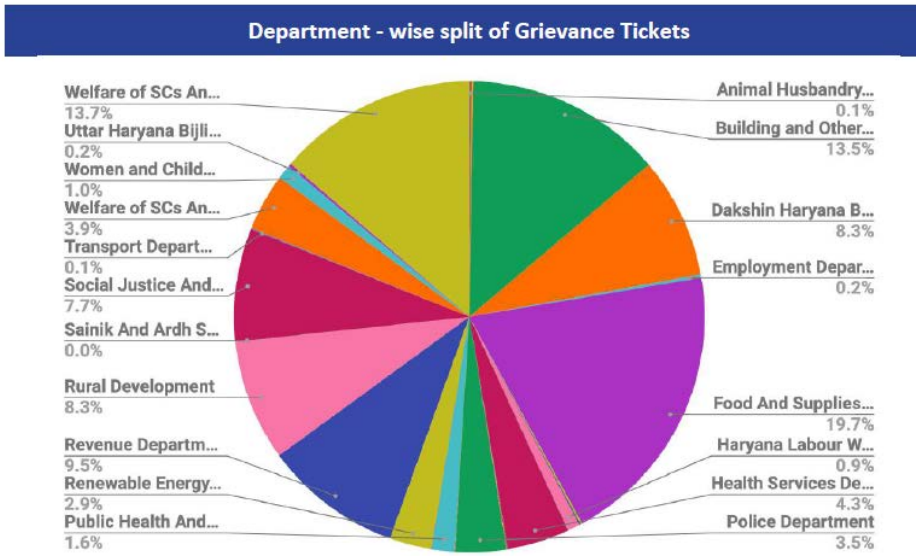
RTS performance of the Departments is as follows (1/2)

Department	Number of applications received	Total Completed applications	Completed applications		Total Underway Application	Underway applications		Rejection (%)	AS Score June 2020	AS Score July 2020	AS Score Aug 2020
			Within RTS timeline(%)	Outside RTS timeline(%)		Within RTS timeline(%)	Outside RTS timeline (%)				
Science and Technology Department	48	0	0%	0%	48	100%	0%	0%	10.00	10.00	10.00
Employment Department	59,992	59,992	96%	4%	0	0%	0%	21%	2.90	9.90	9.90
Public Health And Engineering-PHED	12,98,337	12,94,661	99%	1%	3,676	98%	2%	1%	9.50	9.10	9.80
Sainik And Ardh Sainik Welfare	48	19	89%	11%	29	100%	0%	47%	10.00	9.50	9.70
Fisheries Department	5,021	4,811	88%	12%	210	100%	0%	35%	9.40	9.60	9.60
Board of School Education Haryana	14,626	14,356	89%	11%	270	99%	1%	4%	7.80	8.60	9.60
Horticulture Department	19,246	18,270	96%	4%	976	94%	6%	2%	9.60	9.70	9.50
Food And Supplies Department	38,00,739	37,72,665	92%	8%	28,074	94%	6%	14%	8.50	8.40	9.30
Social Justice And Empowerment	11,62,165	11,40,895	82%	18%	21,270	97%	3%	28%	9.10	9.00	9.30
Revenue Department	70,07,235	69,82,588	98%	2%	24,647	86%	14%	2%	8.80	8.90	9.00
Haryana Scheduled Castes Development Corporation	2,006	1,269	84%	16%	737	88%	12%	54%	2.80	6.10	8.70
Uttar Haryana Bijli Vitran Nigam-UHBVN	8,85,799	8,61,983	86%	14%	23,816	87%	13%	20%	9.10	9.10	8.70
Dakshin Haryana Bijli Vitran Nigam-DHBVN	11,02,296	10,75,042	85%	15%	27,254	87%	13%	30%	8.50	8.80	8.60
Renewable Energy Department	1,40,323	98,200	90%	10%	42,123	81%	19%	4%	8.00	8.10	8.40
Printing And Stationery Department	809	804	90%	10%	5	80%	20%	14%	7.20	9.70	8.30

(Department Performance review on dynamic input bases KPI's and Saral formula for RTS service delivery)

Ticketing Performance of the Depts is as follows (1/2)

Tickets Pending On	Total Grievances	Resolved	Unresolved	Resolved		Unresolved		Reopened	Ticketing Score May 2020	Ticketing Score June 2020	Ticketing Score Aug 2020
				(< SLA)	(> SLA)	(< SLA)	(> SLA)				
Animal Husbandry and Dairying	91	90	1	81	9	1	0	0	7.50	7.50	9.70
Women and Child Development Department	549	546	1	462	84	1	0	2	7.50	9.60	9.50
Haryana Forest Department	33	32	1	26	6	1	0	0	7.20	9.30	9.40
Printing And Stationery Department	17	16	1	13	3	1	0	0	7.30	7.30	9.40
Agriculture Department	407	405	2	325	80	2	0	0	7.30	7.30	9.40
Social Justice And Empowerment	7972	7,946	16	6,196	1,750	16	0	10	9.30	9.30	9.30
Haryana Backward Classes Kalyan Nigam	266	265	1	147	118	1	0	0	8.60	6.50	8.70
Food And Supplies Department	13074	13,039	33	6,999	6,040	32	1	2	6.80	8.00	8.40
Welfare of SCs And BCs	7130	7,106	13	4,579	2,527	12	1	11	5.10	8.90	8.40
Charitable Endowments	1	1	0	1	0	0	0	0	7.90	7.90	7.90
Public Health And Engineering-PHED	1060	1,041	19	678	363	16	3	0	8.80	8.90	7.80
Haryana Labour Welfare Board (HLWB)	5354	5,349	5	3,828	1,521	4	1	0	7.40	9.10	7.70
Renewable Energy Department	389	379	10	347	32	7	3	0	9.80	9.80	7.60
Haryana State Ind & Infrastructure Development Co	18	18	0	15	3	0	0	0	7.40	7.40	7.40
Health Services Department	3712	3,610	88	1,977	1,633	71	17	14	3.70	6.00	7.30
Science and Technology Department	7	7	0	5	2	0	0	0	7.00	7.00	7.00
Urban Local Bodies	2060	1,996	60	1,416	580	41	19	4	9.10	8.80	6.90
Housing Board	39	34	5	13	21	4	1	0	1.10	8.10	6.70
Horticulture Department	141	141	0	84	57	0	0	0	6.70	8.80	6.70

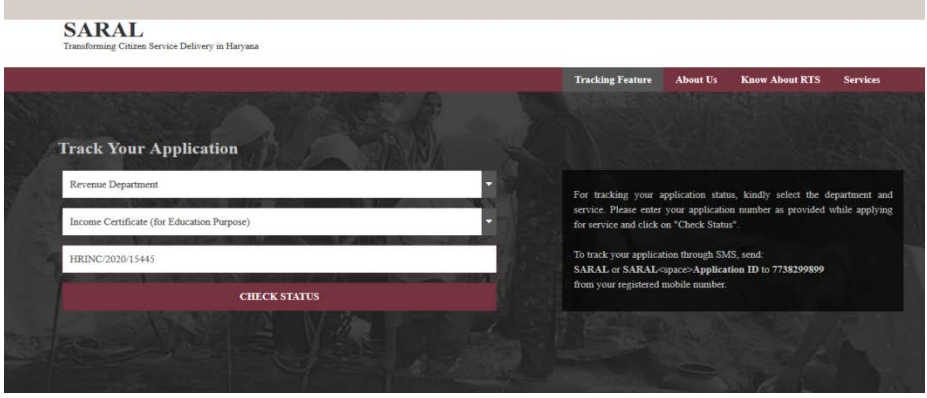


Improvements/enhancements specifically planned out during next one year

SARAL was initially launched on the Digital Haryana Summit in September 2017 by Honb'le minister of IT Sh. Ravi Shankar Prasad in which Online status tracking of 134 services, Proactive status SMSs of 134 services and Service Delivery Dashboard of 10 departments were made available.

Another launch took place during the Good Governance day on 25th December 2017 by Chief Minister Haryana in which 106 services of 15 departments at five pilot locations were made live.

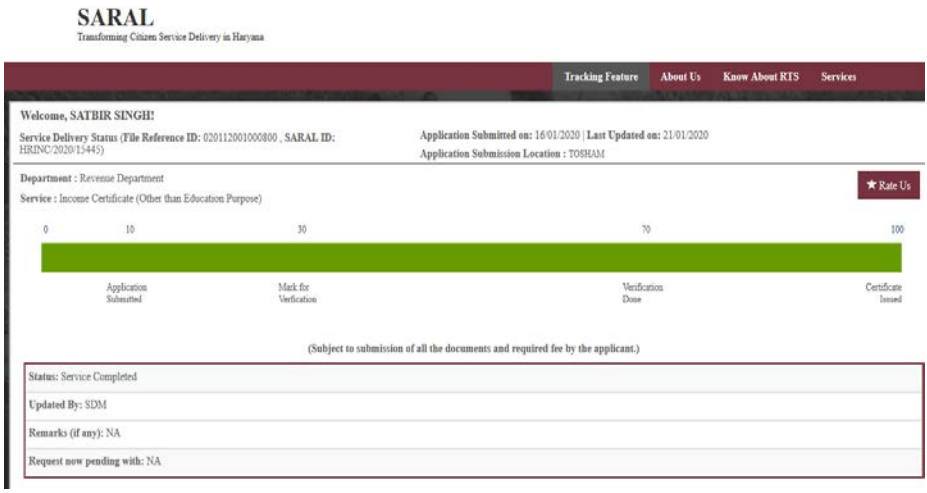
On 14th April 2018, 7 Antyodaya Bhawan with an aim to deliver 180+ schemes were inaugrated by the Chief Minister Haryana which facilitated online status tracking of 300 services, Proactive status SMSs of 300 services, Service Delivery Dashboard of 21 departments, Online applications submission of 287 services. By that time SARAL Helpline was made operationalized and Public Service Delivery Dashboard made available to HoDs.



A mega launch was done by Honble CM Haryana on 25th December 2018, on Good Governance Day with following facility :

- Online status tracking – 500+ services
- Proactive status SMSs – 500+ services
- Service Delivery Dashboard – 39 depts
- Online applications – 500+ services

- Antyodaya Saral Kendras – 117+
- 80 seater SARAL Helpline



(Glimpse of Realtime public tracking feature of Saral)

We are planning to identify more services and schemes which ar left in the departments and can be incoporated in the Saral. Our target is to deliver every service/scheme of all the govt departments in B2C cloud. This taget can lead to expansion on 600+ services/schemes.

Also, we are expanding Saral on Voice base mobile App search and more tools of transparency and automation.

ENABLER

Processes Re-engineered

- Availability of services at all touch points
- Simplified uniform look and feel of the services everywhere
- All services/schemes under right to service act
- Uniform fee across state for each service
- Acceptance of application from all touch points
- Acceptance of scanned documents submitted along with service request
- Delivery of services from all touch points
- Notifications to user at different stages of service delivery through SMS/e-mail.
- Minimization of department walk-ins.
- Government fee payments through eGRAS system
- Introduction of e-Token system for crowd management at all physical touch points; each e-token carries service information along with fee details and enclosures to be attached.

(Realtime crowd management system implemented for ease of citizens across all Saral Centers and to curb the touts and agents)

Technologies

For SARAL, a tool was needed which supports

- Service delivery architecture
- No dependency on OS platform, IDE, languages etc.
- No dependency on hardware
- Rapid development
- Scalable
- Accessibility from anywhere, any time
- Integrated with Digital India components like CSC, payGov, DigiLocker, eSign, Aadhaar authentication, Rapid Assessment System (RAS)

All above features found in a single solution name "ServicePlus" developed by National Informatics Centre and available free of cost along with support of strong technical team of NIC.

People

Development of 500+ services for 39 departments in a very short span of time was a very difficult task to accomplish. A strategy has been made to do in-house development of services and make department accountable for their services. Each department has been categorized in four levels; L0 – Totally offline, L1- Backend exists, L2- back end along with workflow, L3- Saral ready. Each department was capacity was identified, the departments with no capacity were taken up by NIC Haryana and the department with in-house capacity or departments which have engaged external agencies were made part of team. By this a strong team of 150+ technical professional was created which were imparted the training on SARAL service configuration. A state NIC cell of 5 officers has been created to coordinates with departments and NIC HQ team. No extra manpower/hardware were hired or purchased by the departments.

- Chief Minister has taken various meetings of administrative secretaries and review of DCs through video conferencing.
- APSCM's close monitoring of every aspect of the projects and fortnightly meetings of departments HoDs & nodals to push for early development of services. (DHC)
- SIO took weekly meetings of NIC Delhi, NIC Haryana & Digital Haryana Cell team to remove any bottlenecks being faced technically.
- DHC in close coordination with NIC coordinators, have coordinated the development, implementation & capacity building activities. More than 15 workshops have been organized for departments & in-house professionals.
- At ground level NIC District Units and CMGGA carried out capacity building program. First, they have been imparted a training by State NIC team and later they have provided training to officials, operators & VLEs.
- Each department carried out training for their officials themselves.

VALUE INDICATORS

Learnings for sharing

- This project is one of its kind where all departments were working together and were involved from service definition to final service delivery and best of all departments have ownership of their services.
- In-house driven development, wherever departments have capacity they did it in-house or NIC developers helped to get it developed.

- Selection of solution for rapid development in collaborative environment and strong technical architecture with scalability. Our search ended up ServicePlus developed by NIC HQ and supported by a strong technical team free of cost. Best thing it requires no IDE or software to develop a workflow-based service, one can do it over internet after registration even doesn't requires proficiency on any languages.
- Very low-cost solution as it required no additional hiring of developers and purchase of hardware.
- Timely delivery of services by working day and night as a cohesive team which consist of around 150+ developers of 39 departments.
- A service delivery dashboard made available to department HoDs and DCs along with leadership index based on RTS compliance to make healthy competition among departments. This dashboard is being used in review meetings by the Chief Minister and administrative secretaries.
- State of the art centers has been created/revamped with separate airconditioned service area and waiting area and all services made available at all counters.
- E-Token system has been implemented for crowd management. A token carries information of the service to be availed along with fee, max delivery time defined under RTSA and documents required for this service.

Digital Empowerment

As Haryana is a small state and has no noticeable difference in language, demographic & culture but yes, government wanted to give benefits of schemes to the person standing at the last and have no knowledge of schemes and how & where to avail it. For them, government has newly created Antyodaya Bhawans in all 22-district headquarters where full information of schemes are given based on their eligibility. An app has been developed to know the eligibility based on some parameters and provided to helpdesk operators. These operators also help them in applying for a scheme.

Green e-Governance

Do away the physical file movement; documents are scanned and uploaded with the application and officials process the files based on those digital files.

Shri. V Umashankar, IAS*, Department of IT, Electronics & Communication, Haryana, officeofapscm@gmail.com*

Shri. Deepak Bansal, *State Informatics Officer, NIC, National Informatics Center, Haryana, sio@hry.nic.in*

Ente Jilla (My District)

National Informatics Centre, Kerala

T. Mohana Dhas and Andrews Varghese

PROJECT OVERVIEW

EnteJilla (My District) is a simple yet complete mobile app which provides information about Govt. offices and organizations in all districts of Kerala. Objectives of the app is to make all govt. offices most available to public by providing their contact information such as address, contact numbers, geo location in Google map and additional officers contacts. In addition to that, a registered user can rate and review any office based on their personal experience. This in turn gradually improves the services provided by govt. institutions in a healthy race to keep their rating higher by providing citizens better, faster and quality services. EnteJilla is available in Google Play store since February 2019 with a total download count of more than 7700 as of now. EnteJilla right now is packed with features such as, public self-registration to home district, list of departments & offices in the district, search offices, get contact information and geo location of Govt. institutions, rate & review offices and services offered, top 10 events in the district, latest public reviews, from Collector's desk, grievances to Collector, links to pay utility bills online, easy switch to any other district.

Software environment

- *Application Server:* RHEL version 7.7
- *Web Server:* Apache
- *APIs :* PHP 7.1.6
- *Database:* PostgreSQL 10.2
- Periodical software stack update happens based on NIC version tracker release

Cyber Security

- *Audit conducted by* Application Security Division, National Informatics Centre, New Delhi
- *Audit Clearance date:* 02.02.2019
- *Security certificate validity:* 2 Years
- *Security certificate no:* NIC/CSD/IA/15353
- Periodical PEN test and incremental audit are conducted by NIC State App Security Division

Disaster Recovery and service continuity

Replication database server is in place with near to real-time data replication. In case of master failure, the slave takes over as master so the service remains uninterrupted and continuous. Near DR Facility in place. Far DR, state government is in technical consultation with NDC New Delhi and Bhubaneswar.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Information Service	The Offices listed in the App		6012	5682

API integration with eGovernance Services			1	1
Total number of downloads			4090	3610

Implementation

All functionalities intended are implemented and made available to the targeted users. All fourteen districts of Kerala are on-boarded on the app. App development of iOS version is completed and is ready for App store distribution. The official launch in 7 districts has been done and the remaining 7 release is in progress. A state level release is expected in November 2020.

The expected users of the app is over 1 Lakhs by January 2021 after the state level release of the mobile app.

The next mile stone set are as follows

- Information and guidelines to apply for services offered/ certificates issued by offices/departments
- Integration of e-Application
- Facility to push notification in a classified format such as SOS, emergency alerts, information, and general announcements
- Real time data update with API integration for department/office details so that no stale data is served by the app
- Sustainability of the application depends on the service to the public with accurate and correct information. About 90% of the eGovernance services of the state are from NIC and hence the eGovernance applications are to be integrated with Ente Jilla to facilitate real time availability of data from other legacy applications.

ENABLER

Processes Re-engineered

By empowering public to directly contact and follow up the requested services from Govt. institutions, the conventional way of apply for service and wait till action will be taken is ended which in turn improved the overall performance of Govt. offices. The rate and review feature provided to general public triggers the offices to perform well to maintain their overall office performance rating.

Technologies

Since the mobile app development technologies drastically emerge, the app development is always benefitted with the help of shared pool of knowledge available online. Google map location pins are integrated in the app to locate all Govt. institutions. Independent channels in social media platforms like YouTube promoted the app with introductory and helper videos

People

The then District Collector, Kannur District conceptualized an app called We are Kannur which was a big hit in the district. With the popularity received by this app, it was taken up for state-wide roll out under the guidance of DDG & SIO NIC Kerala and with the utmost support from Kerala Chief Minister's Office as well.

Since the app is intended for the public, it was made as simple as possible for a layman to understand the concept and use the app without much support or help documents. There are many independent YouTube videos promoting the app to help the needy.

VALUE INDICATORS

Learnings for sharing

Clarity in the concept, strict planning and time bound execution of action plans

are key factors in success of any project. Sticking to software architecture, design and development guidelines considerably increases the standards of developing software. Maintaining source code and database versions for major and minor milestones prove beneficial. Integrating legacy applications information services with the mobile app through APIs could only be done because of sticking to LGD and other metadata standards.

Digital Empowerment

Ente Jilla is a generic informative app helping public reach out to Govt. institutions for assistance. This empowers public to get their work done without having to visit offices multiple times. Public can rate and review offices based on services received which ensures time bound and quality services from Govt. institutions. The review, grievances and complaints are bilingual (Malayalam and English) catering to 100% of Kerala population. This app is capable of catering to multilingual society as the backend is purely Unicode compliant.

Green e-Governance

This is a simple mobile app running on smart phones without any need to have additional gadgets or infrastructure. Hence, this produces zero e-waste. The rate and review, grievances and complaints features allow public to submit their praises and concerns to District Collector directly through the app reducing the usage of papers as well as a humble green governance initiative.

Shri T. Mohana Dhas, *DDG & SIO, National Informatics Centre (Kerala), sio-ker@nic.in.*

Shri. Andrews Varghese, *District Informatics Officer, Kannur District, National Informatics Centre (Kerala), kerkan@nic.in*

Jansunwai - Samadhan

Chief Minister's Office, Uttar Pradesh

S P Goyal, Surendra Singh and Hemant Arora

PROJECT OVERVIEW

Objectives

To provide a transparent integrated monitoring tool and tracking system for redressal of all type of grievances received through various existing platforms like CM Helpline, CM Office (Janta Darshan), DM/ SP/ other field officers/ Samadhan Divas, GOI , CSC/ Lokvani Kendra, Departments etc. on a single platform.

Citizen Perspective:

- Increase the trust of citizen on Government by providing quality resolution of grievance with in the defined timeframe
- Reduce the cost (Direct cost and Time, Travel & Opportunity costs) of filling grievance

Public Servant Perspective:

- Reduction in effort and time required for management and redressal of grievance at all levels of UP Government
- Enhance the focus of public servants on resolution of grievance by offering rewards and recognition
- Provide input in policy making for reduction in region or domain specific grievance

Unique Features

- Integrated Single Platform
- E-forwarding: a 'green' initiative to speed up the process and also save paper, as per UN Sustainable Development Goals
- Action Taken Reports (ATRs): Respective officer takes action on grievance and submits ATR on CMIS portal
- Mobile App for applicants as well as for Officers
- Monthly performance Reports of Officers for healthy competition
- Feedback mechanism: Revival of complaint if feedback found logical

Functional and Geographical Scope

- Offices of Principal Secretaries/ Secretaries
- Offices of Head of Departments/ Ayog / Parishad/ Nigam etc.
- Commissioner offices
- IG/DIG Offices
- DM Offices
- SSP/ SP Offices
- Universities
- Development Authorities
- Municipal Corporations
- All departments district /Tehsil /block /Thana level offices with ICTfacility

Key Stakeholders

- Citizens- Actual beneficiary of the system
- Departmental offices at state head office, Commissionaires, District, Tehsil and so on…
- Officers dealing with public grievances
- CM Office owner and initiator of the project

- Department of IT&E, Uttar Pradesh for issuance of necessary guidelines, training support.
- National Informatics Centre (NIC) for development and evaluation of web based software
- Ministry of Electronics and Information Technology (Meity), GOI for hosting support, expansion
- Secretariat Administrative Department (SAD) for state funding
- CM Helpline Call Centre

Intended benefits

- Speedy redressal of grievances
- System generated correspondence letters and SMS Alert
- Feedback of complainant regarding disposal of grievances
- Continuous betterment of redressal process through integrated Database
- Minimize corruption
- Facility to view status and details of nodal officers handling grievances
- Increased citizen morale and satisfaction
- Single Web portal for the grievances received through all channels
- Efficient and effective monitoring of grievances.
- De-duplication of complaints by tagging up duplicate references
- Improved efficiency of Government departments
- Convenient online lodging and monitoring of grievances

Current Status

- Complaints from all sources such as Grievances at CM Helpline, CM Office (Janta Darshan), DM/ SSP / Commissioner/ IG/ DIG, Cm Relief Fund, Anti-Bhumafia Portal, Anti-Corruption Portal and other levels or Departmental Office are available on a single platform which will improve access, redressal & monitoring.
- Lodging of manual grievances with facility of uploading scanned Grievance related document(s) is also available. This scanned document can be seen at all levels wherever the grievance will be forwarded.
- All grievance details get stored in centralized IGRS system. Grievance gets routed on the basis of category and department to the concerned officers. Respective officer can dispose the reference at his own level or can forward the references to his subordinates for action.
- Grievance cell, Sr. Officers can monitor the redressal of grievances using IGRS portal. Officer provides approval on action taken reports for references marked to subordinate officer.
- Redressal of grievance gets available on IGRS portal. Complainant can access redressal through web portal or mobile app.
- Complainant can submit feedback on disposed complaint online and feedback on disposed complaints can also be received through call centers. Complainant can rate the redressal of grievance on scale of 1 to 5 and can also give feedback description for their complaint.
- Action on negative feedback is mandatorily acted upon and reviewed by officer one level higher. (Note - if no action is taken within 15 days, the reference is automatically revived). Submission of ATR for disposal of complaints having un-satisfactory feedback is mandatory.
- Through grading option, an officer can take action on complainant's feedback and improve the quality of disposal as well. If senior officer

finds the disposal of grievance insufficient/not satisfactory, then he/ she can revive the disposed complaint.

Some of the recent activities are as follows

Covid-19

Health Related

- Registration of health related complaint through Helpline CRM application. Complaints were logged by Covid-19 patients themselves or by others like neighbour, relative etc.
- MIS Reports & Dashboard for Covid -19 with drill down from state to complaint details for monitoring by officers.
- Reports for Covid -19:
- Covid-19 Report – Data received directly from complainant / corona patient.
- Information received from Gram Pradhan.
- Surveillance/ Enquiry regarding health from corona patients through CM Helpline.
- Feedback from Patients in Home Isolation and Hospital Isolation through CM Helpline and action is taken by DM on an urgent basis in case of negative feedback.

Nigrani Samiti

Nigrani Samiti is a community organization that provides Covid-19 information. Asha Bahu, Aganwadi Workers, Sachiv Lekhpal, Gram Pradhan etc are the members of monitoring committee (**निगरानीसमिति**)**.**

Development of modules for complaints related to Lockdown:

- Registration and Feedback (disposed lockdown complaints) of Complaints through CM Helpline (1076) / Mobile Application for various issues in 21 categories such as Ration, Medicine, Financial Assistance, Sanitization, etc.
- Feedback from Students returned from KOTA, Patients, Migrants, etc.
- Disposal and ATR submission from concerned officials.
- SMS on approval and rejection of '**प्रवासीपंजीकरण**'
- Bharat Map Integration.
- Dashboard & MIS Reports.

E-Pass &Migrant Movement

- E-pass Generation for Migrant workers who wanted to return to Uttar Pradesh and for those who are in Uttar Pradesh and wanted to return to their native places (other states).
- Transport Arrangements (Trains & Buses) were made through effective planning through the portal for migrants to move to their respective destinations conveniently.
- Calls to get information related to Shelter Home, Quarantine Rules etc. for migrants coming to Uttar Pradesh from other states.
- Tracking of e-pass application through portal and app.
- Skill mapping for migrant workers who have returned from other states during lockdown and this mapping will help them getting work near to their places.

Feedback from Beneficiaries through CM Helpline:

- Feedback for Dialysis: feedback is obtained from patients through CM Helpline regarding charges and treatment.

- Feedback for CT scan and Ventilators from patients through CM Helpline.
- Feedback from farmers growing paddy crops.
- Feedback received by CM Helpline for Food supply and other problems arisen due to Covid-19.

MIS Reports & Dashboard for Covid-19: Dashboard with drill down from state to complaint details was also provided on officer's login for better monitoring and fast disposal of references.

Random Quality Check module: Inspection and re-rating of disposed complaints on random basis by higher authorities, Final decision on proposals of complaints with satisfactory feedback and disposal quality check for finally disposed references with C-type feedback by higher authorities.

Digital Signature Implementation: This feature enables the officers to register their DS on IGRS Portal, approve and verify action taken reports directly through digital signature.

Statistical Data:

- More than 25.9M complaints have been registered through Samadhan Portal, out of which 25.6M complaints has been disposed through the portal.
- Total of 53149 health related complaints were lodged by Covid-19 patients or by others like neighbours, relatives etc.
- 145963 calls were placed to Nigrani Samitisin order to receive information about Covid-19.
- During Lockdown, a total of 814055 complaints were registered through CM helpline (1076)/ Mobile application for various issues such as Ration, Medicine, Financial assistance, Sanitization etc.
- Total of 8684 feedback was taken from students who returned from Kota to their homes (Uttar Pradesh).
- Total of 494331 registrations for migrant workers from Uttar Pradesh who wanted to return to their native states.
- Total of 1242911 registrations by migrant workers who wished to return to Uttar Pradesh.
- Mobile Application:
- App for Citizens: More than 1 Million downloads by citizens from Google Play Store.
- App for Officers: More than 1 Lacs downloads by officers.

Software

Web Application

- Programing Language: Java 8 with framework Spring Boot, Hibernate, REST APIs
- Databases: RDBMS Postgre SQL 12 and NOSQL Database MongoDB 4
- Development Tools: Spring Tool Suite 4 with Maven 4, PG Admin 4, PG Agent MongoDB Compass 1.21.2
- Dashboard Charting Tools: Google Charts API
- Application Server: Apache Tomcat 9
- HW environment cloud resource at Meghraj

Android App

Android based mobile app developed on API level 16 supporting Android OS Jelly Bean to ANDROID 10

- Scripting Language: Javascript, jQuery 3.3.7
- Programming Language: Java 8 with Android SDK (Native Application)
- Native Database: SQLite
- Development Tools: Android Studio 4.0.1 with Volley library

Cyber Security

Security audit is done time-to-time by third party cert-in empaneled agency under the guidance of NIC IGRS Team.

Disaster Recovery and service continuity

- Data is maintained at Government of India's cloud server 'MEGHRAJ' with DR facilities.
- Local back-ups at regular intervals &replication to avoid disaster

RESULTS INDICATOR

Information

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Complaint Registration	Applicant can register his/her complaint online via website / mobile app	6240320 (6.2M)	8765592 (8.8M)	2906999 (2.9M)
Tracking of Complaint	Applicant can track his/her registered complaint online	18720760 (18.7M)	26296800 (26.3M)	8139597 (8.1M)
Sending Reminder against Complaint	Applicant can send online reminder if complaint is not resolved within Time.	182065 (0.2M)	249398 (0.3M)	91684 (0.1M)
Feedback after Disposal	If applicant is not satisfied with disposal report, then he/she can give online feedback.	3836515 (3.8M)	6854008 (6.9M)	860161 (0.9M)
Covid-19 Health related Complaints	Complaints lodged by Covid-19 patients or by others like neighbors, relatives etc.			53149
Covid-19 related calls for Health Information	Nigrani Samiti that provided Covid-19 information on calls			145963
Lockdown Complaints	During Lockdown complaints received through CM helpline (1076) / Mobile application for various issues such as Ration, Medicine, Financial assistance, Sanitization etc.			814055
Feedback from KOTA Students	Feedback from students who returned from Kota to their home			8684
Registration for Migrant Movement	Registration for migrant workers from Uttar Pradesh who wanted to return to the state			494331 (0.5M)
	Registration for migrant workers for those who were in the state and wanted to return their native places			1242911 (1.2M)
Mobile Application	• App for Citizens: More than **1 Million** downloads by citizens from Google Play Store. • App for Officers: More than **1 Lacs** downloads by officers.			

Implementation

Implementation Coverage achieved

The system was developed, departments were consulted, and system was redesigned after these consultations so as to meet requirements of all departments. A very systematic plan was made to train the vast work force (around 50,000) which was supposed to work on this new system. Detailed user manuals and videos explaining the process of working were made available on the portal itself to facilitate users. Intensive monitoring was done so as to make the system get going. Repeated reminders through various letters were sent to concerned authorities. Regular Video conferences by Chief Minister were taken to keep the process on track.

As proposed, more than 30,000 officer logins has been created and working successfully at various levels of U.P. Govt. Around 95 departments, 232Directorates, 75 DMs, 73SSPs/ SPs, 2 Commissioner level login and several other users at various levels such at division level, district level, tehsil, thana and block level, university level, development authorities, nagar panchayat/ palika level etc. has been covered under this platform as targeted initially.

Moreover, there is provision of 100 percent feedback system i.e. on every complaint feedback has to be taken either through website/app or by calling to applicant through CM helpline

Improvements / Enhancements

- Improvement of Monthly ranking on various parameters for effective and timely disposal and to make the officers more sensitive towards public grievance.
- Quality testing Module has been developed from the highest level of administration to ensure qualitative and satisfactory disposal. Random Quality check module for quality check of disposed applications received from various sources - CM complaints, CM Helpline complaints, Online complaints, DM references, PG portal and Tehsil Diwas.
- Poor quality disposal will lead to action against disposing Officer/Office.
- During Covid-19 pandemic, E-pass module for Citizen, migrant labour registration, dedicated complaint system for Health, food supply and other problems arisen due to Covid-19.
- Dedicated Feedback module for Covid-19 patients/suspects who has been admitted to Covid-19 Centers/ Hospitals regarding medical facilities and other facilities. Using this module feedback from Nigrani Samiti at Gram panchayat Level, skill migrants, students returned from Kota to their home and Gram Pradhan was received through CM helpline.
- Standard Operating Procedures are to be integrated in the portal for specified resolution procedures and also to bring uniformity in reporting.
- Implementation of Digital Signature to all officers for submission of ATR, disposal and approval purposes
- Various monitoring reports were added in the system such as - Lockdown category wise report, Lockdown District report, Report on Kota Students, Report on Migrant Movement and several other reports as per the user requirement.

Future Plan

- Social Media (Facebook, Twitter etc.) will be linked through the IGRS for compliant making and status update.

- Analytical report based on the MIS generated from the IGRS data will also be facilitated through this system
- Geotagging (adding geographical information) & photo uploading facilities for uploading photos by the officer at the time of grievance redressal
- Samadhan Divas (Thana Divas)
- Call Centre/IVRS - IVRS based complaint registration and status update
- Other Systems as per user requirement
- Development of Mahila Help Desk Module
- Chatbot using AI technology

ENABLER

Processes Re-engineered

Earlier Grievance Redressal Systems were isolated, running on different platforms and had no interlinking. At state level CM Office had their own grievance redressal system at CM Office (Janta Darbaar) while in Districts, District Magistrate Office have "Jan Sunwai". Similarly, Tehsil Diwas was being organized in the Districts to resolve the grievances at tehsil level. Departments interacting with citizens had their own mechanisms to deal with grievances such as office of the Principal Secretaries, HoD's, Call Centres (Jan Suvidha Kendra), Lokvani, Helpline etc. Grievance redressal process was non-transparent and citizens had no clue of the resolution provided to them. Redressal process was "Black Box" for citizen. Almost impossible for concerned officers to track and monitor the redressal because of large number of grievances received through different channels/ web portal/ platforms. Indifferent attitude of some of public servants on citizen grievances also causes problem. Lack of transparency sometimes leads to improper practices. Person based grievance redressal system - Acceptance of / action on grievance is at discretion of receiving officer.

The existing system – Integrated Grievance Redressal System (IGRS) aims at redressal of all type of grievances received through various existing platform like CM helpline, CM office (Janta Darshan), DM/ SSP/ Commissioner/ IG/ DIG/ Samadhan (Tehsil) Diwas, GOI (PM/ President Office), CSC/ Lokvani Kendra, CM Relief Fund, Anti-Bhumafia, Anti-Corruption etc. on a single platform. A citizen can freely and conveniently register a grievance, track the grievance lodged on this platform and receive response to his satisfaction both in terms of quality and time. Along with lodging of complaints, citizen can also interact with Government Departments/Offices in an easy and transparent manner. Citizen can also send reminders for grievances crossing SLA timelines & Feedback regarding disposal of grievances.

Complaints from all sources will be available on a single platform to all departments which improves access, redressal & monitoring. The nominated nodal Public Grievance Officers (PGOs) from Departments of State Govt. are provided with a user-id and password to access the system.

Following the E-Governance mandate, the above mentioned facilities were also made available on mobile phone through an Android app. SMS intimations are sent to applicants at various stages. Reminder alerts through SMS and email were also sent through the portal to the concerned officials. Monthly Performance Evaluation reports of all officers at various levels are auto-generated in the system which promoted healthy competition among officers, which in turn helped in speeding up the redressal process.

Being nimble and agile is the mode of operandi for Government Departments today as they need to react quickly to challenges posed by various factors besides their declared Vision. Progress of government departments towards their vision is often thwarted by manual and time-consuming processes and lack of data-driven insights.

The IGRS initiative for grievance handling tries to bridge the gap between the officers and citizens and thus provide a transparent and corruption free ecosystem.

Technologies

System Architecture:

IGRS is developed in a very popular and widely used open source Spring Boot Java Framework. Spring boot follows Model View Controller (MVC) and a layered architecture with four layers:

- Presentation Layer: for views or frontend. The presentation layer handles the HTTP requests, translates the JSON parameter to object, and authenticates the request and transfer it to the business layer.
- Business Layer: for controller and service layer. The business layer handles all the business logic. It consists of service classes and uses services provided by data access layers. It also performs authorization and validation.
- Persistence Layer: for model. The persistence layer contains all the storage logic and translates business objects from and to database rows.
- Database Layer: create, retrieve, update and delete operations are performed in the database layer i.e. Postgre SQL RDBMS and MongoDB NoSQL database.

IGRS application is deployed on Meghraj Cloud with Apache Tomcat as application Server. Database PGSQL and MongoDB is replicated with single leader or master - slave replication with one leader and two followers.

Android based Mobile App for applicants to lodge complaints and Officers for disposal of complaints. Representational State Transfer (REST) web services are used at server end to communicate with IGRS portal.

Google Chart API for Dashboard comprising following charts:

- Dashboard showing total received references, disposed, pending and defaulters
- Nature of complaints showing Complaint, Demand, Suggestion and others type
- Covid-19 References showing A, B, C1, C2, C3 categories
- Covid-19 Lockdown Health Issues references
- Total references showing CM references, Sampurna Samadhan Divas references, Online references, GOI (PG Portal) references, Bhu-Mafia references, Anti-Corruption references etc.
- CM helpline references – level wise (L1,L2,L3, and L4)
- Action taken on Dis-satisfied feedback and their classification
- Defaulter references
- Disposed reference

Dashboard showing summarized data using Google Charts API

People

All concerned stakeholders (Officials and Applicants) were consulted and accordingly the project was developed.The system was redesigned after these consultations so as to meet requirements of all departments. A very systematic plan was made to train the vast work force (around 50,000) which was supposed to work on this new system.

First of all master trainers were prepared at district level (District InformaticsOfficers, NIC) through Video conferences who further imparted training to Tehsil and Block Level. At State Level training on portal was imparted to all departments and directorates.

Detailed user manuals and videos explaining the process of working were made available on the portal itself to facilitate users. Intensive monitoring was done so as to make the system get going. Repeated reminders through various letters were sent to concerned authorities. Regular Video conferences by Chief Minister were taken to keep the process on track.

Chief Minister directly monitors the resolution of references through dashboard&reports provided in portal to identify the attributes with maximum number of references and directs the concerned depts. to take appropriate action.

Time to time training is being provided to concerned stakeholders for operation of newly integrated modules.

VALUE INDICATORS

Learnings for sharing

- 100 percent Feedback System provides huge data which could be analyzed from highest level.
- In Quality testing module from the highest level, the poor quality disposed complaints are pin-pointed and in the process the Team member come to know the loop holes of the rules and regulations so that corrective measures could be taken to plug these loop holes.
- Challenge of Timely and qualitative redressal of every complaint.
- Due to transparent and visible to applicant every time, increased trust towards Government.
- Single platform enabled every officer to act effectively and efficiently as all information is available on single Dashboard.
- GIS dashboard provides reference wise, department wise, category wise grievance representation for managing, and analyzing data. It also represents top and bottom districts on the basis of disposal.
- Officer Dashboard represents data in the form of PIE charts, Bar charts and Line charts depicting Total, Disposed, and Pending & Defaulter references at officer level as well as subordinate level. In addition to this, Action And Grading on Unsatisfied Feedback is also shown on the dashboard.

Digital Empowerment

- Bilingual online platform: Complainants can lodge complains in both Hindi as well as English Language according to their ease and convenience. There is no language barrier to access this platform.
- No Location Barrier: Complainant can lodge complaints from anywhere at any time through web portal and mobile app.
- Filing complaint and getting it redressed is free of cost for each and every citizen.

- The platform promotes a transparent and corruption free ecosystem.
- SMS alerts are sent at every stage of complaint processing. Notifications and alert system increases the satisfaction level to the applicant lodging complaints.
- Concerned officer also gets notified through SMS alerts and emails.

Green e-Governance

- End to End fully paperless redressal system. Applicant can file online application and forwarding of application is electronic.
- Even disposals can also be done through Digital signature on website/Mobile App. So no paper is required at any stage of redressal.
- Applicant can also give online reminders and feedback.

Shri S P Goyal, *Addl. Chief Secretary to Chief Minister, Chief MinisterOffice, Uttar Pradesh, spgoyal@nic.in*

Shri Surendra Singh, IAS, *Special Secretary to Chief Minister, Chief Minister Office, Uttar Pradesh, iassurendra@gmail.com*

Shri Hemant Arora, *Technical Director, National Informatics Center, Uttar Pradesh, jansunwai-up@gov.in, hemant.arora@nic.in*

MADAD – A Social Reach-out Programme for Overseas Indians in Distress

CPV Division, Ministry of External Affairs, Govt. of India

Devesh Uttam, Vishnu Kumar Sharma and Rajesh Dogra

PROJECT OVERVIEW

Background

The Indian diaspora face a variety of problems and seek help from the Indian government – for example, in matters related to salary payment by employer, harassment at work, marital discord, being implicated in a criminal case, or when they need to send the mortal remains of a loved one who had died overseas back to India. In these situations, the victim or his friends and family reach out to the nearest Embassy/Consulate or the Ministry in India, through its Consular, Passport and Visa (CPV) division. Earlier, the Ministry had no systematic mechanism for handling such requests for help. The connect was either through phone calls, emails or letter correspondence. Many a times there was duplicity of effort as the same grievance came in through multiple channels. There was no formal tracking or monitoring possible which led to delays, lack of transparency and inability to fix accountability.

The Solution

MADAD initiative was launched by the Ministry of External Affairs in Public Private Partnership with Tata Consultancy Services, to build a successful next generation digital platform for helping Indians staying abroad in times of need and distress, and to manage a number of consular services imparted by Indian Embassies and Consulates abroad. MADAD system provides a simple, unique, multi-channel digital platform comprising of an online web portal, a mobile app, 24*7 call centre in major Indian regional languages, along with email & SMS facility for alerts and updates on the status of help requests. The MADAD platform has been rolled out to 185+ Indian Missions/Posts linked with various MEA subdivisions like OIA-I & II and PGE, other government systems & prominent databases like eMigrate, as well as with the state/union territory governments for holistic resolution of the various dimensions involved in the help requests raised by the citizens abroad or their kin in India. The help requests can be logged through the online portal (www.madad.gov.in) or a mobile app (available across Android, iOS and Windows platforms) or through a multi lingual call center (available in 10 languages). The request flows through an automated workflow to the concerned Indian Mission who is now accountable for its redressal. Requests which are unattended are automatically escalated and Red-Amber-Green dashboards highlight concern areas to the Embassy/Consulate and Ministry higher ups. Regular status updates are available to the citizen through email and SMS alerts – as well as through the portal, the mobile app and call center. Thus, a request for help is addressed by MEA in a timely, transparent and secure manner. MADAD is an integral part of the Government's "Good Governance" initiative and is highly promoted by the Hon'ble Prime Minister and Hon'ble External Affairs Minister. To our knowledge, no other country in the world offers such an integrated platform for providing transparent and traceable assistance.

Key Stakeholders

- Indian Diaspora Abroad (and their kin in India)
- Students (studying abroad or planning to go abroad for studies)

- Indian Missions (Embassies & Consulates) Abroad
- Consular, Passport & Visa Division (MADAD section) of MEA – the governing body for MADAD
- PGE and OIA (I & II) divisions
- Pravasi Bhartiya Sahayata Kendras (operating call centres and regional offices for help & support)
- MEA Branch Secretariats
- TCS - the service provider

Impact on Citizen Service Delivery

MADAD has brought in a paradigm shift in the way the Indian Government comes forward to connect with and to help overseas Indians in distress. The MADAD system provides anytime, anywhere access to the Government – through the portal and the mobile app. To bridge the digital divide a 10-language call center has also been set up. The platform was specifically designed with ease of use in mind, as a large segment of Indian citizens living abroad are either semi-literate or illiterate workers. MADAD saves on travel, thus saving fuel, travel effort, time and cost for citizens and their family or friends seeking help. It also saves on paper as the complete process is digitized. More importantly, MADAD provides peace of mind to the Indian traveller that, should the need arise, organized help from the Government is only a click away. Within the Ministry, the use of the MADAD platform has helped in standardization of processes, brought in transparency, certainty, and greater accountability. The Red-Amber-Green dashboards are monitored at all levels within the Ministry, including the office of the External Affairs Minister. The entire eco system is vibrant, performing and continuously looking to bring in improvements in process and platform. Further, there has been a saving of time, effort, and cost of communication within the various Ministerial divisions. The project has helped enhance the brand image of India. Going forward, the Ministry is looking to leverage the platform to proactively reach out to the Indian diaspora, for example, to issue advisories in case of an emergency in a country or adverse weather conditions etc. The student registration module is one such attempt where the Ministry is encouraging Indian students going abroad to register online, at the time of travel.

Details on current usage of the system

The system is rolled out globally and serves the Indian community (over 13.5 million Non-Resident Indians and 18.5 million people of Indian origin and their relatives in India who may require assistance. The system can potentially be used by the 1.35 billion Indian population to log in a request for help on behalf of any citizen abroad in need for help. The Students Registration Module, which is a part of the MADAD portal, potentially extends the coverage of the platform to an estimated 7.0 Lakh Indian students studying abroad. All the Indian Embassies/Consulates as well as the MEA can now track and monitor such requests for help through the MADAD platform. Since the implementation of the project in February 2015, nearly 1,52,225+ Indians have registered and 66,300+ requests for help have been logged in the system. Out of these, 57,900+ requests for help have been addressed to date. More than 300 calls are processed every day by the call centres. MADAD mobile app, available on Android and iOS platforms, has been downloaded by more than 53650 people (43800+ Android, 9850+ iOS). The various help requests are closed through a well-defined, transparent processing work-flow equipped with reminder and escalation provisions to ascertain clear responsibilities and agile monitoring of

the help request processing efficiency. The average cycle-time for processing of help requests is 18 days, with high priority ones like transport of mortal remains to India getting closed within 3-7 days.

Software

MADAD application software (functional) environment consists of an online portal, a mobile app, email plus SMS alerts facility and a call center, the MADAD platform is rolled out to 185+ Indian Missions/Posts. The request can be logged through the online portal (www.madad.gov.in) or a mobile app (available across Android, iOS and Windows platforms) or through a multi lingual call center (available in 10 languages). The request flows through an automated workflow to the concerned Indian Mission who is now accountable for its redressal. Requests which are unattended are automatically escalated and Red-Amber-Green dashboards highlight concern areas to the Embassy/Consulate and Ministry higher ups. Regular status updates are available to the citizen through email and SMS alerts – as well as through the portal, the mobile app and call center.

HW & SW Platforms

Following are the salient features of Hardware and Software platforms used in MADAD:

- Tier III Data Centre, and an active-active configuration Data Recovery Centre operating on 24*7 basis
- Web Portals, Mobile Apps on Android and iOS platforms
- Hardware: IBM P-Series and X-Series Servers,
- Server Software(s) - DB2 UDB, IBM Http Server, IBM Tivoli suite of products, IBM Websphere Application Server, IBM Websphere MQ,
- Application Software(s) – Java/J2EE, Web Services, JSP, Servlets, XML, Struts, Spring, Junit

Tools Deployed

TCS uses a number of bespoke tools and technologies apart from the standard programming and project management tools. Following is a gist of the notable tools used in the areas specified in the query:

- Project Management: TCS iQMS, TCS IPMS, MS Office Suite of Products
- Build, Release, Testing and Deployment activities: JUnit, SVN, SonarQube, Maven, Jenkins, Selenium, TestNG, IBM RPT, Xenu, Burp Suite
- Design & Modelling: IBM BPM, Open Source/COTS/Bespoke products
- EMS: TCS Bespoke Tool apart from standard COTS products

Security Controls

Security controls are implemented at Network, Application, data, host layer in existing project implementations, following are the salient features

- Security controls at perimeter layer, deployment of WAF & UTM devices
- 24x7 dedicated Security operational center to address:
  i. Six horizontal domains namely network, servers, endpoints, database, messaging & content, voice and data/information; and
  ii. Four vertical domains of policy definition, enforcement, monitoring and response and measurement.
- Periodic Security assessment
- Server and endpoint security

Cyber Security

Overview of MADAD Security Architecture

A layered security approach has been implemented to enable enterprise information security framework covering distributed entities countrywide. MADAD Security framework deployed in project is derived from an extensive threat modeling exercise across project environment components. The Security framework, derived from security solution architecture, includes multiple phases namely design, deployment, implementation and integration, monitoring and security event management at different layers namely physical, application, database, system and network from multiple security threats originating from intranet and internet.

Best in class security technologies have been deployed to implement controls as per project specific requirements:

- Filtering mechanism devices to filter unauthorized sessions/traffic (Application and Network) from internet and intranet
- Intrusion Prevention System to detect and prevent unauthorized activities or sessions from internet and intranet
- Advanced application and Database security deployed to secure application code against top security vulnerability detected and published world-wide
- Host Security; Comprehensive logging & audit trail of sessions and transactions
- Electronic surveillance system provisioned at premises using Physical Security requirements namely Biometric and Smart card-based access to facilities to prevent unauthorized access, damage, and interference with information services
- Security compliance requirements by formulation of Security policies, procedures and guidelines based on ISO 27001 Security standard; Security Operations using Security Information and Event management technology to detect and manage 24x7x365 real-time malicious packets in production from internet and internet.

Certifications Received

The MADAD system, leverages the MEA's prestigious Passport Seva program eco-system which is the first mission mode project under the national e-governance plan to have achieved triple ISO certifications against three widely recognized ISO standards, namely:

- *ISO 9001:2008* – which acknowledges effective implementation of Quality Management System (QMS)
- *ISO 20000-1:2011 Certification* – which acknowledges IT Service Management and Operational Support covering all IT Infrastructure, Application and Information Security. This covers IT service management backbone supporting the services to various stakeholders.
- *ISO 27001:2013 Certification* – which acknowledges Information security management System: Protection of information assets and IT infrastructure of all the entities within the complete technical ecosystem encompassing the embassies, Data Centre, Disaster Recovery Centre, Network Operation Centre, Application Support Centre, and Headquarters (MEA-CPV). This includes establishing of comprehensive ISMS (Information Security Management System) framework comprising of Security policies & procedures, Risk and Incident Management artefacts to ensure confidentiality, integrity and availability of information assets.

Disaster Recovery and service continuity

The MADAD program scope also includes maintaining the state of art Data

Center (DC) of Tier-III standard, Network Operation Centre (NoC) in Delhi and a Disaster Recovery Centre (DRC) in Chennai. DC is hosted on premise (provided by MEA) in Delhi and Disaster Recovery Centre (DRC) co-located at MTNL STPI Data Center in Chennai. Both DC and DRC are exact replica of each other and run in Active-Active configuration with equal distribution of production transactional workload. Further, the scope also includes designing and deployment of IT Infrastructure comprising of Servers (x86 and power Servers) Storage (in TB), Network devices (Link Load Balancers, Server Load Balancers, Routers, Switches), Security components (Firewalls, Intrusion prevision system, Antivirus and Security and Event monitoring system) and Voice and Email systems for communication. The system is designed to be a centralized system with web access. It is sustainable in technology domain and adheres to the architectural principles of security, manageability, service orientation, availability, scalability and maintainability. The system is based on J2EE architecture and is deployed on a redundant set of web, application and database servers. These servers are deployed at two geographically distant locations - DC (at Delhi) and DR (at Chennai). Each location, an exact replica of the other in terms of the IT infrastructure, is capable of catering to 100% of the full user load at any given point of time. This deployment provides equal load distribution during normal modes of operation as both locations are operating simultaneously. This enables optimal usage of the IT infrastructure at both the sites as against a conventional DR site which becomes operational only in case of a disaster and also provides seamless business continuity in case of failure of one of the sites. The databases get replicated near real time between DC and DRC while the document repository gets replicated using disk replication technology. The entire Data Centre operations including IT and Non-IT Infrastructure and building management system are being managed by TCS. Data Centres are connected to 100+ remote locations over MPLS network from two different service providers to achieve the redundancy and high availability. Network Operation Centre (50-seaters) acts as a nerve centre for MADAD operations and is a focal point to monitor, control and manage infrastructure, network, middleware and application components. Domain experts sitting in NoC work 24x7 to make complete stack of infrastructure deployed at DC, DRC and remote locations up and running in order to ensure 100% availability of production environment. Large Frame Display are provisioned in NoC to keep bird eye view on complete Infrastructure. Data Centres and remote locations are connected using redundant MPLS networks comprising of two different service providers. Backbone comprising of MPLS networks has been designed to ensure sites are always connected to Data Centres for business continuity

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Processing of Requests for Help from Indian Citizens Abroad	There are 23 categories under which a help request can be filed in MADAD.	15483	12032	7245*

Monthly ICWF Details Data Entry	Data entry for monthly monitoring & MIS purposes	2035	1987	903
Quarterly CPV Returns Data Entry	Data entry of quarterly CPV returns (important stats to be reported by each Mission/Post every quarter)	535	528	218
Repatriation Cases	Processing of repatriation cases at Missions	72	151	71

Implementation

Implementation Coverage achieved in comparison to the plan / target

100% target achieved as the MADAD system is live in each and every Indian Mission (Embassies & Consulates) abroad, as well as in the targeted MEA (OIA, PGE, PBSK) and state/UT government offices.

Improvements/ enhancements specifically planned out during next one Year

Following is a chronological summary of some of the major enhancements and improvements deployed in the MADAD system using the agile methodology in the last one year:

- Exchange of processing remarks as well as supporting documents (apart from regular status updates) between MADAD and eMigrate systems for seamless integration and efficient decision making by respective system users
- Feature to display complete case history including remarks and attachments, priority-based sorting of worklists, more categories of help request, and additional MIS reports & dashboards
- More exhaustive tracking and status updates for VIP reference cases. The VIPs/offices (like PMO, EAM, State/UT govt., MPs) are automatically informed in detail about the latest processing updates and resolution of help requests raised for the cases referred by them.
- Improved tracking of ICWF fund usage by standardizing the related categories/sub-categories for data entry across Missions. Provision to maintain transaction updates and MIS in local currency used in the country where Mission is deputed,
- Better de-duplication of Requests (same case logged in the system by both requester and family/friends or MEA staff on receipt of VIP recommendation), more filters in Request Processing worklists of Mission/Post staff, Display of Help documents (PDF) and Quick Guides (PPT) in various MADAD screens
- Refinement in reminder and escalation rule matrices used for the automated email reminders (to users whose work items are delayed) and escalations (to supervisors of delayed work items' owners) generated from the system
- Linking of similar requests (say on same Passport Number and Request Category) for simplified processing and sharing of updates, Feature to transfer the request processing workflow to neighboring Missions/Posts or other locations giving due reasons/remarks
- Refinement in the bilingual portal content (static information/guidelines, FAQs) in MADAD Portal (Hindi and English)
- Motley Refinements and Enhancements in Dashboards (Ageing Summary View with Drill-down feature, Customized Search/Sort

features), Customizable Reports (feature to choose columns and sorting order, display on screen or download as excel/PDF)

- Refinements in the feature to defer work items for a limited time period which cannot be processed soon because of pending inputs from requester (Status: More Information Required) or pending at Court/3rd Party (on which Mission/Government of India has little influence) with due reasons/remarks, no reminder/escalation emails to be sent in such cases but pendency would continue at the Mission/Post
- Enhancement in MADAD modules such as the "Prisoner Module" to maintain details of Indians Imprisoned Abroad, feature for data entry/edit/search/delete the prisoner records as per the sentence status/court verdict and to declare that no Indian is imprisoned therein (applicable for small countries with very low population of Indian diaspora)
- Enhancement in the role-based access privileges granted to Head of Missions, and CPV officials reviewing the processing actions taken by the Mission users
- Enhancement in MADAD mobile app (GUI refinements, additional features, performance improvements)
- Consolidation of Intimation and Reminder emails in a single email (to make it more effective to notify the Mission/Post staff where request processing is delayed beyond reminder timelines), Enhancements in Prisoner module
- Enhancements in the colored bullet symbols' code in search/work lists to visually distinguish the requests based on their pendency/ageing and last action dates
- Enhancement in the "CPV Returns" module for maintenance of important stats (on quarterly basis) related to processing of consular, passport and visa services, details of Indian diaspora, and important operational metrics that is often required to be shared across MEA/Parliamentary Committees
- Reorganization of MADAD functional screens/links in logical groups for ease of processing at Missions/Posts
- Refinements in "Student" module of MADAD (basis recommendations from OIA division) under which Indians studying/planning to study abroad can register their course and contact details with MEA and the same can be leveraged by MEA in future G2C connect programs or in times of need (e.g. exodus of nursing students in war like situation)
- Improved provision for generating customized letters in More Information Required cases (and for communication with other departments involved in help request processing), and dispatch the same through email or post to the respective requesters/concerned-persons, Enhancements in Reciprocity Module, Further Refinements in MIS features
- Refinements in the search & MIS features for status of processing / information exchange with the state and UT government departments integrated with MADAD
- Improved search features for generating and tracking customized email/printable (for postal dispatch) notifications (to requester/concerned-person/other departments/recipients) to CPV, OIA-I, OIA-II, PGE and MEABS Users in MADAD

- Enhancement in format for capturing additional details pertaining to the VIP Reference cases for better tracking of progress made on select requests

The following features are envisaged to be deployed in the MADAD system during the next one year, in due sync with CPV division:

- Lean User Registration & Improved User Management for Faster Form Filling at MADAD Web Portal and Mobile App
- Chatbots for AI-assisted support and improved user experience in MADAD portal and mobile app
- Social media and Aadhaar integration for authentication services
- Smart Videos for Proactive Student and Citizen Awareness
- Refinements in MADAD mobile apps for improved security and Usability as part of continuous improvement initiative
- Mobile App for Consular Officials to access Important Dashboards and Reports
- Futuristic Provisions in e-Notification & e-Response Processing Operations (notifications/updates in local vernacular, audio/video response, chat/video conferencing between requesters and MADAD officials)
- Addition of more consular services to be managed through MADAD system
- Citizen Advisories, Other MEA Proactive Connect Initiatives

ENABLER

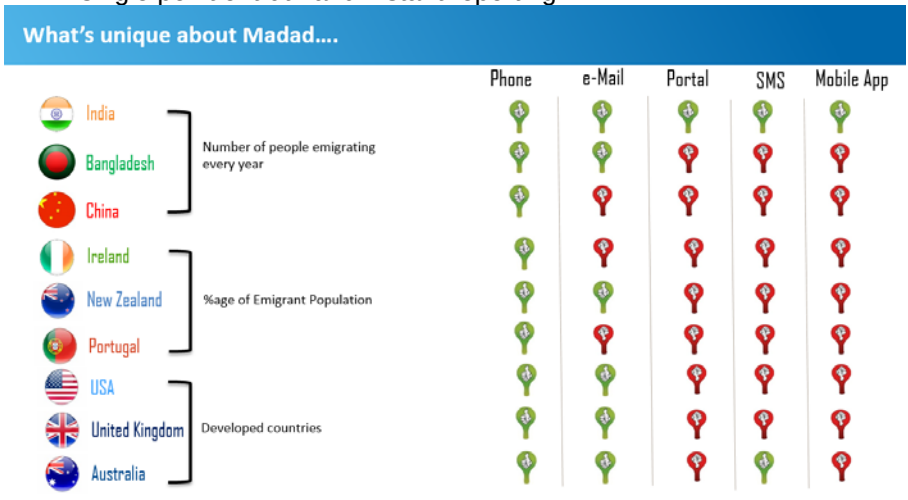
Processes Re-engineered

Prior to the launch of MADAD, there were numerous problems faced by the ministry in helping the Indian diaspora and their families in distress. TCS analyzed the same in sync with the Ministry and identified the key requirements to address the primary pain areas such as the following:

- *Open loop handling:* There was no standardized workflow or process to resolve problems of citizens abroad (at Missions/Posts) or in India. Similar cases were approached very differently at different Missions and there was no assurance about timelines to resolve the help requests.
- *Limited reach and accessibility:* Due to the lack of proper processes and procedure, there was no defined mechanism for connecting or communicating with the concerned department in case of need. So, a need was felt by the Ministry to develop a platform that empowers Indian citizens living abroad or in India to connect with the Government of India through multiple channels i.e. online website, mobile application and social media
- *Manual and error-prone processes:* All the work was done manually which leads to the delay and errors. Need for an automated and digitized solution was identified accordingly.
- *Non-transparent working procedures:* Due to the lack of centralized system there was no transparency of the work and there were no defined working procedures. Thus, to increase the efficiency of the system a need for centralized MIS and enquiry features was identified.
- *Long & uncertain wait:* There was no specific timelines defined for any case or complaint to get resolved. Thus, a need for automated reminders and escalations through rule-based matrices along with email, SMS updates to requester, call centre and helpdesk solutions was identified.

Process Re-engineering Implemented under MADAD:

- End to end Digitization: No paper required to be used by citizens or Embassies. Complete help request workflow, from submission till resolution is completely electronic.
- Multi-channel Reach-out to Diaspora: Web Portal, Mobile App, and Call centre-based help request filing options for abroad citizens.
- Standardized Request Form and Processes across Missions: Scientifically designed help request form with option to electronically upload supporting documents, transparent and standardized processing workflow across all 185+ Missions with status updates and processing remarks mandatorily and timely shared with help seekers; time-bound resolution ensured through automated reminders/escalations and digital reviews/follow-ups
- Proactive & Reactive Status Updates: Portal, Mobile App based status tracking options; email and SMS based alerts and updates on status of help request; instant sharing of further information required to process the help requests.
- Interoperability with Other Government Systems/Agencies: Web Service based application interoperability with multiple government databases, Browser Independent Web Application, Mobile App on Android and iOS platforms
- Special Focus on Emigrant Workers: Near Real time integration with eMigrate portal for checking fraudulent cases related to emigration of Indian workers abroad, integration with state/UT governments for tracking and penalizing of illegal recruiting agents
- Advanced IT Infrastructure for Improved Business Continuity and Service Assurance: N-tier scalable, modular, technical SOA based architecture; Active-active Dual Data Centres with advanced virtualization, security and load balancing features; mix of COTS & open-source solution components; 24*7*365 application support, monitoring of network and security operations
- Efficient MIS: High Quality MIS Reports & Dashboards with Visual analytics Efficient Search & Enquiry Features, centralized database for single point of truth and instant reporting



MADAD was conceptualized as a state of art G2C digital platform with much deeper connect with Indian diaspora and their families than any other international program of equivalent stature. The TCS consultants, accordingly, provisioned a variety of digital citizen touchpoints that had never been attempted by any foreign government (refer the following screenshot) in a single government to citizen connect program.

TCS is also responsible for the following aspects as part of agile based consultancy and solution delivery to continuously enhance the reach, speed and effectiveness of MADAD program. Following are a few areas covered by TCS:

- Establishment of IT and non-IT infrastructure:
  i. Maintenance of State-of-the-Art Tier III Data Centre and an active-active Disaster Recovery site
  ii. 24*7 Network Operations Centre (NOC)
  iii. 24*7 Security Operations Centre (SOC)
- Development and Maintenance of the MADAD Application, Portal and Mobile App
- Maintenance of Information Security Framework
- Efficient Change Management, Communication Management and Training. For instance, two dedicated TCS associates have been engaged till June 2020 to train and assist the officials in State/Union Territories government offices are well-trained and comfortable in using the MADAD system for processing of work items assigned to them as part of resolution of various help requests raised in MADAD from around the world.

Technologies

Solution Architecture

The MADAD system is designed to be a centralized system with web access. It is sustainable in technology domain and adheres to the architectural principles of security, manageability, service orientation, availability, scalability and maintainability. The system is based on J2EE architecture and is deployed on a redundant set of web, application and database servers. These servers are deployed at two geographically distant locations - DC (at Delhi) and DR (at Chennai). Each location, an exact replica of the other in terms of the IT infrastructure, is capable of catering to 100% of the full user load at any given point of time. The databases get replicated near real time between DC and DRC using Q Replication technology while the document repository gets replicated using disk replication technology.

Following are the salient features of Hardware and Software platforms used in MADAD:

- Tier III Data Centre, and an active-active configuration Data Recovery Centre operating on 24*7 basis
- Web Portals, Mobile Apps on Android and iOS platforms
- Hardware: IBM P-Series and X-Series Servers,
- Server Software(s) - DB2 UDB, IBM Http Server, IBM Tivoli suite of products, IBM Websphere Application Server, IBM Websphere MQ,
- Application Software(s) – Java/J2EE, Web Services, JSP, Servlets, XML, Struts, Spring, Junit
- Build, Release, Testing and Deployment activities: JUnit, SVN, SonarQube, Maven, Jenkins, Selenium, TestNG, IBM RPT, Xenu, Burp Suite

- Design & Modelling: IBM BPM, Open Source/COTS/Bespoke products
- EMS: TCS Bespoke Tool apart from standard COTS products

MADAD Security Architecture

The security architecture proposed for the MADAD system is designed to ensure complete authenticity and integrity of help requests' data and transactions.

To achieve aforesaid objective, a robust security framework has been developed and deployed as part of the system. This state-of-the-art security framework spans multiple specialized domains, viz. robust security solution architecture, threat modeling, cryptography and digital signature-based operations, security compliance, application and database security, perimeter and network security, data protection, security surveillance systems, real time security operations, protection against emerging cyber threats & vulnerabilities, end point security etc. The system has implemented the following security principles in its ICT implementation to minimize threats:

- *Principle of Least Privilege*–privileges are kept at the feasible minimum level
- *Principle of Least Trust* – mechanisms ensure trust between applications, trust between users and applications
- *Defence in Depth* – multiple layers of security control with each security control using a different approach
- *Positive Security Model* – common mechanism for validation of inputs against a list of known good items has been implemented
- *Minimal Attack Surface* - application components, database uses least number of well documented interfaces
- *Avoid Security by Obscurity* – the application assumes that the attacker has intimate knowledge of the application
- *Simple Design* - avoid complicated design and reduce the number of software modules required to implement a security control
- *Accountability and Traceability* – critical data access and modification are recorded and are traceable

The security solution addresses six horizontal domains namely network, servers, endpoints, database, messaging & content, voice and data/information and four vertical domains of policy definition, enforcement, monitoring and response and measurement.

Disaster Recovery & Service Continuity Assurance Measures

The MADAD system operates from two geographically distant locations – a Data Centre (at Delhi) and a Disaster Recovery Centre (at Chennai). Each location, an exact replica of the other in terms of the IT infrastructure, is capable of catering to 100% of the full user load at any given point of time. This is an active-active deployment wherein there is equal load distribution across the two locations – both of which operate simultaneously. Such a deployment architecture provides seamless business continuity in case of failure of one of the sites. This is unlike a conventional DR site which becomes operational only in case of a disaster. The project being mission critical, has a well-defined Business Continuity Plan across each entity which ensures that critical business can continue in case of an emergency and quickly recover from the emergency with minimum impact to the Business Operations. Periodic drills are conducted to verify the efficiency and effectiveness of the business continuity plans and procedures.

People

Re-engineering the various processes involved and implementing the new ICT

enabled processes as part of the MADAD System has involved the following steps:

- Selection of a Service Provider
- Leveraging Data Center / Disaster Recovery Center
- Definition of the new processes and outlining of the roles and responsibilities of various stakeholders involved in the MADAD processes esp. the ones related to processing of help requests
- In-time approvals to the Service Provider for application and portal requirements, technical solution, security solution and so on
- Change Management for the 700+ staff across the 185+ Indian Missions/Posts abroad, CPV, OIA, PGE, MEA Branch Secretariat, PBSKs, and state/UT government offices
- Bringing on-board the Indian Missions & Posts abroad.
- Bringing on-board the various state and UT government departments for integration with MADAD.
- Retaining Strategic Control over the newly implemented MADAD system
- Implementing agile methodology for continuous, quick, and sustained improvements in the MADAD system.
- Onboarding additional consular services for monitoring and management through the MADAD ecosystem.

Each step in the journey of implementation, as described above, needed active participation from the senior officials at MEA. The implementation at each Mission and Indi-based stakeholders' offices needed complete involvement of the senior Mission Consular officials and their staff. The staff had to imbibe the new processes and system as they moved from the old to the new. A well-defined change management plan including a comprehensive training program coupled with hand holding by the Service Provider and mentoring by the senior officials ensured the migration to the new system was smooth and seamless. Over 500 staff from the Missions were duly trained (using remote training and train-the-trainer approach) over a period spanning more than two months. Similarly, over 150 state and UT government department users were trained as part of the system enhancement to integrate state and UT government departments with MADAD for ensuring action on illegal/unregistered travel agents causing multiple problems to a huge percentage of emigrant workers esp. in the Middle Eastern countries. Senior level meetings with Heads of Missions and states ensured the project received the appropriate support from the police department in rolling out the new system. Over 1700 police personnel were trained on the new system. It is important to mention here that the ownership and strategic control of the core assets including data, information and processes is with the Ministry**.**

Change Management Strategy

A comprehensive Change Management Plan including communication management and training was drawn up. Over 50 staff of service provider, 500 staff of Missions/Posts, 150 state/UT government staff, and 50+ CPV and MEA (OIA, PGE, Branch Secretariats) staff were trained as part of the rollout of MADAD system and subsequent major enhancements deployed in MADAD. Remote training using webinars and teleconference, and train-the-trainer approaches were used for distant locations (Missions/Posts/Branch Secretariat) to save time and cost for roll-out. Physical training with due hand-holding support was provisioned for CPV division users considering their vast role in monitoring the efficiency of MADAD services' delivery. Physical visits

were carried out to train sessions were conducted for state and UT government departments considering the special demand as well as general disparity in the departments/authorities & dynamics across various states/UTs in India. The change management included awareness and training on the new processes and application as well as soft skills trainings for the aged/less techno-savvy staff needing additional handholding for usage of computers and/or software applications like MADAD. As part of the communication management of the program, a number of MIS reports and dashboards, as well as status update/reminder emails are generated in the system everyday which give focused information on general health of processing and pendency at various Missions/Posts, and help monitoring the productivity in a transparent and agile manner.

Capacity building plan and its implementation status

The private service provider has hired and trained 250+ best-in-class skilled staff for maintaining and running the entire MADAD system – at the Network Operating Center, the Security Operations Center, the Data Center, the Disaster Recovery Center as well as the IT development center. This has more than doubled the manpower capacity of MEA. MEA has also consistently reviewed the staff position at various roles across locations and augmented as per the requirement of the program.

Program Management

Program Management and monitoring has been the core to the success of the project. A Program Management Unit has been set up to carry out the administrative and facilitation steps and tasks to support the implementation and stabilization of the project. The Program Management Unit (PMU) comprises of functional and technical consultants as well as experts handling HR and related matters. The team has been instrumental in finalizing the system functional and technical requirements in a progressively elaborated and agile manner, providing timely approvals for IT Infrastructure procurements and staff onboarding aspects through the agreed change management process. The team has ensured sufficient staff across roles are available at all RPOs. The PMU proactively monitors the project plan and identifies /handles any risks perceived**.**

Leadership Support

MADAD program has enjoyed a great deal of support from the top leadership involving the hon. EAM Ms. Sushma Swaraj at the time of launch (2015) and hon. Prime minister Mr. Narendra Modi who have promoted MADAD in multiple national and international forums. This has really helped promote MADAD which attained a grand stature and widespread following across the Indian diaspora and students in a quick time, and increased its adoption not only amongst citizens seeking help from Missions but also amongst the Mission consular department staff for timebound processing of help requests as well as for monitoring and managing other consular services imparted from their respective Missions.

VALUE INDICATORS

Learnings for sharing

The MADAD experience has enhanced our belief in the fundamental best practices of large program management with extensive use of technology. The following are the key learnings from MADAD which may be of benefit for other e-governance programs aiming to deliver citizen services in a highly efficient, transparent and agile manner:

- Have a well-defined Project Vision
- Ensure the selection of a financially and technically strong Service Partner (in this cased TCS)
- Ensure commitment by senior leadership. In MADAD's case, the hon. External Affairs Minister was directly updated by TCS along with the Join Secretary (JS-CPV) and Personal Secretary (PS-EAM) of the progress made in the initial Agile Deployment iterations. This helped in winning her trust and appreciation which led to faster adoption across Embassies and other departments in the Ministry of External Affairs.
- Ensure the new system does not focus on technical aspects/automation alone. Technology and processes are enabler however, people must be inclined to execute the system in the best way to serve the end customer.
- Ensure the adoption of the right implementation approach coupled with a comprehensive change and communication management strategy (in MADAD's case – Agile methodology was used for delivering continuous incremental value to the end customers through a series of weekly/fortnightly iterations in sync with the customer (CPV))

Digital Empowerment

The key enablers for the successful digital empowerment through the MADAD program are as follows.

Building Eco System

- Leveraging existing Ministry Infrastructure in terms of IT systems, people and processes. For instance:
  i. Pravasi Bhartiya Sahayata Kendras' regional language call centres were integrated with MADAD for reach-out to Indian emigrant workers in their own dialect - many of whom do not know reading and writing, let alone the English language!
  ii. eMigrate system was integrated for instant exchange of information regarding emigrant workers' data, and follow-up with registered travel agents, if required as part of help request processing
  iii. State/UT government departments were integrated with MADAD for instant action on illegal/unregistered travel agents causing problems (salary/contract/insurance/compensation/physical abuse and related issues) for the citizen abroad
  iv. Integration with Ministry of Women & Child Development for marital disputes/fraudulent marriages and related grievances
- Standardized, Re-engineered processes across 185+ Embassies
- Workflow based automated system with built-in escalation matrix bringing in Transparency & Greater Accountability and timely resolution
- Multi-channel Connect with citizens through Web Portal, Mobile App, Call-centre, Email & SMS

Program Governance

- Intuitive Red-Amber-Green theme-based MIS for instant process health check
- Dashboard based monitoring bringing in Efficiency and Certainty
- Regular governance by EAM, and EAM's office
- Continuous feedback for improved services
- Efficient tracking of ICWF fund usage at Missions, and management of other consular services through the MADAD framework

Change management & Communication

- Ability to address a wide variety of problem areas in compliance with each country's rules & regulations
- Paradigm Shift in the mindset of Mission welfare officer
- Active promotion by the Prime Minister & External Affairs Minister
- Multipronged communication strategy – Print, Social and Word of Mouth

Green e-Governance

The Project is committed to environmental protection by ensuring proper e-Waste management. E-Waste in the context of MADAD project refers to electronic waste as per the WEEE (Waste Electric & Electronic Equipment) directives.

The project has an e-waste management policy which reflects the objectives and measures to manage e-waste in an environment friendly manner. This policy affects the way the Project Team handles, disposes outdated electronics and electrical equipment and procures new ones. Through this policy, the project team seeks to:

- Procure computers/hardware and other Electronic and Electrical Equipment from Energy star compliant vendors.
- Minimize generation of e-waste by extending the useful life of computers/hardware, till the support is available from the OEMs & other Vendors.
- Achieve 100% environmentally responsible disposal of e-Waste.
- Carry out e-Waste disposal as per the standard SP's guidelines of disposal only through the E-Waste handlers / recyclers authorized by Ministry of Environment and Forest / Central or State Pollution Control Boards.

A list of e-Waste applicable in the MADAD project as per WEEE directives is given below:

1. Main Frames / Servers
2. Printer Units & toners
3. Personal Computers
4. Laptop
5. Notebook Computers
6. Note Pad Computers
7. Scanning & Copying Equipment
8. Pocket & Desk Calculators
9. Audio/Video conferencing System
10. Lighting Equipment
11. LCD TVs / Plasma Screens
12. Photocopying Machines / toners
13. Refrigerators / Deep Freezers
14. Smoke Detector/Heat Regulators
15. Automatic dispensers for hot drinks
16. Air conditioners
17. Telephone, telex and other telecommunications systems
18. Other products & Equipment for the collection, storage or processing of information by electronics means.

At the help request processing locations (Indian Embassies/Consulates, CPV/OIA-I/OIA-II/OE&PGE Divisions in MEA, MEA Branch Secretariat, State Governments' authorities and other client offices), all the processing workflows have been digitized to ensure no paper-waste is generated as part of MADAD application-based processing of help requests. MADAD system has also made the life simple for help request seekers who do not need to physically travel to Indian Missions/Posts, Protector of Emigrants Offices or to MEA Hqs for submitting their requests in physical (paper) format or to check

status of the same. The reduced travel and paperwork at the end of the applicants too has led to immense saving of trees and bio-degradable fuel otherwise attributed to such paperwork and travel/front-ending activities.

Shri. Devesh Uttam, *OSD (CPV), CPV Division, Ministry of External Affairs, New Delhi, jscpv@mea.gov.in.*

Shri. Vishnu Kumar Sharma, *Director (CPV), CPV Division, Ministry of External Affairs, New Delhi, dircpv@mea.gov.in*

Shri. Rajesh Dogra, *Program Director (PSP & MADAD), Tata Consultancy Services Limited, Delhi, rajesh.dogra@tcs.com*

Mukhyamantri Vishesh Sahayata Portal

Chief Minister's Secretariat, CM Office, Bihar

Chanchal Kumar, Shailesh Kumar Shrivastava and Rajesh Kumar Singh

PROJECT OVERVIEW

Mukhyamantri Vishesh Sahayata Yojana Portal has been designed to assist Workers stranded outside Bihar and were struggling for livelihood in sudden lockdown. The sudden announcement of lockdown has resulted in stranding of a large number of migrant workers across India originally from Bihar. Many of them were daily wage workers who were finding it extremely hard to meet the both ends for their family due to sudden loss of job. Chief Minister's Office, Bihar conceptualized a unique model to find out a solution to this unprecedented problem so that at least some instant monetary help can be extended to such people across country. The Disaster Management Department, Govt. of Bihar has also been asked to fulfil the logistics and funding requirement. Identification of such workers was uphill task and ensuring help at their own place was also difficult task. Later on, the problem multiplied when special trains were run for workers/laborers, who had started coming in large number and put in quarantine centers. State government decided to provide special assistance to such people also. Apart from that, providing jobs to such people after skill mapping of workers once they are out of the quarantine centers also needed to be addressed. Therefore, it was decided to adopt IT based solution to address these issues. The e-governance solution has been developed under active supervision of CM Office, Bihar with technical help of NIC, Bihar and is unique of its kind in country. The solution has also been shared with Jharkhand and Uttar Pradesh.

Objectives

State Govt has launched Mukhyamantri Vishesh Sahayata Yojana for financial assistance of Rs. 1000/- for Workers of Bihar Origin stranded outside Bihar due to COVID-19 (Coronavirus) lockdown, Under the Mukhyamantri Vishesh Sahayata Yojana Scheme the state government has to provide financial assistance to 21 lakhs of migrant workers stuck outside in other states. Willing candidates apply for Mukhyamantri Vishesh Sahayata Yojana Bihar through Bihar Corona Tatkal Sahayata App or aapda.bih.nic.in. After downloading the Bihar Corona Sahayata Mobile App, the people can register to get financial assistance Rs. 1000 by the government after due verification through digital platform.

Stakeholders

Chief Minister Office, Bihar; Disaster Management Department, Govt. of Bihar; Industries Department, Bihar; NIC, Bihar; Citizen of Bihar origin stranded outside Bihar during Covid-19 lockdown.

Scope of the Project

- Identification and verification of beneficiary details
- Geo-tagging of Beneficiary
- Financial Assistance to the Workers
- Reduction of Duplicates in Beneficiary data.
- Accurate Targeting of Beneficiaries.
- Most of the Services are accessible through Mobile Phones/Tablets
- Social Audit through digital interface
- Direct Benefit transfer to 29 Lakhs Beneficiary

- Extending benefit to citizen who need govt. services most and are placed at the remotest of society
- De-duplication with existing databases such as Aadhaar etc.
- Process Reengineering of schemes for simpler flow of information and funds.
- Greater Accountability of concerned authorities.
- Elimination of redundant processes in fund transfers and fast processing of applications.

Geographical Boundaries

The project has been fully implemented in entire state covering all districts of Bihar.

- 38 (Thirty-Eight) Districts of Bihar
- 534(Five Hundred Thirty-Four) Blocks of Bihar
- 8463 Panchayats of Bihar
- Citizens of Bihar State through Web Site https://aapda.bih.nic.in/
- Across Country using Mobile App "Bihar corona Sahayata Mobile App"

H/W and Software Specification	Name of H/W and S/W
Servers & Desktop	High End Blade Servers, Local servers, Desktops Hosted at NIC Mini Cloud Patna
OS	Windows 2012, Windows 10
DBMS	SQLSERVER 2012/PgSQL, MySQL
Web Server	IIS 7.0 or more
Framework	.net Framework 4.5, Java
IDE Software	Visual Studio 2012, NetBeans, Java Script
Reports	Crystal Reports
SMS	Mobile Seva of DEITY and NIC SMS Gateway
Mobile App	Android based Java Application
GIS/GPS Mapping (Spatial Data)	ARC GIS Server
Unicode Support	Indic IME, Google API
Video Player	Adobe Flash Player

Cyber Security

The application software has been developed with security by design approach and best security coding practices has been followed for creating quality software. Application Security Certification is being done by Centre of Excellence for Application Security, NIC Bhubaneshwar. After completion of the process security certificate will be issued.

Disaster Recovery and service continuity

NIC Mini Cloud /State Data Centre disaster facility at Hyderabad has been used for Disaster Management. The project has been notified by the department and approved in highest level meetings headed by Chief Secretary/Principal Secretary. The project has been funded for hiring manpower and other hardware and software requirements under DBT initiative of the State. The project has been approved by Project Advisory Committee of NIC. The project has been highly appreciated at top level and district administration level due to optimization of processes.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Aadhaar Authentication	Digital Identity verification of Beneficiary			29.36 lakh
Online Forms Submission	Submission of Application through Mobile App for grant of financial Assistance			29.26 lakh
Account Validation through PFMS	Verification of Accounts, Beneficiary Name, Active, closed, others name etc.			29.26 lakh
Matching of Beneficiary Image	Manual Matching of image (Selfie) with Aadhaar Photograph)			42.32 lakh
Payment Generation	Sending Payment to Beneficiary through PFMS			20.96 lakh
Online Query, SMS alert and Reporting Service	Query, SMS Alert and Reporting for all levels of Applications			50.48 lakh

Implementation

Implementation Coverage achieved in comparison to the plan / target

Geographical areas

The project has been fully implemented in entire country covering all states. People identified at remote locations belong to different geographical locations of Bihar.

- 38 (Thirty-Eight) Districts of Bihar
- 534(Five Hundred Thirty-Four) Blocks of Bihar
- 8463 Panchayats of Bihar
- Citizens of Bihar State through Web Site https://aapda.bih.nic.in/
- Across Country using Mobile App “Bihar Corona Sahayata Mobile App”

Functionality

Delivery channels

- SMS Alert
- Online Enquiry
- Mobile App
- Helpdesk and Kiosk
- Call Centre Support

Category of stakeholders

- Migrant Workers
- State Administration
- District Administration
- Banks

- PRI functionaries
- Citizen of Bihar

Improvements/ enhancements specifically rolled out during the last one year

- Identification and verification of beneficiary details
- Geo-tagging of Beneficiary
- Financial Assistance to the Workers
- Reduction of Duplicates in Beneficiary data.
- Accurate Targeting of Beneficiaries.
- Most of the Services are accessible through Mobile Phones/Tablets
- Social Audit through digital interface
- Direct Benefit transfer to 29 Lakhs Beneficiary
- Extending benefit to citizen who need govt. services most and are placed at the remotest of society
- De-duplication with existing databases such as Aadhaar etc.
- Process Reengineering of schemes for simpler flow of information and funds.
- Greater Accountability of concerned authorities.
- Elimination of redundant processes in fund transfers and fast processing of applications.

Improvements/ enhancements specifically planned out during next one Year

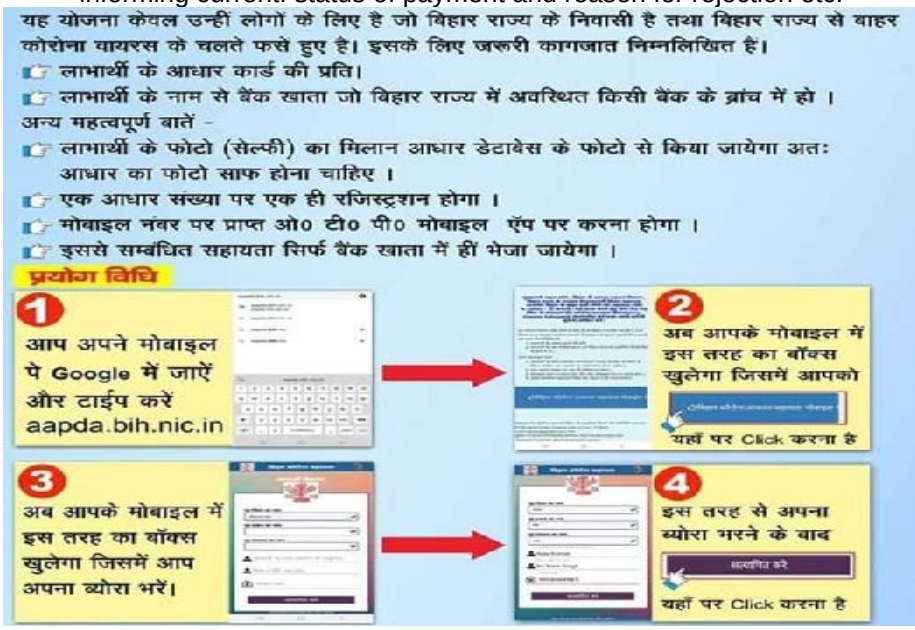
- Skill Mapping of Migrant Workers
- Planning of Training and Training Schedule
- Registration of Companies
- Creation of Jobs as per skill-set of Workers
- Information regarding various existing govt. contractual/private jobs.
- Worker Rozgar Portal

ENABLER

Processes Re-engineered

- *Online Application Submission through Bihar Corona Sahayata Mobile App:* A mobile has had been launched which allowed applicants scattered across country can apply through the Mobile app. The mobile App had more than 60 lakh downloads.
- *Identification of Beneficiary through Aadhaar authentication:* In order to apply it was necessary to enter Beneficiary name, Home District, Home Block, date of birth, gender and Year of Birth along with Aadhaar Number so that beneficiary can be verified online through Aadhaar service.
- *Geo-tagging of Beneficiary:* In order to identify current location of the Beneficiary a Selfie through Mobile app had to be uploaded by the applicant. The geo-tagging establishes that the beneficiary is not currently available in Bihar.
- *Online Account Verification through PFMS:* To ensure that the bank account provided by the Beneficiary belongs to Bihar and the account is in the name of the Beneficiary the entire system was integrated with Public Finance Management System. This validates the ban account and also provide information that the beneficiary account is currently available in Bihar. The rejected account, closed account and account in the name of other was also rejected and corresponding applicant was informed for the same through SMS.

- *Photo Matching of Beneficiary of Aadhaar and Selfie Photo through districts:* It was also necessary to match the photo provided in Aadhaar Card and Selfie uploaded by the Beneficiary. Multiple teams with different role were used at all districts of individually verify them so that only correct persons are provided financial assistance.
- *Financial Assistance to the Workers through DBT:* After due verification and as per established procedure all the valid beneficiary has been provided a sum of Rs. 1000 through digital payment network using digital signature.
- *SMS alert for invalid transactions, name mismatch:* In order to support the applicants SMS alert at all stages were provided. This also helped in informing current. status of payment and reason for rejection etc.



Technologies

- Work flow Management System with separate roles defined for each stakeholder
- Three tier architecture for data, application and middleware management.
- Data Analytics to identify ghost beneficiary
- SMS and email Integration for alert
- Fuzzy logic for matching names of Beneficiary and name received from Bank
- Social media platform for analysis of comments and public requirements
- XML based data transfer between various external systems
- Aadhaar Service Integration for Aadhaar Authentication and digital identity establishment.
- API integration for offline applications.
- Integration with GIS Platform for Spatial Analysis of Beneficiary.
- Mobile Application Development for Hybrid Platforms

People

Chief Minister's Relief Fund: Chief Minister's Relief Fund (CMRF) was

established in the year 1971 for helping people in distress. The fund is recognized as a Trust and its income exempt under Income Tax Act, 1961 under Section 12A and 139 for return purposes. Chief Minister is the Chairman of CMRF and is assisted by Officers/Staff on honorary basis. The fund consists entirely of public contributions. CMRF accepts only voluntary donations by individuals and institutions. Contributions to the CMRF have been notified for 100% deduction from taxable income under Section 80(G) of the Income Tax Act. The corpus of the fund is invested with banks in fixed deposits. Disbursements are made with the approval of the Honourable Chief Minister. The resources of the CMRF are utilized primarily to render immediate relief to families of those killed in natural calamities like floods, cyclones and earthquakes, etc. and to the victims of the major accidents and riots. Assistance from CMRF is also rendered, to partially defray the expenses for medical treatment like heart surgeries, kidney transplantation, cancer treatment, etc.

The fund provisioned for Mukhyamantri Vishesh Sahayata Yojana was primarily given from Chief Minister Relief Fund however the scheme was executed through Disaster Management Department. The entire operations and support for the scheme was done under active supervision of chief Minister's Office.

State Disaster Management Apex Committee:

This is headed by Chief Minister with Ministers of various line departments, finance department as members. This also include high-level committee members at the level of Chief Secretary and Principal Secretaries/Secretaries as members. This is apex body for taking policy decision for disaster management.

State Project Core Team:

CM Office, Disaster Management Department, Government of Bihar, NIC, Bihar has notified officers as Project Members of project team. This also have members from administrative officers etc. who advices and assist during project implementation. This team is supported by a team of hired programmers well versed in adopting online web applications, GIS, mobile applications and provides technology implementation of the Project. This team work under overall supervision of Principal Secretary, Chief Minister, Principal Secretary, Disaster Management, Government of Bihar and State Informatics Officer, Bihar.

Project Steering Committee:

In order to support project, it is necessary to create and train a group of resource persons who can work at State HQ level and oversee progress of project and ensure smooth operations at field level. An ICT cell has been created with hired manpower and domain experts. These people have been trained on using application by Central Core Bihar team. These people not only co-ordinate with stakeholders but also interact with field formation for collecting data. In addition, the cell motivates decision makers to use ICT in decision making process and create ICT enabled environment for planning and monitoring.

Resource Persons at District/Division level:

In order to support project at district/sub-division and Block level large chunk of data has to be uploaded regular basis various kinds of resource persons have been hired or recruited. Project is being executed on HOH mode both officers and resource persons of service organization work together to achieve the objective of the project. Kind of Parameters required at decision making is

being identified by the field formations but it is being aligned with organization objective at HQ level. Field officials dealing with data have been trained and equipped both for uploading data, data standardization and also, they can use ICT as a tool for decision making. Proper h/w and software infrastructure has been created at field formations for updating data. District Informatics Officer/IT Manager has been trained to use the application and provide technical support to the Project. Training has been conducted for ADMs, Executive Assistants etc.

Workshops on adoption of latest technologies:

Workshops have been conducted for various stakeholders of the project to make them understand about available technologies and best practices In order to support project at division/district large chunk of data has to be verified/uploaded on Servers at regular basis. Numerous training programme has been conducted by Master trainers. Currently there is emphasis is on using Mobile technology to deliver services and gather data from field formations. In addition, regular training programme has been conducted through video conferencing.

VALUE INDICATORS

Learnings for sharing

Challenges

- Non-Availability of Mobile Phones with Beneficiary.
- Non-Availability of Bank Accounts in Bihar
- Lockdown under Covid 19 guideline
- Non-Availability of Aadhaar Card
- Delivering quality Service within very limited time
- Delivering Services to the remotest part of country
- Availability Internet Connectivity
- Literacy Rate of Beneficiary and use of Smart Phones by them
- Establishing Transparent Processes

Opportunities

- Identification and verification of beneficiary details
- Geo-tagging of Beneficiary
- Financial Assistance to the Workers
- Reduction of Duplicates in Beneficiary data.
- Accurate Targeting of Beneficiaries.
- Direct Benefit transfer to 29 Lakhs Beneficiary
- Extending benefit to citizen who need govt. services most and are placed at the remotest of society
- Process Reengineering of schemes for simpler flow of information and funds.
- Elimination of redundant processes in fund transfers and fast processing of applications.

Key Learnings

- Use of Mobile Apps for Service Delivery and Fund Transfer
- Aadhaar Authentication for digital identity of individuals
- Integration with PFMS for fund transfer
- Name Matching of Beneficiary and Bank Accounts Name using Fuzzy Logic
- SMS based service delivery framework

- Supporting Large Number of Users and Architectural design to handle large number of users.
- Registration of Beneficiary and skill Mapping
- Data Analytics and skill area identification for job opportunities.

Digital Empowerment

Parameters	Current Software
Platform	SQLSERVER 2012 and .net Platform, C#, AJAX, ARCGIS Server, JavaScript, IIS
Localization	English and Unicode Support
Online	Online Software with work flow management
Aapda Sampoorti Portal	On-line facilities and Bihar Corona Sahayata Mobile App
SMS Support	SMS Alert and SMS Monitoring facility has been added for monitoring
On-line Receipt Financial Disbursements	Direct Benefit Transfer has been done in the project
Help Desk and KIOSK	Available for Search Facilities
GIS Mapping	Spatial Analysis of Beneficiaries Across Country and Restriction of Beneficiary not to apply from certain restricted areas
Mobile App	Online Identification of Beneficiary, Submission of Form, SMS Alert, Online Enquiry
Dashboard	User based dashboards most of the stakeholders

Green e-Governance

- The project has tried to popularize its motto of "THINK BEFORE PRINT - save trees" among stake holders and citizen.
- Most of the task is being performed online
- SMS and email are used for communication.
- Documents are submitted in Scanned Copy and verified online.
- Online submission of forms.
- Digital verification of identity and verification of bank account online through PFMS.
- Online records are being processed
- Online grievance redressal mechanism
- Special training sessions are conducted for participants on Green ICT and its impact.
- Use of virtualization on servers, when available, to allow multiple operating systems to run on each machine.

Shri Chanchal Kumar, **IAS**, *Principal Secretary to Chief Minister, Chief Minister's Secretariat, CM Office (Bihar), chanchalk@gmail.com*
Shri. Shailesh Kumar Shrivastava, *Scientist F and Head, DGRC, National Informatics Centre, Digital Government Research Centre (Bihar), sk.shrivastava@nic.in*
Shri. Rajesh Kumar Singh, *Deputy Director General and SIO, National Informatics Centre (Bihar), sio-bih@nic.in*

Price Statistics in Rajasthan "PSR"

Directorate of Economics and Statistics, Rajasthan

Om Prakash Bairwa, Ranveer Singh and Amit Agarwal

PROJECT OVERVIEW

Vision & Objective

Earlier price data collected at district centres were send to Directorate at Jaipur by post or excel file for the compilation and index generation which took lot of time in data transmission and compilation thus index generation could not be done timely. 'Late data means no data', delay in data sending to various agencies means there is of no use of the data.

Price Statistics Portal is an integrated system to capture details of the various prices online from the district and Mandi Samitis. The system allows the department to keep an eye on price stability in the state. It is used to generate commodity wise indexes in the state. The system captures the data from Districts and Krishi Upaj / Fruits and Vegetables Mandi Samitis in a time bound manner. Once the price data is captured and freezed, it has been made available to various sections for analyzing and generation of indices. The portal serve as a useful tool for creation of district level statistical information and also to generate state level index and various major analytic reports timely, which may be useful for the state and central government and various agencies.

Key Module of the projects are:

- Whole Sale Price Capturing - Weekly Basis.
- Retail Price Capturing – Weekly Basis
- Live Stock Prices - Weekly Basis
- Building Material - Labour Price Capturing – Quarterly Basis
- Consumer Price Index Capturing – Monthly
- Animal Fair (Animal) Price Capturing – Yearly or as and when fair organized.
- Index Generation – Whole Sale, Retail, Live Stock, Animal Fair, Building Material

Key Stakeholders

- Directorate of Economics and Statistics: Overall Monitoring of the the price collections in the state. Sets the target date and keep an eye on the information in the state. Also responsible for analysis of the data and report the data at state and central government.
- District Statistics Office: Collect the prices from the identified shops and entry on the portal. Monitoring of the price collection in the district.
- Krishi Upaj / Fruits and Vegetables Mandi Samitis: Collect the prices of the commodities coming at Mandis and entry on the portal. Monitoring of the price collection in the Mandi.
- Labour Bureau, Shimla: Collection of the commodities prices from four centres Viz. Ajmer, Bhilwara, Alwar and Jaipur for the generation of Consumer Price Index. The generated CPI is captured in the PSR portal.

Key features of the projects

- Uniform process of Price Collection across the state.
- Prices are entered from District/Mandis itself. No offline mechanism available for sending data.

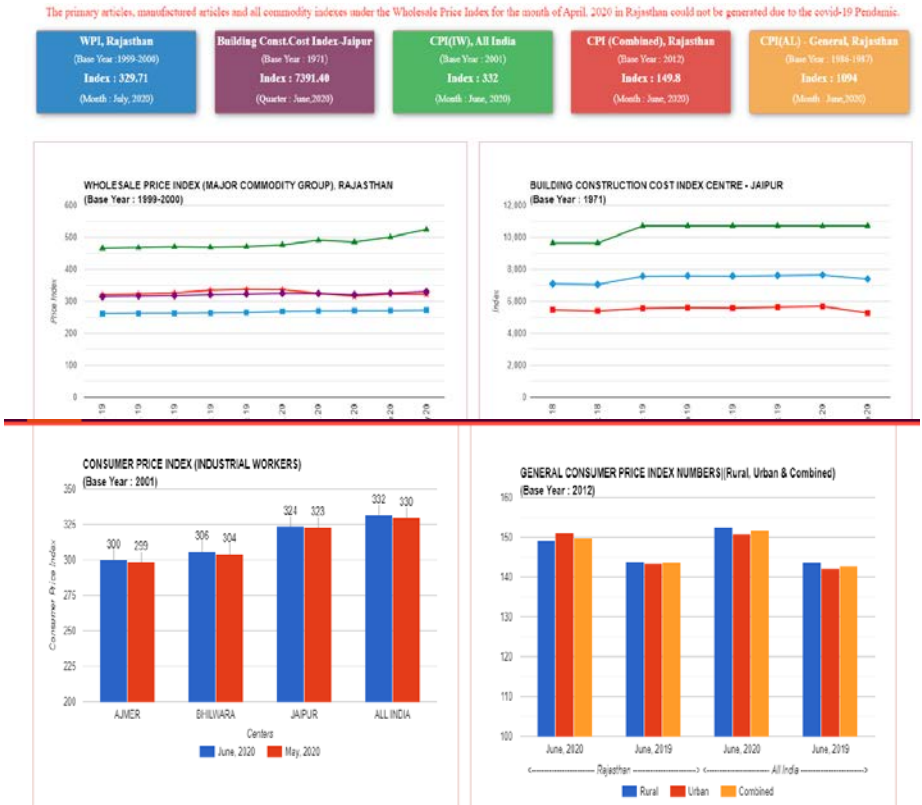
- Minimized duplicity of price data collection due to single portal at state level and proper validation.
- Maintenance of Centralized Prices database, which is being used for various analysis purposes.
- Availability of various MIS reports at District & State level.
- Circulation of Instructions, Notifications etc. to Districts / Citizens.
- Generation of Monthly Price Bulletin and releasing for citizens
- Modular Implementation (Agile) Approach

Key benefits of the projects

- Transparency in Price Collection.
- All information to citizens about the Price Statistics, Publications at single place.
- Timely generation and release of the indices.
- Analysing commodity wise existing markets.
- Assessing/assisting market research.
- Economic Solution - In-House Development

Current Status

- Price capturing only through portal.
- Automatic generation for wholesale Price Index and Building Construction & Wage rate Index for Jaipur Centre and major analytic reports for Retail and other prices.
- Various Price Publications are being released on the portal.
- Monthly price Bulletins are being released on portal
- Trends of Prices Statistics are shown to citizens.



Hardware/ Software

Application is developed using ASP.Net 4.8, C# and Microsoft SQL Server 2012 technology with three tire architecture using responsive framework. Application is hosted at State Data Centre, Rajasthan using rack servers. It is working on SSL. *Application/Web Server* - 4 Proc 8 Cores Server with 512 GB RAM, OS-Windows 2016 Server (IIS-10)

Data Base Server - 4 Proc 8 Cores Server with 256 GB RAM, OS-Windows 2012 Server & MS SQL Server – 2012

Certification (Certifying Agency)

PSR Web-Application has received web security audit clearance in January' 2018 from

- Cyber Security Division, NIC, New Delhi

Disaster Recovery and Service Continuity

Provision of full database backup and transactional backup on SAN (Storage area network) is scheduled.

Development and Support team also take regular backup on local staging Server of the database. Updated (latest) Application code is also available on the staging server.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Whole Sale Price	Capture weekly Whole Sale Prices and generate indexes	31697	32272	13725
Retail Price	Capture weekly Retail Prices and generate indexes	73856	75443	37068
Live Stock	Capture weekly Live Stock Prices and generate indexes	87519	87044	40666
Building Material	Capture Quarterly Building material Prices and generate indexes	9903	9899	2701
Consumer price	Monthly Consumer Price index data capturing and indexes generation.	1072	984	246

Implementation

In February' 2018 portal was started with the coverage of PAN Rajasthan and made mandatory for all District and Mandi Samitis to enter data on portal and no other means for sending data is acceptable. Legacy price data available with the department has also been migrated to the portal in phased manner.

Extensive training has been provided to all Districts officials for using the portal and correct data entry in their district. Dedicated support team have been identified so that any query may be answered quickly. Regular District wise training and monitoring through Video Conferencing done.

Presently 100% prices are being captured on the portal from district only.

Improvements / Enhancements

- Building and Labour price module developed.

- New citizen centric home page developed showing trends in the price statistics in the state.
- New module for CPI index capturing and reports developed.
- Mobile App for citizens.
- Legacy Price data has been migrated.

Major requirement envisaged (for coming year) are as under-

- GIS Mapping of all Price Collection location of the state.
- Addition of new Role for Block offices to be developed to deepen the reach of the portal.
- Mobile app for the collection of prices from the identified centers.
- New state CPI generation software to be developed.
- Productisation of PSR portal so that it may be implemented in other state also.

ENABLER

Processes Re-engineered

Before the psr portal, no such data for prices exist in the government. Major innovations were adopted as part of process reengineering in module designing in following entities:

- Citizens
  i. Online tends in prices.
  ii. Mobile App for various price statistics.
  iii. Various price publications online.
- District Offices
  i. Real time monitoring of Price Statistics in District.
  ii. No need to send any report to Directorate office.
- Directorate of Economics and Statistics
  i. Real time monitoring of Price Statistics in State.
  ii. Various types of monitoring reports.
  i. No need to compile any report for sending to MosPI, New Delhi.

Technologies

The role based Web-Application uses responsive design, enabling it to be easily accessible through PC/Laptop/ /Tablet/Mobile devices. Mobile App for Android users available.

Dashboard for State and District to quickly monitor the progress and pendency. Video Conferencing has been used for the training and monitoring purpose. Field officers were also get updated through social media like WhatsApp groups.

People

Extensive capacity building programme has been conducted for all District officials to monitor and data entry for their district. Support system has been identified with a dedicated support team so that any query may be answered quickly. Regular District wise training and monitoring through Video Conferencing done.

As Portal is mobile/tablet friendly, they access the portal, wherever available as per their suitability.

VALUE INDICATORS

Learnings for sharing

- The toughest challenge faced was to change the mindset of district officials who are reluctant to adopt new system which enables directorate to generate indexes on real time.

- The process re-engineering was big challenge due to existing manual and outdated process of registration.
- E-readiness of various stakeholders.
- Development of system within limited resources available with the department.
- Modular approach to development, frequent module launches.
- Daily meetings and interactions to ensure smooth progress.
- Feedback from stakeholders used to make the service more effective and user friendly.

Digital Empowerment

As Rajasthan is a backward state and major region belongs to rural, the portal is designed in a way that users does not face any problem. Helpful hints are provided at every stages of application form.

Green e-Governance

- Orders, Circulars and notifications are distributed through the portal which were earlier circulated on hard copies.
- No need to send any paper reports to any higher authority. All concerned authorities have been provided login to see their reports.

Shri. Om Prakash Bairwa, *Director and Joint Secretary, Economics & Statistics Department, Directorate of Economics and Statistics,Rajasthan, ombairwa@gmail.com*

Shri. Ranveer Singh, *Joint Director, Directorate of Economics and Statistics Rajasthan, jdcoord.des@rajasthan.gov.in*

Shri. Amit Agarwal, *Senior Technical Director & Scientist F, National Informatics Centre, Rajasthan, amit.agarwal@nic.in*

Telangana State Mana Isuka Vahanam (TSMIV)
(My Sand Taxi)

Department of Mines and Geology, Telangana

D Ronald Rose, Rajani Vishwanath and Rajendra Nimje

PROJECT OVERVIEW

Recent surge in infrastructure and real estate development across the state of Telangana has increased the demand for various construction materials including sand. This has led to spike in illegal sand mining and trafficking activities which could lead to environmental ramifications in the long run. To put an end to illegal sand mining and transportation, Govt. of Telangana has initiated an innovative e-Governance Solution called 'Mana Isuka Vahanam' ('My Sand Taxi' in English) in Telangana State through which citizens can book sand and get it delivered at their doorstep by paying a nominal amount. MIV is a web & mobile based application, providing suite of sand procurement and delivery solution to all stakeholders in the value chain including customers, tractor owners, Department of Mines and Geology, Government of Telangana and District Sand Management Societies headed by the Collectors. This application has been effective not only in curbing illegal Sand trafficking but has also almost doubled up government revenue from district sand mining societies by bringing efficiency and transparency into the system. The overall goal of the initiative is to implement a state-wide 'Sand Delivery and management System' through use of innovative technologies for improved Governance in the state. With this goal in mind, Government of Telangana has implemented an innovative e-Governance Solution of 'Mana Isuka Vahanam' Project in May 2019 to 'enhance efficiency in sand transactions, effectiveness in control, transparency in operations, accountability at all levels, sustainability in the long run and convenience to all the stakeholders."

Objectives

The detailed objectives of the project are as given below:

- To implement a State wide web and mobile based e-Governance solution of 'Mana Isuka Vahanam' project to streamline the end-to-end processes of Sand booking and delivery management system in the Telangana State.
- To control unauthorized excavation and transportation of Sand in the Districts
- To ensure seamless services to all the stakeholders such as customers, tractor owners, district officials etc without any manual interventions and physical touch points.
- To provide fair employment opportunities to the Tractor owners and labourers in the Districts.
- System should be user friendly and 'Easy to Access' by keeping Citizen Experiences in mind (especially sand customers and tractor owners).
- System should be Contactless, Paperless and Cashless as per Digital India guidelines.

Following are the ways through which the above stated objectives are achieved after the implementation of 'Mana Isuka Vahanam' Project:

- Seamless implementation of web and mobile app-based e-Governance Solution of 'Mana IsukaVahanam' project in 11 Districts of Telangana State.

- TSMIV is an online system and is without any manual interventions in the end-to-end processes of Sand Booking & Delivery Management and do not have any or physical touch points with the customers or tractor owners.
- System is designed and developed as bilingual (Telugu & English) web & mobile solutions developed on latest technology platform and emerging technologies.
- System is user friendly and 'Easy to Access' and designed &developed by keeping Citizen Experiences in mind (especially sand customers and tractor owners).
- System is Contactless, Paperless and Cashless as per Digital India guidelines.
- All the stakeholders are seamlessly connected with the system as per their user access and privileges.

Scope (Functional)

MIV, an e-Governance Solution is a State wide Web & Mobile based application, providing cutting edge to the Department of Mines and Geology, GoTS and District Sand Management Societies headed by the Collectors for the efficient delivery of public services in the State; and the service delivery to the Citizens through effective, transparent and efficient sand booking and delivery Management in the State. MIV has been implemented in nearly 90% of the Sand Producing Districts in the Telangana with all the innovative features of latest web & mobile technologies (including bilingual versions in Telugu and English), Artificial Intelligence Chatbot, GIS, AIML, security features etc. The responsiveness to the users is ensured through SMS services at every stage of sand booking and delivery and a secured payment gateway is setup to avoid any payment issues. MIV ensures that the 'end to end' Sand booking and delivery management system in the Districts should be totally automated and without any manual interventions through a transparent robust e-Governance Solution based on real time information availability to all the stakeholders. TS-MIV is a path breaking innovative e-Governance solution and is developed on the latest technology platforms. TS-MIV has technology features of GIS and is compatible with the Vehicle tracking System towards effective sand management in the districts and to control illegal Sand mining and transportation in the Districts. TSMIV has used Artificial Intelligence 'Chatbot' for automated online conversation related to customer service is developed via text which is a rulebased, open source Chatbot that leverages Artificial Intelligence Markup Language (AIML) features. This project is a long-term end to end solution towards an automated Sand Management System for the District Sand Management Societies by automating the activities right from the registration of tractors to its approval and the related file management through automated work flow processes. The system will facilitate building databases of all the stakeholders along with the applied processes and generates online Dashboards, MIS Reports, Tableau Reports which can be drilled down to the granular levels.

Following are the broad modules and innovative features of TSMIV Project:

- *Tractor Registration:* The tractor owners are uniquely registered in the system online by the use of e-payment gateway facility and with the upload of all the relevant documents. Assistant Director, Mines approves the tractor registration and authorizes the tractors to get sand allocation.

Only authorized tractors can transport Sand in the districts. Tractor owner can either accept or reject order through mobile application.

- *Sand Booking:* Customer registers into the TS-MIV Web Portal or Mobile application by entering the mobile number and validating it with OTP. On registering, the customer can book Sand by entering the booking details and by making online payments from anywhere and anytime in a hassle-free manner without physically visiting the office. The sand charges are regulated by the Government. The customers get estimated time of delivery of the Sand and can track the delivery. Once the sand is delivered to the customer, the trip is closed by providing the customer OTP to the driver and the driver receives the successful sand delivery message also making him eligible for the next trip in FIFO. This innovative solution has given the experience of online market services at the grass root level in the State of Telangana. Use of Artificial Intelligence Chatbot for automated online conversation related to quick customer service is ensured.
- *Allocation of Tractors to the Customers:* The tractor trip allocation is automated based on queuing process of FIFO i.e. 'First In First Out'. This ensures equal opportunity to all the enrolled tractors operators in the Districts to transport the Sand and removes bias present in the manual system. It also ensures efficiency & transparency in the system and restores Trust in the Government working. On getting the auto allotments by the system, the tractor drivers receive the order, confirm the same and load the Sand from the respective sand reach. On giving OTP by sand consumer, tractor owner uploads to the system to join the queue for next trip.
- *Sand Loading*: The sand is loaded into the tractor for its delivery to the customer. The Sand Reach Officer (SRO) captures a sand loaded picture of the tractor and submits in the mobile app along with geo-coordinates. On submission, the customer receives the details of the vehicle (booking delivery) along with an OTP, which he has to provide to the tractor driver on the delivery of sand.
- *Trackable Sand Delivery*: The tractor driver delivers the sand at the doorstep of the customer and submits OTP for the closure of trip. Use of innovative technology is ensured as the tractor movement during the supply chain is recorded with Geo coordinates along with photographs till its final delivery at the doorsteps of the Customers and the customer can track the delivery. At the end of each trip, the driver receives SMS from the system with sand delivery confirmation and amount earned for the trip.
- *Decision Support System:* Dashboards, MIS reports and GIS parameters are available in TS-MIV for the real time monitoring and quick decision making by the Collectors and District Sand Management officials to monitor the working, grievances and the revenues from time to time. Speedy decision-making system is enabled through Dashboards, MIS Reports and Tableau Reports available for all the stakeholders including Department of Mines and Geology, District officials based on real time information. This also helps in the monitoring of the revenue generated from each district.
- *Grievances Redressal System:* Grievances can be filed directly in the TS-MIV by the customer & tractor owners. The District Sand

Management Society addresses the grievances online and inform to the Customers & the Stakeholders.

The logins are available in TS MIV for the following users:

- Tractor Owner, Customer, AD Mines, Collector, Police Personnel, SRO, Call Centre, Grievance Officer

Scope (Geographical):

MIV is implemented in 90% of the Sand Producing Districts in Telangana State and is successfully in vogue in the following 11 districts of Telangana State:

1) Jagital, 2) Jogulamba Gadwal, 3) Mancherial, 4) Mahabubnagar, 5) Nalgonda, 6) Narayanpet, 7) Peddapalli, 8) Wanaparthy, 9) Bhadradri Kothagudem, 10) Mulugu, and 11) Karimnagar

Following Districts are in the pipeline for its implementation

- Kamareddy, Nagar Kurnool, Khammam districts are in pipeline for its implementation.

Key Stakeholders:

MIV is an integrated platform catering to the requirements of all stakeholders in sand mining and procurement ecosystem; all stakeholders are seamlessly connected by the system as per their user access and privileges.

- Department of Mines & Geology
- District Collectorate Offices
- Assistant Director, Mines & Geology
- Sand Management Societies – throughout the state
- Tractor Owners
- Customers
- Payment/SMS Gateway agencies
- CGG e-Governance team & Management

Benefits:

The outcomes are immense in terms of effective delivery of transparent services by the Government to all the Stakeholders of the ecosystem by giving them the user experience at par with the private online market services at the grass root level and in building the institution through accountability. This solution has been effective in not only curbing illegal Sand trafficking but also in the conservation of Environment and has almost doubled up the revenue of the Government due to the transparency in the system. The customers are benefitted enormously on account of reduction in the cycle time of booking of sand and its delivery, the transparency in terms of charges, ease of accessibility the government services, quick redressal of grievances etc. The revenue has grown in the sand producing Districts after implementation of the system.

Till date approx. Rs. 215 crores of sand is procured through TS-MIV system. TS-MIV has also helped the Districts to have better Sand Management and to control the illegal mining and transportation of Sand through the innovative use of technologies.

MIV has enhanced the following

- *User Convenience* on the lines of any private online marketplace like Flipkart or Amazon making booking to delivery of sand a smooth experience. Mobile App in Telugu language has deep penetration due to its simple format. Tractor owners can track their trip earnings online.
- *Enhancing income to hand to mouth tractor owners* by system driven FIFO system and auto Queuing for the next trip

- *Efficiency in transactions* led to increase in the revenue receipts of the District Sand Management Societies
- *Responsiveness* by the District Sand Management Societies to customers and tractor owner grievances in time
- *Effectiveness in control* –Collector and the officials of Sand Management Society have effective control on the Sand Management in the District as only authorized tractors are allowed to reach sand mine reaches that too as per queuing system. Unauthorized sand mining is under control on account of the project. The Dashboards and MIS reports are highly useful to Sand Officials and District Collector for decision making as they are based on real time information.
- *Transparency in operations*-TS-MIV is completely transparent for each process. Sand booking to delivery, Tractor registration to trip allotment and revenue reconciliation with payment gateways, SMS to stakeholders at each stage, everything is system driven without any manual intervention.
- *Accountability at all levels*-On account of real-time and online information availability at various levels the accountability is easily fixed on the defaulters. Tractor registration is online replacing the corrupt manual system. Trip allotment is FIFO removing control out of the hands of sand reach officials. Photographs have to be uploaded by Sand officials at various stages ensuring accountably fixation.
- *Scalability and Sustainability in the long run* –System is designed and developed based on the latest Technology Platforms with scalability to ensure the business continuity. New districts and sand mines in existing districts can be added with least efforts. After testing the success of the system the stakeholders are putting pressure on the system for its continuity. Tractor owners' income has considerably gone up and customer satisfaction is very high which ensures sustainability.

The Stakeholders wise benefits are given below:

TS-MIV is a decentralized solution and implemented at the grass root level and it is very easy for the District officials to monitor and manage the Sand. Through TS-MIV customers, tractor owners, District Sand Management Society and State are majorly benefitted as per the details given below:

To the Customers (Citizens):

- There is no involvement of middleman as the entire processes considering the above stated in the supply chain is online
- The cycle time of delivery of Sand has substantially reduced from the time of booking till its delivery to the customers. Now the customers are getting sand almost on the same day of booking.
- MIV enables the citizens to purchase the sand at the lowest possible cost regulated by the Government.
- The customers have their own dashboards in MIV including mobile app monitoring and can track their orders and deliveries from time to time. SMS is sent to them at the stage of loading approximate time for transport and also share OTP to be given to Tractor driver only after satisfied sand delivery.
- Payment for sand is online and integrated with best payment gateways for ease of operation
- The MIV helpdesk is established to address the grievances of customers.

- The user-friendly system has enabled the customers to approach public services at par with private online market players

To the Tractor owners:

- Registration of tractor for sand transport is online removing the harassments and corruption.
- Trip booking is based on FIFO i.e. 'First In First Out' principle for Sand Allotment to the Tractors owners which ensured transparency, equal opportunities and Trust in the system.
- Trip re-queuing is linked to the confirmation of delivery of sand to the customer by uploading OTP given by customer ensuring auto rights for next sand load at sand reach points removing harassments at the hands of sand reach officials
- Tractor owners have their own dashboards to track their orders trip and total earnings from time to time.
- TS-MIV is a user-friendly system and has enabled the tractor owners to approach the District Sand Management Society directly for their quick grievance redressal.
- The MIV helpdesk is established to address the grievances in a speedy manner.

To the District Sand Management Societies and Department of Mines & Geology:

- *Efficient System:* It controls unauthorized excavation and transportation of sand in the districts. There is no involvement of middleman as the entire processes in the supply chain are online i.e. the tractor registration, sand booking, payment and efficient delivery of Sand at the doorstep of the customer.
- *Efficiency in transactions* –TS-MIV is an online system without any hidden costs and manual interventions during the entire supply chain of Sand booking till its delivery at the doorstep of the customer. All the transactions are recorded in the system and audit trails are available.
- *Revenue growth*-Now it is very easy for the District officials to monitor the revenue realization as it is generated based on real time information. Within the 6 months of the implementation, the revenue receipts in the Districts have gone up by 50% in the Sand producing districts of the Telangana State. Following is the broad statistics of TS- MIV project:
  i. Tractors registered- 9,292
  ii. Customer booking received -2,59,681
  iii. Trips booked - 13,46,991
  iv. Revenue generated-approx. 220 crores
- *Responsiveness* –Online Grievance Redressal by the District Sand Management Societies on time on the pain areas or challenges faced by the stakeholders from time to time has made the system responsive. This has enhanced the credibility of the Government for the efficient delivery of public services.
- *Effectiveness in control* –Only authorized Tractors receive Sand allocation from the System and can deliver the Sand. This has stopped fictitious and bogus sand bookings and has controlled unauthorized excavation and transportation of sand in the district. District Collectors and Sand officials have access to revenue and grievance monitoring ensuring execution of designed control points.

- *Transparency in operations* -The Sand delivery can be tracked by the officials through the mobile and web application. Tractor registration system, FIFO implementation, auto closure of trip based on customer given OTP to tractor owner has ensured transparency for District societies.
- *Decision Support system:* MIV has Dashboards and detailed MIS, Tableau reports& GIS based reports for effective monitoring and decision making at the District and State level.

Regulatory Department:

- The system is accessible to Police machinery in the district so that they can easily verify the authenticity of the authorized tractors carrying and transporting sand in the district.
- The Sand delivery can be tracked by the officials through the mobile application

Accountability at all levels-

The Stakeholders have trust on the system as they are aware that all the processes are system driven and are without any manual interventions.

Sustainability in the long run –

- System is designed and developed in the latest Technology Platforms. TS-MIV platform is eminently scalable and capable of adaptive accessibility across multiple change vectors.
- Provides employment to the tractor owners and labourers in the districts

Convenience to all the stakeholder of the system-

Bilingual (Telugu &English) web and mobile based e-Governance Solution of TS-MIV is user friendly and very easy to use.

Current Status:

TS MIV is successfully in operation for the past 1.5 years in 11 Districts of the Telangana State. However, District Sand Management Societies are continuously asking for improvements in the TS MIV web and mobile application to make it highly automated system for the ease of transactions by the citizens as well as the District Sand Management Societies.

Software

CGG has its own Data centre and near line Disaster Recovery Centre with STPI, Hyderabad. Technology Stack for Web based application for TS-MIV:

- *Application development:* MIV is developed using open-source Java Technologies i.e., Java Development Kit version 1.7, Java server pages, JQuery, Ajax, Java script, Servlets, JDBC, Struts frame work, My Eclipse 10, , CSS, HTML 5 for the UI development.
- *Database:* MS SQL server 2012 database is used for storing and retrieving electoral data. Postgre SQL 9.3 database is used for generation of dash board reports and various analysis reports.
- *Operating System:* Windows 10/ Red Hat Linux Enterprise edition 5.0(RHEL 5.0)
- *Web Server:* Apache Tomcat 7.0

Technology Stack for Mobile based application for TS-MIV:

- *Mobile Application:* Android
- *Database:* The application has a built-in database, designed and developed using PostgreSQL 9.3 and MS SQL server 2012 version.
- *Operating System:* Windows/ Red Hat Linux Enterprise edition 5.0(RHEL 5.0).

- *Web Server:* The hosting of applications is done using Apache Tomcat Server

Hardware: RAM: 32GB, CPU Cores: 16.

IT Infrastructure Security Measures taken are as follows:

Network infrastructure

- Two-layer Firewalls for network security with failover
- Hardened all its Network infrastructure
- Native Security enabled to all the Linux & Windows servers
- Host based malware protection for all the servers
- Mail server is protected with Anti-spam to control the spam.
- Desktops and laptops are protected by Endpoint and Symantec DLP.

Compliance & Security Standards

- Guidelines for Indian Government Websites (GIGW)
- Telangana Government Websites (GTGW)

Data Security

- Application Security (certified by CERT-In empanelled agencies)
- Security Policy for IT Infrastructure formulated by CDAC,

IT Infrastructure Audited by CERT-IN empanelled agency

- Server Systems, Network Infrastructure – Firewall, Routers and Load Balancer

Cyber Security

TS- MIV application is Security Audited by CERT-IN empanelled agency.

Disaster Recovery and service continuity

CGG, as the technology partner, has its own data center and uses information technology to quickly and effectively process information. CGG processes information and stores large amounts of data in its state-of-the-art datacenter at its premises.

- An information technology disaster recovery plan is being implemented by CGG in conjunction with the business continuity plan. Priorities and recovery time objectives for information technology are developed during the business impact analysis.
- Technology recovery strategies are developed to restore hardware, applications and data in time to meet the needs of CGG business recovery.
- Centre for Development of Advanced Technology(CDAC) has prepared Security Policy for the Data Centre of CGG
- CGG is certified with ISO 27001:2013 for establishing, implementing, maintaining and continually improving Information Security Management System(ISMS)
- CGG uses the following technologies for Disaster Recovery and Business Continuity:
  i. *Data Centre*-Disaster Recovery replication between and within the same Data Centre at the storage level with latest technologies such as “HyperSwap” for high-availability of services to the Government and the citizens.
  ii. Near line Disaster Recovery Centre is set up at Software Technology Park of India (STPI), using OEM proprietary technologies with VMWare for high-availability of services to the Government and the citizens. The Disaster Recovery Centre for CGG’s Data Centre, is equipped with state-of-the-art Hardware, Software and Control

Infrastructure, to achieve optimum operational performance, safety and security.

iii. CGG Business continuity is achieved by VDI (Virtual Desktop Infrastructure).

iv. CGG has its own infrastructure of power source, for its Data Center and a renewable energy source through solar plant is being set up @CGG Gachibowli office.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21 (till 21st Oct 2020)
Tractor Owner Registration	This service is used for Registrations of Tractors		7,141	2,151
Customer Sand Booking	This service is used for booking of sand		1,46,768	1,12,913
Trip allocation	Trip booking is based on FIFO i.e. 'First-In First-Out' principle for Sand Allotment		7,20,410	6,26,581
Grievance Monitoring System	Service is used to raise any Grievance faced by the customer/tractor drivers.		3,632	4,885

Implementation

Implementation Coverage achieved in comparison to the plan / target

MIV has been implemented in nearly 90 per cent of the sand producing Districts in the State of Telangana with all the innovative features of latest web & mobile technologies (including bilingual versions in Telugu and English), Artificial Intelligence Chatbot, GIS, AIML, security features etc and with the interface of Vehicle Management System.

The 11 sand producing districts where MIV has been implemented are 1) Jagital, 2) Jogulamba Gadwal, 3) Mancherial, 4) Mahabubnagar, 5) Nalgonda, 6) Narayanpet, 7) Peddapalli, 8) Wanaparthy, 9) Bhadradri Kothagudem, 10) Mulugu, and 11) Karimnagar. Implementation in Kamareddy, Nagar Kurnool and Khammam districts are in pipeline

The targeted goals for implementation of TS MIV project are achieved by 100%.

Geographical Area

- TS MIV is implemented in 90% of the sand producing Districts who have requested for TS-MIV web & mobile based application. The 11 sand producing districts where MIV has been implemented are 1) Jagital, 2) Jogulamba Gadwal, 3) Mancherial, 4) Mahabubnagar, 5) Nalgonda, 6) Narayanpet, 7) Peddapalli, 8) Wanaparthy, 9) Bhadradri Kothagudem, 10) Mulugu, and 11) Karimnagar
- Implementation of TS MIV in Kamareddy, Nagar Kurnool and Khammam districts is in pipeline

Functionality

- MIV has been implemented in nearly 90 per cent of the sand producing Districts in the State of Telangana with all the innovative features of latest web & mobile technologies (including bilingual versions in Telugu and English), Artificial Intelligence Chatbot, GIS, AIML, security features etc and with the interface of Vehicle Management System.
- All the functionalities developed in TS-MIV as described in detail in section 3.1 are implemented in all the 11 Districts.

Delivery Channels

- TS-MIV is a web & mobile based application for the efficient functioning of various modules by the District Sand Management Societies, Tractor Owners and Customers
- Mobile application is predominantly being used by the Tractor Owners, Sand Reach Officers, Customers etc for accepting trips allocation, geo tagging, taking pictures while uploading of Sand, trip closure etc with the use of SMS services.
- The responsiveness to the users is ensured through SMS services at every stage of sand booking and delivery and a secured payment gateway is setup to avoid any payment issues.

Category of Stakeholders

All Categories of Stakeholders are covered and getting benefitted through the implementation of TS-MIV and stakeholders wise actual benefits are described in detail in Section 3.1

- Customers & Tractor Owners
- Sand Management Societies, District Collectors, Department of Mines & Geology
- E Payment Gateway Agency & SMS Gateway agencies

Improvements/ enhancements specifically rolled out during last one Year

- *Automated trip allocation:* Tractors are registered online and allotment of vehicles is scheduled in the automated First-In-First-Out (FIFO) system. Tractor owner can either accept or reject order through mobile application.
- *Innovative technology adoption:* Artificial Intelligence Chatbot, GIS based dashboards, AIML, security features etc.
- *Automation of Payment Reports:* All the payment are generated online and can download by giving the appropriate dates at any point of time.
- *Payment Gateway:* Secured payment gateway is setup to avoid any payment issues
- *SMS Gateway:* The responsiveness to the users is ensured through SMS services at every stage of sand booking and delivery and
- *Chatbot:* Use of Artificial Intelligence 'Chatbot' for automated online conversation related to customer service.
- *MIS Dashboards:* Speedy decision-making system is enabled through Dashboards, MIS Reports and Tableau Reports available for all the stakeholders including Department of Mines and Geology, District officials based on real time information. This also helps in the monitoring of the revenue generated from each district.
- *Grievances* can be filed directly in the TS-MIV by the customer & tractor owners.

Improvements/enhancements specifically planned out during next one year

- *Online Refund to Customers:* When the customer books sand and he puts the request for cancellation of Sand, the amount has to be refunded to the Customer online by the District Sand Management Societies.
- *Vehicle Tracking System (VTS):* Implementation of VTS with the Dashboard to track the movement of the tractor. It does the route monitoring & violation triggers once the vehicle deviates for a particular trip.
- *Data Science Execution:* Implementation of AI/ML/ Data Science Use Cases for MIV project.

ENABLER

Processes Re-engineered

MIV was started as the Government of Telangana with objectives of curbing illegal sand mining (to prevent environmental degradation), providing timely sand delivery at least price to the customers. Dept. of Mines and Geology, GoTS (incl. AD Mines) in technical collaboration with CGG took this initiative forward to build a robust and scalable system to deliver sand to the end customer in efficient manner.

CGG has a dedicated e-Governance Software professional working on new Technologies to develop required applications for departments of all State Governments and the Union Government. Process initiates with requirements collection and follows Prototype Demonstration, Series of interactions, signoff, and Development, Testing, Quality and Deployment stages.

CGG focuses on Requirements understanding, Project Planning, Risk planning & Mitigation and ensures quality and estimates the 100% usage & success of deliverable before deployment. CGGs' Project Management Approach has been designed to cover eight vital areas of project management:

Expectation Management:

Defines and sets key expectations and level of authorities within CGG and TSMIV Team.

- *Requirement gathering:* Collection of requirements from the District Sand Management Societies as per the prevalent rules/procedures duly involving consultation with all the stake holders. CGG team had detailed discussion with all the stakeholders to understand the existing processes (AS-IS), challenges, collection of data etc. This stage had helped CGG to understand the requirements for the proposed e-Governance Solution (TO-BE).
- *Due Diligence on best practices:* CGG has benchmarked National and International best practices in Sand Management through the secondary research to ensure that the proposed solution must have the best features available to the grassroots' levels in Telangana
- *Gap Analysis:* CGG had conducted gap analysis after studying AS-IS processes and proposed areas of improvements to the District Sand Management Societies based on the challenges and pain areas informed by them. The major challenges informed are as given below:
  i. illegal mining and transportation of sand by unauthorized tractors,
  ii. Citizens were getting services with enormous delays and the system was opaque for them
  iii. Involvement of middleman resulted in huge inconveniences to all the stakeholders.
  iv. Tractor owners were required to physically visit offices for their tractor's registration and closure of trips

v. Bias in allocation of sand trips to the tractors resulted in unfair practices
vi. Manual interventions, physical touch points and interferences at each stage of Sand booking till its delivery to the customers
vii. no real time information availability with the District Sand Management Societies for monitoring and managing Sand in the Districts
viii. Manual reconciliation of revenue earnings for the sand mining societies was the most difficult task and auditing was cumbersome

- *Finalization of TO-BE processes for TSMIV project* after considering all the challenges and pain areas in the current set up. Firming up of functionalities required for innovative e-Governance Solution of TS-MIV.
- *Development of prototypes:* Based on the finalized TO-BE processes, the required services were identified; prototypes were designed and demonstrated to the stakeholders for confirmation.
- *Implementation of the system:* Web and mobile based TS-MIV systems were demonstrated to the Collectors, District Sand Management Society Officers, and the Department of Mines & Geology, GoTS. Modifications or improvements were addressed for the effective use of TS-MIV by the districts in the State
- *Help Desk Support*- Help desk support is located at CGG and the services are provided to all the stakeholders of the system for hassle free delivery/consumption of TS-MIV services.
- *Preparation of user manuals and training to the stakeholders:* Training is conducted from time to time to the users of the system and video User manuals are prepared for all the services and communicated during the training. A test/demo URL is provided to the user department to get acquainted with the system.
- *Access Rights:* Role based restricted access is provided to all the stakeholders of the system.
- *Documentation of the project:* CGG has documented the project at various stages such as Proposal, MoU, SRS, SDD, Project Plan, Test Plan, IDD, User Manuals (video also) etc.

Quality Management:
Defines key quality management measurements and processes during project lifecycle.CGG follows standards such as CMMi L3, ISO 9001;2015 for Software Development Life Cycle & ISO 27001:2013 for Information Security Management System.
Project Planning and Control:
Defines practices to manage project costs, schedules and deliverables throughout the project lifecycle.
Risk Management:
Defines practices to quantify potential risks, prepare risk mitigation plans and raise early warnings, as required.
Scope Management:
Defines practices to manage change (addition, reduction and modification of the functionality) by establishing key decision-making criteria and striking a balance between functionality to deliver, project schedule and costs.
Inter-Group Coordination:
Defines practices to facilitate inter-group cooperation to leverage the entire strength of both TSMIV Teams and CGG, including support teams for project

resources, standard practices, training and development, and technical assistance.

Technology Audits: Defines practices to establish, follow and control technology aspects, i.e. development and deployment environment, tools used, system architecture etc. This facilitates a high-level of on-going performance, scalability, extendibility and maintainability through regularly scheduled audits.

Process Audits: Defines practices to establish, follow and control the quality aspects through regularly scheduled process audits.

Knowledge Transfer- It is a routine activity to provide domain and technical knowledge on all the Processes and code, Sharing of Technical Documentation etc.

Process Reengineering & Change requests

Older system of sand allocation and delivery was manual and had a lot of hiccups; it was prone to system inefficiencies and corruption. There was no tracking of Sand delivery, MIS Reporting, Grievance Mechanism. The GoTS had initiated an innovative e-Governance Solution called 'Mana Isuka Vahanam' (My Sand Taxi in English) in the Telangana State in order to weed out inefficiencies and corruption in the Sand Delivery and to ensure uniformity and simplification of procedures and standardization of processes through automation.

This solution has been effective in not only curbing illegal Sand trafficking but also in the Conservation of Environment and has almost doubled up the revenue of the Government due to the transparency in the system.

The MIV Application is LIVE from May 2019 and entire system of Sand Booking, Trip Allocation and Sand Delivery processesare completely automated. New interventions are incorporated on a regular basis. Modular design approachand reengineering is in place in TSMIV. The application is improvised regularly based on the inputs and change requests from all the stakeholders with the latest trends and technologies.

Through 'Mana Isuka Vahanam' Project, following are the perceptible improvements in processes/ systems in alignment with the above stated goals &objectives in Section 3.1:

- Identified process improvement areas through brainstorming sessions with the stakeholders. The overall objective of the process transformation was to cut down the redundant processes and avoid physical touch points or manual interventions throughout the supply chain of Sand in the Districts.
- System is designed and developed as bilingual (Telugu & English) web & mobile solution. System is designed and developed as User friendly by keeping Customer Experiences in mind (especially sand customers and tractor owners).
- System is Contactless, Paperless and Cashless as per Digital India guidelines.
- All the stakeholders are seamlessly connected with the system as per their user access and privileges.
- All the processes i.e. 'end to end' online booking, online payment and efficient delivery are automated to avoid any physical touch points or manual interventions with the Tractor Owners, Customers or any other stakeholders of the system. No middleman is involved. This has infused Trust in the Government Service delivery.

- The system records the geo-coordinates and photos of the Tractors during the entire Supply Chain of Sand i.e. from Sand Reach to the doorstep of the customers.
- The system is designed to integrate with the Vehicle Tracking System in the District.
- The Customer can track the sand from the start of the trip, likely day and time of the delivery and get notifications during the supply chain through SMS at par with private online market players. The Customer can track the deliveries quickly through the mobile application.
- Police officials in the Districts are given the access to the system to check the authenticity of the Tractors carrying the Sand to curb the unauthorized sand mining
- Decision Support System through Dashboards & MIS report to the Collectors, AD Mines, other officials based on real time information
- Revenue reports are accessible to the District & State Functionaries
- Use of Artificial Intelligence 'Chatbot' for automated online conversation related to customer service.
- Tractor owners have their own Dashboard and keep a track of trip and total earnings at any given point of time.
- The customers can book sand at the lowest possible cost as regulated by the Government.
- Speedy disposal of Grievances received from the Stakeholders by the District Sand Management Societies
- It provides employment to the tractor owners and labourers in the district
- Controls unauthorized excavation and transportation of sand in the district.

TS-MIV is an integrated solution and all the stakeholders are seamlessly connected and getting benefitted. This has helped in building & strengthening institutions for the delivery of public services up to the grass root level through efficient, accountable, responsive and transparent sand management system.

Technologies

TS-MIV is a path breaking innovative e-Governance solution and is developed on the latest technology platforms. TS-MIV leverages latest technological innovations to ensure seamless sand delivery to customers and curb illegal sand mining in the state:

- *GIS:* Sand loaded vehicles are photographed at the sand reach location; these photographs are geo-tagged using GIS technology to ascertain the location and then uploaded to the MIV application. GSI based Dashboards are available for decision making for the District Collectors.
- *AIML:* Artificial Intelligence based 'Chatbot' is used for automated online conversation related to customer service
- *Data Analytics (BI):* Tableau based BI Dashboards are provided for different stakeholders for reporting the relevant performance and current status:
  i. *Dept. of Mines and Geology:* Dashboard to view the State-wide revenue and various activities going on in the State w.r.t Sand excavation.
  ii. *District Authorities (incl. Collectors and Sand Management Societies):* Dashboards to know booking / delivery status and revenue earned and can drilled down up to Sand Reach wise and

booking wise status of Sand deliveries. Tractor Drivers: Dashboard to have history of information on all the bookings and income earned by trip deliveries in a given month (time period)

iii. *Customers:* Dashboard to know the past order details and the status of their current order

iv. *Law Enforcement:* To overcome the challenge of illegal sand mining, MIV has enabled a dashboard for police which would enable them to ascertain if a particular tractor is transporting legally mined sand to the designated customer through MIV application

- Devops Implementation: Continuous Integration (CI)/Continuous Deployment (CD) to provide dynamic release and deployment Management.
- Web and Mobile based application(Bilingual) for ease of use
- Social Media:
  i. MIV documentary featuring its functionalities and video user manuals are posted in You Tube
  ii. WhatsApp group is created to speedy monitoring of various issues faced by customers, tractor owners & Mining officers.

People

Capacity Building

- Prior to the implementation, awareness was created at individual and organization level on the TS MIV applications usage through brainstorming session conducted by CGG with all the District Sand Management Societies.
- Web and mobile based TSMIV systems were demonstrated to the Collectors, District Sand Management Society Officers, and the Department of Mines & Geology, GoTS
- During implementation, trainings were given to all the users of web & Mobile applications in the Districts. Training on developed software has been given to all tractor owners, Sand reach officers, AD Mines, and other officials of District Sand Management Societies.
- On the implementation of any new feature, training is continuously provided to the users of the system. Training is conducted from time to time to the users of the system and video User manuals are prepared for all the services and communicated during the training and available in the Portal. A test/demo URL is provided to the user department to get acquainted with the system.
- Web and mobile based TSMIV systems were demonstrated to the Collectors, District Sand Management Society Officers, and the Department of Mines & Geology, GoTS
- Helpdesk facility is given for all the Stakeholders to attend to any queries.

Leadership support

- Director Mines & Geology, Telangana, District Collectors & District Sand Management Societies officials with an aim to curb illegal mining of sand and to provide sand access at an affordable price to citizens have contributed and helped CGG in conceptualizing TS-MIV as a citizen centric e-Governance Solution. The TSMIV is designed and developed by keeping the citizen experiences in mind.

- This project being very important to the State, Director General, CGG guided the team for adoption of relevant technologies during the design and development stage and reviewed the project frequently.
- Motivated the teams to achieve the desired project goals by developing the innovative solution for the Government.

Change Management

- Stakeholder meetings were held with AD Mines from sand producing districts in Telangana before developing the application to incorporate their suggestions and concerns
  Modifications or improvements were addressed for the effective use of TS-MIV by the districts in the State
- CGG has ensured involvement of all the Stakeholders during the entire project life cycle along with communication of clear roles and responsibilities at all the stages of the project. Further, reasons for change were also explained to all the stakeholders, ensured smooth implementation.
- In case of project transition, a customized plan shall be prepared to ensure less impact on the project deliverables. For ensuring continuity, project documents, training and knowledge transfer shall be provided so that the transition is smooth and successful

Help Desk Support-Help desk support is located at CGG and the services are provided to all the stakeholders of the system for hassle free delivery/consumption of TS-MIV services.

Stakeholders consultation for the continuous improvement

Web & Mobile based Application Demonstration to the Stakeholders: MIV application (both web and mobile) are demonstrated to the Collectors, District Sand Management Society Officers, and the Department of Mines & Geology, GoTS to obtain their feedback for improvement on regular basis.

VALUE INDICATORS

Learnings for sharing

Participation and inclusion of all the stakeholders

- CGG team had detailed discussion with all the stakeholders to understand the existing processes (AS-IS), challenges, collection of data etc. This stage had helped CGG to understand the requirements for the proposed e-Governance Solution (TOBE).
- Based on the finalized TO-BE processes, the required services were identified; prototypes were designed and demonstrated to the stakeholders for confirmation.
- All the stakeholders are continuously participating in the continuous improvement of the Project.

Conducting Trainings & Workshops on regular basis

- CGG conducts trainings and workshops for AD Mines officials, Field Personnel whenever the application is launched in districts.
- CGG deploys a Project officer at the AD Mines office for training and handholding support at the district during the initial phase of operation to ensure smooth transition from manual system to automated technology driven system for sand delivery
- CGG provides training to the stake holders whenever new processes are developed/existing processes are modified and share them the work flow documents/manuals.

- Conducting workshops to Collectors whenever required

Challenges

- Managing frequent changes in the requirements, for the development of web & mobile based Integrated e-Governance Solution at the eleventh hour
- Working with the end users i.e. section officers/nodal officers and taking them into confidence for getting the necessary data
- Ensuring validity of data with the end users

Opportunities

- TS-MIV can be implemented in the other states as the processes are similar across the country

Key Learning's

- Maintaining frequent change requests in a registry, helped in showcasing CGG team's effort and maintained the required transparency in development
- Chalking out a training plan for the District Sand Management Societies(DSMS) to explain them about the benefits, helped the CGG team to get the officers confidence on the project
- Modular design achieved through incorporation of new initiatives
- This project tried out new ideas to improve the existing system. The same will be used in upcoming projects.
- Leveraged transparency in communication between District Collectors and CGG ensured close collaboration between District Sand Management Societies and CGG for the success of the project

Best Practices

- CGG has benchmarked National and International best practices in Sand Management through the secondary research to ensure that the proposed solution must have the best features available to the grassroots' levels in Telangana.
- Maintaining a requirements registry – All the requirements along with changes given by the District Sand Management Societies are maintained online post their approval and continuous updation of SRS. This reduces re-work
- Trainings and workshops conducted on a regular basis on new features in the TSMIV application software

Innovative Design

- Major breakthrough for simplifying the MIV application is transparency in allocation– using First-In-First-Out (FIFO) system. The System searches availability of tractors in FIFO and allocates orders, this will help in allotting the orders in a cyclic manner to the tractor owner and the payment process has been made completely online which is a more authentic process and a holistic solution was provided
- TS-MIV has also helped the Districts to have better Sand Management and to control the illegal mining and transportation of Sand through the innovative use of technologies.

Customer Orientation

- User experience at par with the private online market services at the grass root level and in building the institution through accountability
- Customer satisfaction: The customers/citizens are benefitted enormously on account of reduction in the cycle time of booking of sand

and its delivery, the transparency in terms of charges; ease of accessibility the government services, quick redressal of grievances etc. The revenue has grown in the sand producing Districts after implementation of the system

Use of Disruptive Technologies

- Implementation of AIML Chatbots for automated online conversation related to customer service

Recruitment of right resources

- CGG follows the best recruitment practices which are vital to the project's success. People with talent, multiple skills and relevant experience were identified for this project and from them the right people were assigned the right kind of work.

Selecting the right development process

- The development life-cycle depends heavily on the process implementation. CGG developed well-structured and flexible design documents at the initial stage of development and that is why it could handle change management in software requirements so effectively. CGG team made sure it performed the code reviews and Quality Assurance testing, essential ways of promoting code quality and the desired software output.

Process adoption and sustainability

- A process-oriented approach, in accordance with the ISO 9001:2015, ISO 27001:2013 & CMMi L3 processes are adopted in SDLC, Information Security Management System (ISMS) etc for reliable and consistent outcomes and minimization of mistakes.

Digital Empowerment

There is no demographic or cultural barrier in the Telangana State which may impact TSMIV benefits to the Stakeholders. TS-MIV also provides opportunity to the tractor owners to meet their needs i.e. transparent services, transactions, payments etc. in a responsible and sustainable way.

However, following measures are taken to address these indicators:

- Ease of use of TSMIV by the tractor owners, District Sand Management Societies & Customers as the system is specifically designed based on the customer experiences and to digitally empower them.
  i. Multiple modes of payments for booking sand i.e. Credit Card, Debit Card, Internet Banking, UPI, NEFT etc
  ii. Tractor owner can view total earnings at any time
- Digital Empowerment of important beneficiary of the application are citizens, especially rural citizens; small to medium construction contractors; and tractor owners. The stakeholders wise digital empowerment is given below:
  i. Approx. 2.6 Lakhs of citizens are digitally empowered through the TS MIV web & mobile based system as they have booked the sand online, track the orders and got the deliveries at their doorstep.
  ii. Approx. 10000 tractor owners are getting sand allocation with transparency using First-In-First-Out (FIFO) system.
  iii. Approximately 13 Lakhs + of Sand trips are transparently delivered through the system without any manual interventions from the District

Sand Management Societies.

iv. Approx. 8000 tractor owners and customers are benefitted through online Grievance Redressal System for their Grievances with full transparency and accountability by District Sand Management Societies

- System is Bilingual (Telugu & English). The vernacular version of web & mobile application helps especially the rural customer base in the State of Telangana.
- Information, Education & Communication: District Sand Management Societies & CGG are training field officers and making available the user manuals (video versions also) to educate the users of TSMIV so that they can extract the full benefit of the system.
- User Friendly Ease of use of TSMIV by the tractor owners, District Sand Management Societies & Customers as the system is specifically designed based on the customer experiences
- Empowered District Sand Management Societies

i. Through continuous monitoring through Dashboards and MIS reports to eliminate sand traffickers/anti-social elements thriving on unauthorized mining.

ii. Grievance Redressal System, which can be filed directly in the app by the customer & tractor owners

Green e-Governance

- Reduction in Carbon Footprints

i. System is Contactless, Paperless and Cashless as per Digital India guidelines

ii. The tractor registration, Sand booking by the customers, payments, sand delivery at the doorstep of the customers & monitoring of the Sand in the Districts are made fully automated. This has resulted in humongous saving of papers, corruption, manpower, information asymmetry and transaction cost.

iii. TSMIV web & mobile application, developed by CGG, enables citizens to download their receipt copy, tractor owner their registration copy in their personalized dashboards. This has also resulted in saving of printing cost and reducing of paper wastage.

iv. Substantially reduced Paper usage as there is no need to maintain huge multiple transaction details and the Data is readily available in electronic format with the Department for Audit Compliance also. As per IT Policy, Data backup is being maintained on tapes for application and database

v. The Stationery & Xerox printing cost is reduced substantially in the Districts.

- Environmentally Friendly practices:

i. For TS-MIV, CGG uses state of the art IT infrastructure in the Data Centre @CGG that consumes less power and enhances power efficiency, thereby saving electricity

ii. CGG uses and disposes e-Waste i.e. computers, servers, and associated subsystems efficiently and effectively with minimal or no impact on the environment.

iii. CGG is in a process of erecting Solar Panels to tap Solar Energy as a non-conventional energy for CGG office @Gachibowli.

Shri. D Ronald Rose, IAS, *Director, Department of Mines and Geology (Telangana), directorminests@gmail.com*

Ms. Rajani Vishwanath, *Project Manager, Centre for Good Governance (Telangana), rajani.v@cgg.gov.in*

Shri. Rajendra Nimje, ex-IAS, *Director General, Centre for Good Governance (Telangana), dg@cgg.gov.in, cggegov@cgg.gov.in*

The Performance Dashboard "Empowering Tribals-Transforming India": Empowerment of Tribal Communities through various ICT Initiatives of Ministry of Tribal Affairs

Ministry of Tribal Affairs, Govt. of India

Naval Jit Kapoor

PROJECT OVERVIEW

Vision & Objective

Administrative data forms the backbone of decentralized evidence-based decision making in the Government of India. With emerging international evidence of the vital role played by data as an enabler in driving public policy across its lifecycle, Ministry of Tribal Affairs has paid significant attention to its data systems during last 1 year. Management Information Systems (MIS) and dashboards have been developed for most government schemes and programs. To disseminate this information more widely, Open Data initiatives have also been undertaken.

Online Performance Dashboard named "Empowering Tribals, Transforming India" is an interactive and dynamic online platform that showcases updated and real-time data and status of 16 schemes and initiatives of the Ministry meant for achieving the Sustainable Development Goals of the United Nations. Out of these schemes, 5 are scholarship schemes of the Ministry where every year about 30 lakh underprivileged ST beneficiaries are given financial support for pursuing studies from 9th Class (Pre Matric) to doing Post Graduation courses PhD and Post Doctorate in India and Abroad and monitors expenditure of INR 2500 crores each year. In respect of Centrally Sponsored Scheme like Post Matric and Pre Matric Scholarship, the data is shared by 31 States/UTs on DBT Portal before being displayed on dashboard.

The Dashboard also displays the details of 566 Eklavya Model Residential Schools (EMRS) in 554 blocks, like functional schools, schools under construction and district wise, gender-wise details of 73,300 students in various EMRS schools with funds release to them.

Under scheme of Grant in Aid to NGOs, Ministry also provides funds to about 250 NGOs for more than 300 projects, in area of Education, Livelihood and Health. The Dashboard maps district wise NGO details, funds given to NGO and beneficiaries details. The NGO can also see the status of its application whether it is pending at district, State or in Ministry. For all schemes and initiatives, information upto District level in respect of each scheme has been compiled.

Ministry of Tribal Affairs also monitors STC (Schedule Tribe Component), wherein 41 Ministries spend a fixed percentage of their budget for welfare and development of Scheduled Tribes. In 2019-20, budget of Rs 51,000 crore was allocated by 41 Ministries in more than 275 schemes. The performance of all these Ministries can be seen on various parameters in the Dashboard.

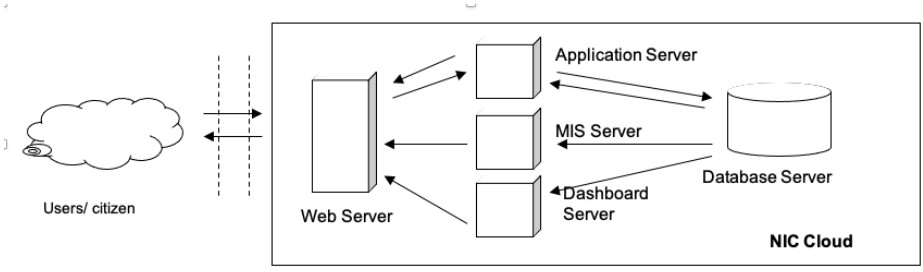
The dashboard also shows data in respect of status of 42.5 lacs claims of Individual and Community claims under Forest Rights Act pending in various States.

The links to various e-initiatives of the Ministry like District wise Mentees and Men-tors under Going Online as Leaders (GOAL) program, which is joint initiative of the Ministry with Facebook for imparting Digital Entrepreneurship to young, talented, tribal youth. The Sickle Cell Support Corner is developed to

collate data of Sickle Cell disease carriers and patients so that strategy for their treatment can be planned, Sickle Cell is endemic in Tribal dominated 8 States. The Swathya Portal provides district wise data of Health Infrastructure by collating data from all the data sources, such as NFHS 4, Census 2011, HMIS &RHS. This dashboard gives insight to comprehensive data repository, collating data from different sources for 177 high priority tribal districts and is linked to online databases of MoH&FW and MoWCD for regular inflow of data. The Dashboard has been developed by Centre of Excellence of Data Analytics (CEDA), organization under National Informatics Centre (NIC) with domain name (http://dashboard.tribal.gov.in). The aim is to assimilate with the larger vision of 'Digital India' Initiative to work towards empowering Scheduled Tribes and will bring efficiency and transparency in the system by monitoring performance through key indicators.

Hardware/Software

The SW environment for the projects includes mainly Microsoft environment in 3 tier **architecture:**



The Technology Stack consists of:

- Operating Environment: Windows
- Infrastructure: NIC Cloud (National Data Centre)
- Database: Microsoft SQL Server
- Application Server : Developed by NIC using Microsoft .Net Technology
- Web Server : Microsoft IIS
- Dashboard Server: Microsoft PowerBI
- Integration : With other application through API for data exchange

Certification (Certifying Agency)

Proper security audit process has been completed from NICSI empalled agency for security audit certificate.

Disaster Recovery/ Service Continuity

As per the National Data Centre policy

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
National fellowship [https://fellowship.tribal.gov.in]	This is a Central Sector Scheme of Ministry of Tribal Affairs and every year 750 fresh ST students are given fellowship for pursuing M.Phil and Ph. D. Courses. The applications are invited online on National Fellowship Portal. The	Rs 86.74 Cr paid to 2519 Fellowship students through	Rs 84.17 Cr paid to 2552 Fellowship students through	Rs 40.89 Cr paid to 2311 Fellowship students through

	detailed guidelines of scheme, Instruction manual, list of Universities and all information required for filling application is available here. The portal is integrated with Digital Locker and fetches documents already available there and also has facility to upload documents not available on digilocker. For online verification of credentials of applicants, the portal is Integrated with all Universities where students pursue fellowship courses. The portal is also linked with Canara Bank for keeping track research scholar payment details.	DBT mode.	DBT mode.	DBT mode.
National Scholar-ship [https://scholarships.gov.in] developed by Meity and has been im-plemented by Mo-TA for the scheme.	National Scholarship Scheme is intended to encourage meritorious ST students to pursue courses at Graduate and Post Graduate level in 246 Top Class Institutes identified by the Ministry in professional fields such as Management, Medicine/Science, Engi-neering and Technolo-gy, Humanities and So-cial Science etc.	Rs.18.40 cr paid to 1983 top class students.	Rs.19.10 cr paid to 1914 top class students.	Rs.17.80 cr paid to 1952 top class students.
National Overseas Scholarship [https://overseas.tribal.gov.in)	This is a Central Sector Scheme of Ministry of Tribal Affairs and every year 20 fresh ST students are given scholarship for pursuing Master Degree, Ph.D, Post-Doctoral courses at abroad. The applications are invited online on National Overseas Portal. The detailed guidelines of scheme, Instruction manual, and all information required for filling application is available here. The portal is integrated with Digital Locker and fetches documents already available there and also has facility to upload documents not available on digilocker.	Rs.1.76 cr paid to 21 NO S students through Indian Embassy	Rs.1.99 cr paid to 29 students through Indian Embassy	Rs.1.89 Cr paid to 18students through Indian Embassy
Post Matric scholarship [[https://dbttribal.gov.in]	Post Matric Scholarship portal namely DBT Tribal (https://dbttribal.gov.in/), the scholarship scheme is being implemented through states. Ministry of Tribal Affairs (MoTA) receives proposals from States and Union Territories (UTs) for	Rs.1646.98 cr has released to States/UTS for 17.40	Rs.1862.64 cr has released for 20.73 lakh students	Rs.984 cr has released for 10.10 lakh students

	disbursement of funds for scholarship to students pursuing courses from class XI to PhD. Ministry examines and releases the requisite amount to States and UTs, who in turn disburse the amount to individual beneficiaries using the Direct Beneficiary Transfer (DBT) mechanism and maintain their own heterogeneous systems for recording applicant and disbursement details. The portal facilitates States & UTs to share beneficiary/ disbursement details through Web Application Program Interface (API), Excel / Comma Separated Value (CSV) files and online Data Entry Form using their authorized Login IDs.	lakh students		
Pre-Matric scholarship [https://dbttribal.gov.in]	Post Matric Scholarship portal namely DBT Tribal (https://dbttribal.gov.in/), the scholarship scheme is being implemented through states. Ministry of Tribal Affairs (MoTA) receives proposals from States and Union Territories (UTs) for disbursement of funds for a scholarship to students for pursuing studies in IX and Xth class. Ministry examines and releases the requisite amount. The States and UTs disburse the scholarship amount to individual beneficiaries using the Direct Beneficiary Transfer (DBT) mechanism and maintain their own heterogeneous systems for recording applicant and disbursement details.	Rs.311.50 cr has released to States/UTS for 12.84 lakh students	Rs.439.99 cr has released to States/UTS for 12.71 lakh students	Rs.151.81 cr has released to States/UTS for 7.98 lakh students
NGO Online Portal http://www.ngo.tribal.gov.in/	One stop solution for applying, inspecting, recommending, grievance redressal, document deficiency redressal, sanction generation of proposals applied by NGOs	Amt 114.00 Cr was given to 183 NGOs running 268 projects	Amt 94.85 Cr was given to 159 NGOs running 259 projects	Amt 4.05 Cr was given to 22 NGOs running 28 projects

Implementation

Covid has given huge opportunity to establish connect amongst various stakeholders through digital mode. MoTA had started digitisation of the office

system since 2018 and started digitalisation of entire paper based files by scanning them and placed in eoffice developed by NIC. During covid, depsite lockdown, there was smooth movement of files right from ASO to Honble Minister, and the process of disbursement of funds, monitoring and evaluation went smoothly and during lockdown more than Rs. 1500 Cr budget was released to States through PFMS, individual beneficiaries through DBT.

The process of physical meetings for approvals of State projects through Project Appraisal Committees was gone away with and all meetings happened through virtual mode and the proposals were shared through the e-mode. The process of selection of NGOs was also conducted through VCs and 70 NGOs from remotest areas gave their presentation through VC. This resulted in lot of time & money saving and avoided unnecessary travelling. Most of the staffs had worked from home which saved commuting time and the performance also improved. Though all the initiatives stated above were conceptualised since 2019-20 but were developed and rolled out in last 6 months. Important among them are revamping of 2 scholarship portals namely fellowship.tribal.gov.in, overseas.tribal.gov.in and NGO portal (ngotribal.gov.in) and development of dashboard (dashboard.tribal.gov.in), National Tribal Research Portal (tri.tribal.gov.in), National Tribal document Repository (repository.tribal.gov.in), Migration Portal(migration.tribal.gov.in), Media Repository.

Improvements / Enhancements

- Scholarship Portals: (dbt,tribal.gov.in, fellowship.tribal.gov.in, overseas.tribal. gov.in)

i. Integration of Universities with fellowships portal
   There are 331 Universities where 4794 Scholars are pursuing fellowship programs. Universities have been integrated with the fellowship portal through the "Verification Module", wherein the registered Nodal officer of University can view documents available on Digi-Locker and can approve or reject application digitally.

i. Integration with Digi-Locker
   In the application form, students are required to upload documents like Aadhar, Income, Caste, Birth and Marks Certificate, which are required by MoTA and institutes where they have taken admission. Both fellowship and Overseas Portals have been integrated with Digi-Locker.

ii. Aadhar Authentication
   The DBT Mission has mandated that the beneficiary should be Aadhar authenticated. In all Central sector schemes, Aadhar is captured mandatorily. Aadhar Based Unique ID can help in following the student's educational journey from pre-metric to Ph.D. and can also track the benefits of scholarship taken by him/her.

iii. Data Analytics and MIS Reports
   Ministry has given the job of Data Analytics to Centre of Excellence of Data Analytics (CEDA), managed by the National informatics Centre (NIC) and the National Informatics Centre Services Incorporated (NICSI). In 2 years, there is a data bank of 75 lakh students getting scholarships from CS and CSS Schemes.

iv. Grievance Redressal and Communication Module
   This module facilitates sending of alerts and notifications through SMS and e-mail to various stakeholders. This module has also been designed to handle the grievances of Candidates, Universities, State

and UTs nodal officers and other stakeholders on line. All States have been registered on the Portal. Login ID and Password have been issued to Principal Secretary of the state, who is the administrator and two other officials, one being the Nodal officer looking after Scholarship division and the other being technical.

DBT Portal has a two-way communication Module.

a. MoTA with States: All important letters, notifications are uploaded on the portal can be viewed by stakeholders. In case of state-specific correspondence,
b. States with MoTA: States have also been given the facility to raise any technical query and upload documents relating to a proposal like SOE/UC etc. A dedicated team of technical experts ensures that all such queries are timely resolved.
c. States with States: States can share inputs of the best practices in the portal.

- NGO portal (ngotribal.gov.in)
- Development of Performance dashboard (dashboard.tribal.gov.in)
- National Tribal Research Portal (tri.tribal.gov.in)
- National Tribal Document Repository (repository.tribal.gov.in)
- Media Repository .
- Going on line as Leaders: Digital entrepreneurship Program in collaboration with Facebook, goal.tribal.gov.in-
- Swasthya Portal: Database of Health and Manpower Infrastructure for 117 Tribal districts (swathya.tribal.gov.in)
- Sickle Cell Support Corner: (scdcorner.in)
- Gap analysis of 1,17,000 villages

Enhancement planned in Next one year

- National Tribal Virtual Art and Culture Portal: Documentation of art & culture of 700+ different tribes of India.
- National Tribal Migration Repository: End to end data base of Tribal Migrants on five parameters. (shramshakti.tribal.gov.in}
- Adi - Tarang: Communication Module System of Ministry for enabling States and Ministry to send online documents, proposals and communication.
- Grant Monitoring & Evaluation Portal jointly developed by UNDP-MoTA: Effective monitoring of grants more than 5000 Crores in various schemes like SCA to TSS, Grant, PVTGs, Livelihood, etc.

ENABLER

Processes Re-engineered

- Use of pre exiting as well as new Infrastructure and manpower resources for implementation of diversified ICT implementation on the ministry.
- Conceptualization of CoEs (Centre of Excellence) and use of ideas across multiple think tanks (like IIT Delhi, NICSI, Consulting firms etc.) through brain storming / idea exchange for process re-engineering.
- Adaptation of consultancy mode for the technical / analytical dashboard solution to minimize the cost and focused scope with involvement of existing technical manpower.
- Ideas generation by involvement of other stakeholders like State Govt, NGOs, Facebook, Other related ministries for integrated approach

- Standardized approach for possible data fields at data origin level and use of single master data across all ICT solution of the ministry.
- Data Quality Assessment of existing as well as new data with proper validation /check points for quality improvement
- Holistic approach to integrate sub components of Ministry data and its processes in terms of monitoring & management.
- Monitoring of fund allocation process to state-level for effective utilization of resources.

Challenges faced in implementing Process changes

Like other e-Governance project, this ICT implementation at Ministry level project also requires People, Process and Technology integration. Here people are the end users / beneficiaries as well as the manpower involved in the project in terms of decision makers and support activities. The process part concentrated toward method to regulate, monitor and adopt required changes in operational as well as technical level. Technology part involved use of latest Information Technology and challenges to keep updated considering fast changes and other aspects like security, version change etc. During conceptualisation, development & implementation of this project the Ministry has faced the following challenges:

- Integration of different sources of data at multiple level of Ministry function through software ICT by adopting uniform method
- Estimation of scalability and ICT resources in terms of volume and complexities.
- Completeness & consistency of data digitisation with maintenance of its quality for further usage for analytics purposes.
- Uniformity across all multiple sources of data in terms of master data and functional information.
- Involvement of external sources and their data at single places with integration like Facebook, NGOs.
- Capacity building among stakeholders for importance of data and its quality need to adopt new technologies & process.
- Integration of ideas from multiple think tanks (e.g., IITD, ASSOCHAM, FICCI, NGOs, CEDA etc.) into a single platform with regular integration and improvement.
- Interactions and data exchange with external vendors/other government departments

The Lessons learnt from the Process re-engineering exercise

During the process of conceptualisation, development and implementation of multiple ICT activities in Ministry of Tribal Affairs following learning came out:

- For any such type of multiple sources ICT project, major emphasis should be given on data correctness & completeness with emphasis over data quality.
- Regular exercise of data quality assessment is required with proper tool / technologies
- It is very important to keep update the manpower resources and relevant stakeholders about business requirement and technological know-how through capacity building program at multiple levels.
- Selection of right tool / technologies by involvement of suitable agencies with high expertise for long tern support and high efficiency.

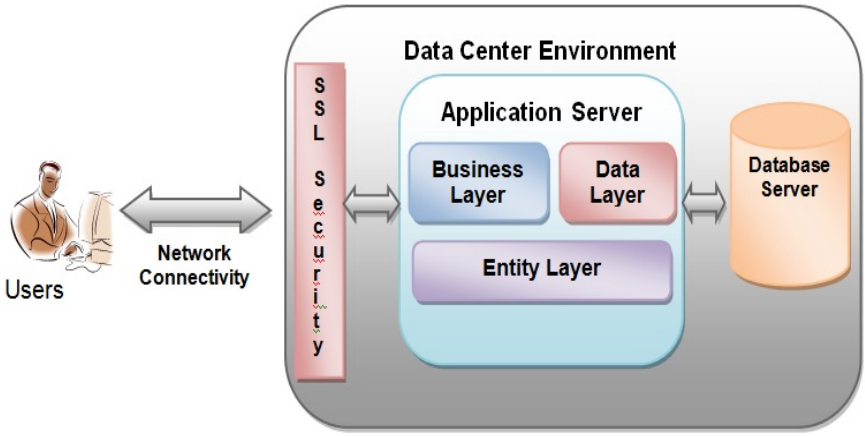
- Need for appropriate capacity building programs by involvement of users of all levels and frequent training / awareness program.
- Need of mindset to accept change process as well as capability to in-corporate new suggested operational process if applicable.

Technologies

Technological solution adopted

The ICT project is hosted mainly on Microsoft-Technology. Few portals are on JAVA, MYSQL and Post resin open source also the technical details are as under:

i. Operating System: MS- Server 2016
ii. Data Base: MS SQL Server
iii. Development Platform: MS .Net Framework
iv. Web Server: IIS
v. Application Hosting: NIC National Data Centre
vi. Business Intelligence Tool: Microsoft – Power BI
vii. Application Flow: As below



Data Analytics : The features of the implemented Data analytics solution is as below:

- On premise deployment of Business Intelligence tool over National Cloud Data Centre
- Two types of interactive Dashboards deployment: for public information with limited information, For internal use: with detailed information
- Automatic update of information / data over dashboard through connected database
- Use of appropriate machine learning algorithms (text mining, fuzzy) for data quality handling
- Multiple variant of dashboard across multiple data sources like – Scholarship (pre-matric, post matric, overseas, top class, NGO, Forest reserve act etc.)
- Identification of multiple use cases for advance analytics using R / Python machine learning language as future plan with integration of output with Dashboard.

- Involvement of Centre of Excellence of Data Analytics – NICSI, a Data Analytics unit of NIC & NICSI having rich experience of analytics inside Government domain.

NITI Aayog in its recent report on Data Governance quality Index (DGQI), has ranked Ministry of Tribal Affairs amongst top 5 Ministries in respect of use of Technology, Top ranker with 5/5 points in respect of Data Security & HR Capacity,

Technology related challenges faced :

Major technological challenges faced are :

- Selection of right tool & technologies for data analytics
- Complete & correct data digitization with appropriate validation for high data quality
- Integration of multiple sources of data at single dashboard
- Estimation and handling of data volume
- Facility for Integration of other e-Governance projects / data
- Information Security and credential encryption
- Capacity building and grooming for analytics

The Lessons learnt from Technology choices and implementation strategy adopted:

- For any such type of ICT implementation project at ministry level, major emphasis should be given on data correctness & completeness and its quality.
- It is very important to keep updated about the right method of utilisation of software at field level through capacity building program by involvement of appropriate authorities.
- Need for active involvement of both technical as well as functional level man-powers during planning and implementation phase of the project.
- Need of mindset to accept change process as well as capability to incorporate new suggested operational process if applicable.
- Need for regular update of tool / technologies with security implementation.

People

Change Management and Capacity Building

Leadership support for capacity building, visibility of actions with current status

- Ministry of Tribal Affairs
- NITI Aayog
- State Units – Tribal Welfare Department
- NIC – Centre – at Ministry of Tribal Affairs Level
- NIC – HQ / National Data Centre
- CEDA – NICSI (Centre of Excellence for Data Analytics)
- External stakeholders like – Facebook, ASSOCHAM, FICCI NGOs
- Institute of Imminence like IIT Delhi ,CoE recognised by MoTA
- Hired Consultants from agencies

Change Management

1. Conceptualization of change process as per targeted goal
2. Planning and identification of stakeholders for change process
2. Process Re-Engineering as per the applicability and reviews at multiple level.
3. Regular periodic meetings to get the feedback and improvements
4. Sessions/guidelines to data workers
5. Video conference session between officials of multiple stakeholders

7. training and grooming to manpower for desired output as per instruction
8. Awareness and importance of data, data quality, analytics, its impact etc. through conduct of multiple workshop at state level

Project Management consists of following hierarchies:

- Ministry of Tribal Affairs (Senior officials for decision makings + Domain Experts + Hired consultants)
- NIC – Ministry (NIC official + Hired Technical manpower)
- State Level (State Government officials – for data sharing, operations at field level, Domain decisions
- Hired Consultant with expertise (Consulting Activities).
- External Agencies (Facebook, IITD, NGOs, etc.)

Challenges faced in Change Management and Capacity building:

- Fast change of Technology – selection and deployment of technology
- Use of multiple technologies and integration among each other
- Involvement of multiple stakeholders
- Impact /dependencies of local staff/persons
- Manpower skillset utilisation & upgradation
- Awareness and importance of data and analytics knowledge
- Documentation process
- Adoption of mindset for the change
- Allocation of work to stakeholders and implementation of output for further implementation

The Lessons learnt from Change Management and Capacity building exercise

- Prioritise the issues with targeted manner
- Use of existing manpower with capacity building results better result
- Hand-on exposure to technology impact positively
- Need of selection of right candidate and skillset for capacity building
- Need of consistent up gradation & refreshment of operational guidelines by trainings/sessions
- Awareness about importance of key factors results better
- Need of business process uniformity before adoption of such projects
- Involvement of functional knowledge impact better
- Integration of implementer and end users creates good impact
- For the success of implementation the knowledge dissemination is another important factor and for that workshop & conferences are very effective.

VALUE INDICATORS

Learnings for sharing

Despite huge expenditure on various Scholarship schemes,, MoTA did not have complete information about its various beneficiaries. For example, the details of beneficiaries in centrally sponsored schemes like Pre Matric and Post Matric, gender wise details, course wise, district wise details, beneficiaries linked Aadhar card. There was huge time lag between date of admission and disbursal of scholarship which has been substantially reduced. There is now paradigm shift from paper based UC system to data based monitoring.

Under Fellowship Scholarship Scheme, there was no system to have information in respect of fellows who are doing MPhil and PhD in various Institutes and Universities, at a particular point of time, what are areas of research, how many scholars left course with-out completing, how many

scholars completed the course, in which Universities they are studying, from which states and how many scholars got job after PhD. The Fellowship portal had facility of only for inviting applications and for disbursal of scholarship. Ideally 750 fellows should complete their PhD every year, however there was no mechanism to know whether the fellow completed PhD as details of fellows completing the course was not forthcoming. In order to know these number of fellows who have completed the course, the last 3 months scholarship was stopped and was released only when the fellows uploaded the research thesis. It was observed that the scholars preferred to forgo last 3-month scholarship rather than uploading the thesis. IIPA was asked to examine analyse quality of thesis submitted by the scholars. It was found that in more than 40% cases, the quality of thesis is very poor. Due to this, despite huge expenditure on such students they are not able to get proper jobs in reputed Universities. A project was given to IIPA named Tribal Talent Pool in order to make a connect with these research scholarship and to understand their aspiration, difficulties and ensure that after completion of the PhD they get proper jobs as researchers, teachers or utilize various schemes of ministry as entrepreneurs.

Similarly while monitoring of NGOs getting funds from Ministry, it was found that many NGOs did not have proper Infrastructure to implement the scheme. Based on learning an independent agency Bharat Rural Livelihood Foundation was appointed to do grading of all the NGOs. Out of 17 NGOs who were inspected, in respect of 5 the grants were stopped due to poor Infrastructure and improper implementation of scheme.

In respect of Tribal research Institutes, who get grants from Ministry for various research projects, on the basis of data it was found that large number of projects sanctioned to the TRIs in 2017-18 and 2018-19 have not yet started. In few cases, the funds given to States were not allocated to the TRIs. A project was given to IIPA for revamping and strengthening of TRIs. Details of Infrastructure and manpower gaps are analysed to ensure that TRIs have capacity and capability to undertake research work.

Regarding STC Monitoring, it was found that there was 81 schemes of various Ministries which were not relevant for tribal and budget of Rs 3152 Cr in these schemes did not benefit tribal. There was an underutilization of budget of Rs. 6741 Cr under various schemes, which are otherwise relevant for tribal. As many as 130 schemes had national allocation involving fund of RS 28,481cr, meaning thereby that there was no mechanism to know that the beneficiaries were tribal and outcome of the expenditure through such schemes. In 124 schemes fund allocation < 10 cr and Such meager allocations have hardly any potential to fetch tangible results. Only 175 scheme have STC earmarking and only 96 schemes have IT system to manage beneficiary level details. When the concerned Ministries were asked to furnish the details, 8 Ministries requested for exemption from STC mechanism and 8 Ministries requested for reallocation of STC funds to different schemes.

Based on these learnings, Inter-Ministerial Collaboration and convergence of various schemes has been initiated. Between Ministry of Rural Development (MoRD) and MoTA MOU signed on 18.8.2020 for convergence under National Rural Livelihood Mission. (NRLM). The MoRD shared Mission Antodya Mission data, from which the gap analysis of 1,17,000 villages was done. Details are being worked out worked out for sharing Pradhan Mantri Gramin Awas Yojna (PMGAY) and other schemes like MNREGA data.

A MOU has been finalised between Ministry of Health and Family Welfare and

MoTA to work out joint strategy on control of Tuberculosis (TB) and Sickle Cell Disease (SCD). MoHFW and Women and Child Development are sharing health Infrastructure, disease and Manpower data based on which the data is compiled on Swathys, Health and Nutrition Portal.

A joint collaboration between M/O Civil Aviation and MoTA is under consideration on kisan Udaan scheme so that the remote Tribal areas can be connected with the scheme so that they are able to sell perishable products in national and International market.Similarly, with Ministry of Food Processing, a joint MOU has been finalised on utilisation of STC funds for establishing Micro processing Units in Tribal Areas. Letter form MSME Ministry is received for making NSTFDC as implementing agency for various projects undertaken by MSME. Data of Tribal Entrepreneurs will also be shared on performance dashboard.

MoTA is Jointly working plans with Department of Science and Technology (DST) on geo-tagging of tribal products, assets based on mapping of such products and artisans. MoTA is working closely with MeiTY to work on e-education and virtual classes. CDAC working with EMRS and preparing or online Learning Management System

There are about 75 lakh Tribal card holders who have been registered on National Health Agency Portal under Ayushman Bharat Scheme. Based on data MoTA would be starting awareness campaign amongst tribal beneficiaries to make this card from which they can get Health facilities across India.

Similar talks are going on with Ministry of Panchayti Raj, Rashtriya Kamdhenu Aayog, Ministry of Culture, Tourism and external affairs to ensure that the tribal areas and tribal culture is showcased in India and neighbouring countries. There is vast scope of such convergence and collaborations, which would go a long way in efficient utilization of TSP funds and upliftment of Tribal.

Challenges pertaining to monitoring: The process of inviting applications, documents, verification and correspondence was manual and was time consuming which resulted in delays. Broadly, the challenges being faced with manual processing of Scholarship ap-plications system were:

- No pre-defined standard process for data collection.
- Non-availability of beneficiary records at a centralized location.
- Non-Standard format for collating beneficiary records, data quality assessment.
- Loss of student applications during the postal process.
- Receipt of student applications after the due date.
- Manual time-consuming system for verification of applications and documents.
- No mechanism for tracking the applications.
- No Mechanism for ensuring disbursement to the genuine beneficiary.
- Non-availability of a framework for tracking disbursement.
- Non-availability of follow up mechanism for utilization of disbursed scholarship.
- No mechanism for gathering information on the talent and skills of beneficiaries.
- Poor grievance redressal mechanism.
- Absence of Monitoring Mechanism.

Challenges faced before deployment/implementation :

- Understanding of domain and data

- Data Collection from multiple stakeholders
- Data Cleaning and integration among multiple sources
- Identification and deployment of Manpower
- Selection of tool & technologies and deployment
- Planning for long term sustainability

Examples of Common Data Issues in Scholarship portals :

- Multiple format of date: DD/MM/YY, DD/MM/YY, DD-MM-YYYY 00:00:00
- Age : Inconsistent values (> 35)
- Incomplete / invalid School Address (Only single word)
- Multiple Gender Values : Male / Female / Transgender / Other / NA / BLANK
- District code / Name: Invalid Values (999,888)
- IFSC Code / Bank Details : Invalid values (12345)
- AISHE / School Code : Invalid values
- Invalid code for Aadhar seeding : Yes / NO / NA / NULL
- Other Invalid Data : PINCODE,
- Course Name,
- Amount (<100),
- Date of Birth

The innovative aspects of project/activity.

- Easy access – open website for all public : Single platform
- Highly interactive with multiple filter criteria
- Automatic update with data
- Coverage of multiple activities of Ministry
- Provision for separate detailed Analytical dashboard for internal use
- Use of latest tool / technologies
- Easy to maintain
- Open scope for advanced analytics by using collected data
- Transparency ,Accuracy
- Easy for Policy framing

Digital Empowerment

Key Facts:

- 8.6% population constitutes of Scheduled Tribes
- 31 States/UTs
- 90% live in Rural India
- 700 + ethnic groups
- 75 PVTGs*
- 59% Literacy Rate

Digital Inclusion

- *Data Driven Governance:* Ministry has tried to adopt Data driven Governance by digitisation of available information collected from multiple internal sources and external sources . Ministry has tried to cover almost all facts and figures related to tribal communities .The Ministry has given lot of focus on use of data analytics through integrated performance dashboard. Findings can be utilised for policy framing and further course action . Regular precise monitoring of data

also helps in resolving suspicious activities and subsequent communication.

- Ministry is committed for promotion of digital inclusion of tribal communities by various initiatives like exclusive Tribal Research Portal, Repository of Tribal Artefacts, Tribal Health & Nutrition Portal , Forest Rights Act etc. These initiatives will play vital role in holistic development of Tribal communities.

GOAL (Going Online As Leaders) :

Facebook and Ministry of Tribal Affairs have initiated Digital entrepreneurship program, designed to empower tribal youth through mentorship, leadership training, and digital literacy skills. The purpose behind GOAL is to not only increase the number of tribal-owned businesses in India, but also create role models within the tribal community, who can further serve as an inspiration and help the tribal youth explore, learn, and grow. After all, knowledge builds confidence that transforms us to become agents of justice and break down barriers into opportunities.

Going Online as Leaders (GOAL) is a digital literacy and mentorship initiative of Facebook and MoTA, that lies at the foundation of this motto.

Financial inclusion by DBT Portal:

MoTA is the first Ministry to develop DBT Tribal Portal for capturing beneficiary data of centrally sponsored scholarship schemes from different States as mandated by DBT Mission. Services Improvement include:

- Single point for monitoring of decided Key performance indicators.
- Adoption of Standard Operating Procedure
- Central Repository of data in a secured environment
- Faster dissemination of Information amongst stakeholders
- Role-based access to information to various stakeholders
- Improved efficiency and accuracy in processing scholarship applications
- Transfer of Funds directly to Beneficiary
- Reduction in paper-based documentation
- Smooth verification of document due to Digi-Locker integration
- Mitigation of risk and fraud by integration and correlation of data across schemes
- Integrating Fund Releases with Public Financial Management System (PFMS)
- Ease of data sharing with different stake holders and Data Integrity
- Online Connect with multiple stakeholders and speedy grievance redressal
- Productivity Enhancement of stakeholders
- Focused execution of Scheme objective.
- Planning and Monitoring of funds based on beneficiary data
- Reduction in the timeline of approval and release of grants due to online submission of Utilization Certificates (UC) and Statements of Expenditure (SOE).
- Monitoring of Key Performance Indicators (KPIs).
- Performance Tracking of States and UTs.
- Reduction in of processing time and cost.
- The proposed system will be able to auto update the dashboard with periodic interval by data update at pre-existing data collection server

Productivity Enhancement

- Focused execution of scheme objective.
- Planning and Monitoring of funds based on beneficiary data
- Reduction in the timeline of approval and release of grants due to online submission of Utilization Certificates (UC) and Statements of Expenditure (SOE).
- Monitoring of Key Performance Indicators (KPIs).
- Performance Tracking of States and UTs.
- Reduction in of processing time and cost.

Social Impact

- Sustainable livelihood for the underprivileged group
- Upliftment of tribal population and augmented confidence
- NGO's entertains as additional ''on ground monitoring team.

Green e-Governance

Ministry of Tribal Affairs is ensuring that growth and environment go hand in hand and believes in Combined Sustainable tribal Development with Environmental Protection. The last 24 months of the Ministry have been defined by transparency, objectivity and innovative initiatives which have touched the lives of millions of the tribal people in the country, particularly the downtrodden and under-privileged.

Eco-Rehabilitation of tribal villages through Innovative design in water management using Ice-stupa, promoting Farm-stay tourism and passive solar heating system- Joint Initiative of Tribal Affairs and Secmol in Leh : Ladakh is characterised by distinct geographical and climatic features. Known as a cold desert. With reducing precipitation, increasing average temperatures, and reduced glaciers to water the villages anymore, some Himalayan villages are now slowly turning into ghost towns with abandoned but habitable houses and wasted agricultural land. This gives rise to three major modern issues of Ladakh relating to water scarcity, low indoor temperatures in buildings, and a shift from the original agrarian-based economy resulting into youth migration.

A unique way to solve water problems and livelihood problems through Action Research project in Ladakh has been initiated with SECMOL, Ladakh. Last year 26 Ice stupas were built by Villagers. Through this project, participating villagers were able to conserve about 75 million lakh litres of water during winters and eco-tourism activities like "1st Ladakh Ice Climbing Festival" gave opportunity to the local youth to be indulged in eco-entrepreneurial ventures. This is 2 year project and since locals are associated in developing these stupas, their capacity building and training will help them to undertake necessary repairs and maintenance of such structures.

1000 Springs Initiative" to rejuvenate dying springs in Tribal Areas with community participation:

Springs are natural sources of groundwater discharge and have been used extensively in the Himalayan region in India. For many people, springs are the sole source of water. However these remains largely unrecognized and under-utilized or are slowly drying up. It is the need of hour to harness the potential of these perennial springs water in order to address scarcity of water for ameliorating the problems in tribal areas.

The joint initiative of '1000 Springs Initiative' by MOTA and UNDP is an attempt demonstrate a localised solution by harnessing the potential of perennial springs to meet the water need of tribal communities in remote areas where

conventional means of piped water supply is either not possible or not cost effective. Around 408 springs has been already mapped across Odisha on the Spring Atlas portal till now.

Program level Outputs:

- 108 village level cadres trained as Para-hydrologists and managing the community level NRM work related to springshed and watersheds.-
- 1250 Acres of land in the catchment area treated under the springshed/watershed principles. 1,52,000 Plantation of indigenous plants in the catchment area to reduce run-off and increase soil moisture holding capacities.
- 45 Number of micro-watersheds/springsheds covered under this initiative
- 90 Habitations covered on the Spring Water Atlas after mapping and inventorying spring based water resources. 408 springs mapped across Odisha covering its physical, chemical and biological properties.
- Mobile Application developed to collect physical, hydrological and chemical properties of springs. An online platform - GIS-based Spring Atlas https://thespringsportal.org/ launched to display properties of springs in tribal areas

The Ministry of Tribal Affairs follows E-Waste Management Rules . The E-Waste Management Rules 2016 have been amended vide notification G.S.R. 261(E), dated March 22, 2018.

There are a number of waste types such as e-waste, waste water, recycling waste, construction waste, hazardous waste, solid waste, organic waste, packaging waste, paper waste, wet waste, plastic waste, food waste, dry waste, consumer waste, biomedical waste and biodegradable waste.

In terms of promotion of Green e-Governance under this project, the Ministry has adopted the ICT computing resources from National Cloud servers. As per requirement the computing is processed and ultimately help to reduce the consumption of power for systems & cooling. Ministry is also promoting the e-initiative for internal communication which ultimately saving the paper utilisation and ultimately adopting the green e-Governance. MoTA utilises the service of government authorised recyclers and other government supported initiatives to support the e-waste recycling and disposal, due-diligence audit process for e-waste dismantlers and recyclers to verify their HSE legal compliances and government regulations pertaining to e-waste management and other specific guidelines to assist in waste management.

Even most of the institutions like EMRS, ITI Colleges supported by tribal ministry has actively participated in Green Skill Development Programme launched in June 2017 by the ministry of Environment, Forest, and Climate Change. During the pilot phase, the ministry introduced courses for biodiversity conservationists and para-taxonomists for three months at 10 different locations.

As tribals live in forest and are committed to preservation of forest and biodiversity. Ministry of Tribal Affairs has taken large number of initiatives on Organic Farming and development of model Villages and Aspirational districts in collaboration with reputed organizations. Ministry in its vision document has stressed on Education, Livelihood, Health, Skill Development, preservation of Tribal Culture and Heritage and Infrastructure development of tribal villages and Aspirational districts.

Based on data, some of the important areas that we would like to work on

include clean air campaign for 177 tribal dominated districts , creating more opportunities for livelihood of coastal tribal communities, sustainable development and protection of coastal system, planting of billions of trees to add 2.5 to 3 billion carbon stock, National Forest Policy and development of cost-effective technologies for pollution abatement, climate change and biodiversity conservation while positioning India as the Global Leader in the field of environment and sustainable development.

Dr. Naval Jit Kapoor, *Joint Secretary, Ministry of Tribal Affairs, Government of India, kapoor.naval@gov.in*

Uttar Pradesh Chief Minister Helpline (UP CM Helpline) – 1076

Uttar Pradesh Development Systems Corporation Limited (UPDESCO)

Neha Prakash

PROJECT OVERVIEW

Vision & Objective

Citizens of Uttar Pradesh are the key stake holders of UP CM Helpline.
Chief Minister Helpline '1076' is an effort to hear citizen's grievances at the doorstep & effectively redress them in a time bound manner.

Functional Scope

- Complaints pertaining to sixty-three State Government departments.
- More than five hundred complaint attributes pertaining to non-availability of ration, Farmer loan etc.
- Information is provided for 135 Government schemes like employment registration of candidates, Investment in agriculture and fertilizer availability, counselling Programme etc.

Geographical Scope:

- Calls from across the state including all 75 districts
- Calls are also being catered for migrants from UP currently residing in other states

Key Stakeholders:

- Uttar Pradesh Development Systems Corp. Ltd. (UPDESCO)
- National Informatics Center (NIC)
- Consortium of Network Techlab (I) Pvt Ltd and Wewin Ltd. as the Call Center Agency (CCA)

Benefits

- Citizen across the State can reach to Government by dialing a toll-free number '1076' irrespective of location (urban/rural), spoken language and literacy status.
- Citizen can reach to the State Government without incurring any financial or time cost of physically visiting a Government office.
- Time-bound resolution of grievances with satisfaction of complainant or escalation to higher Officials of departments for proper redressal till satisfaction of citizen.
- Citizen can have the status of registered complaint by dialing '1076' anytime as the Call Center would be operational round the clock.
- Citizen can inquire for eligibility and can raise demand to avail benefits of State Government schemes.
- Districts and Departments level monitoring on complaints and demands registered, for good governance within the districts/departments and Government to take necessary steps for improvement areas.
- System should be flexible and can adopt any situation-based changes, as happened in Covid-19 pandemic crisis

Current Status

- Over 39 Lakh complaints received with around 97% closure till date.
- CM Helpline adopted additional operations to perform as Covid Control Room for State Government from 23 March 2020 onwards as highlighted below:

i. Attended more than 96 Lakh calls during Covid-19 crisis till date including over 6 Lakh Covid-19 health-related calls.
ii. Over 6.39 Lakh lockdown-related complaints registered on IGRS and got resolved by authorities.
iii. Over 45 Lakh Outbound calls done to citizens & officers mapped for Covid related activities in UP till date.

Hardware/ Software

Two agencies are technically involved in CM Helpline Operations – NIC for IGRS & CCA for Call Center Operations.

SW environment details are as follows:

- *NIC* – ASP.NET& Microsoft SQL Server 2012
- *CCA* – Ameyo Dialer with PostgreSQL Database / Dell Power Edge Server

Certification (Certifying Agency)

NIC undergoes security audit for IGRS as the data is managed and secured by NIC.

Disaster Recovery and Service Continuity

CCA has Ameyo Cold Failure Redundancy Server, AWS Storage Solution.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Complaint Registration & Resolution	UP Citizens register complaints by dialling tollfree number '1076' from his/ her home without incurring any financial or time cost and resolution provided by mapped officials on IGRS within stipulated timeframe.	Registered – more than 1.57 Lakhs Resolved – more than 1.52 Lakhs	Registered – more than 20.36 Lakhs Resolved – more than 20.12 Lakhs	Registered – more than 13.5 Lakhs Resolved – more than 12.3 Lakhs (till date)
Covid Control Room Operations	CM Helpline works as Covid Control Room for State Government to provide resolutions to Citizens regarding Lockdown & Health related issues during Covid pandemic crisis.	NA	NA	More than 95 Lakh Inbound calls. Over 6 Lakh Covid-19 health-related calls. Over 6.39 Lakh lockdown-related complaints registered on IGRS. Around 45 Lakh Outbound calls done to citizens &

				officers mapped for Covid related activities in UP till date.
Online Demands registration	Citizen register his/her requirement and get fulfilled by related departments as per the Govt direct / indirect benefit schemes depending upon his / her respective eligibility.	Registered and Resolved more than 50 thousand demand	Registered and Resolved more than 50 thousand demand.	Registered – more than 2.8 Lakhs Resolved – more than 2.6 Lakhs (till date)
Online Complaint Status and escalation.	To know the current status of the compliant and escalation to higher mapped Official if citizen feedback is not satisfactory on the resolution provided.	Call Center provides status of complaint redressal on follow-up inbound call and takes citizen feedback through outbound call, on the resolution provided on his / her registered complaint by mapped Official and close or escalate the complaint depending upon the satisfaction of citizen.		
Reporting mechanism to empower online performance monitoring	Strong monitoring mechanism for higher authorities of mapped departments to monitor performance of the last Official deployed on the ground.	This is a Central Sector Scheme of Ministry of Tribal Affairs and every year 20 fresh ST students are given scholarship for pursuing Master Degree, Ph.D, Post-Doctoral courses at abroad. The applications are invited online on National Overseas Portal. The detailed guidelines of scheme, Instruction manual, and all information required for filling application is available here. The portal is integrated with Digital Locker and fetches documents already available there and also has facility to upload documents not available on digilocker. The registered student can upload their queries and grievance on portal. There is provision of sending alerts/notifications through individual or bulk SMS and Emails to students. For monitoring purposes, it is linked to the Dashboard. The portal is also integrated with UMANG Mobile App for filing online application.		
Integration with other emergency helplines.	CM Helpline forward calls to other helplines like 112, 102, 108, 1912 (Electricity Department) if required by Citizen.	CM Helpline has the call forwarding facility to Police Department, Health (Ambulance) and Electricity department helpline if the Citizen failed to connect them or if Citizen is in emergency		

Implementation

- CM Helpline has the Geographical coverage across State of Uttar Pradesh with the reach to all citizens irrespective of area (urban/rural), literacy factor or understanding of nature of grievance.
- Call Center Executives (CCEs) are well equipped/ trained to identify the nature of complaint and route it to the concerned department Officials over a call.
- Complaints, with undefined complaint attribute, are registered in "Other"/ *Anya* category. Analysis of complaints under *Anya* are analyzed to create new attributes.
- Covid Control Room operations developed a sense of adoptability in CM Helpline process which now operates as emergency service to the citizen of UP in Covid-19 pandemic crisis.
- Integration with other helpline services helps citizen to get one-stop solution by simply calling to '1076'. 43

Covid-19 pandemic crisis has raised during this year across the nation. CM Helpline has taken the responsibility to grow the operations accordingly and operates as Covid Control Room to work with State Government and help the citizen during & post lockdown situation for both health & other essentials. Some of the adaptable features are listed below:

- CM Helpline is functional as Covid Control Room for UP State from 23 March 2020.
- Introduced new features in operations to meet new types of issues like daily essentials availability, sanitization issue, food related queries, etc. In this, the complaints are directed to District Control Rooms to take necessary actions.
- To maintain social distancing, CM Helpline operations were decentralized and operates smoothly.
- In view of limitation of Health Department control room (1800-180-5145), these calls are also being diverted to CM Helpline.

ENABLER

Processes Re-engineered

- CM Helpline registers citizen grievances on Integrated Grievance Redressal System (IGRS) through phone calls and forwards them electronically to the concerned official within no time. This mechanism subsides the older version of written complaints which moved physically to the departments for redressal and citizens had to visit departments for complaint status updates.
- During Covid crisis, CM Helpline has been working to reach the government local bodies like Gram Pradhans, Parshads, Secretaries, ASHA/ANM workers, immigrants, migrants, nigrani samiti etc. within no time to get the status of their areas through repeated approach.
- CM Helpline has also played a vital role in bringing back stranded Kota students and migrant workers across the nation during Lockdown by registering their details / grievances and forwarding to concerned authorities for further action.
- Calling to patient regarding their Home/Hospital isolation related status on regular basis signifies the easy and appropriate approach of State Government through CM Helpline

Technologies

CCA has implemented call center solution for the CM Helpline Process:

Ameyo omnichannel contact center software solution.

Also, the Helpline has presence on various social media platforms as mentioned below*:*

- Facebook: UPCMHelpline1076
- Twitter: @CMHelpline1076

People

CM Helpline operations are handled by a 500-seater Call Center with both Inbound & Outbound processes.

- For Capacity Building, all the Call Center Executives are trained in below 3 phases:
  i. Soft skill training: General understanding of working in a call center environment including being polite, clear voice, proper pronunciation etc.
  ii. SME training: Understanding of complaint categories according to all mapped government departments.
- On hands training: Hands-on understanding the calling application and registration e-form. Mock drills for correctly capturing information shared by the citizen on IGRS
  i. Apart from CCE trainings, departmental officers and NIC district level officials were also trained in various phases:
  ii. Department wise State level workshops were conducted for understanding of redressal mechanism of registered grievance, developed for CM Helpline on IGRS portal.
  iii. District Magistrates (DMs) of all districts including respective District Information Officers (DIOs) of NIC and other District level officers of all mapped departments, had participated in workshops conducted through physical as well as Video Conferencing platforms.
  iv. Officers' Mapping in CM Helpline is based on L1-L4 mechanism which provides access to upper-level officer for redressal monitoring and add / delete or modify existing attributes within their respective departments as per their need.
  v. For smooth transition from existing to redefined mechanism, SMEs from respective departments provide timely training to CCEs and provide solution to CCE queries as and when required

VALUE INDICATORS

Learnings for sharing

- UP CM Helpline is one of the biggest Call Center operating in India, registering almost all types of grievance across the State followed by the redressal feedback. It is operational with the capacity of 80,000 inbound & 55,000 outbound calls per day.
- It includes 360^0 coverage to public grievance across the State and stretch the reach of higher authorities of departments to the last Official deployed on the ground. This L1-L4 mapping framework with level wise timeline is highly customizable.
- CM Helpline was implemented primarily for non-emergency issues, but in Covid-19 pandemic crisis, CM Helpline is responding as emergency helpline and delivering successfully in dynamic operational environment with minimal operational changes. This is a testimony of agility of the Helpline.

- CM Helpline which has operated as a centralized call center, in view of the Covid-19 situation, plans to move towards decentralization. This is the level of flexibility of this project.
- A separate officer helpline/ desk setup at the Helpline provisions for exceptional situations wherein intervention of Govt official is required. The replication of the Helpline model may allow handling of matters which cannot be handled by Call Center Executives.

Digital Empowerment

Various factors which signifies the digital empowerment are:

- Citizen can reach to the State Government without incurring any financial or time cost of physically visiting a Government office.
- Citizen across the State can reach to Government by dialing a toll-free number '1076' irrespective of location (urban/rural), spoken language and literacy status.

Green e-Governance

- Factors responsible for Green e-Governance are:
  i. Minimum movement of citizen from his place to Government offices regarding complaint registration and follow-ups reduces the pollution which include paperless procedure, reduction in fuel consumption etc.
  ii. In view of Covid 19, CM Helpline plays an additional role in providing time-bound redressal of citizens' grievances without physical contact with the Officials in offices and other people in public transports.
  iii. Officers are able to provide redressal to citizens' grievances while maintaining social distancing and keeping them safe.
  iv. Loss of documents or related papers condition nullifies in CM Helpline due to paperless procedure and soft copy uploading on IGRS.

Mrs. Neha Prakash, *Managing Director, Uttar Pradesh Development Systems Corporation Limited (UPDESCO), mdupdesco.up@gmail.com*

Ease of Doing Business in Assam

National Informatics Centre, Assam

Oinam Saran Singh, Suchitra Pyarelal and Kakoli Chaudhury

PROJECT OVERVIEW

As a part of the “Ease of Doing Business” initiative the Govt. of Assam has taken up the implementation of the Single Window Project to facilitate the setting up of industries in Assam. The ‘Single Window' was aimed to allow business man / citizens with the facility to lodge their clearance documents online at a single point only. Assam Ease of Doing Business Act, 2016 was passed by the Government of Assam in the year 2016. A Third Party Consultant was engaged by the department then and NIC was handed over the development of the portal in December 2018.

Objective

The EODB (Ease of Doing Business) platform https://eodb.assam.gov.in was developed using the Open, Secure and Scalable Framework – ServicePlus, to facilitate for filing, management and tracking of all necessary clearances, approvals, registrations and renewals under various State enactments. The Single Window Interface for EoDB reduced the interface with Governmental agencies and the cost of doing business. It was launched on 17th June 2019. 19 departments with 37 sub-departments have gone live with 275 plus services.

Scope

The services are available to all businessmen and citizens. The entire state of Assam including 33 districts and all 219 blocks and other administrative zones of departments are covered by the project.

The key stake-holders of the project are Government department officials, citizens, and businessmen of Assam. The Single Window Interface for EoDB reduced the interface with Governmental agencies and the cost of doing business. It was launched on 17th June 2019. 19 departments with 37 sub-departments have gone live with 275 plus services.

Software

The EODB platform https://eodb.assam.gov.in was developed using

- ServicePlus framework, which is on open-source stack (Java, PostgreSQL, Linux)
- Codeigniter, MongoDB (dashboard, MIS, Central Inspection Module)
- HTML/ Jquery/ JavaScript, Bootstrap used for front-end

Cyber Security

The site is security certified. Certified by NIC.

Disaster Recovery and service continuity

We have a near DR site and service continuity is in place.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Common Application Form	With a view to facilitate the businessmen in obtaining various approvals/Registrations/Lice	NA	3247	7243

	nses etc from the department to set up business in the state, Government of Assam has authorized Single Window Agency to introduce a Unique Business Identification Number (UBIN). This UBIN is obtained by registering in the portal through one common application form (CAF) available in the portal.			
Electrical Contractors license	License issued to electrical contractors	NA	3688	5621
Registration / Renewal and Grant of Factory License	This is a service under Inspectorate of Factories, to grant license for Factory registration	NA	3162	1789
Registration and renewals of Firms and societies	This service issues the registration of firms	NA	548	2553
Grant of a license to sell, stock, exhibit or offer for sale, or distribute drugs other than those specified in Schedule X Form 19 and additional information (retail)	Service to grant license to sell, stock or distribute drugs under State Drugs Control Administration	NA	NA	1579

Implementation

Implementation Coverage achieved in comparison to the plan / target

The implementation coverage was remarkable as compared to plan/ target. As many as 275 plus services are online since June 2019 in about 9 months.

Improvements/ enhancements specifically planned out during next one Year

- Integration with Payments, Digital Signature: To facilitate secure digital payments while availing services eGRAS (Online Government Receipts Accounting System) has been integrated for online service delivery.
- SMS gateway and email integration: SMS gateway and email have been integrated for delivering alerts and acknowledgements.
- Skill and Capacity building: Capacity building and skill development are of utmost importance, since this would make Government officials better equipped for service delivery.
- Application Tracking feature available: Users can track their application without logging into the portal
- Processing History: Officials can view the processing history of an application once it has been processed by them
- Services are listed for easy access
- Requirements for each service is clearly listed so citizen can have everything ready before applying
- User Manual on how to apply for the services are available for citizens
- Downloadable forms are available for ease of citizens and entrepreneurs.

- Acts, Rules, OMs, Notifications available for view and download
- A Dashboard for department heads is under development
- MIS for taking decisive actions is also under development.
- Central Inspection System Module: A centralized inspection module currently also under development for carrying out common inspections by inspectors of a few departments

ENABLER

Processes Re-engineered

Before EoDB system was in place investors were required to visit 35 departments for clearances, Licenses and Registrations. Applications were processed offline and status of applications couldn't be tracked.

However, the automation through the EoDB portal has strengthened by redesigning the backend processes and enabling investors to apply online from the comfort of their offices / homes even in times of pandemic at any time 24*7. The application status can be tracked now online

Reforms and Standardization of Acts:

- Registration under The Assam Shops & Establishment Act in 1 working day.
- Factory Licenses issued with validity of 10 years.
- Provision for Third Party Certification and self-Certification of Boilers.
- Self-Certification Scheme under all Labour Laws.
- Women have been allowed to work in Night Shifts.
- Single Integrated Return under all Labour Laws.
- All white category industries exempted from obtaining environment licenses
- No inspection for green category industries
- Auto renewal of registrations/ licenses
- Joint common inspection introduced for many Govt services to avoid multiple visits
- All inspection reports to be available online within 48 hours.

Technologies

All the services have been designed and developed by ServicePlus, a metadata-based, single, unified configurable service delivery framework. It enables a single delivery portal for the citizen to access information about any service provided by the government.

People

Skill and capability building: Strengthening the skills of the people behind service delivery will help them to perform better. This in turn will translate to better efficiency in service delivery mechanism. Continuous capability building has been done for the user departments. A Help Desk is also in place and training has been imparted to help desk manpower. All methods of communication offered by ICT were used to monitor this project. The State-level Review Committee headed by the Commissioner & Secretary of the Department meets regularly and all department functionaries interacted withusing NIC's Video Conferencing. Regular interaction through e-mails also is used extensively. For fruitful monitoring of the services of EoDB a Dashboard for departments has been under development where alerts for the Heads of Departments are generated. Reports are available to see the pendency status of the services so that necessary steps can be taken by Department heads.

VALUE INDICATORS

Learnings for sharing

- Common Application Form for applying the UBIN (Unique Business identification Number)
- Single State-Registration Id
- User Dashboard
- No physical touch points in the life cycle of a service delivery
- Time line management
- Status tracking
- SMS and Email alerts
- QR code verified
- eGRAS integration
- Centralised inspection agency
- Online verification system
- Secured environment

Digital Empowerment

To address these issues, it is planned in latter stages to implement portal services in local language.

Green e-Governance

This project did not create any extra ICT resources (i.e. no ICT resource was specifically procured for implementing this project). Therefore, e-waste management was not one of the project considerations.

Shri. Oinam Saran Singh, *Commissioner Industries, Commissionerate of Industries and Commerce (Assam), commissioner@diccassam.com*

Shri. Suchitra Pyarelal, *Deputy Director General and State Informatics Officer, National Informatics Centre (Assam), sio-asm@nic.in*

Ms. Kakoli Chaudhury, *Scientist F, National Informatics Centre (Assam), asm-kakoli@nic.in*

Nivesh Mitra - Single Window Portal of Uttar Pradesh

Department of Infrastructure & Industrial Development, Govt. of U.P.

Neena Sharma, Mohammad Wali Abbas and Hemant Arora

PROJECT OVERVIEW

"NIVESH MITRA" is a dedicated Single Window System of Govt. of Uttar Pradesh to collaborate in the holistic development of industry friendly environment through progressive regulatory processes, efficient system and effective measurable timelines. The main objective of the system is to enable 'ease of doing business in Uttar Pradesh' through facilitating the entrepreneurs with the electronic based transparent system for online submission, eliminating physical touch points and tracking of applications including online fee payment. Entrepreneurs setting up small, medium and large-scale industry have to file application forms mandatorily through this system. Nivesh Mitra provides the facility of online submission and updating of all forms required for various approvals by the entrepreneurs.

Nivesh Mitra acts as a seamless interface, aimed to facilitate faster and time bound issuance of various approvals needed by entrepreneur desirous of setting up of an enterprise in U.P. It provides a hassle free and user-friendly platform between existing & prospective investors and entrepreneurs and various departments to ensure faster and time bound issuance of various approvals.

- Application status at Nivesh Mitra: Total applications disposed through Nivesh Mitra are 2,31,199 (93%).
- User Satisfaction level: With more than 66,000 users' feedbacks till date, Nivesh Mitra has been consistently able to record more than 73% 'Satisfaction' level.
- Grievances redressal: Till date Nivesh Mitra has received more than 19,500 Grievances out of which it has successfully redressed more than 18,900 (98%) applications which is unprecedented for any e-Governance system

Software

Front End: MS Visual Studio (VB.NET) 2012, JQuery, CSS and bootstraps are used for designing.

Back End: SQL server 2017 Enterprise Edition

Cyber Security

Security audit done by cert is empanelled agency under the guidance of NIC Nivesh Mitra Team.

Disaster Recovery and service continuity

Standard Data recovery and service continuity for National Cloud Meghraj.

RESULTS INDICATOR

Information

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Total number of Services integrated with Nivesh Mitra		69	112	147

Total Application Received for license / NOC	36,478	1,11,387	2,49,099

Implementation

Implementation Coverage achieved

Nivesh Mitra has already excelled its plan wherein it began with 69 services and in today's date it has covered more than 147 services spreading across more than 20 departments.

Improvements / Enhancements

- As part of enhancements, Nivesh Mitra has mandated to issue only digitally signed Licenses/NOC through its platform which has been convenient for Entrepreneurs not to physically visit departments to collect the issued NOC.
- Nivesh Mitra has also developed online dashboard for all department ACS/PS and District Magistrates wherein everyone can analyze the performance of their respective departments/districts in terms of Application status/user feedback/Grievances.
- This feature also supports in trend analysis of applications/user feedback/Grievances status for month on month basis which helps in better decision making.
- User feedback Module: In order to collect User experience with the online system and departmental process/forms/applications, Nivesh Mitra has implemented User Feedback module to find out the user experience as well as identify if users were asked to physically visit departments or not. This tool has been pivotal in mapping user's expectations.
- Nivesh Mitra has also implemented 'Escalation Matrix' which allows system to escalate notifications to higher authorities in case applications have elapsed 50%, 75% or 100% timeline. This tool helps in timely issuance the licenses in UP.

Future Plan

- Nivesh Mitra has already envisaged to add 42 more additional services (Labour/IDA) which are currently in testing phase and shall be completed before Nov'20
- Focus on integration of sector specific licensing services i.e. Tourism/Film /Movie Shooting etc.
- Business Process Reengineering –Further simplification of application forms, elimination of redundant information asked in government forms, reduction in Timelines for services (Benchmarking) and simplification of Application Processing process through merging the licenses wherever it is possible
- Entire Nivesh Mitra Walkthrough feature (bilingual) for our local native Entrepreneurs
- Provision of Chat Box on Nivesh Mitra for quick and faster support

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ENABLER

Processes Re-engineered

In Order to implement Nivesh Mitra, 10-point strategy was followed:

- Step 1: Harnessed Business Reform Action Plan, DPIIT, Govt. of India recommendations
- Step 2: Geared Up with validating existing department wise NOC/Licensing system

- Step 3: Defined Standard Operating Procedure(SOP) for Single window system implementation
- Step 4: Development of end to end online system for more than 10 departments
- Step5: Developed more than 30 new services' application forms across 20 departments
- Step 6: Delved deeper with making time bound service delivery through Janhit Guarantee Act
- Step 7: Realized the value of well-defined checklist & procedure for each service
- Step 8: Focused on No manual intervention through Intra-departmental online system
- Step 9: Provision of Grievance Redressal & Feedback mechanism
- Step 10: Realized the Value of data analytics through reports & dash boarding system

Understanding the lack of process-oriented governance mechanism persist with many of e-Governance systems, Nivesh Mitra was developed on clear cut defined Standard Operating Procedures(SOP) ensuring the efficiency, effectiveness and sustainability of the system in near future.

Due to these SOPs such as pre- defined application status, non-movement of application until all necessary documents are filled, provision of online digitally signed NOC etc. have allowed Nivesh Mitra to integrate with any of the department systems. In short, with these SOPs now almost every Licensing system in UP are being developed on same guidelines.

To ease out the online payment process, consolidated payment option for all submitted applications was adopted.

In order to automate the Licenses/NOC & Incentives information identification, 'Know Your Approval' Online Information wizard was developed on Nivesh Mitra to let user know about applicable Licenses & Incentives requirements in UP

To simplify the third party's verification process from Banks / other Private & Government Institutions to verify NOCs / Licenses online, third party verification tool was also provided on Nivesh Mitra to eliminate the unnecessary hassle for industries.

Technologies

Using Advanced data analytics through dashboards/trend analysis etc. the overall licensing issuance projection process has not only been simplified but also it has significantly improved the decision making process to be adopted by more than 20 odd departments.

People

Meetings with major 20 departments' representatives, principal secretaries for implementation of BRAP reforms.

Workshops in all 75 districts were conducted by Invest UP (Udyog Bandhu) team for sensitizing over functionality of Nivesh Mitra portal and its link with department portal.

The state government also set up a monitoring mechanism where the applications status and departments performances are reviewed at district level, at departmental level, PS industries, Chief Secretary and Chief Minister's office

VALUE INDICATORS

Learnings for sharing

There have been workshops in all 75 districts/18 Commissionerate of Pradesh over sensitization on working with Nivesh Mitra Portal.

A complete technical & functional training were conducted for district level officers/entrepreneurs/industries/ Industries associations.

Digital Empowerment

The system is completely equipped with end to end online unified payment process involving all more than 20 departments involved and it also covers all 75 districts across the state.

'Nivesh Mitra' has empowered all entrepreneurs through it anytime, anywhere application submission methodology by eliminating all physical touch points from licensing process.

The outcome of issuance of more than 2 lacs NOC through its platform, system has proven its efficiency and credibility among all users/entrepreneurs.

Green e-Governance

As part of going Green e-Governance initiative, 'Nivesh Mitra' has been hosted on cloud so that the gigantic system likes 'Nivesh Mitra can save a lot on data Centre/server requirements. This initiative has also resulted into saving a lot of power requirements vis-à-vis reduced manpower requirement.

The mandatory provision of issuance of 'Digitally Signed' NOC/ Licenses through 'Nivesh Mitra' has also saved a lot on physical papers saving a huge number of trees.

Smt. Neena Sharma, *CEO, Invest UP Erstwhile Udyog Bandhu, Department of Infrastructure & Industrial Development, Govt of U.P. (Uttar Pradesh), bandhu.up@nic.in; info@udyogbandhu.com*

Shri Mohammad Wali Abbas, *Director (IT), Chief Minister Office, Uttar Pradesh (Uttar Pradesh), waliabbas@udyogbandhu.com*

Shri Hemant Arora, *Technical Director, National Informatics Center (Uttar Pradesh), jansunwai-up@gov.in, hemant.arora@nic.in*

Banglar Shiksha Online 2.0 *School Education Department, West Bengal*

Manish Jain and Debashis Sarkar

PROJECT OVERVIEW

Banglar Shiksha Online 2.0, the ePortal of School Education Dept has been developed to integrate various databases related to School Education System of West Bengal. The ePortal consists of database of every school, its infrastructure, details of teaching & non-teaching staffs as well as details of every student. It is also linked with database of Mid-Day Meal System, eHRMS etc. The ePortal is being operated by stakeholders of School Education eco system, like, Head of Institutions, SIs (Circle level), DI of Schools (SE / PE), Chairman of DPSCs, OC, Mid-Day Meals, DPO-SamagraShikshaAbhiyan, District Magistrates, etc. Hon'ble Chief Minister, Hon'ble Education Minister, Chief Secretary, Principal Secretary & other senior officials of School Education Dept have their own dashboards which highlight various important indicators and KPI as well as progress monitoring reports of various activities.

The basic objectives of Banglar Shiksha Online 2.0 are:

- To develop a comprehensive online system for all services related to School Education.
- To bring all stakeholders of School Education in single virtual platform.
- To develop a comprehensive digital eco system for entire school education sector.

Components of Banglar Shiksha Online 2.0

- **Student management System** of Banglar Shiksha Online 2.0 has been developed for New admission of students in opening classes and promotion / detention of each student after school examination as well as board examination with obtained marks. This module also facilitates transfer of students, incentives distribution (Text Book, Exercise Book, School Bag, Shoes etc.).
  Link: https://banglarshiksha.gov.in/
- **School Management System, another component of "Banglar Shiksha"** has been developed for digitizing various day-to-day activities at School level. The School Management System also consists of individual School Websites. Schools are able to prepare Class routines, Class logs, update daily attendance etc using the system.
  Link: https://school.banglarshiksha.gov.in/
- The **i-OSMS v2 portal** used for processing 4.1 lakh school's employees as well as 750 no. of DPSC employee's monthly salary. This software facilitates employee transfer, employee increment, Festival Bonus etc. It is also integrated with e-Pension portal of finance dept. for seamless processing of pension.
  Link: https://osms.wbsed.gov.in/
- The **Mid-day Meal** website has been specially designed to monitor daily coverage of Mid-day meal scheme by officials of the Department. This program covered the children studying in Primary schools (Class: Pre Primary - V) and later it has been extended to the Upper Primary stage of education (Class: VI - VIII). It covers the Govt., Govt. aided, Local Body schools besides the children studying in Madrasah, NCLP, SSK, MSK etc.

Reports have been synchronized with server on daily basis through the MDM mobile app & web application.
Link: https://mdm.wbsed.gov.in/

- This UDISE+ system has been designed for collecting infrastructure data for schools with respect to School profile, Physical facilities, Equipments, Sanitary Infrastructure, ICT facilities, Admissions, dropouts, etc.
  The **UDISE+** website has been designed for the school level and all the details of the school stored in this website. Different dashboards have been provided for Block & District & State level covering 982994 schools (operational 95696), with an enrolment of 181,74,803 students and 5,58,812 Teachers.
  Link: http://202.61.117.128/
- The **Sabooj Sathi portal** is the e-Governance mechanism of the scheme under which by-cycle is distributed among students of class IX – XII. The portal ensures seamless importing of basic students data from student management system of Banglar Shiksha Online 2.0, finalization of bi-cycle requirements (delivery point wise), supply chain from factory to distribution point, updating distribution records online and proactive disclosure in public domain.
  Link: https://wbsaboojsathi.gov.in/v2/
- The **Scholarship portal** has been designed for the student of Class VIII and Class X. After passing the exam students of Class X have been selected for the second stage of NTSE exam. After qualifying the examination they are eligible for scholarship. For the students of Class VIIII, after qualifying the exam they get the scholarship.
  Link: https://scholarships.wbsed.gov.in/
- **GIS** software has been developed and integrated with Banglar Shiksha Online 2.0.
  Link: https://schoolgis.nic.in/wb/

Mobile Apps

- The **mPardidarshan Mobile App** is used by SIs, DI of Schools & other senior officials for inspection of Schools. It involves review of academic performance, school infrastructure & administrative aspects. Features of the App may be found below:
  i) Uploading of Inspection Reports and relevant images of School infrastructure.
  ii) Reports are stored in offline mode and will be synchronized with server when internet will be available.
  iii) Provision for viewing past inspection reports.
  iv) Rating may be generated based on uploaded Inspection Reports.
  v) Location details will be auto captured.
- The **Mid-day Meal Inspection App** has been specially designed to inspect the Mid-day meal scheme by officials of the Dept. as well as common citizens. Features of the App may be found below:
  i) Uploading of Inspection Reports and relevant images on the spot.
  ii) Reports are stored in offline mode and will be synchronized with server when internet becomes available.
  iii) Rating may be generated based on uploaded Inspection Reports.
  iv) Location details will be auto captured.

- The **eHRMS Mobile App** will be used by around 4.1 lakh employees to receive update about their pay slips, annual pay statement, various notifications etc. Features of the App may be found below:
    i) OTP based authentication for Login.
    ii) Employee Dashboard.
    iii) View Employee Profile.
    iv) Generation of Monthly Pay slip.
    v) Generation of Annual Salary Statement.

Stake Holders

- Student – 1,39,00,000
- Teacher – 4,33,767
- School – 63,668
- Circle (726 nos.), Education District (25 nos.) & State level official.
- Official of Mid-Day-Meal
- Inspector.

Software

The software has been developed using Open Source technology.

- Application Server- PHP engine
- Database Server- PostgreSQL 9.6
- Web Server- Apache 2.4.6
- Middleware- N/A
- System Software-RHEL 7.4

Cyber Security

The Application software has been security audited by STQC, MeitY, GoI.
The Application has been hosted in NIC's data Center. It is protected through standard security arrangements which are available in the NIC's Data Center including Firewalls & Intrusion Detection System.

Disaster Recovery and service continuity

Disaster Recovery facility is available.

RESULTS INDICATOR

Information

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Student Record Entry		-	1,33,00000	14,50,000
Validated Student Record		-	1,24,00000	14,50,000
Student Promotion & Detention after School/ Board Examination		-	1,24,00000	-
Student Transfer Out& online TC generated		-	18,00,000	-
Student Transfer In		-	13,10,000	-
School Basic Details Validated		-	63,000	-
Para Teacher Record Entry		-	43728	-
Profile incorporated from eHRMS via webservice		-	390039	-
MIS – For monitoring, State, District, Circle & HOI login.		-	At various stages of	At various stages of

			implementation	implementation
Submission / processing of monthly salary requisition of school employees.		-	4.1 lakh / month	4.1 lakh / month
No of students served Mid-day Meal		-	95,000 schools / Day	95,000 schools / Day
UDIE+ record entry		-	91,810	-

Implementation

Implementation Coverage achieved

"BanglarShiksha" portal is targeted to cover 1,39,00,000 students of Pre-Primary to Class XII of schools of West Bengal. Also Teaching and non-teaching staff of 63,688 schools. It has been implemented throughout the state in all schools.

Total number of employee is 433767

Improvements / Enhancements

- Provision for major Incentive Distribution (like, Text Book, Shoes, School Bags, Exercise Books) incorporated in BS Portal. Piloting has been initiated in AMPHAN affected 8 Districts.
- UDISE+ module of BS Portal has been launched & data entry & certification completed for 61,016 no of Schools.
- Integration with Sabooj Sathi Portal done.
- Data Entry in TRGMDM Portal of MHRD will be replaced with similar module in BS Portal. Action initiated.
- mParidarshan and e-HRMS mobile app have been launched.

ENABLER

Processes Re-engineered

School Education dept. developed a comprehensive online system for all services related to School Education.

Student & Employee details has been stored in a standard format.

All stakeholders of School Education access in single virtual platform.

School Education Department bring all databases to school education in one single platform through Banglar Shiksha Online 2.0.

Pre-Computerised System: The employee wise Salary of each month was manually prepared by HOI and submitted to concerned treasury. After clearance, treasury sent consolidated cheques to the concerned bank ac of the school. Then the school authority credited cash to its employees

Simplification: In the simplified reengineered system the salary and various other components viz,arrears, pay fixation, Bonus,are computed by DDOs thru the iOSMS system.

Automation: Electronically submitted to IFMS for further electronic transfer to respective employees bank accoun

Technologies

The software has been developed using Open Source technology.

- Application Server- PHP engine
- Database Server- PostgreSQL 9.6
- Web Server- Apache 2.4.6
- Middleware- N/A
- System Software-RHEL 7.4

People

- State and District level committees have been created for monitoring on daily basis.
- Various WhatsApp groups created for monitoring in the HOI, Circle, District levels.
- State Data Analysis and Management Centre (State Control room) create for the Banglar Shiksha Online 2.0 support & management.

VALUE INDICATORS

Learnings for sharing

The School Education sector comprises of more than 63 thousand schools, 1.3 crore students and 4.1 lakh employees. It is very difficult to properly offer various services without effective process re-engineering, comprehensive digital eco system and adequately trained human resources. It was a humongous task to bring all the stake holders under one umbrella.

The innovative design of the e-governance system ensures all activities are streamlined, processes are re-engineered, bottlenecks are removed, redundant processes are eradicated and human resources are properly trained. The well-established management structure ensures efficient monitoring of the system.

Digital Empowerment

- It's a comprehensive single window digital platform for stakeholders of School Education in West Bengal.
- Teacher are encouraged to prepare Class routines, Class logs, Class Plan and update daily attendance etc. using the system.
- This digital platform provided opportunity of 'Digital Inclusion' to Teachers & Staffs of 63,688 Schools, officials of District & Circle levels. They worked online in the system. They felt empowered & motivated once they receive their 'own' user id & password to access the portal.
- The Students and their parents are also encouraged to see the details of the student online through the portal including their facilities.

Green e-Governance

The *BanglarShiksha Online 2.0* has been designed in such a way that papers are seldom required in the entire process. The digital record keeping is a step towards Green Governance.

Shri Manish Jain, *Principal Secretary, School Education Department (Kolkata), wbssed@gmail.com*

Shri Debashis Sarkar, *Joint Director, School Education Department, jdse@wbsed.gov.in*

ICT in Department of School Education and Board of Secondary Education Uttarakhand

School Education Department Uttarakhand

R. Minakshi Sundaram, Sanjay Gupta, Pushpanjali and Mukesh Bahuguna

PROJECT OVERVIEW

Background

Geographical spread of Uttarakhand is marked by plains and hills in the south and tough mountainous terrain in the north which controls the demographic pattern. Implementation of the state run education system face challenges born out of complications. To enhance the effectiveness of the education system in vogue, it was conceived by the state Govt. to develop a web based portal which can be used as an integrated platform for the students, teachers, administration and decision makers of school education. With this background a portal named "School Education Portal Uttarakhand" was designed & developed by NIC Uttarakhand and implemented by the school education department Uttarakhand in Jan 2016.The portal is a huge repository of 70000 teachers/employees profile and 22000 Government schools with "sugam" and "durgam" categorization. It is having various online modules related to school education department Uttarakhand and SCERT Uttarakhand. After sustenance and acceptance of school education portal at the grass roots level, an another portal conceptualize and developed for the board of secondary education Uttarakhand.

Objective

The project was initiated to develop a multitude of systems as written below:

Human Resource Management System

To have an online system with complete digitized service profile of teachers and employees.

School Management System

To capture details of schools like demographic details, infrastructure details, student enrolment, sanction post and unit categorization (X or Y) on the basis of eleven norms and their sub-norms parameters etc.

Teachers Transfer Module

Transfer system is based on the quality points calculated for the teachers. Quality points are calculated on the basis of certain parameters i.e. teacher's tenures in X(Sugam) and Y(Durgam) type of schools, last three years' attendance records of employees and exam result performance in employee's subject in last three years etc.

School Inspection module

This module is for creating and managing the inspection team, inspection schedules, reports etc. for the inspection of schools for improving the quality of education in the State.

Student enrolment module

This module captures school and class wise student personal details. The enrolment of students for Uttarakhand School Education Board is also done using this module. The student's promotion to next class after completion of academic session is also done by respective schools.

Other Major modules

- Work-flow based system for application and processing of teacher's service extension.

- Collection and processing of school related data to give star rating to the schools.
- Generation of QR Code enabled teachers and employee's identity card.
- As per requirements of District Education Department Almora, a module is developed and incorporated in the portal though which alumni of any of the Government school in the district can donate funds to his/her school for infrastructure development of the school.
- Module for sharing of best practices by teachers in the field of ICT.
- Module for monthly assessment of students for assessment of student competency and class wise subject wise learning outcome
- Module for e-learning during Covid 19 pandemic lockdown
- Android based mobile app
    i. Online system for receipt of application and processing of
    ii. Applications for recruitment of guest teachers
    iii. Applications for appearing in Uttarakhand Teachers Eligibility Test-2019
- GIS interface for school's location with categorization
- Uttarakhand board result publication

Scope

The broad scope of the project was to induce ICT work culture in Department of School Education Uttarakhand. With this objective, the first step of the project was to create directory of schools and repository of school teachers and employees service profile data. This formed the basis for building various future modules in the portal. The department's prime objective of having a web portal was to bring transparency in teacher's annual transfer process. Once this was implemented, subsequent modules were added to the portal for the benefits of teachers, students and administrators. Future scope of the project can be summarized as:

- Development of analytics portal for Uttarakhand board result
- The UTET System is developed and designed in such manner that same system may be used for other exams /tests conducted by Uttarakhand board like D.EL.ED (Diploma in elementary education).
- Inclusion of Artificial Intelligence and Machine Learning modules based on SCERT online module data for monthly test.
- Development of Online leave management system.
- Development of online APAR module for submission, review and maintenance of Annual Performance Report of officials of School Education Department.
- Online school management
- Other requirements by school education department

Stakeholders

- School education department Uttarakhand
- SCERT Uttarakhand
- Board of secondary education Uttarakhand
- Applicants of UTET exam
- Teachers of Uttarakhand Government schools
- Students of Uttarakhand Government schools

Benefits

With the implementation of School Education portal, department is able to implement any activity for monitoring of schools, student results analysis,

transparency in annual transfer of teachers, teacher's recruitment process, analysis of teacher's vacancy in schools, assess student's learning outcomes etc. Other main benefits of the project are:

- A powerful tool in the hand of stakeholders for continual improvement of the school education system in public domain.
- The e-Service book is readily available to a teacher or an officer by accessing the portal using his/her user credentials.
- Availability of all information related to school system at one point viz details of students, subject-wise teachers, amenities available in the school etc.
- The generation of teacher's gradation list after incorporating an individual teacher's quality points is electronically generated using this system. The gradation list helps in assessing the vacancies for compulsory transfer of teachers.
- Availability of completely transparent system for submission of applications and fees for Uttarakhand teacher's eligibility test exam. Thus reducing in the means of expenditure and other resources..

Software

The project is developed mainly in Open-source technologies. Software and hardware used are as below

SW – Linux/Tomcat7.0/Java

Database – PostGreSQL

HW- Two Virtual Servers in state data centreUttarakhand

SSL configured

Cyber Security

Portal has been security audited regularly by CERT-IN empanelled vendors whenever new module is added to the portal. Following agencies were involved in certification

- XIARCH SOLUTIONS PRIVATE LIMITED- 3-Feb-2020
- AKS Information Technology Services Private Ltd.- 19-Mar-2018
- Torrid Networks Pvt. Ltd- 23-May-2017

Disaster Recovery and service continuity

As the application and databases, both are deployed on virtual servers in state data center Uttarakhand, database and application backup plan is followed as per data center policy. However, critical applications such as dissemination of board results, online registration of UTET applications etc are hosted at National Data Center to ensure service continuity.

RESULTS INDICATOR

Information

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
e-Service Book	Captures all the service book details of employees and teachers including employees' profile photo. All the entries of service book viz Personal details, posting details, spouse details, details of training attended, leave details etc. are	67495	67110	66085

	covered under this system. Employee's profiles are created and updated by the respective controlling units.			
e-Inspection	This module is for creating and managing the inspection team, inspection schedules, reports etc. for the inspection of schools for improving the quality of education in the State.	29259	26066	5072
e-Student Profile	Student profile including aadhar number is captured by this system as per class-wise enrolment by head of school.	275929	951960	7000
Online application for Guest Teacher Recruitment	Online registration of contract teachers in Govt. high school and Govt. Inter college in Uttarakhand	67283	---	---
Teacher's service extension	Role based online module for application of service extension by teachers of Uttarakhand.	---	111	236
Students monthly test assessment	The results of monthly test of home exam of school students are assessed using graphical analysis.	---	282222	239348
e-Learning content	During COVID-19 induced lockdown period, the individual contribution of e-Content by school teachers enabled students to interact with their teachers virtually. eContents uploaded	---	---	3139
	Views till date	---	---	93464
Online application for UTET exam 2019	Approximately 80,000 applications were submitted using the portal amounting to Rs 5 Cr were received through online payment as application fee.	---	80000	---
e-Service Book	Captures all the service book details of employees and teachers including employees' profile photo. All the entries of service book viz Personal details, posting details, spouse details, details of training attended, leave details etc. are covered under this system. Employee's profiles are created and updated by the respective controlling units.	67495	67110	66085

Implementation

Implementation Coverage achieved

- The system covers all primary, secondary and senior secondary schools run by Uttarakhand Government as well as Government aided and unaided schools across all the 13 districts and 95 blocks in the State.

- It covers all offices of school education Uttarakhand, SCERT Uttarakhand offices including DIETS and Board of secondary education Uttarakhand. As whole, the project coverage is enumerated as below
    i. Primary Schools :12866
    ii. Junior Schools: 3921
    iii. High Schools: 991
    iv. Inter colleges: 1251
    v. Institutes :34
    vi. Offices: 1392
- Geographically large part of Uttarakhand is covered by tough mountainous terrain, classified "Durgam" areas others as Sugam areas. The project covers all the units spread in Durgam as well as Sugam areas.
- All 272 controlling (administrative) units, 70,000 teachers including employees, 22000 schools and more than 10 lakh students across the state are covered as on date.
- Module for monthly assessment of students for assessment of student competency and class wise subject wise learning outcome has been implemented for school wise data entry in the first phase. In next phase, student wise data entry will be taken up.
- All the functionalities of "School Education Portal" and "Board of Secondary Schools Portal" cover all the geographical areas of the state, however, some of the specific modules are initiated by specific districts as pilot projects.

Android app for attendance of teachers is implemented by Udham Singh Nagar district schools.

School Rupantaran module implemented by Almora district.

Improvements / Enhancements

- Online module for automation of Teacher's Service Extension. This a workflow based application added to the portal for submission of online request by the teachers for extension of their service who are retiring from the service in the current financial year.
- One of the major enhancement in the project during the last one year is the design and development of "Online System for Uttarakhand Teacher's Eligibility Test Exam Management 2019". The portal implemented successfully across the state on 1st July 2019. The objective of this system was to introduce automated management system for receiving applications and conduction of Teachers eligibility test in Uttarakhand.
- In the sector of SCERT, an online module has been designed and developed for capturing school wise, class wise subject wise monthly test performance data of students. To assess and improve the actual competency of a student in each subject, three types of grading (like achieved, partially achieved and not achieved) in particular question of test is marked. Each question is mapped with a Learning Outcome defined by NCERT (class wise subject wise learning outcomes). Accordingly, various parameterized reports and analytical dashboard generated for analysis of student's performance and hence display teacher's performance. It is implemented for class 3 to 8 since December 2019. In the first phase data is being entered school wise. Achievement of class wise Subject wise learning outcome of students is the key

objective of this exercise. The dashboard with informative visualizations helps to identify the areas of training needs for teachers as well as improvement needs of the students in the subject.

- Online module for School Star Rating. School wise details like infrastructure, school result and other academic details with document/image uploads for every six months were submitted by head of school/principal. Based on defined norms and various parameters, points are calculated for marking star ratings to the schools.
- During the period of lockdown due to Covid 19 pandemic when all private and government schools are closed, the Department of School Education UK and project team of NIC Uttarakhand took an initiative to develop a module as part of existing School Education Portal for uploading self-prepared e-Contents by Teachers of School Education Department, GoUK. In this module, any teacher can upload class, subject and topic wise self-prepared content in any of the form from video, document or power-point presentation on to the portal. The uploaded content is reviewed and approved/rejected by experts at department's State level before publishing it in public domain of the portal. The school students can download the e-Contents from the portal and use them for study purpose from their homes, thus simulating a Live Class Room kind of environment.
- Approximately 500 Government schools of Uttarakhand are identified as smart schools where complete package of ICT infrastructure are made available including VSAT systems and connected to each other.

Modules planned to be rolled out during next one year

- Portal for analytics of results of board of secondary school Uttarakhand.
- Value addition in the existing module for e-Learning Contents for Students of Uttarakhand Government Schools developed and implemented during Covid 19 pandemic lockdown.
- Online submission of queries & questions by students against each of the available e-Content
- Provision for submission of answer or response by respective teacher using his/her user credentials
- Online module for employees' annual confidential reports (APAR)

ENABLER

Processes Re-engineered

1. Government Process re-engineering

Development and implementation of a web based portal for receiving online applications and automation of exam related activities for conducting Uttarakhand Teachers Eligibility Test (UTET)

Pre-Computerization

Manual System Process	Time and Cost implications
Preliminary Preparation of UTET exam	2 months and more than 35 lakh expenditure in forms printing and payment to post offices for form distribution
Preparation of application form, manuals and information leaflets	
Tender invitation for printing of OMR forms and information leaflets	
Printing of forms	

Arrangements for distribution and sale of application forms through 42 post offices in Uttarakhand State	
Time for application to be received by registered post from applicants	1 month or more
Scanning of OMR application forms	3 months or more in scanning of OMR sheets and payment to private vendors for other digitisation activities.
Preparation of data scanning	
Display of incorrect forms on website	
Updation of data after correction	

Post-Computerization

Online System Process	Time and cost Implications
Online modules developed. No printing work and no roles of post office. Since initiated and implemented first time in 2019, system study ,design and development, hosting arrangements done	Zero cost of printing and post office. Approximately 12.48 % growth in no. of applications received.
Applications received online from 1 July 19 to 31 July 19	1 Month
Receiving of application and fees done through the online system only. Edit feature provided.	Zero hosting cost.

Challenges

- Since the online system was implemented for the first time in the State, applicants were required assistance for meeting the problems encountered in the process of online application submission. A 24 x 7 call helpdesk was provided to resolve the applicant's issues.
- Internet connectivity is still a huge challenge in rural and remote areas of Uttarakhand. For smooth flow and execution of the system, the online applications were received for a longer period of one month.

Outcome and Key achievements

- A completely transparent and automated system generated
- The portal may be used for automation of other activities of Uttarakhand board
- Time and cost reduced for candidates as well as department
- All activities are handled through a single window and thus optimizing the resources
- Approximately 80,000 applications have been received online
- Approximately Rs 5 crores have been received as exam fees through online payments. Therefore, the accounting of the fee collected was easy for UBSE.

2. Government Process re-engineering- Teachers Transfer Process

Pre-Computerization

- A large no. of manual requests was submitted by teachers for seeking transfer from remote locations to the location of their preference
- No repository of transfer requests.

- The availability of school wise vacancy of teachers was not transparent to different stakeholders.

Post-Computerization

- Online generation of gradation list of teachers on the basis of quality points. The quality points are calculated on the basis of concerned subject performance, attendance and their posting in type of school (Sugam or Durgam).
- The eligible teachers are allowed to submit their choice of posting.
- The status of submitted application is accessible to the individual applicant for transfer.
- Online submission of related documents in case of transfer is sought on the basis of medical ground by a teacher.
- Workflow designed and finalized in coordination with the department after undergoing an iterative process, assigned the roles and responsibilities, consolidated the workflow, and implemented it.

3. Government Process re-engineering- e-Inspection module

- Online monthly scheduling of inspection team
- Online submission of visit report in prescribed format
- Auto grading calculated as per the percentage set criteria of achievements
    i. System reconstitutes the inspection team on a periodical basis and hence provides Govt. a tool for fair & efficient governance
    ii. More than 1000 inspections submitted monthly through the system. Online inspection report includes school infrastructure condition, construction and re-construction building or physical status, student and teacher attendance and student performance in school.
    iii. Regular generation and publication of inspection reports through this automated system has come up as an efficient tool for improving awareness and sense of accountability.
    iv. The system has led smooth monitoring, decision making andmade it easy to identify the areas for improvement through online submission of school inspection report by the respective controlling unit.
    v. As the system generates a grading based inspection report which highlights the areas of improvement and escalates to the respective sections, it creates an alert for all the concerned departments

4. Government Process re-engineering- e-Service Book

Captures all the service book details of employees and teachers including employees picture. Details like Personal details, posting details, spouse details, details of training attended, leave details etc. are covered under this system. The employee's profiles are created and updated by the respective controlling units. As on date approximately 70,000 profiles have been created.

- Teacher's quality of teaching can be assessed. The Quality points are calculated based on teacher's attendance in school, his/her student's result etc.

  It is a cumbersome process to acquire individual's data with accuracy and carry out the assessment of each employee. After implementation of the system across the state, the data pertaining to quality assessment has been done for all 70000 teachers, and an exhaustive database is

generated using this portal. This system offers a platform to maintain and upgrade this database regularly which is being used by the state Govt. for the efficient assessment of quality of education being imparted by the teachers. It equips Govt. with an efficient tool to monitor quality of education.

- To assess training requirement of teachers.
  The e-service book captures all the trainings done by employees hence skill mapping of all 70000 employees in the state has been carried out. Using this information the department is in the process of identifying teachers who have not attained any formal degree like B.Ed, D.L.Ed. related to teaching.
- Mapping of subject wise teacher's availability in all the 22000 government schools across the state is carried out.
- The system captures the subject wise class wise and RTE based sanction posts and hence enables government to assess vacancies which are going to arise due to superannuation of teachers and provides a tool for recruitment planning.
- Teachers are able to view their service record online without any administrative hassle.
- Teachers can download self-Identity card with QR-code data.
- Through this portal all the teachers and employees (70.000) are provided with individual login credentials to enter into the system for above activities.

Technologies

- NIC SMS service has been integrated in UTET management system and used for sending confirmation SMS after verified registration of the candidates, form submission after payment, forgot password, admit card generation and for sending bulk messages to the 80,000 applicants.
- GIS interface for school location with categorization of SUGAM and DURGAM helps in decision making support system for the department.
- Android app for Geo-tag based location capture of group photographs of teachers helps in tracking daily real time attendance of teachers. Implemented in Udhamsingh Nagar district of Uttarakhand.
- This year beginning, approximately 500 schools of Uttarakhand get connected for virtual trainings and meetings through the smart school project.
- Online module developed for upload of self-prepared contents or videos by teachers for e-learning from home during Covid 19 Pandemic may also use as knowledge management system for department of school education Uttarakhand.
- School education portal have a facebook page and feedback page where employees, teachers and users can give their suggestion and interact with each other.
- All administrative units are having whatsapp group to interact and update each other**.**

People

Capacity Building

- Approximately 500 Government schools of Uttarakhand are identified as smart schools where complete package of ICT infrastructure are made available including VSAT systems and connected to each

other. Widely used for virtual trainings and meetings by the ministers, administration, teachers etc at up to the school level during Covid 19 pandemic.

- Regular training programs and workshops for teachers and employees are conducted on new modules of the Portal.
- The department officials are now able to work on this web portal after providing basic operational training on computers and internet.
- Every teacher and controlling units are having their login based access to the portal for related activities. Now teachers are able to self-prepare their learning contents, videos and uploading on the portal for the student's benefit.

Change management

- Creation of MIS cell at Directorate level enabling a single point of contact for large no. of stakeholders to address their grievances related to employee, school and student's data.
- Allotment of unique employee Id and generation of Identity card with bar-code for teachers.
- Use of ICT in schools
- Accessibility of e-Service book for teachers and officers.

Implementation

Time to time GOs and office orders released at directorate and secretary level to adopt the new system at all the grassroots levels

VALUE INDICATORS

Learnings for sharing

- Digitization of large number of teacher's profile and their verification has been a very challenging task. For this, strict time lines were defined by top management to finish the digitization work within stipulated time period.
- There should be a central team at State level to drive and monitor the progress of any computerization project.
- ICT infrastructure for hosting the web portal was a big issue initially while conceptualize. Virtual Servers on MEGHRAJ cloud of GOI were allocated for this. The application now migrated to state data Centre Uttarakhand.
- In order to keep data up-to-date due to posting/transfer of teachers etc, the transfer orders and relieving/joining orders should be generated through online portal using a workflow based system.
- Availability of continuous internet connectivity are still a big challenge in the remotest areas, thus timely submission of applications and fees by the candidates become difficult.
- The training of teachers conducted by SCERT, DIET etc can also be integrated with the portal for real time update of teacher's data.

Digital Empowerment

- Use of more and more virtual meetings and trainings through the smart school's project in the state.
- Accessibility of online system at remotest of the location.

- Sharing of best practices and uploading of class wise subject wise e contents by teachers thereby benefitting the students
- Availability of Uttarakhand board Student results through online system.

Green e-Governance

- Implementation of online system for receiving of 1.5 lakhs applications for UTET exam 2019 and Guest teacher recruitment minimizes expenditure of paper/stationary at great extent.
- Virtual meetings and trainings used up to the village level schools through the ICT setup of Uttarakhand smart schools.
- Limited use of paper: The e-services reduce the use of paper. All the Go's and office orders are generated and uploaded on the portal which can be viewed and stored electronically.
- Limited use of gadgets. Cloud based hosting of Portal.
- Online receiving of feedback about portal from teachers and officials.
- The maintenance of hardware systems is in place for enhanced efficiency of hardware and therefore minimize generation of e-Waste.
- Awareness programs to create environment friendly and Green e-Governance.
- Restrict transportation/ travelling as all information is readily available and accessible through portal. Also physical movements of candidates automatically restricted due to the implementation of online system for receiving of applications.

Shri R. Minakshi Sundaram, IAS, *Secretary and Director General, School Education Uttarakhand, dg-education@uk.gov.in*

Shri Sanjay Gupta, *Senior Technical Director, National Informatics Center, sanjaygupta@nic.in*

Ms. Pushpanjali, *Senior Systems Analyst, National Informatics Center, p.anjali@nic.in*

Shri Mukesh Bahuguna, *Senior Administrative Officer, School Education Department Uttarakhand, ua.education@yahoo.in*

Karmo Bhumi

Department of Information Technology & Electronics, West Bengal

Sanjay Kumar Das

PROJECT OVERVIEW

Objective

The primary objective of the project is to develop a comprehensive platform to collect relevant working data/ details from the repatriated IT/ ITeS employee /s and explore an opportunity to facilitate them to obtain employment within the IT/ ITeS companies operating in the state. Key objective includes the following:

- Capturing the skills that the applicants possess i.e. creating a Skill Registry
- Database for Skill-registry is Personally Identifiable Information (PII) agonistic as applicant's social, demographical and geographical details are neither captured nor preserved, thus compliant with ISO 27701:2013 i.e. principles of Personal Information Management System (PIMS), accepted globally.
- Help the job seekers in IT/ ITeS domain to assess their skills and find out the skill gaps
- Assist the job seekers to upskill/ reskill themselves depending upon their core skill areas to improve employability
- Help the job seekers in securing employment in the state
- Facilitate IT/ ITeS companies and state Govt. departments/ agencies to utilize the available talent pool from migrated IT/ ITeS workers for their regular recruitment process.
- Facilitate IT/ ITeS companies and state Govt. departments/ agencies to post skill requirements for specific jobs to reach out to intended skilled work pool.

Scope of the project

Functional Scope:

The functional scope of this initiative revolves around the development of a comprehensive platform to capture repatriated IT/ ITeS employees'skill data and encourage state operated companies and Govt. departments/ agencies to provide employment opportunity. The functional scope also plans to include self-assessment section for the enrolled job seekers and upskilling opportunity for the lot. The scope also intends to include Job Board module where the employers will be able to post skill requirements for specific jobs.

Geographical Scope:

- National level – No of State(s) covered: 1 (employer point of view), Across India (Employee point of view)
- State/UT level- No of District(s) covered: 23
- District level- No of Blocks covered: 342

The geographical scope of this initiative covers the whole India from an employee/ job seekers point of view as anybody who is willing to relocate to West Bengal and searching for jobs in the state can register on this portal. From an employer point of view, the initiative covers all the interested IT/ITeS organization in the state of West Bengal to come aboard and search resources for recruitment. A current Govt. Order also allows state govt. departments and agencies to consider Karmobhumi as a parallel channel of recruitment for IT/ITeS vacancies.

Key Stake holders

- Job Seekers in IT/ITeS sector: Experienced resources of IT/ITeS employees who have lost their jobs / aren't satisfied with their jobs and looking for jobs in IT/ITeS sector in West Bengal. Current no. of registration of such job seekers on the portal is 44,000+
- Private Employers: IT/ITeS private organizations, who are operational in West Bengal and are looking for skilled resources for their organizations. Current no. of registration of such organizations on the portal is 363
- Other Govt. Departments / Agencies: All other Govt. Departments and Agencies in West Bengal who may be looking for recruitment in their department for IT/ITeS roles. Vide GoWB Memorandum No. 404-Estt(IT)/IT/0/9/2020 dated 21st Sept 2020, Karmobhumi has been authorized as an additional source of recruitment for IT/ITeS roles in Govt. departments
- Training Partner (Diksha): The portal will add features for upskilling section where job seekers can upskill themselves through trainings provided by training partners.
- Dept. of Information Technology & Electronics, GoWB – The initiative being launched by the Dept, is the owner of the portal
- SNLTR: The development of the portal has been done by the Society for Natural Language Technology Research (SNLTR), a Society under the Dept of IT&E, Govt of West Bengal, https://nltr.itewb.gov.in

Intended Benefits and Status

- Creating a skill registry of IT/ ITeS work pool in the state of West Bengal
- Skill upgradation among the IT/ ITeS job seekers
- Improved employability of the skilled IT/ ITeS resources
- Creation of job opportunities with the availability of more skilled workforce
- Improvement of IT/ ITeS sector scenario in West Bengal with the availability of highly skilled work pool
- Creating a robust ecosystem for IT/ ITeS sector capturing both demand side (employers) and supply side (Job seekers) of labour
- Creating a parallel channel of recruitment for IT/ ITeS vacancies for the state govt. departments and agencies using the readymade database.

Current Status:

Currently version 2.0 Karmobhumi has been launched where the following modules and sections are made live

- Employee module: for the job seekers to register themselves and declare their skill sets in IT/ ITeS domain. Current Registration No.: 44,000+
- Employer module: for the employers to register themselves and search for their required workforce. Current no. of registrations: 363
- Admin module: for the Karmobhumi back-end team to monitor and control the registration process
- Insta Jobs: Applicants can apply for opportunities for a short-term / contractual basis. This section is Live. Applicants willing to work in very

specific domains (e.g. API development, network configuration etc.) can avail this feature

- Vacancies: Employers from the IT/ ITeS industry can post open positions and opportunities in their respective organizations. This section is also Live.
- External Job Search: Provision of searching of job prospects from the external databases. Currently "Jobs on Jooble" has been integrated and Live in this section.

Within three months of its launch, it witnessed 44,000+ registrations boasting top-rated skills such as skilled-resources in Artificial Intelligence – Machine Learning; Block-chain; Cyber-Security in 30+ such skill domains; 44,000+ applications for jobs were raised, 15,000+ were shortlisted; more than 8,000 were selected and employed by 363 registered Employers while hundreds of others were offered part-time and odd-jobs.For example; Kolkata Municipal Corporation has selected three Software Support Personnel from Karmobhumi; M/s WTL has chosen scores of skilled resources for supporting Bangla Sahayata Kendra; a Singapore based firm has chosen couple of skilled resources on AI to work from home, so on and so forth.

State Government has recently declared Karmo Bhumi an approved source of shortlisting candidates for recruitment in all IT/ITeS vacancy. It is being integrated with Employment Bank to increase benefits to employers registered therein too vide Govt Memo. No. 404-Estt (IT)/IT/0/9/2020 dated 21st Sept 2020.

Webinars and Quiz sessions on emerging technologies have been organized by Dept. of IT&E to promote Karmobhumi and attract Job seekers and Employers to access the benefits of Karmobhumi portal.

On 18th Sept, 24th Sept, 1st October& 8th October, 2020,four webinars were organized with registered skilled-resources of Cyber Security, Block-chain technology, AI-ML and Cloud Computing respectively.

More than 1600 applicants registered in and attended these webinars wherein industry leaders across the country were brought in to discuss as to how their skill-set would make themselves employable with the changing market dynamics. Start-up leaders, Industry stalwarts and Trade Association representatives discussed, heard, guided and answered to queries of scores of registrants. 14 Quiz sessions on emerging technologies have also been conducted with 2400+ participations.

Software

Technology Platform used:

The backend platform is developed in .PHP. MySQL is used as database.

The Application is developed in Linux Apache PHP and MySQL

Interoperability& Scalability:

The application is developed using open-source technology stack; hence it is platform agnostic and can be run or executed in any prominent platforms like Linux, Windows, Mac, etc. The Web application is connected through API services. The application is currently hosted on Amazon Web Server; however, it is planned to be shifted to State Data Centre.

The application was primarily conceptualized to register only high-level

category (e.g. IoT, AI etc.) wise details of the job seekers' skills. However, after multiple discussions with the employers, DoIT&E decided to dig down to each category and highlight specific subcategories of each IT skills. Moreover, in order to ensure credibility of the skills claimed by the professional, DoIT&E has planned to implement Recognition of Prior Learning (RPL) for these professionals which would assess and certify the skill with competency level (Basic/ Intermediate/ Advanced). Also, there would be appropriate mechanisms for facilitating re-skilling and up-skilling of the professionals followed by certification, to bolster their employability in the industry.

Security concerns:

- The W3C standard for HTML and standard coding structure for .PHP were meticulously adhered.
- The entire system is OWASP guideline compliant.
- The application is protected from SQL injection technique.
- It is also protected from cross site scripting.
- The Web Server does not disclose its identity.
- The database security structure provides different layers with the overall control of the database available with the security administrator; only the authorized database administration users with assigned privilege can access database.
- The application is safe to host certified
- For data security, phone number and email id are stored in encrypted format and the data is decrypted to the user with proper authentication

Service delivery channels:

Web, Email, SMS

Cyber Security

Name of Certifying Agency:

The application has not been formally audited yet.

However, review of application security has been done independently by a 3rd party agency to identify the existing bugs and vulnerabilities.The identified lapses have been successfully mitigated, followed by another round of audit.

The Karmo Bhumi application would be subjected to a formal audit, prior to migration to the State Data Centre (WBSDC).

Certificate Reference No.:N.A.

Issue Date:N.A.

Disaster Recovery

The application is hosted in Amazon Web Services (AWS) cloud.

Though native Disaster Recovery (DR) is not in place, the application is running in single availability zone in AWS. The application not being mission-critical, for back-up and continuity plan we are relying on manual daily backup twice every day, keeping the same in physical drive as well as on AWS's native capability for snapshot and VM auto-recovery.

Once Karmo Bhumi application is migrated to WBSDC, a formal risk management and risk mitigation strategy along with applicable policies would be in place for maintaining service continuity along with applicable service levels.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e Service	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Registration of job seekers	Employees can declare their skill set which will be visible to employers	N.A.	N.A	44,000+
Registration of the employers	Employers can register and search for required skilled employees for recruitment	N.A.	N.A.	363

Implementation

Implementation Coverage achieved in comparison to the plan / target

Karmo Bhumi was initially envisaged as an electronic platform offering centralized skill registry and restoration of employment of repatriated resources in IT/ ITeS sector, especially for those who have lost their livelihood due to the impact of COVID-19.Sincethe version 1.0 of Karmo bhumi was launched, 3 modules namely the Applicant, Employer and Admin modules have remained live.

Since the launch in June 2020, the portal has 44,000+ and 363 registration by Applicants and verified Employers respectively. As on date, 44,000+ applications for jobs were raised, 15,000+ were shortlisted; more than 8,000 were selected and employed by 363 registered Employers while hundreds of others were offered part-time and odd-jobs, using Karmo bhumi platform.

Having the basic objective of having a platform catering to skill registry and employment being achieved, the Department of IT&E launched Karmo bhumi Version 2.0 with specific sections targeted at outcome-oriented functionalities

- Insta Jobs: Applicants can apply for opportunities for a short-term / contractual basis. This section is Live. Applicants willing to work in very specific domains (e.g. API development, network configuration etc.) can avail this feature
- Vacancies: Employers from the IT/ ITeS industry can post open positions and opportunities in their respective organizations. This section is also Live.
- External Job Search: Provision of searching of job prospects from the external databases. Currently “Jobs on Jooble” has been integrated and Live in this section. Integration with Employment Bank is under process

Improvements / Enhancements

The application was primarily conceptualized to register only high-level category (e.g. IoT, AI etc.) wise details of the job seekers’ skills. However, in due course, after multiple discussions with the employers, Do IT& E decided to dig down to each category and highlight specific subcategories of each IT skills. As on date, Karmobhumi has undergone one version upgrade. The basic version of Karmobhumi (Version 1.0) was launched with three modules namely

- Applicant Module: Job seekers can create profile and search/ apply for jobs

- Employer Module: Create profile and search for desired resources from the Karmobhumi database
- Admin Module: Conduct due diligence for on boarding employers on the portal

In a recently launched Karmobhumi Version 2.0, the following sections have been additionally been made Live:

- Insta Jobs: Applicants can apply for opportunities for a short-term / contractual basis. This section is Live. Applicants willing to work in very specific domains (e.g. API development, network configuration etc.) can avail this feature
- Vacancies: Employers from the IT/ITeS industry can post open positions and opportunities in their respective organizations. This section is also Live.
- External Job Search: Provision of searching of job prospects from the external databases. Currently "Jobs on Jooble" has been integrated and Live in this section.

Efforts are being put into by Karmobhumi team to add more functionalities which include:

- Self-Assessment: Candidates will be able to self-assess themselves on the declared skill set as against the expectations from recruiters
- Upskilling Module- Diksha: The applicants would be supported to improve their skill-sets in order to bolster employment prospects through specific courses and initiatives
- Integration with PBSSD: The Kormo Bhumi portal would integrate with Paschim Banga Society for Skill Development under the TET&SD to support upskilling of applicants from the non-IT/ITeS background.
- Integration with Employment Bank: The Kormo Bhumi portal would integrate with Employment Bank under the Department of Labour, GoWB to help in expansion of the employment opportunities for the applicants in Karmo Bhumi.
- Internship Module: In order to provide enhanced internship opportunities for students of Higher Education Institution, a new module on Internship would be developed where organizations can put up their vacancies for internships
- Counselling: This upcoming section would help the applicants in understanding key market trends in different IT/ITeS domains, and possible job opportunities in their domain of expertise.

ENABLER

Processes Re-engineered

This is a green field project since there was no such platform specific to IT/ ITeS domain initiated by Govt. An earlier portal "Employment Bank" run by Labour Dept. captures job seekers for all domains. However, Karmobhumi portal intends to sort out the IT/ ITeS domain with niche IT skills. Recently Karmobhumi has been approved by state govt. to be considered as additional mechanism for recruitment in IT/ ITeS roles for Govt. vacancies.

Technologies

Architecture

The entire application is currently hosted in Amazon AWS cloud and can be divided into the following three different tiers:

Client Tier

This tier consists of client devices which are used to access the application. These devices include web browsers in any PC/Laptop, Android Phones, and Tablets etc. This tier adheres the recommendations provided in W3C Standards and Guidelines for Indian Govt. Websites (GIGW) to make the UI/UX more adaptive and user friendly.

Web Tier

This tier not only hosts the application but also is used to provide the web/remote services to the mobile client.

The Web Tier can further be broken into the following two different tiers.

Http Server: This layer in the first interceptor of the HTTP/HTTPS request coming to the application URL. This server has a public IP mapped with the domain name of the portal. This is configured in a way to redirect the incoming request to dedicated web servers having internal private IP and protected behind a firewall to allow request from permitted hosts only. This also manages the incoming request dispatching load using proper failsafe load balancing technique and has the rules to auto redirect any normal HTTP (port 80) request to HTTPS (port 443) ports for better security purpose to protect sensitive data during the exchange of the same between client and server.

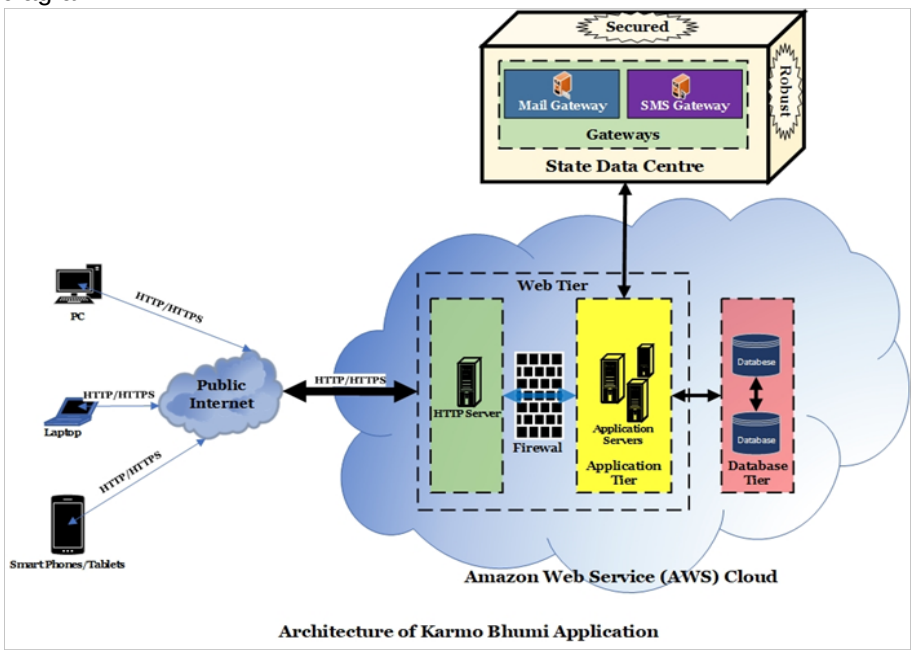
Application/ Business Tier: This tier hosts the actual web application and the associated business components. The entire web application is designed & developed using Model-View-Controller (MVC2) design patters to segregate the data model, data presentation and application control flow as per business process. Most popular PHP framework *Laravel* has been used here. This uses MVC architecture pattern. It provides features like a complete Authentication System, Database Migrations, powerful ORM, Pagination, and so on. Applications user Interface (UI) which is called as *view* includes Responsive Design with Bootstrap, jQuery maintaining standard W3C recommendations.

- Model: This segment of the application deals with the data models to harness the application data structures as per designs. These models are used to carry data from one state to another during execution of a business process sequence.
- View: This segment of the application deals with the logic and codes to decide the way the underlying data is presented to the end user.
- Controller: This segment of the application manages the flow of control from one state to another during execution of business process sequence. This manages flowing the business/control data from one state to another, executes dedicated business actions and present the final data output into user understandable views through the presentation layer.

Database Tier

This tier hosts the actual application database for storing the actual business data in indexed, normalised Relational Database Management System (RDBMS). For this application, MySQL is used as RDBMS server. This tier is protected with all standard data protection techniques and accessible only from the Web Tier and that through permitted exposed APIs only.

The above architectural details are pictorially represented in the following diagram.



Architecture of Karmo Bhumi Application

PEOPLE

Although Karmobhumi was conceptualized as only a skill registry for the IT /ITeS workforce, later provisions for self-skill assessment and upskilling through dedicated training programmes have been included in the project plan. Such initiatives will help the IT/ ITeS job seekers to identify their core competencies and align them with the market demand through the training programmes.

The Karmobhumi portal initiative is being closely monitored by the Dept. of IT&E and continuous improvement areas are being explored with the help of developer's team in SNLTR.A dedicated 24x7 helpline has been launched by the Department to address the queries and issues faced by job seekers and employers.

VALUE INDICATORS

Learnings for sharing

As any initiative would require sound strategy of public outreach, proper channel(s) of publicity and frequent marketing of the initiatives for adoption by end-beneficiaries, DoIT&E has frequently associated with representatives from educational institutes, technology veterans and industry experts to receive inputs for enhancement of the existing functionalities.

Intermittent focus group discussions have been held with sample population of the stalwarts to evolve the application features and the suggestions are being continuously incorporated.

DoIT&E has also triggered survey questionnaire to the registered Applicants to capture and understand their ideal expectations, in order to improve a better user experience. A 24/7 toll-free number along with a dedicated mailing facility are also in place to provide instant support to the Applicants or Employers and their queries.

Taking cue from the Applicant feedbacks & responses, DoIT&E has recently

started organizing weekly webinar sessions on sensitization of predominant IT Skills, by industry veterans and academicians. The sessions are followed by live interactive sessions to dispel the doubts and bring more visibility on the Skill/ subject to adopt as a career path with probable growth trajectories.

Moreover, regular quiz sessions on different topics (emerging technologies, current technology trends etc) are being organized to promote Karmobhumi and keep the job seekers aware of the recent trends and market demands in terms of skillsets.

Digital Empowerment

The Karmo Bhumi portal is being made bi-lingual (in progress)for ease of understanding of the Applicants as well as cater to the resources with limited knowledge of English.

This initiative has been designed to meet the requirements of freshers, mid-senior and experienced resources as per their respective needs.

The Career Counselling module (upcoming) would immensely help the freshers to understand and chart their own path of progress, whereas the eligible mid-senior and experienced resources would be able to assess their skill competencies and get recognized by the industry standards, free of cost (supported by the State Govt.).

Green e-Governance

The functionalities of Karmobhumi portal is completely online based and a paperless process and thereby contribute to Green e-Governance.

Shri. Sanjay Kumar Das, *W.B.C.S (Exe.), Joint Secretary, Department of Information Technology & Electronics, Govt. of West Bengal, jsit@wb.gov.in*

Madhya Pradesh State Mid-Day Meal Portal

Rural Development Department, Madhya Pradesh

Deleep Kumar and Sunil Jain

PROJECT OVERVIEW

The Mid Day Meal scheme was introduced for providing hot cooked meals in schools to all children studying in classes 1st to 8th in Government and Aided schools, Madarass and Schools being run for labourers. The scheme aims to enhance enrolment, retention and attendance of the children enrolled in Government, Govt-Aided Schools and Madrasas, while simultaneously improving nutritional levels among children. Considering the large number of beneficiaries and vide array of stakeholders in the implementation at grass-root level such as the involvement of SHGs, NGOs and the Cooks-Cum-Helpers, the Government of Madhya Pradesh has set-up MP State Mid-Day Meal Council as a SPV to undertake focused & effective implementation MDM Scheme in State. The Council functions under Rural Development Department of the Govt. of Madhya Pradesh. The Council manpower functions under the Office of Zilla Panchayat at district level and undertakes the required functions. The key processes involved in the implementation of schemes are:

- Assigning a Fair Price Shop to each School for collection of dry ration required for cooking meals.
- Designation of an agency for cooking meals at the school. In Madhya Pradesh this agency in the rural areas is the Self-Help Group of the village/ local in which the school is located. Predominantly, an NGO is deputed for cooking meals for the schools in urban areas.
- Designation of one or two members of the agency as 'Takers' for collecting Dry Ration from designated fair price shops (FPS) after bio-metric authentication using PoS devices installed at FPS.
- Services of Cook-cum- Helpers are taken at School for preparing meals.
- Rule-based Computation /Determination of the food grain allocation order for the schools as per the enrolment and attendance and adjustment of unutilized / balance food grain of previous months.
- e-Payments of Management, monitoring and evaluation costs to all schools for the upkeep and maintenance of the Kitchen, Cooking equipment and Utensils.
- Monthly e-Payments of Honorarium to Cook-cum-Helpers as per attendance. On an average 383 Crores have been paid to cook-cum-helpers through the system via DBT every year.
- Rule-based calculation of cooking cost to be paid to cooking agencies / SHGs
- Monthly e-Payment of Cooking cost to designated cooking agency. On an average 587Crores have been paid to cooking agencies through the system via DBT every year.
- Monitoring of Quality of Mid Day Meals served at the Schools.
- Provisions of mid day meals during summer vacation in drought affected areas or any other natural calamity or other exigencies.
- Provision of e-Payment of Supply Food Allowance to students during Covid-19 Lockdown period. Over 331 crores have been paid to 66.57 lakh students in three instalments so far in this academic session to

compensate for the suspension of MDM at schools for the prevention of the COVID-19.

Objectives

- Transform and Automate all key processes in the implementation of the Mid Day Meal Scheme via integration with external systems (School Education Portal, Supply-Chain Management System, Point of Sale Devices installed at FPS, PDS system, banking System, Nach of NPCI, Simplification of the components of the processes; Trivialize the steps involved in the operation to establish rule-based operations and accountability and eliminate scope of discretion in decision making or payments.
- Rule based execution of the operations/ processes involved in the implementation of the Mid Day Meal Scheme. This liberates the field team from exerting/ expending efforts on quality improvement, monitoring and effective implementation.
- Leverage JAM trinity for de-duplication, simplification and optimization of the payments and disbursement of food-grains being made to the Self-Help-Groups, NGOs, School Management Committees and Cooks.

Functional Scope

Making different departments, agencies & offices agree on using the common integrated platform, integrate their systems with the MDM platform and leverage the data sourced from different software for simplification and automation. Enforcing a Centralized e-Payment System for Payments of honorarium and cooking cost. Change management via Elimination of scope of discretion in various payments and decision was seen as a sign of curtailing of their powers. Any changes to the existing procedures for the implementation of the scheme must relieve the Quality monitors of the MDM of the triviality of creating food-grain release orders for schools and the subsequent delivery of these orders to the other stakeholders. This would allow the Quality Monitors to focus on their primary objectives and core businesses. Providing sustenance to SHGs and motivation to volunteers by ensuring timely and hassle-free payments of their dues.

- Establishing a credible, transparent and accountable mechanism for timely and hassle-free dispensation of payments to all stakeholders without any scope of discretion.
- Financial Inclusion of Cook-Cum-Helpers and SHGs so e-Payments could be routed directly to their accounts.

Geographic Scope

State-wide Implementation Completed

- ~1.14 lakh Primary & Middle Government Schools located in over 90,000 habitations
- ~2,000 Madarsas
- 220 Schools under NCLP (National Child Labour Project)
- ~22,000 Fair Price Shops

Number of delivery centres

- ~1.14 lakh Primary and Middle Government Schools located in over 90,000 habitations
- ~ 2,000 Madarsas
- 220 Schools under NCLP (National Child Labour Project)
- ~22,000 Fair Price Shops
- ~4,000 NGOs

- ~200 Depots of MP State Civil Supplies Corporation

Geographical

- The project has been implemented in one State i.e. Madhya Pradesh
- 52 Districts
- 313 Blocks
- 23,272 Gram Panchayats and 384 Urban Local Bodies

Stakeholders

Initiative covers and benefits approximately 19.7 % of the population of Madhya Pradesh

- Over 68 lakh children in government & Government aided Primary & Middle Schools, Madarsas, Labour Schools
- Over 2.12 lakh Cook-cum-Helpers whose services are being used for preparation of MDM
- Over 8 lakh members of ~1.11 lakh Self Help Groups whose services are being used for undertaking the cooking the meals and other related activities at School
- Over 4,000 NGO s who are implementing the Schemes under Centralized Kitchen model in Municipal Corporations
- Over 90,000 Supervisory Staff of MDM and AWC
- School Education Department
- Labour Dept.
- Food and Civil Supplies Dept.
- MP State Civil Supplies Corporation
- Fair Price Shops
- School Management Committees
- Nodal Bank
- NPCI

Current Status

Outcomes/ Benefits

Single source of Functional Schools and their Enrolment

- Integration with the Online School Enrolment Register created a single source of functional schools and children enrolled across all blocks/ districts in the State. This implies no new school (government/ aided/ madarsa) is omitted from availing the Mid Day Meal Scheme. Also, ensuring there is no leakage via falsifying enrolment numbers at the school or the functional status of the school.
- Constant state of flux in the determination of quantum of allotment and duration of allotment of food-grains to schools for implementing the Mid Day Meal Scheme has been eliminated. This is because the system had to interface with a singular entity that is the Online School Enrolment Register.
- Elimination of discretion in the estimation of Quantity of Food Grains allotted to Schools
- As the system computes the estimates of quantity of food-grains required at the school/ anganwadis the allotment matrix is standardized. The allotment matrix is both customisable and configurable to account for variance in staple food of people in are going in the state and the kind of nutritional levels to be maintained in the meals.
- Allotment estimates for food-grains are precise and fairly accurate the system has been able to eliminate misappropriation of the food-grains.

Better Logistical planning in Delivery of food-grains

- MP State Civil Supplies Corporation (MPSCSC) now has access to authenticated allotments (via eRelease Orders) for each Fair Price Shops (FPS) it is able to draft and execute a comprehensive and optimal Transportation strategy for delivery of food-grains to the FPS.
- MPSCSC is able to achieve synergy in transportation of food-grains to the FPS by consolidating allotments for Targeted Public Distribution System, Mid Day Meal Scheme and Hot Cooked Meals Scheme at Anganwadis as singular allotments. This synergy has lead to efficiency and efficiency to productivity and productivity to better earnings.
- Lifting / collection of dry ration / food-grains by the authorized taker from FPS via PoS devices after Authentication through AUA
- Establish accountability on the part of SHG that the food-grains were collected from the FPS by taker who is a member of the SHG
- FPS is held accountable for delivery of the food-grains within the range of allotment.
- This has established a credible last mile delivery channel for food-grains in the MDM at Schools and Hot Cooked Meals Scheme at the Anganwadis.

Single click e-Payments of Cooking Costs and Honorarium via Integration with the

NACH Platform of NPCI through the Partner Bank

- Has ensured all payments to be executed in time.
- This ability to deliver e-Payments on 1 st of every month as clock work has helped sustain and engage the SHGs in the MDM scheme.
- The timely e-Payments of Honorarium to CCHs for their voluntary services at the Schools helps boost their moral and incentivizes engagement with the MDM scheme.

Software

Open Source Tools & Development Kit: ANDROID SDK, JAVA, POSTGRES Database server

Front End Development: ASP.Net, Bootstrap Library,

SMS Integration: PUSH & PULL Services

Database Servers: SQL Server 2016, PostGres DB

Other Technology Used: Google Map API, JQuery, HTML5, SVN

Analytics: Power BI, Google Analytics

Web Server: Internet Information System, Apache

Mobile Application - Android

Smart Phone capabilities & Mobile Apps - GPS feature of Smart Phones

Assistive technologies: GPS and Wireless fidelity

Cyber Security

All the guidelines for cyber security have been followed as the system had to be seamlessly integrated with banking system for e-payments.

Disaster Recovery and service continuity

- In house development by the National Informatics Centre ensures continuity and no case of vendor lock in preventing enhancements.
- The system has been deployed in Government Data Centre. Data Centre team takes care of the DR.
- Implementation via capacity building of the field functionaries of the Mid Day Meal Council ensures no additional burden to the exchequer is added by the system.

- Integration with both upstream and downstream systems such as

State Education Portal- Platform for the administration of Schools Education Department as authentic source of teachers, schools and enrolment at schools
Supply Chain Management System of the Madhya Pradesh State Civil Supplies Corporation (MPSCSC) for ensuring food grains delivery to the Fair Price Shops
Integration with the NACH Platform of NPCI for disbursement and direct benefit transfer to the account of the entity (cooking agency/ cooks/ SMCs and Students)
Integration with the POS machines and Public Distribution System for delivery of thefood-grains to the authorized representative of the cooking agency at the school.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	**Volume (Nos) of Services year wise**					
	2018-19		**2019-20**		**2020-21**	
	No. of Transactions	Quantity/Amount	No. of Transactions	Quantity/Amount	No. of Transactions	Quantity/ Amount
electronic Release Orders for Wheat (in Metric Tons)	12,74,297	48,344	11,21,223	45,126	7,82,754	46,684
electronic Release Orders for Rice (in Metric Tons)	12,74,297	95,250	11,21,223	86,029	7,82,754	92,043
electronic Payment Orders for payment of honorariums to cooks (in Crores)	24,08,186	338.79	23,09,668	430.07	6,21,822	124.36
electronic Payment Orders for payment of cooking costs to the cooking agency (in Crores)	12,72,744	592.10	12,26,059	582.92	0	0.00
electronic Payment Orders for payment of	1,05,714	5.12	0	0.00	0	0.00

Monitoring, Maintenance and Estimation to School Management Committee(in Crores)						
electronic Payment Orders for payment of Food Security Allowance(COVID-19) to students (in Crores)	-	-	-	-	148,11,813	317.66

Implementation

Implementation Coverage achieved in comparison to the plan / target

Initiative covered cent per cent of the target and was rolled out to cover all schools inthe entire State which are in the ambit of Mid Day Meal Scheme Initiative covers and benefits approximately 19.7 % of the population of Madhya Pradesh. Over 68 lakh children in government & Government aided Primary & Middle Schools, Madarsas, Labour Schools Over 2.12 lakh Cook-cum-Helpers whose services are being used for preparation of MDM Over 8 lakh members of ~1.11 lakh Self Help Groups whose services are being used for undertaking the cooking the meals and other related activities at School Over 4,000 NGOs who are implementing the Schemes under Centralized Kitchen model in Municipal Corporations Over 90,000 Supervisory Staff of MDM and AWC

Improvements/ enhancements specifically planned out during next one Year

New features added to the portal in the last one year

- Integration with the Online School Enrolment Register of the School Education Department on the Education Portal. This enabled the Government of Madhya Pradesh to disburse the Food Security Allowance (in lieu of the suspension of Schools for prevention of spread of COVID19) via DBT to the accounts of the student. Perhaps the only state in the country to have completed the disbursement of the FSA via DBT and in a very small turnaround time.
- Enforcement of eKYC for registration of the authorized representative of the Cooking Agency who will be collecting ration at the FPS.

Planned upgrades

- Aadhaar based payments to Cook cum helpers

ENABLER

Processes Re-engineered

#	Process	Before the initiative [AS-IS]	After the Initiative [TO-BE]	Extent
1.	Children enrolled in various classes of	• Manual, tedious, and Offline processes, Prone to inconsistencies and	• The process has been transformed. After the GPR, manual and offline work has been	100%

	target schools for calculation/ determination of quantum of food grains required for schools and generation of e-Release orders to be issued to Civil Supplies Corporation.	unintentional /deliberate errors. • Block Resource Co-ordinator (BRC) of the School Education Department would compile the school-wise, class-wise enrolment data for the month and provide the same to Office of the Block Development Officer (CEO JP) for preparation of food grain release order to be issued to civil supplies corporation	eliminated by undertaking seamless integration with the State Education Portal. • Child-wise, class-wise school-wise enrolment for the month is pulled electronically from the Online School Enrolment Register of the State Education Portal. • A credible and transparent system for rule and data based automated calculation of quantity of food grains to be alloted to Schools for preparation of meals in schools as per the enrolled children has been established.	
2.	Daily Attendance required for calculation of balance food grains available with the cooking agency	No credible mechanism was available to seek the details of the meals served and generate the balance food grains available with the cooking agency	*Mobile App based system implemented.* The system has been integrated with m-Shiksha Mitra App being used by the teachers for their day-to-day functions. Count of students present in school is reported by the teacher using the App which is used for calculation of utilization.	100%
3.	Estimation of Quantity of Food Grains by block Panchayats	Ad-hoc and manual estimation of food-grains required for schools by Janpad (Block) Panchayats	*Processes at district and block level have been eliminated.* Calculation of food-grains required for Schools is now done by the software at State level as per business rules.	100%
4.	Preparation and Issue of Food Grain e-Release Orders for supply of food grains to schools.	• CEO JP manually prepares food-grain Release Orders for the schools and Cooking Agencies. • The paper based food grain release orders are provided to the CEO ZP for endorsement. • CEO JP does not a follow a strict table on when the orders will be generated.	• Processes undertaken at District and block level have been eliminated. • School-wise electronic Food grain Release Orders (e-ROs) are centrally generated by the software in a rule-based manner. • It uses the school class-wise enrolment data, attendance, district specific meal plan, balance food grain (left	100%

		• CEO ZP approves and physically signs the Release Orders • The physical Release Orders are then collected by a representative of the SHG from the Office of CEO JP/ CEO ZP.	overstock) available with school and generates the e-RO. • eRO for all the Schools are generated by the system by the 10th of the month. • eROs for the Schools are published online on the MDM Portal in the public domain for all Stakeholders such as the FPS, SHGs, SMC, School Teachers and Field Staff at the Block/District. • SMS alerts are also sent out to the SHG representatives and the field staff by the System.	
5.	Orders for delivery of food grains to schools	The District Panchayats used to issue paper-based food grain release orders for each school to the District Manager, Civil Supplies Corporation	• Processes at district and block level have been eliminated. • The MDM portal has been integrated with the software of MP State Civil Supplies Corporation (MP SCSC) using web-services. • The MDM system electronically pushes the school-wise eROs to the Supply Chain management software of the MP SCSC.	
6.	Logistics of Delivery of food-grains	Fair Price Shops issue food-grains to the authorized functionaries of the SHG based on the physical paper-based Release Orders.	• Process has been transformed by undertaking seamless integration with the Point-of-Sale machines (PoS) machines installed at FPS. • The MDM system electronically uses the web-services to push school-wise release orders to the PoS machine of the concerned Fair Price Shop.	100%
7.	Collection of food-grains from FPS	• The representative of the SHG travels to the designated FPS presents the physical release orders to the FPS owner/ operator.	• Integration with Supply Chain Management System of the MPSCSC for ensuring the transportation of the allotted quantities of	100%

		• If the FPS has the food-grains in stock it releases the food-grains to the representative. • Else if the food-grains are not in stock the FPS raises a demand with the concerned District Manager. • District Manager based on the demand of the FPS strives his best to arrange for the supply of food-grains trying to reach the FPS factoring in the cost of transportation.	food-grains to the designated FPS in a time-bound manner. • With the consolidated demands for TPDS, MDM and WBNP schemes the transportation costs for MPSCSC are optimized.	
8.	Authentication and record keeping of persons who have collected the food grains.	No mechanism for authentication and record keeping of the person who has collected the food grain on behalf of school.	• The authorized person of the SHG/Cooking Agency collects the ration using the Aadhaar based authentication. • Identity of the person who has collected the ration on behalf of the school is captured, established using bio-metric and tracked for setting the accountability.	100%
9.	Payment of Cooking Costs	• Office of the CEO JP through the Quality Monitors of the MDM Council computes the cooking cost for all the schools factoring in the number of working days, average attendance in the block and past recoveries from the SHG engaged • The Accountant at the CEO JP creates a bill with the details of dues of SHGs and submits them to the Office of the CEO ZP. • Office of the CEO ZP examines the bills presented by the CEO JP and issues cheque in the name of SHGs	All underlying process for payments of cooking costs transformed and are undertaken by the system at State level using the centralized e-Payment System of the MDM portal • All SHGs/ NGOs engaged as Cooking agencies in the implementation of the MDM Scheme were registered on the MDM Portal. • The registration included details of all SHG members/ NGO representatives and the bank account of the SHG/ NGO. • On the 25th of the Month a Pay Advice is generated for the payment of cooking	

		• Representative of the SHG then collects the cheque from the Office of the CEO JP. • Payment of dues for cooking cost are being source intensive activity was conducted once every quarter. • Final status of the payment is inferred by the Accountant of the CEO ZP after reconciliation of the debits to the account against all cheques issued by the Office.	costs for all the schools factoring in the number of working days, average attendance in the block. • Office of the CEO JP registers past recoveries from the SHG engaged at the School on the MDM Portal. • On the last working day of the month the System generates an electronic Payment Order (ePO), for payment of cooking costs in schools, to be digitally signed on behalf of the Office of the CEO ZP containing the bank account of the SHG the amount to be credited to the SHG. • This digitally signed ePO is delivered electronically to the Partner Bank for routing of payments through the NACH platform of the NPCI on the last working day of the month. • Partner Bank shares an electronic response file containing the status of payments for all SHGs. • Failed payments are re-routed after the necessary amendments (such as corrections to the bank account details, re-activation of dormant/frozen accounts) are incorporated and a digitally signed ePO is again sent out to the Partner-Bank.	
10.	Honorarium Payments	• Office of the CEO JP through the Quality Monitors of the MDM Council computes the honorarium factoring the attendance of the CCH • The Accountant at the CEO JP creates a bill with the details of honorarium payments for all cooks and	All underlying process for payments of honorarium to the Cooks-cum-helpers have been transformed and are undertaken by the system at State level using the e-Payment System of the MDM portal • All CCHs engaged by the Cooking agencies in the implementation of the MDM Scheme were	

		submits them to the Office of the CEO ZP. • Office of the CEO ZP examines the bills presented by the CEOJP and issues cheque in the name of Cooks. • Representative of the SHG then collects the cheque from the Office of the CEO JP. • Payment of honorarium being resource intensive activity was conducted once every quarter. • There were several Districts which paid the honorarium of CCHs to the concerned SHG as most CCH did not have a bank account.	registered on the MDM Portal. • The registration included details name, gender and the bank account of the Cook. • On the 25th of the Month a Pay Advice is generated for the payment of honorarium for all the CCHs factoring in the number of days attended. • On the last working day of the month the System generates an electronic Payment Order (ePO), for payment of honorarium to cooks, to be digitally signed on behalf of the Office of the CEO ZP containing the bank account of the CCH and the amount to be credited to the CCH. • This digitally signed ePO is delivered electronically to the Partner Bank for routing of payments through the NACH platform of the NPCI on the last working day of the month. • Partner Bank shares an electronic response file containing the status of payments for all CCHs. • Failed payments are re-routed after the necessary amendments (such as corrections to the bank account details, re-activation of dormant/frozen accounts) are incorporated and a digitally signed ePO is again sent out to the Partner-Bank.	

Technologies

Open-Source Tools & Development Kit: ANDROID SDK, JAVA, POSTGRES Database server

Front End Development: ASP.Net, Bootstrap Library,

SMS Integration: PUSH & PULL Services

Database Servers: SQL Server 2016, PostGres DB

Other Technology Used: Google Map API, JQuery, HTML5, SVN

Analytics: Power BI, Google Analytics

Web Server: Internet Information System, Apache

Mobile Application - Android

Smart Phone capabilities & Mobile Apps - GPS feature of Smart Phones

Assistive technologies: GPS and Wireless fidelity

People

Roll out/ Implementation model

The initiative was designed and rolled out in such a manner that it was acceptable andall the stakeholders derived tangible benefits for their wilful support. Development of the system was based on the Agile Software Development Model. Rollout was for the entire State in one go. It required capacity building of nearly 3.5thousand officers and staff of the Office of the CEO Zilla Parishad and Janpad. A cascaded model of training was adopted for capacity building.

Capacity Building And Communication Strategy

Video conferencing sessions using NIC Video Conferencing. Social Media apps like WhatsApp as exploited for seamless communication and knowledge and issue sharing and resolution by peer-group:

- State level WhatsApp group constituted of ACS, Director of MDM Council, Officials of NIC, Joint Commissioners, District Project Officer and MDM District Quality Monitors.
- Each district created their district-specific WhatsApp group that constituted of DM, DEO, DPC, Programmer, MDM District and Block Quality Monitors, BEOs
- Each group shared the issues and allowed other members to confirm the solution Daily state-level, block-level progress reports were posted in the concerned groups.

Updates on Facebook were used for dissemination. SMS Alert groups were created and alerts were sent to concerned office for updates. Circulars/ notices were also posted on the MDM web-portal.

VALUE INDICATORS

Learnings for sharing

Disruptive changes to the processes

- Individual Child-wise Enrolment as reported in the Online School Enrolment. Register of the State Education Portal is used as the base line for the number of students to be served MDM at the school. No other source of information is acceptable or is used to determine the quantity of food grains to be released or amount of money to be paid to the cooking agency as cooking cost.
- Payment of Cooking Cost to Cooking Agency and Honorarium would be effected on the last working day of the month. Onus of reporting deductions, arising out of absence from duty or meals being not served at the school, on the portal before the last working day of the month was with the concerned field officer.
- For schools where the school teacher reports daily attendance of students via the App the food-grain allotment in the next month was auto adjusted based on the attendance reported. For any other school the

system requires a manual approval of the quantum of rations to be released to the school.

Innovative use of ICT

- Integration of the MDM Portal with the existing Supply Chain Management System of MPSCSC has allowed MPSCSC to attain synergy in transportation of food-grains to the FPS for supporting Targeted Public Distribution System, Mid Day Meal Scheme and Hot Cooked Meals Scheme at Anganwadis. As the MPSCSC now has access to authenticated allotments (via eROs) for each FPS it is able to draft and execute a comprehensive Transportation strategy for delivery of food-grains to the FPS. This synergy would lead it to efficiency and efficiency to productivity and productivity to better earnings.
- Integration with the NACH Platform of NPCI through the Partner Bank has allowed all payments to be executed in a time. This ability to deliver payments every month as clock work has helped sustain and engage the SHGs in the MDM scheme. The timely payments of Honorarium to CCHs for their voluntary services at the Schools helps boost their moral and incentivises engagement with the MDM scheme.
- Leveraging ubiquitous presence of Smart-phones and their abilities helps re-enforce the monitoring mechanisms of the MDM scheme. The smart-phones have also enabled dissemination of information, validation and verification of claims be it with regards to payment status of dues, allotment of food-grains.
- Using digital signatures for Non repudiation and authentication of eROs and ePOs allows establishing trust and accountability in the system.

Digital Empowerment

- *Direct Benefit Transfer* - All payments be it to for the cooking costs to the NGOs/ SHGs or honorarium payments to the cook-cum-helpers at the schools are routed through the NACH platform of NPCI by the partner bank.
- *Financial Inclusion and Financial Literacy* - As all payments are routed to the bank account of the designated entity (cook-cum-helpers/ NGO/ SHG) the initiative has been a shot in the arm to the financial inclusion activities in the State. As all payments are made like clockwork the initiative has helped the entities to sustain their banking engagements and have grown accustomed to the primary banking system.
- *Digital Inclusion* - System has brought about a digital revolution in the sector. It has introduced SHGs, cook-cum-helpers, teachers and the administrators to the digital world and the endless possibilities it offers.

Green e-Governance

- Better Logistical planning in Delivery of food-grains results in tangible savings in fuels MPSCSC now has access to authenticated allotments (via eROs) for each FPS it is able to draft and execute a comprehensive Transportation strategy for delivery of food-grains to the FPS.MPSCSC is able to achieve synergy in transportation of food-grains to the FPS by consolidating allotments for Targeted Public Distribution System, Mid Day Meal Scheme and Hot Cooked Meals Scheme at Anganwadis as singular allotments.

- Use of NACH platform for disbursement of payments results in less paper being required to print Payment Orders and the subsequent overheads with manual mode of payments.

Shri. Deleep Kumar, *State Co-ordinator, Mid Day Meal Council, Rural Development Department, Madhya Pradesh, mpmdm@rediffmail.com*

Shri. Sunil Jain, *Senior Technical Director, National Informatics Centre, Madhya Pradesh, sjain@nic.in*

Padhai Tunhar Duar (पढ़ई तुंहर दुआर)

Department of School Education, Chhattisgarh

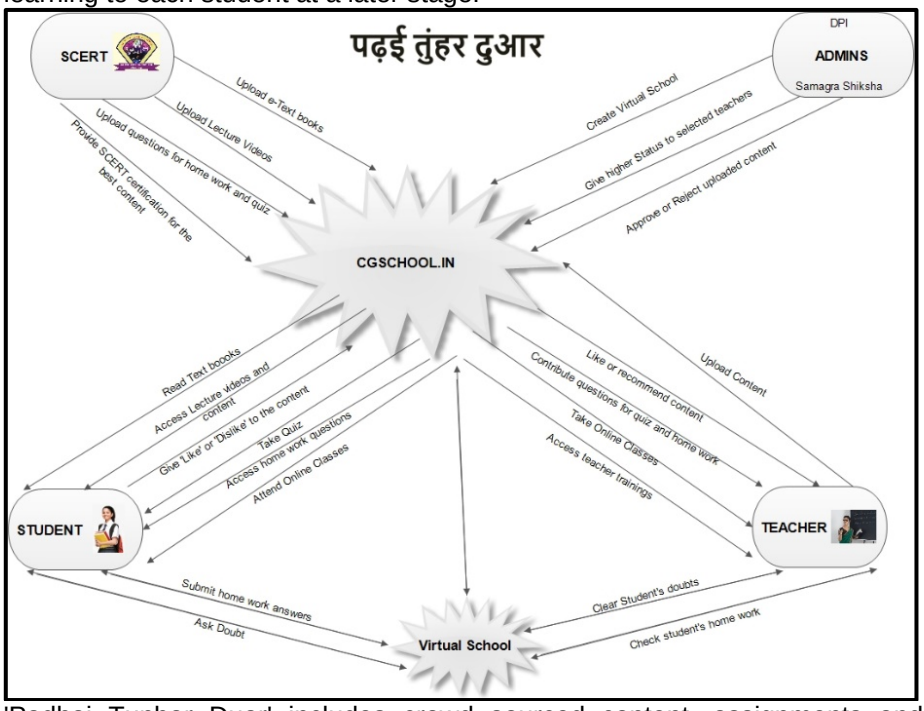
Alok Shukla, A. K. Somasekhar and Jitendra Shukla

PROJECT OVERVIEW

'Padhai Tunhar Duar' is a comprehensive academic cycle management system which include online text book delivery, lecture videos for each chapter, other TLM and reference material (videos, images, audios, PDFs) Online classes, assignments for each chapter, student homework management and doubt clearance. Student can submit their home works by taking a picture of the note book which can be corrected by teacher electronically without taking a printout. Teachers have liked the portal and voluntarily uploaded 23378 videos, 1144 audios, 15401 images and 4332 course material.

A teacher can use this platform to make their created content available to students of whole state. 'Padhai Tunhar Duar' provides a platform to upload content by teachers which will be available to all students after a process of curation. 'Padhai Tunhar Duar' includes online teacher training management system where teacher become student and can use all the features available to students to learn online.

The data items relating to teachers and student activity on the portal are being captured which can be used for data analytics to provide personalized adaptive learning to each student at a later stage.



'Padhai Tunhar Duar' includes crowd sourced content, assignments and doubts, online classes, quizzes, virtual schools, public appreciation and private reprimand, subjective assessment by teachers, attention check questions during online classes, offline initiative to reach the unreached.

Software

- The system is deployed on 4 virtual machines in state data center and maintained by NIC.
- The platform includes Microsoft Windows Operating System, Microsoft SQL Server, (Postgre SQL in some part), Dot net as a front end and Python for data analytics.

Cyber Security

The software has been security audited and certified for safe hosting by one of the Cert-In empaneled vendors (Xiarch Solutions Pvt. Ltd.).

Disaster Recovery and service continuity

Currently we are maintaining local DR by mirroring the database.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Student Registration	Students can voluntarily register in the system and can take advantage of educational content and online classes.			23.5 Lakh
Teacher Registration	Both government and private teachers can voluntarily register in the system to upload content & take online classes.			2,09,999
Online classes	During the time of COVID-19 online classes have been encouraged to continue education. More than 10 lakh online classes have been taken within 6 months.			10,62,857
Students benefited through online classes				31.69 lakh
Number of assignments	Students can submit a photo of the assignment to the system which can be corrected by a teacher electronically without taking a photograph.			19,599
Doubts	Students can ask their doubts to teachers through the system which will be answered by relevant teachers.			18,517

Implementation

Implementation Coverage achieved in comparison to the plan / target

- The system has been rolled out through the state as planned.

- The system benefited more than 20 Lakh students who have access to smart phones and internet connectivity.
- The system includes offline activities like 'पढ़ईतुंहरपारा', loudspeaker teaching, Bultu केबोल, etc. to reach remaining students/

Improvements/ enhancements specifically planned out during next one Year

- Feature for subjective assessment of students by teachers has been rolled out and the periodic assessment continues for the next 6 months.
- Gamification techniques are being implemented to motivate students and teachers to use the portal
- To expand teacher training to cover more online courses than brick wall training.

ENABLER

Processes Re-engineered

- Competency framework has been designed for subjective assessment of students by teachers and implemented.
- The process of video creation has been made simpler and cost effective by designing 'Jugaad Studio', so that any teacher can create an acceptable quality of video within no time.
- The process of creating, uploading and curation process has been made democratic. Content shall be available to students based on its popularity after a small curation.
- Online initiatives cannot reach 100% beneficiaries due to digital divide between areas or social categories. An online initiative is completed only when it is complimented with offline activities to reach the un-reached. '**पढ़ईतुंहरदुआर**'has been complimented with '**पढ़ईतुंहरपारा**', loud speaker classes, Bultu **केबोल** and offline Apps.

Technologies

Data analytics have been done by using Python.

People

- Dr. Alok Shukla, Principal Secretary, Department of School Education.
- Shri. Jitendra Shukla, Director of Public Instructions and MD, SS
- Shri Rahul Venkat, Director, State Council of Education, Research and Training.
- Shri A. K. Somasekhar, Sr. Technical Director, National Informatics Centre.
- Dr. Yogesh Sheohare, Joint Director, State Council of Education, Research and Training.
- Dr. M. Sudhish, Assistant Director, Samagra Shiksha.
- Ms. Lalita Verma, Scientist – 'B', National Informatics Centre
- Mr. Sathyaraj Iyer, Sr. Consultant, KPMG.
- Mr. Ajay Verma, Developer

VALUE INDICATORS

Learnings for sharing

- Now a days everyone has a computing device in their hands. The system should try to use them instead of procuring new devices.
- IT is always accurate and better way of data capturing at the place of its origin than at a different place.
- Emerging technologies like Data analytics help governments taka data supported decisions than orbitary decisions.

- Involvement of all stake holders from the beginning of the system development will improve the ownership and sustainability.

Digital Empowerment

- All the application's user interface is in Hindi which most of the stake holders understand.
- Sufficient care has been taken to make Apps work offline to serve those in no network area and audio content to serve those with feature phones.
- 'पढ़ईतुंहरपारा', loud speaker classes, Bultu केबोलinitiatives have been taken to empower those who do not have access to smart computing devices.

Green e-Governance

Submission of assignments online and enabling teachers to correct them electronically saved printing of 1000s of pages.

Dr. Alok Shukla, *Principal Secretary, Department of School Education, (Technical Partner - National Informatics Centre) (Chhattisgarh), dr.alokshukla@gmail.com*

Shri. A. K. Somasekhar, *Sr. Technical Director, National Informatics Centre (Chhattisgarh), som@nic.in*

Shri. Jitendra Shukla, *Mission Director, Samagr Siksha, State Council of Education Research and Training (SCERT) (Chhattisgarh), mis.head@gmail.com*

Rojgaar Sangam

Directorate of Training & Employment
Government of Uttar Pradesh

Kunal Silku, Pramod Kumar Pundir and Hemant Arora

PROJECT OVERVIEW

Objective

The Objective of this portal is to provide a one stop solution for all employment related issues in state of UP. It facilitates all type of job seekers (unskilled / semi skilled / skilled / degree holders / highly educated etc) and all types of job providers (Private Sector Industries / Service sector / Private Individuals / Governments) and also helps in career progression of all registered workforce.

Scope

The scope of this portal covers almost everyone living in state of UP. While it does offer services to unemployed for gaining meaningful service, it also facilitates employed population to go for job upgradation. It also offers those retired from working age to go for skill upgradation which can also be in areas of their interest and hobby. Obviously it also covers all types of job providers also (As explained above)

Stake Holders

Intended benefits and current status

While our key state holders are the unemployed population of our state, the portal also provide service to those seeking job upgradation. On the employer side, our key stakeholders are both private industries as well as government departments. However it also facilitates any general public looking for some day job or daily workers also. Currently around 72 lakh job seekers and almost 18 thousand employers are registered on the portal. This portal has up till now provided more than 3 lakh jobs in just past 4 years. The Government department jobs have been mandatorily being flashed through the portal. Besides these, our other important stakeholders are NIC(Technology Partner) which has given a shape to the vision of our department ,in the form of Rojgaar Sangam portal and continuously enhancing and upgrading the portal as per the needs and requirements, along with Government of India whose NCS(National Career Service) portal is integrated with Rojgaar Sangam

Software

MVC 5, C#7.0, RESTfull Web API 2.0, RabbitMQ Client, Bouncy Castle for Digital Signature
.Net Framework 7.0
Jquery 3.5.1
Bootstrap 4.5.2
Microsoft SQL Server 2017
Microsoft Windows Server 2016
HW environment cloud resource at Meghraj

Cyber Security

Cyber Security: Security audit done by cert in empaneled agency and cyber security cell NIC

Disaster Recovery and service continuity

Standard Data Recovery and Service Continuity for National Cloud under Meghraj initiative is in place for Rojgaar Sangam

RESULTS INDICATOR

Information

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Registration of job seekers	Jobseekers are registered to get jobs in different companies.	30,43,098	33,82,043	35,24,924
Registration of Migrant Workers	Due to Covid-19 Pandemic ,registration of Migrant labours for providing employment benefits	-	-	37,84,255
Registration of employers	Employers are registered to get skilled and trained workforce for industries.	15,787	17,587	18,368
Job Fairs	Online Job fairs are conducted to provide jobs to jobseekers and trained workforce to Industries.	1,03,202	1,43,304	23,597
Outsourcing of Manpower	Manpower through outsourcing to all Govt Deptt. Of UP is being provided by sewayojan portal.	Started in October 2020		

Implementation

Implementation Coverage achieved

The present portal/app is a live one and it has almost achieved all its intended aims. From 2016 it has completed its Success journey enhancing itself and incorporating various modules such as Jobseeker and Employer registration, Private employment, Display of Government Vacancies, Outsourcing Modules etc.

As far as geography is concerned, our portal is being all across UP. All districts run their job fairs through this portal only. In this fashion both technologically enabled and technologically deprived job seeking population get access to the features of our portal.

As far as its functionality is concerned, it has been explained in detail in section 2.6. All the functionalities are currently in operation and all intended stake holders are deriving benefits from it. The delivery channel is both online and offline. For those who prefer the online mode, they themselves can register and avail services from the portal. Others who are currently under offline mode, they are facilitated by our field staff and enabled to participate in job fairs or obtain day jobs.

Our stake holders include all types' job seekers and job providers. Details have already been given in above sections.

Improvements / Enhancements

Modules added in last one year are as follows:-

- Module to provide outsourcing government jobs through this portal
  This portal for the first time in country has mandated all government departments at all levels to undertake hiring under contractual basis only from this portal. The departments will post their requirements and the portal using its AI enabled engine will allow 3 times the number of vacancies to apply. Thereafter the department can make selections. It

makes the process completely transparent and also ensures that the hired workforce gets all their intended salary benefits / EPF etc on time.

- Direct Hire module.
  This module has been created so as to capture all unskilled / semi skilled workers who cannot use the portal. Their details have been uploaded on the portal on the basis of surveys and their details are now visible to all job providers. The job providers can now simply call them and hire them.
- Integration with National Career Service (NCS) of Government of India.

Next year:

- Integration with the Unnati portal being developed by Niti Ayog.
- Online Job Fairs to be conducted through this platform itself (Currently the employers are using zoom or other applications)
- Due diligence is being done on Integration of Rojgaar Sangam Portal and Uttar Pradesh Skill Development Mission Portal.

ENABLER

Processes Re-engineered

Re-engineered Processes:

The Portal has re-engineered many cumbersome and tiring manual processes such as:

- *Registration of Job Seekers*: Registration of Job seekers was a tedious process where job seeker has to physically visit the Employment office several times for getting registered and employed. This was challenging with respect to travel, limited time frame and risk of carrying important educational documents. This whole process was re-engineered with the help of Rojgaar Sangam Portal and app, providing ease of registration on the go, round the clock.
- *Registration of Employers*: Employers had to go back and forth to the employment offices for registration and availing list of jobseekers from the department, this process was completely automated through Rojgaar Sangam Portal and app.
- *Outsourcing Recruitment by Government departments*: Uttar Pradesh government through its order no: Sankhya-8/2019/20/1/91-ka-2/2019 dated 16th December 2019 has mandated the outsourcing vacancies to be filled through GeMs along with manpower to be taken from Rojgaar Sangam, in order to curtail corruption, favouritism and nepotism.

Simplification:

It is the first step towards automation, where the Clutter of workflows/processes is deeply analyzed to get away with unnecessary ones and a transformed work flow evolves. Here also the maintenance of records of lakhs of unemployed youth and thousands of employers was an herculean task besides being resource intensive. Informing unemployed youths about upcoming recruitment process involved lots of resources and that too had a chance of information not getting conveyed on time. The problem used to take a mammoth size when it was required to cater to Blue-Collar jobs requirements. Onboarding of employers was completely a manual task and thus the Rojgaar Sangam had this whole process simplified and implemented to cater to all types of Jobs requirements.

Standardization:

The Department had standardized the recruitment process with time, however

there were certain pain areas in the whole process such as collaboration with employers from all sectors, timely exchange of information with key stakeholders, manual interventions leading to nepotism and favouritism etc. These all issue were addresses by the Rojgar Sangam Portal, which standardized the whole process of recruitment, onboarding of employers and job seekers and marking of selections in a timely manner. It also standardized the various compliance requirements for employers.

Automation:

Being nimble and agile is the mode of operandi for Government Departments today as they need to react quickly to challenges posed by various factors besides their declared Vision. Progress of government departments towards their vision is often thwarted by manual and time-consuming processes and lack of data-driven insights. The Rojgaar Sangam's Automation of processes in employment domain for the state tries to bridge the gap between the employment department's vision and its intended goals .Besides the routine automation of processes such as online registrations of employers and job seekers, information exchange among key stakeholders, reporting on important KPIs, Rojgaar Sangam has responded well to the ongoing COVID-19 pandemics ,by contributing through its modules such as Direct Hiring which is completely automated ,contributing to employability especially of Blue collar job workers.

The deep learning of the standardized recruitment process of Outsourcing has led to value added Intelligent AI being incorporated in newly developed outsourcing Module, allowing only the eligible candidates to apply along with allowing minimum manual intervention to keep a check on nepotism and favouritism leading to value addition to the whole process and assisting in completing the recruitment process in given time frame.

Technologies

Enterprise Architecture(EA) Practice of the department in which Rojgaar Sangam plays an important role ,has improved decision-making, the ability to adapt to changing conditions (Such as Direct Hiring), eliminated inefficient or redundant processes, and optimized people, processes and technology.

The EA practice has added value to the department in the following ways:

- Enabled growth: The registrations of the job seekers and employers along with Employment statistics has improved significantly after Rojgaar Junction went Live.
- Ensured compliance: All the necessary ad hock reports such as Assembly Questions, Parliamentary questions, Inter departmental Queries and other routine compliance reports are now available within reasonable time.
- Reduced Complexity: The departmental processes involving important stakeholders have been simplified to a great extent and departmental services available round the clock (24*7) with minimum manual/departmental intervention has lead to surge in registrations of both job seekers and employers.

Data Analytics available through the Rojgaar Sangam has expanded the horizon of Higher Officials' from Bird's eye view of the data to a detailed data view by providing a number of reports to take decisions ,share information and use the same in policy formulation

People

Capacity Building:

The Portal has enabled capacity building for the department by upgrading relevant IT skills. The Officials and workers have upgraded themselves to keep pace with the technology and are satisfactorily serving the state with the help of Rojgaar Sangam.

Leadership Support:

The Leadership of the department has been provided with various reports from the Rojgaar Sangam,which has augmented their decision making along with providing valuable inputs for policy making.

Change Management Process:

The enhancement and changes in the portal/app has evolved with time,with increasing demands and expectations of key stakeholders from ease of registration to an umbrella of jobs covering Private to Government employers.The Portal which started on Water fall model has upgraded itself to 'Devops' methodology.

VALUE INDICATORS

Learnings for sharing

- Minimizing Administrative Intervention in enhancing Citizen Centric Services, by capturing all possible case scenarios and addressing it through technology.
- Being Agile, not only in development but also in methodology and process. The requirements gathering is a tedious job especially in government domains, where last minute surprises are bound to happen, in order to handle this ,the agile methodology was incorporated in training sessions for future requirement gatherings. The participants from different departments were asked to foresee their future requirements and the same is conveyed to the development team and departmental SMEs to collate the information, ironing out common things and be ready with the design, before the change formally arrives.

Digital Empowerment

- The Rojgaar Sangam has enabled the reach of the Employment Services to all the citizens of the Uttar Pradesh, with transparency in terms of Job availability, recruitment process and selection using automated, standardized, simplified process backed with Intelligent AI inputs.
- It has empowered the common Job seeker, who can register, apply and get selected hassle-free at his own will, comfort and from anywhere round the clock.
- Rojgaar Sangam has empowered common man by displaying all government related jobs and Outsourcing jobs in public domain, bringing more transparency in Outsourcing recruitment and reducing nepotism and favouritism.
- It has empowered Employers to post their vacancies, do their recruitments and mark the selections with minimum physical interaction.
- Rojgaar Sangam has reduced the Digital divide gap for Blue collar Job seekers, by providing them a live platform for employment opportunities.

Green e-Governance

Rojgaar Sangam with its technology Partner NIC is E-waste (Management) Rules, 2016 Compliant. Rojgaar Sangam has reduced the usage of paper significantly, which was widely used , when the process was manual as all Communication, Collaboration and Integration was done through written

communication.
The staff and the Stakeholders are being made aware and educated about E-waste and Green initiatives, encouraging e-mail communications with different stakeholders. All the communication through the portal is being done through automated E-mail processes.

Shri Kunal Silku, **IAS**, *Director, Directorate of Training and Employment, Uttar Pradesh (Uttar Pradesh), info.diremp@gmail.com*

Shri Pramod Kumar Pundir, *Deputy Director (Employment), Directorate of Training and Employment, Uttar Pradesh Government (Uttar Pradesh), dde1.lu-up@gov.in*

Shri Hemant Arora, *Technical Director, NIC, Lokbhawan, Lucknow, hemant.arora@nic.in*

Shaala Darpan: An end to end e-Governance solution for school and office automation

Centre for Development of Advanced Computing, Noida

Vivek Khaneja and Aparna Ramamurthy

PROJECT OVERVIEW

Shaala Darpan is an end to end e-Governance solution for school and office automation. It covers all the 636 vidyalayas, 8 Regional Offices and 9 National Learning institutes and head quarter of the Samiti. It is a single integrated platform for information sharing and knowledge dissemination; catering to 22000 employees and over 2 lakh students of the Samiti.

Vision & Objective

With this project Navodaya Vidyalaya Samiti's vision was to attain ease of information sharing, Information analysis and convergence, Collaboration and Strengthening of the System to enable inclusive efficiency of all

The objective of the project was to design, develop and implement an integrated e-Governance solution for Navodaya Vidyalaya Samiti, consisting of the following modules/components:

- Integrated Content Management Portal
- Personal Information System
- Budget and Financial Management System
- School Information and Management System
- Staff Attendance Management System
- Hostel& Mess Management System
- Inventory and Store System
- Centralized Dashboard and Analytical Tools

Functionalities

The broad Functionalities of each of the modules/subsystems are given below:

Integrated Content Management Portal: This is a single umbrella of 654 Bi-Lingual portals for all the schools and offices of the Samiti to disseminate information on the Samiti's activities and achievements to the common man. It is built using Open Source technologies and each portal has individual dashboards to manage and update their respective content. The Single umbrella also allows for uniform updates across all portals and gives a single integrated view of all the Samiti's vidyalayas and offices to the outside world. The smart search capability ensures the end users can find the information they are seeking with ease.

Personal Information System

The Personal Information System is an end to end office automation system that enables the complete automation of all the employee and day to day in-house processes of the Samiti. It includes:

- e-Service Book
- Paper less Leave applications and approvals
- e-APARS for Annual Performance Appraisals
- Online filing of Immovable Property returns
- Management of Employee transfer information
- Promotion and Disciplinary Process
- Information on Employee visits and trainings

Budget and Finance Information System

Shaala Darpan also hosts the Budget and Finance and Inventory Management System for the Samiti functioning. The Samiti offices and vidyalayas cannot raise their budget demands through the system to their respective granting office. This is then examined online by the concerned authorities and the funds are released. Day to day expenditure details allow for easy monitoring and brings about the much needed transparency.

School Information and Management System

The School Information System is the heart of Shaala Darpan to help the Samiti manage the day to day activities of all its 636 Vidyalayas. It gives the Samiti and its students a complete glimpse of each students' life in the Samiti. The system brings all students' information, their health cards, results, attendance, etc. online. The vidyalayas can now prepare the annual course Time Table online, including special class planes, teachers can submit their lesson plans online which can be shared and viewed by different people in the Samiti based on their access rights.

Stake Holders

The stake holders of the system include the following:

- Officers of NVS can do the following:
  i. Manage their courses better
  ii. Manage the entire activities in NVS schools in an efficient manner
  iii. Create a information rich content store for future reference
  iv. Manage their personal records better
  v. Have easy single point access to information shared across the offices of NVS
  vi. Senior management can manage the courses, funds, etc. better with the aid of analytical dashboards
- Students can access their own personal records, information rich content, their entire life in NVS as a single visual album, etc. with greater ease

External Audience:

- Citizens wishing to know about NVS and their working can now visit the single Integrated Content Management Platform
- Parents of students can get to know the life of their students inside JNV with a single click.
- Government can study the working of NVS through up to date data.

Delivery centres

Shaala Darpan in implemented for a total of 654 offices and Vidyalayas of Navodaya Vidyalaya Samiti that are spread across the country which includes:

- 636 Vidyalayas spread across India
- 8 Regional Offices at Bhopal, Chandigarh, Hyderabad, Jaipur, Lucknow, Patna, Pune & Shillong with jurisdiction over different States and UTs.
- 9 Navodaya Leadership Institutes
- One Head Quarter

Geographical Coverage

- National level – Number of State(s) covered: - All
- State/UT level- Number of District(s) covered: - All
- District level- Number of Blocks covered: - All

Benefits

The major benefits attained by the officers of NVS with the implementation of Shaala Darpan are as follows:

- More efficient processes:

i. Reduced time for information searching.
ii. Timely completion of important processes like APAR.
iii. All essential documents available in one click.
iv. Timely information intimations like absence of students in class, movement of students outside the campus, any important notifications from management to officers.

- Ease of stakeholders:
  i. Easy interface navigation with important alerts.
  ii. Responsive GUI helps user to access the system on hand held devices mobile and tablets.
  iii. Analytical dashboards for analysis and inference by management.
  iv. Easy navigation and information access for citizens.
- Increased transparency
  i. Status of actions taken in every module is available to the individual officers as well as NVS Officials at every stage of processing.
  ii. One-Go Dash-Board to see the information of every aspect of the project, thus aiding faster and evidence based decision making.
- Structured and Efficient way of working
  i. Manual processes now automated processing bringing in operational efficiency
  ii. Automated alerts and reminders for informing users of any actions that are required at their end.
  iii. Process transparency both for individual users and management.
  iv. Record store helps future references.
- In line with the Government's manifesto on Education: Link between Industry and academia by way of Alumni portal. Online Assignments, Improvised Projects with students from different classes, streamlined monitoring, etc. via School Information System thus reworking the work culture of teacher training institutions with a goal to prepare committed performing teachers. Inspection reports and monitoring dashboards to aid real time performance audit. Online rich reference store for students to relieve them from huge bags.

Current Status

Shaala Darpan was launched by honourable MOS Shri. Sanjay Dhotre on 7th November 2019 in New Delhi, India. The module – wise status of the project is given below:

Model Name	Status	Module Features
Integrated Content Management Portal	653 Bi-Lingual portal developed for NVS. The portals are in use across all schools and offices of NVS	• Responsive UI • Compliance to GIGW standards • Role Based Access
Personal Information System	•Implemented across all schools and offices of NVS •20423 employees registered •20053 Service Book entries •20230 APARs filled last year •Leaves, transfers, etc. through the system	• Responsive UI • Organogram based access control • Role Based Access • Rich Analytical Reports
School Information and Management System	• Implemented across all schools and offices of NVS • 233820 student registrations	• Responsive UI • Role Based Access • Mobile APP for student attendance

	• 72849 new registrations in 2020 • 13383 pass outs • Other modules use have also started	• Analytical Dashboards
Budget and Finance information system	• Completely developed and implemented • Samiti offices and vidyalayas can raise their budget demands through the system to their respective granting office. This is then examined online by the concerned authorities and the funds are released. Day to day expenditure details allow for easy monitoring and brings about the much needed transparency • Budget requisitions started from the current year • 659 requisitions received	• Event Based Budget • Multi-Level Fund Allocation • One Point control and release of funds • Role Based Access • Rich Analytical Reports
Hostel & Mess and Inventory and Store	Module developed and launched; the use has started	• Responsive UI • Role Based Access • Analytical Dashboards

Technology

Shaala Darpan has been developed using latest & mature web technologies and in line with CMMI level 5 practices. The entire project has been developed using Open Source technologies thus doing away with high licensing costs of proprietary software. The solution has been developed in substantially lower costs as compared to market trends. Below is a brief of the technology stack used in the project:

- *Architecture:* 3-tier
- *Platform:* CentOS 6.2
- *Application Server:* Tomcat 7
- *Database:* Postgresql Enterprise DB 9.2
- *IDE:* Eclipse, Spring Tool Suite
- *Technologies:* JDK 1.8, Spring Boot, Sturts, Jquery (3.2.1), JSON , AJAX, XML, Bootstrap CSS, Open CMS content Management System for building web portals
- *Frameworks:* Spring Boot 1.2, Hibernate 5.0, Bootstrap CSS framework, Struts 2.0
- *Version Control:* SVN is being used as Version control system for both code and documents.
- Jenkins for continuous integration.

Certification (Certifying Agency)

The system has been Safe to Host certified by CERTIN certified agency, C-DAC Hyderabad, to ensure the system is safe for deployment.

Disaster Recovery/ Service Continuity

Backup Policy: Daily (Weekdays: Incremental, Weekend: Full)
For Disaster Recovery: DR Site in Hyderabad

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Integrated Content Management Portal	This is a single umbrella of 654 Bi- Lingual portals for all the schools and offices of the Samiti to disseminate information on the Samiti's activities and achievements to the common man.	17	636	Regular updates of portals
Service Book	All the service details of employees in this online version	20423 registrations	20053	Regular updates
Annual Performance Appraisal Report	The Annual Performance Appraisal report can now be filled online. Has helped in Immediate notifications, timely status updates have simplified APAR timeline maintenance, monitoring and feedback at all levels.	20218	20230	
Budget and Finance	The Samiti offices and vidyalayas can raise their budget demands through the system to their respective granting office. This is then examined online by the concerned authorities and the funds are released.	Not implemented	Not implemented	659
School Information and Management System	The School Information System is the heart of Shaala Darpan to help the Samiti manage the day to day activities of all its 636 Vidyalayas.	Not implemented	233820 student registration	72849 student registration and 13383 pass-outs

Implementation

As planned the Shaala Darpan project has been successfully implemented in all the 636 Schools, 8 Regional Offices, 8 Navodaya Leadership Institutes and the Head Quarter. As indicated earlier, all the employees' and students' information are now on the system.

Improvements/enhancements

The following enhancements have been rolled out in the last one year:

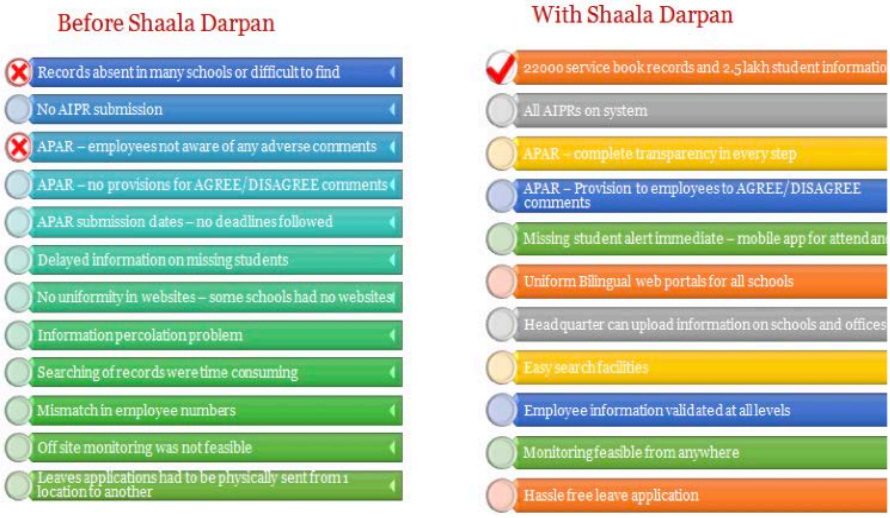
- The Budget and Finance module has been developed and rolled out in this period.
- The Hostel & Mess and inventory module has been launched and made operational.
- APAR review has been enhanced to cater to officers on long leaves.
- APAR representation has been enhanced to indicate action taken.
- School Information System has been integrated with Microsoft Teams for online classes in Covid pandemic.

- Alumni portals being worked on for enhancing the link between NVS and its alumni.

ENABLER

Processes Re-engineered

The below figure gives you a comparison between the pre and post deployment scenarios of Shaala Darpan:



As seen in the figure above, implementation of Shaala Darpan has yielded to number of benefits to the officers of NVS and NVS as a whole. To achieve this a lot of the Business processes of NVS were re-engineered. This included Simplification of existing processes, re-defining or standardizing practices and automating the processes followed.

The below table gives a glimpse of the automation/standardization/simplification achievements attained by the modules of Shaala Darpan:

Process Name	Automation	Standardisation	Simplification
Integrated content Management Portal	Bilingual integrated content management portal for all offices and vidyalayas of NVS – this includes 653 Bilingual portals	• Earlier each school or office of NVS had their own portals with no integration in the content display across the different schools or offices. • There were many schools and offices with no portals.	• Easy 'Find the school' option for end users. • Better visibility of NVS achievements at both student and faculty levels.

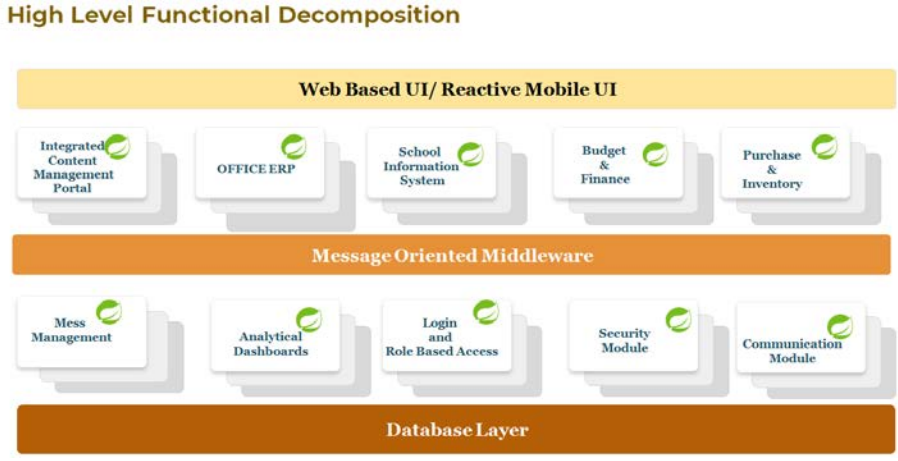
Service Book	Service Book was being maintained by NVS. This was replicated on the system	Standards defined in the system to ensure all employee transfers were through the system.	• Analytical Dashboards have simplified information gathering and percolation.
Annual Performance Appraisal Reports (APAR)	• The annual appraisal process has been automated through the system – the hard formats of appraisal has been replicated in the system. • Dashboards for immediate visibility of status of APAR at all levels introduced.	• The process of uploading a representation through the system in case of grievances has been introduced – this was missing earlier in NVS workflow. • The system has ensured timely appraisal and review of APARs as per Government guidelines.	Immediate notifications, timely status updates have simplified APAR timeline maintenance, monitoring and feedback at all levels
Annual Immovable Property returns (AIPR)	Well defined easy workflow to ensure easy and quick submission of returns.	This mandatory Government process was almost absent as many employees never filled their annual property returns. This has been mandated by the implementation of Shaala Darpan.	The users can submit both hard-filled formats (by an upload) or directly file the returns on the system.
School Information and Management System	All the processes followed in school practice have been automated through Shaala Darpan. This includes class assignment, time tables, lesson plan upload and monitoring, academic projects and assignments,	• Attendance Mobile APP has ensured attendance anytime anywhere and has also introduced immediate update mechanism to the highest	• Analytical Dashboards have simplified information gathering and percolation.

	academic evaluations, activity evaluations of students, student attendance, school inspections, etc.	levels in case of missing children.	
Budget and Finance Information System	All the existing processes automated as is in the system	Well defined processes followed by NVS have now been automated for ease of end users	Easy requests and consolidation of requests at various levels of NVS. Status of requests easily visible to all.
Inventory and Store and Hostel & Mess system	All the existing processes automated as is in the system	Clear SOPs defined to ensure proper updates and feedback of inventory and its use.	Inspection of inventory and issue has been eased by the system as all information available within a clicks reach.
Analytical Dashboards	Statistical and graphical dashboards to aid decision making	There were no easy ways to capture important information before the implementation of Shaala Darpan – the statistical dashboards have been designed to aid policy decisions.	Information percolation across the NVS offices and 636 Vidyalayas are now made very simple with the introduction of Shaala Darpan

Technologies

The system is developed using architectural technologies like SpringBoot on a Cloud.

Below is the High Level Functional Decomposition of the system.

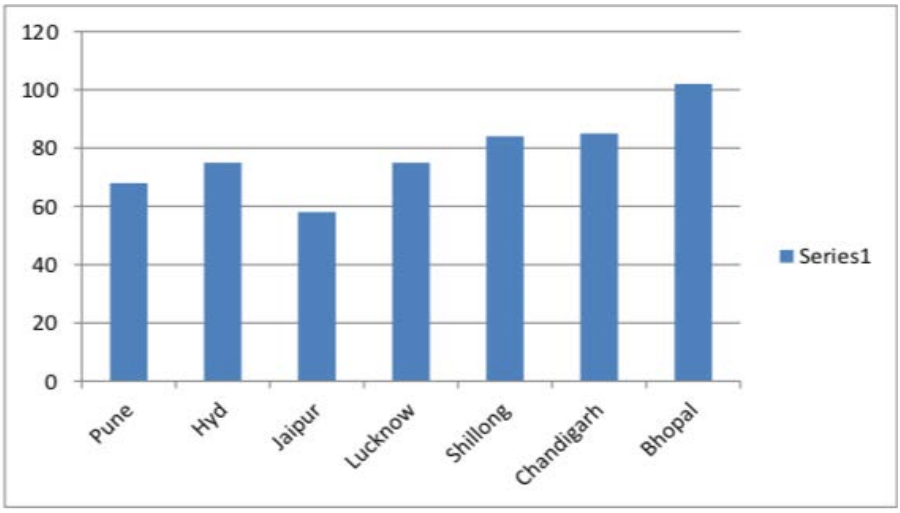


As seen in the figure the users connect to a Web Based UI that is responsive which can be accessed from any hand held device, laptop or desktop. The system is decomposed into multiple functional subsystems like the Integrated Content Management System, Office ERP, School Information System, etc. Each subsystem has an independent existence and also helps in conjunction with the other subsystems. Thus, each subsystem communicates with other subsystems with a Message Oriented Middleware. The Database Layer is governed by an ORM tool will communicate with the application for data storing. The subsystems communicate with the Database Layer for information generation and management.

People

Shaala Darpan was developed by an experienced team. To ensure easy use of the modules by end users a number of training initiatives were carried out.

- *Demonstration of prototypes*: Regular prototype Demonstration meetings were conducted with the respective teams to ensure the system was easily usable by the end users.
- *Training:* Train the trainers program were conducted at 8 regional offices for training the officials on Shaala Darpan modules. These officers in turn trained other officers for using the system. Over 540 officers were trained thus. The below graph gives the region wise number of officers trained:



Further, regular training sessions were conducted for the principals of JNV and the Deputy Commissioners of regional Offices.

- *Help Desk:* A dedicated help desk was set-up during the implementation to provide personal telephonic assistance to the end users. A help desk email was also set-up to provide assistance to the end users. Initially, around 20-25 calls were received per day with user queries.
- *Manuals:* In depth training manuals and FAQ manuals were prepared and shared for officers to refer to in case they faced any difficulties in using the system.

VALUE INDICATORS

Learnings for sharing

Shaala Darpan is a first of its kind project execution which is particularly

important in bringing e- Governance and the Education system together. The very volume of the implementation had a lot of challenges and opportunities for the development and implementation teams.

Challenges

- Implementation of Shaala Darpan has resulted in a change in certain ways in which the NVS officials operate. Also, since a new technology is introduced an initial resistance in using the system was envisaged.
- Train the trainers program was conducted at 8 regional offices for training the officials on Shaala Darpan modules. These officers in turn trained other officers for using the system.
- A dedicated help desk was set-up during the implementation to provide personal telephonic assistance to the end users. A help desk email was also set-up to provide assistance to the end users. The team would also call each school and office personally to understand if any issues are faced and guide the end users.

Scalability

Various measures have been taken while designing the system to support better adaptability of the system at various levels.

- Configurable user roles and access control
- Configurable user menu and dashboards
- Configurable department wise application processing workflow
- Administrative Interfaces for system configuration settings.

Feedback Management System

The feedback management system is designed such that it helps in improving the system time to time. We have process-wise feedback, which enables us to improve the system for a better user experience.

Digital Empowerment

- Shaala Darpan is an inclusive system which has been designed taking into account the diverse geographical distribution and varied technology know-how of its end users. Thus the system has been developed to support bi-lingual content to ensure all users spread across the country can use it.
- The offline content upload feature enables schools in remote parts to access the system with ease. The parents and students corner have been designed to ensure enhanced usability of the system.
- Responsive UI ensures that there is no mandate for the end user to access the system through computers alone and can use the system features seamlessly through mobile devices as well.
- Analytical Dashboards are designed to aid policy decision making.

Green e-Governance

Shaala Darpan has been designed and implemented using Green IT parameters and reduced data wastes in mind. Some of the techniques employed towards Green IT are detailed below:

- Only required information get stored – for instance, NVS being a residential school all students mostly attend the school. Hence while saving the attendance data of the students only absence of students are stored and the presence details are derived from this.

- The system and server resources are dynamically increased or decreased to cater to increase and decrease in load; thus saving on resources.

Shri. Vivek Khaneja, *Executive Director, Centre for development of Advanced Computing (Greater Noida),ed-noida@cdac.in*

Ms. Aparna Ramamurthy, *Joint Director, Centre for development of Advanced Computing (Greater Noida), aparnar@cdac.in*

Telangana State Board of Intermediate Education Services
Board of Intermediate Education, Telangana

Syed Omer Jaleel, Neeluri Ravindranath and Rajendra Nimje

PROJECT OVERVIEW

Background

The entire process of Board Examination Management and Results Processing to Publishing is complex, laborious, taking up a lot of faculty and administrative time, effort and costs.

Considering the 1) large number of students appearing for the examinations; 2) distinct & vast number of subjects (such as Social Science, Mathematics to Home Science to Psychology) for examination; 3) allocation of examination centres in different locations; 4) requirement of superintendents, supervisors to planning of evaluators 5) provision for re-evaluation/re-counting, the entire process is time-consuming and error prone.

In India, board examinations refer to the public examinations that are conducted at the end of the 10th grade education (SSLC), and at the end of the 12th grade education (HSC) (*In Telangana, the Board of Intermediate Education conducts board examination for Class 11 as well*). The scores achieved in these exams are considered very important for getting into universities, professional courses or training programmes and other occupations. These exams play a decisive role in developing a student's lifecycle strategy and provide a valuable experience to each student throughout their academic progress. Board Exams are further very important for their parents too, as it is a career deciding point in every student's life. However, there have been instances, where a student who has always excelled in his/her studies was declared "failed" or scored less in Board examination, primarily due to technical glitch/manual error. (Board results are announced on the official website of the board exam in which the student has appeared)

(Reportedly, the National Crime Records Bureau (NCRB) data shows that 10,159 students died by suicide in 2018, an increase from 9,905 in 2017, and 9,478 in 2016. Education is the point that tops the list of pressure.)

Unless a sufficiently accurate, transparent, error-free and efficient method is used with a suitable software application/technical intervention, the grades/results declared are subjected to convey misinformation and may make the decision-maker disappointed and in few cases may cause turmoil. With this as a background, it is pertinent to have an end-to-end automated system, which is impartial, accurate, effective, transparent, secured, speedy and free from manual intervention

Process prior to automation/digitization by TSBIE

Prior to the implementation of "Telangana State Board of Intermediate Education Services" by CGG in the last quarter of 2019, the TSBIE was grappling with large-scale errors in the Inter results declared in early 2019 (Academic Year 2018-19). There were many issues in processes such as payment of fee, registering for exam, instances where wrong subjects were listed under a candidate's name, some errors in other details such as student's name or father's name. As per official records, the state had received a staggering 1,00,732 applications for re-verification and 22,921 applications for re-counting. This was a gigantic task for TSBIE to evaluate these along with another three lakh answer scripts of candidates who had failed. Earlier students

were applying manually to procure their relevant certificates like Migration, Eligibility, Equivalency, True Extracts of Marks Memo and Duplicate Memorandum of Marks etc., by paying prescribed fees through challans.

While, conducting practical exams, such as generation of exam time-tables, center wise practical batches, generation of absentee's statement and generation of Question papers were also done manually. There were considerable challenges due to manual recording of data pertaining to college affiliations, issuing of relevant certificates to students, preparation of practical batches, preparation of appointment orders, generation of hall tickets etc. leading to inaccuracies/ error prone results processing and tremendous efforts to publish the same, information gaps to the students, influenced decision making based on non-real time data etc.

Manual processes of question paper setting for practical examinations and transfer of those papers to the examination centers make them vulnerable to misuse. Operating expenditure on manpower and other requirements was very high, due to manual intervention of the above activities and also was subjected to plethora of complaints, court cases and grievances by the students.

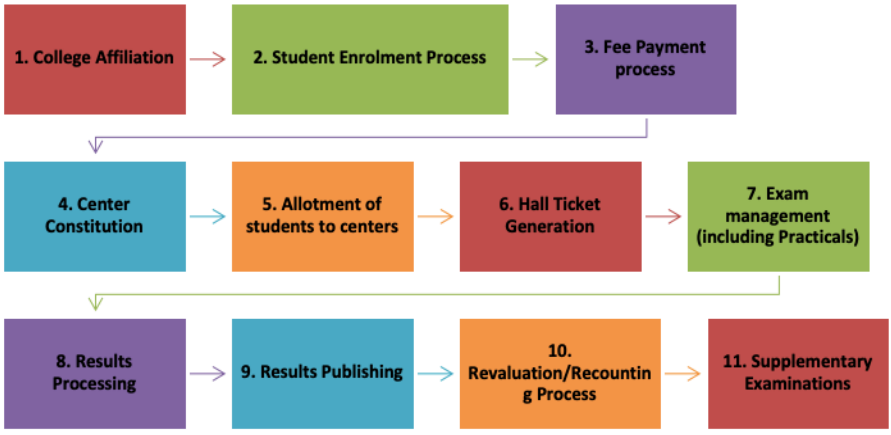
The manual processes that had existed in the college affiliation and pre & post examination activities are now replaced by automated processes and have resulted in saving of time, cost and resources. The automated generation of data pertaining to various activities of the board in conducting of examinations helps officials with easy availability of information resulted in increase of efficiency of officers engaged in the activities by dedicating more time in effective monitoring. The processes are also re-engineered to remove human interference and to ensure transparency and accountability.

Project Objective:

The main objective of designing and developing the application is to remove/minimize the human contacts and to implement a state wide web and mobile based e-Governance solution of 'Telangana State Board of Intermediate Education' project to streamline the end-to-end processes of student admissions and automation of examination process in Board of Intermediate, Telangana State. Also, to ease the process in conducting examinations and processing results and to ensure efficiency, effectiveness, transparency, responsiveness, accountability in the system and sustainability in the long run.

Project Scope:

The scope of the project is to design, develop & maintenance of an IT system



for automating the college affiliation, student admissions, processes involved in pre & post examination, results processing activities, Reverification and Recounting and Supplementary examinations and to provide student services. The details of the modules are detailed here under;

College Affiliation: Facilitates affiliation process, online approvals, captures the details of the colleges such as establishment, renewals, shifting, courses sanctioned/ available, amenities available and staff data. Mobile app provided for college affiliation further helps to capture the geo-coordinates of the colleges along with the rooms available in the colleges.

Student Services:

- Admissions: Process includes the registration of student basic details such as name of the student, father name, mother name, date of birth, identification marks etc. that are taking admissions in to various government and private colleges. Also includes registration of student group/course for which the student is taking admission based on the availability of number of seats in that college pertaining to specific group/course.
- Student online services: The services such as Migration certificate, Duplicate Memo, Name correction in Marks Memo, RV/RC, Equivalency Certificates, Attendance exemption, Transcripts etc. were provided in the application. Students can apply online with prescribed fee to obtain the above said certificates. Head office processes the student requests and sends the correspondence to students online.
- Center constitution: Center Constitution activities include the following
  i. Identifying zones (group of some colleges will be considered as zone)
  ii. Identification of some colleges as centers in a zone
  iii. Allocation of students of all colleges in a zone to centers with randomized distribution
  iv. Jumbling of students

Hall Ticket Generation: Generation/download of hall tickets after jumbling process is completed. Generation of bar codes for various subjects; Centre Nominal Rolls and College Nominal Rolls, D-forms (Day wise forms), Photo attendance sheets, Day-wise/Subject-wise absentee's statement, and appointment orders for examiners, District Reception & Distribution Centre (DRDC) reports etc.

Generation of Nominal Rolls & QP processing: This module deals with the generation of category wise, center wise nominal rolls and Question paper counts and generation of access files.

Center Locator Mobile App: Student can know the route map from the residence to allotted examination center in which the student is going to write an examination.

Exam Management: Automated process of practical exam time-tables, center wise practical batches, generation of absentee's statement and generation of Question papers pdf's with two tier authentication for practical examinations.

Practical examinations: This module deals with environmental & ethics examination activities, and generation of photo attendance sheets, photos & signature sheets for general and vocational categories. Provision to capture the staff data of practical exams along with the advances given to staff, to mark & generate online absentee's statement. Provision to generate day wise practical exam time tables, center wise practical batches, publication of

calendar of practical exams and finalization of award list etc. Provision to capture the day wise marks of students who have attended for practical exams which are conducted.

Theory examinations: This module deals with the services of generation of Centre Nominal Rolls and College Nominal Rolls, D-forms, Photo attendance sheets, Day wise and Subject wise absentees statement, generation of appointment orders for examiners, District Reception & Distribution Centre (DRDC) reports etc. as per the formats and guidelines defined by TSBIE. Provision is also given to download the hall tickets for examinations by students itself.

Results Processing: Provision for building of validation rules/check points, step by step process for finalizing the results and approvals of concerned officials along with generation of stage wise exception, MIS & Press reports etc.

Reverification & Revaluation: Students who opts for revaluation/recounting of the subjects in which they appear will apply for revaluation/recounting with prescribed fees as decided by the Board. Three levels of approvals will be there in the process of revaluation/recounting to reverify the marks awarded in the subject and reassigns the marks if any marks awarded are less than the previously allotted marks. Results will be republished after RV/RC process is completed in all aspects.

Supplementary examinations: Same process which is followed for main examinations will be followed for Supplementary Examinations also i.e. from fee payment process to results publishing.

Grievance Redressal System: Mobile App on Grievance Redressal is also provided to students and officials of the TSBIE for resolving any issues which they encountered in the certificates issues, results and other services.

Intended Benefits:

In Telangana, 9.66 Lakh students registered for the intermediate examinations held in 2020, including 4.80 Lakh students in the first year and 4.86 Lakh students in the second year. Further, more than 25,000 invigilators involved in the invigilation process of examinations conducted for 9.66 Lakh students at 1139 centres. Over 15,000 evaluators were involved in the evaluation process of subjects pertaining to examinations. This involved Result Processing of over 55 Lakh answer sheets. Despite the multiple lockdowns due to COVID-19 pandemic, the evaluation and result processing did not suffer any delay and was completed in a record time.

Students:

- Facilitated the students to apply for the required certificates by paying the prescribed fee and downloading of certificates through online, thus saving tremendous time
- Facilitated the students to download online hall tickets in less than 30 seconds.
- Route map to examination centre from the residence with the help of mobile app i.e. Centre Locator App.
- Impartial, accurate, transparent, secured, speedy/timely results declared

Board of Intermediate Education:

- Implemented end to end seamless Intermediate Education Services for the academic year 2019-20 for 9.66 lakh students

- Effective monitoring of the process from students' admissions to conducting examinations and publishing of exam results
- The solution reduces administrative efforts and costs by automating processes involving student registration, exam center allocation, hall ticket issuance, question paper logistics planning, exam-day management, and results management.
- Enforcement of standard statutory formats and procedures for publication examination results
- Facilitated the college principals to submit attendance of students who appeared for examinations through online absentee's statement
- The solution also alerts and sends notifications to officials of the Board of Intermediate Education during various stages of the processes involved for monitoring of the activities going on and to take precautions on the issues if any occurred.
- Timely action through real time Dashboards & MIS
- Various MIS and Analytical reports which can be drawn out to understand the overall performance of the students.

Hardware/ Software

- Design of Forms: Application development, form design has been done using front end tools based on Java Technologies i.e., Java Development Kit version 1.7, Java Server Pages, Servlets, JDBC, Jakarta Struts 1.2
- Database: PostgreSQL 9.x
- Operating System: Centos 6.3
- Web Server: Apache Tomcat 8

Certification (Certifying Agency)

DECCAN INFOTECH PVT LTD.

Disaster Recovery/ Service Continuity

CGG uses information technology to quickly and effectively process information. CGG processes information and store large amounts of data in its State-of-Art Datacenter located at Gachibowli, Hyderabad. Desktop computers, laptops and wireless devices are used by employees to create process, manage and communicate information.

CGG uses the following technologies for Disaster Recovery and Business Continuity:

- E-waste: Earlier i.e. in 2017 CGG scrapped all its identified e-waste to an e-waste management vendor who is empanelled in Pollution control board, Telangana.
- Data Centre-Disaster Recovery (DC-DR) replication between Datacenter is within 20 km radius using OEM proprietary technologies with VMware for high-availability of services to the citizens. The Disaster Recovery Centre for CGG's Data Centre equipped with state-of-the-art Hardware, Software and Control Infrastructure to achieve optimum operational performance, safety and security is located within its premises (STPI, Jubilee Hills).

RESULTS INDICATOR

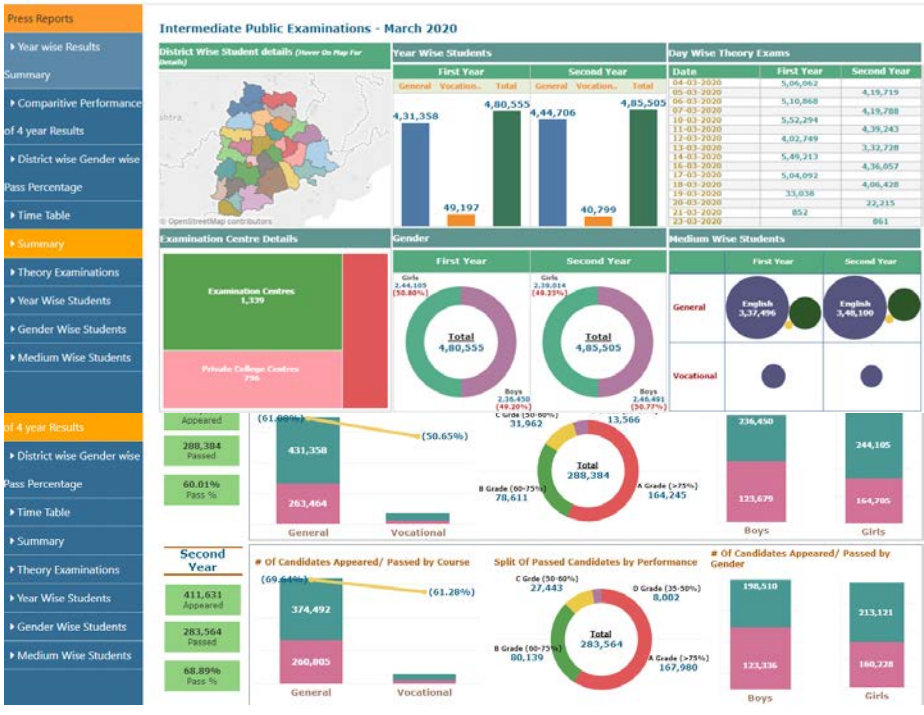
Description of various e-Services, benefits and their Volumes

Name of	Brief service	Volume (Nos) of Services year wise

Planned e-Services	description with benefits	2018-19	2019-20	2020-21
Student Admissions		964039	966056	915889
Colleges Registered		2624	2700	2700
Student Online Services		86112	124234	95620
Fee Payment		964039	966056	Still these activities has not started for this academic year due to delay in admissions because of covid pandemic
Practical Award List		331970	333985	
Hall Tickets Download	No. of Hall tickets Generated:	964039	966056	
	No. of Hall Tickets Downloaded:	964039	966056	
Results Processing	No. of Students Exam Appeared:	964039	966056	
	No. of Students Results Processed:	964039	966056	
	Pass %:	55.26%	61.64%	

Implementation

The system is implementing in Board of Intermediate Education department for the officials of TSBIE head office and DIEO's (33), Colleges (2700), Staff (5000) and students (Around 9 lakhs).



Improvements / Enhancements

Below are the improvements/enhancements that were implemented in TSBIE

- *Results Reports Confirmation service:* This service enables the Controller of Examinations, TSBIE to verify the results data in reports and TR files. COE can either approve or reject the data. Results data will be made visible in press reports only after the approval of COE. This feature is enabled to ensure correctness of data.
- *MIS Reports:* Summary reports provide clear picture and monitoring regarding the student results in all categories i.e., General, Vocational and Bridge Courses.

ENABLER

Processes Re-engineered

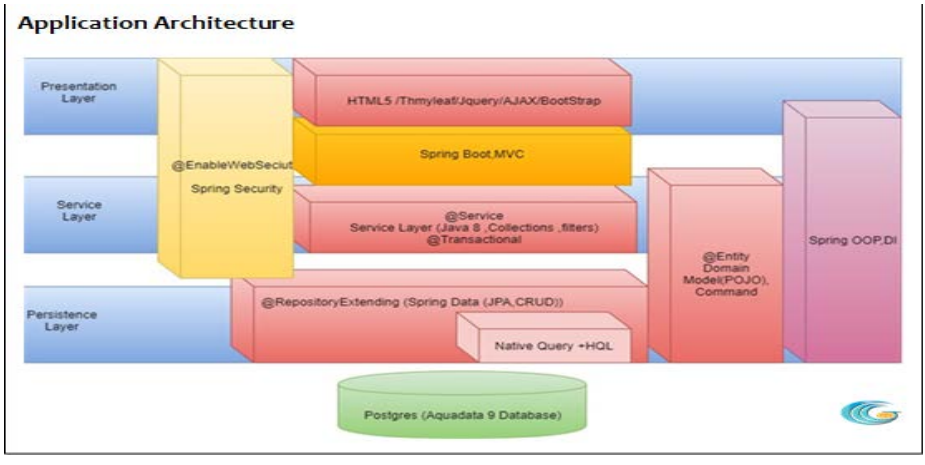
Governing bodies – Telangana State Board of Technical Education have completely defined and re-engineered the admission process to be adopted for admission through TSBIE Application.

- Governing body's leadership had to define the transformation by starting with real student pain points and working backward to diagnose where things are getting vulnerable for manipulations.
- Real and practical digital transition has become possible with combined managerial practices of regular meetings by Governing Bodies leadership and Technological partner
- Decision making based on quantitative analysis and adapting continually with trend/changes in timely manner
- Supported by cross-functional collaboration from Governing Bodies and Technology partner.
- Government has constituted committee at Government level and at operational level
- Government has conducted sequence of meeting with college managements.

Technologies

The Application is built on the framework comprising of technologies:

- Base framework- Spring boot with Spring security, JPA repositories
- Java 8 features of collections, filters and Thyme leaf UI Processing Engine
- Well-formed three tier architecture is used



Benefits

- Environment Compatibility
- No Future Breakdown of Technology used
- Less Maintenance is required
- Sustainability
- Reliability
- Operability -ease of use, Interoperability
- Extensible
- There is no downfall in terms of technical advancements.
- Strong Infrastructure
- Smooth Deliverable
- Flexible architecture to incorporate future changes-in terms of both logical and technical.
- Ease of integration if required.
- No scope of resource depletion

Data Analytics

- System generates year wise reports
- Graphical representation for public view
- Internal calculative reports for head office for monitoring
- Downloading provision in excel and pdf for all the reports

People

Capacity Building

Training was given to all the users on usage of web & mobile application. The user interfaces of the application are made very simple and self-explanatory. User instructions are provided in the website itself in the form of FAQ's, user manual for easy readability. CGG team is always available to monitor the work flow in case of any issues.

People:

- Plan in place for training and transition in case of people leaving and new ones joining
- Availability of user instruction/manuals and guidance documents for users
- Training for end users
- Availability of help desk

Leadership Support

- Formal audits
- Formal and informal reviews to check progress and adherence to timelines
- Support from top most level of officials of board of intermediate education department
- Leadership involvement was demonstrated in terms of providing resources, conducting review meetings to know the progress, status meetings to know the status of the project. All the practices are adoptable to change.

Change Management

- Support in providing resources
- Conducting trainings for the developers on new technology in case of change in technology
- Immediate action taken in case of change in process

VALUE INDICATORS

Learnings for sharing

Challenges/ Opportunities/ Key Learnings:

- Year wise common results data was not present for all the categories in board of intermediate. This project led to the finalization of TR data with the help of the department.
- No clear picture was available on the number of students and colleges that come under general & vocational
- Great difficulty was experienced on finalization of TR's as the project covers large number of students pertaining to all categories.
- Prior to the project, there was no idea on the number of IT systems available as there are multiple service providers for the application developed. For this purpose, there was research made on available IT system on the system status they are holding (working, not working, under development)
- Faced difficulty in integrating the third-party modules in application.

Best Practices

- Helpdesk Facility - All issues related to application are addressed on the same day through emails. Contact numbers are made available on homepage.
- Stakeholder involvement - Process Improvements led to incorporating new features and technologies by involving all the stake holders. Trainings and workshops were conducted on new features on a regular basis.
- User instructions & manuals are also provided in user logins and homepage in point of contact for reference.
- The system has a platform, where students can air their grievances related to exams, results, processes etc. Complaints by students, parents, general public, and college management can be dealt through system.
- Process adoption and sustainability: A process-oriented approach, in accordance with the ISO processes, was adopted for reliable and consistent outcomes and minimization of mistakes.

Digital Empowerment

Below are the best practices that help the digitally challenged:

- Issues are tracked and resolved through help-desk, thereby reducing user-efforts.
- User manuals are readily available for the user on how to use the application.
- For better understanding of the system, trainings and online conferences are conducted to data entry operators who enter the data into the system.
- Apart from helpdesk, query log is available for the users to immediately post their queries through their individual login.
- Phone number scrolling on the website for the users to call and resolve any kind of queries associated with the application.
- The system has a platform, where students can air their grievances related to exams, results, processes etc. Complaints by students, parents, general public, college management can be dealt through system.

- Meetings conducted on regular intervals of time to know the issues faced by the department.

Green e-Governance

- Saving on paper and bandwidth as the student data is huge and hall tickets and results data made available on website which ensures transparency.
- Fine tuning of the application to utilize minimum required IT Infrastructure thereby saving on the resources associated with it.
- Data is readily available in digital formats thus reducing paper work and contributing to environment protection.
- Environmental conscience entwined in CGG work environment and all projects development centers contribute to reduce emissions to net zero, by implementing use of smart lights and recyclable materials.

Shri. Syed Omer Jaleel I.A.S., *Secretary, Board of Intermediate Education, cioofcie@gmail.com.*

Shri. Neeluri Ravindranath, *Project Manager, Centre for Good Governance (Telangana), ravindra.n@cgg.gov.in*

Shri. Rajendra Nimje, ex IAS, *Director General, Centre for Good Governance (Telangana), dg@cgg.gov.in*

Uttar Pradesh Skill Development Mission

Uttar Pradesh Skill Development Mission

Kunal Silku, Rajeev Kumar Yadav and Hemant Arora

PROJECT OVERVIEW

UPSDM is an institution to run certain schemes, it is an experiment, an improvisation and an annotation on the skill centric industrial landscape. Its transformational initiatives are well adored and accepted even by the other states and Government of India also. Implementation of various skilling schemes on integrated and standardized platform, inviting and convincing large business houses to partner with it and adopting handholding supportive strategies for placing the candidates and facilitating their vertical migration to the formal stream of education.

UP Skill Development Mission soon after its establishment has striven incessantly to make a perceptible contribution in building a skill oriented eco system which may cater the needs of the skilled workforce and empower the youth with skilling to realize their dreams and manage a sustainable livelihood for themselves.

UPSDM Process Overview

Seven major processes involved in implementation of this programme, namely:

- Candidate Management
- Training Partner Management
- Center Management
- Batch Management
- Assessment & Certification
- Placement Management
- Financial Management System

An integrated IT platform incorporating above listed seven processes will be developed and deployed for efficient programme management.

Stake Holders

Primary Stakeholder

- Uttar Pradesh Skill Development Mission (UPSDM)
    1. State Management Unit (SPMU)
    2. District Management Unit (DPMU)
- Candidates
- Training Provider
    1. Government Training Partner (GTP)
    2. Private Training Partner (PTP)
    3. Flexi Training Partner (FTP)
- Sector Skill Council (SSC)
- Placement Partner

Secondary Stakeholder

- NSDC/Skill India Portal
- Other GOI and state Government department

Enhancement of Productivity

- On portal, approx. 12 lakh candidates were enrolled for skill training.
- Portal assists the SPMU and 75 DPMU's in monitoring of the programme on a daily basis.
- Due to the IT enablement of the entire training life cycle:

1. Attendance of around 1.5 lakh candidates is available online.
2. The due diligence processes for batch and centre approvals are expedited.
3. The assessment requests can be tracked from start to end
4. Average no. of batches approved on a daily basis: 50
5. Average no. of centres approved on a weekly basis: 20
6. Average number of batch assessment requests approved on a daily basis: 25

Convenience for user/ citizen

- Optimal mix of manual and IT enabled delivery methodology across training and all the related process.
- Information is provided on the website, through circulars, seminars, workshops, brochure, leaflets
- Exhaustive Mobilization campaign including multiple target group, specific media channels to effectively reach the target group.
- All the processes have defined time limits so as to maintain an average cycle time for the entire training life cycle.
- No distance required to travel to access points as
    1. UPSDM's concept is of taking the centres to the trainees,
    2. UPSDM Training partners are covering all 350 tehsils across 75 districts through their 2986 training centres.
- Facility for online/offline download and online submission of forms
- Online MIS portal Point for status tracking, monitoring and evaluation of the various phases of the training life cycle

Software

MVC 5, C#7.0, RESTfull Web API 2.0,RabbitMQ Client, Bouncy Castle for Digital Signature
.Net Framework 7.0
Jquery 3.5.1
Bootstrap 4.5.2
Microsoft SQL Server 2017
Microsoft Windows Server 2016
HW environment cloud resource at Meghraj

Cyber Security

Cyber Security: Security audit done by cert in empaneled agency and cyber security cell NIC

Disaster Recovery and service continuity

Meghraj cloud is maintain Disaster Recovery and service continuity for National Cloud is in place for UPSDM Portal

RESULTS INDICATOR

Information

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Candidate Enrollment	Candidate can be register on portal and give your training preference online. After registration of candidate training partner	328824	174152	19121 (Training started after guideline issued by

	can view candidate and enrolled in a batch as per candidate Training preference. Candidate can view their batch detail, daily attendance and result within their login.			MoH, GoI from 21Sept. 2020)
Training Partner registration	We register empanelled training partner on portal and provide login credentials for further online process. They can register their centers send request for center approval and monitoring whole process online. Authorized officers can visit at center and give approval on portal.	49	91	302 (In process)
Batch Creation	Center manager can be create batches and take live attendance	13151	6965	621

Implementation

Implementation Coverage achieved

Our targeted goal: To Train all eligible youth in 14-35 age group in the trades of their preference, provide facilities for acquisition and upgradation of skills of the unskilled and semi-skilled workforce, enabling Provision for the vulnerable section e.g. women, pwd and minorities etc.

We have implemented the training programme into whole Uttar Pradesh. Our skill center has been established at Tehsil level and we have planned to establish the center at block level.

Improvements / Enhancements

By using the technologies, we have complete successful trainings of 244387 candidates in last one year and for next year, we have plan to train 793500 candidates in next one year. Also, in upcoming year Mission will integrate with Skill India Portal, Govt. of India, Aadhar Integration, CM Darpan Dashboard, eDistrict, Udyog Bandhu.

ENABLER

Processes Re-engineered

S.N.	Process	Previous of Automation	After Automation
1	Real-time monitoring	There is no proper mechanism for monitoring at various level. If state program management Unit require some reports, they communicated to all districts by mail or phone and collect reports and merge them. This process was very time consuming and lots of paper work required.	Reduce paper work and develop online real-time monitoring at state and district level. UPSDM portal facilitate to all stakeholder to monitor their process. We have provide login to all DPMU's and SPMU administration, Training partners, steering committee on district administration. They can review their targets and achievements at various parameter, as: District wise,

			Tehsil wise, TP wise, sector wise and Gender Wise etc.
2	Attendance	Took manual attendance	Take biometric attendance, Now we have implements Live attendance with Geotagging through mobile APP.
3	RPL Scheme	All RPL targets assigned manually to training partners and TP register candidate manually by filling forms.	We have started the online registration for RPL candidate and also provide end to end online solution for RPL Scheme.
4	Assessment	TP send assessment request by mail or other portal. There is no integration between UPSDM portal and Assessment portal. It create many issue of data feeding and time delay.	Integration with skill India portal reduce the assessment delay. Now, training partner can send assessment request from UPSDM portal and View Candidates result from portal. Candidate can also view and download their results through their logins.
5	Invoice generation and payment	Training partner and Assessing body prepare their invoice offline and submit their invoice manually. There is no mechanism to monitor the process and payment.	We have implement online payment system. Training partner and assessing body can generate and submit invoice online and get payment. They can monitor their whole payments process. At the time of submission of invoice all related Formats also forward automatically with invoice. It helps department's officers and other stakeholders in monitoring and processing of payments.

Technologies

- Modular approach to the Portal development
- End to end online solution
- Modular provisions to incorporate scheme guideline changes
- Integration with Skill India portal for assessments
- Integration with Sewayojan portal for providing the placement opportunity to student
- Portal assists the state program management unit (SPMU) and 75 District program management unit (DPMU's) in monitoring of the programme on a daily basis.

People

Capacity Building:

The Portal has enabled capacity building for the mission by upgrading relevant IT skills. The Officials and District Program Management Unite have upgraded themselves to keep pace with the technology and are satisfactorily serving the state with the help of UPSDM Portal.

Leadership Support:

The Leadership of the department has been provided with various reports from the

UPSDM Portal, which has augmented their decision making along with providing valuable inputs for policy making. There is a periodic review of all the processes and inputs from all the stakeholders are taken and if required necessary amendments to the process are done.

VALUE INDICATORS

Learnings for sharing

There have been several rounds of capacity building workshops, seminar, meetings, on-the-job issue resolution for the Mission staff at State and District Level and all the other stakeholders of the Mission programme. With the help of UPSDM Portal, Mission minimizing the administrative intervention enhancing citizen centric services.

Digital Empowerment

The portal is accessible to all stakeholders to suit their own requirements. From the point of view of the youth it has free registration module for registration for training. It has digital instructive module, which a youth with minimum computer literacy may also use with case.

In provides access to all the stakeholders irrespective of their locational profile. It is aimed to provide access and opportunity to all and everybody irrespective of any location and other reservations without any investment and possession of resources or privileges

Green e-Governance

With the UPSDM Portal through its technology Partner NIC, Lokbhavan, UP is E-waste (Management) Rules, 2016 Compliant. UPSDM has reduced the usage of paper significantly, which was widely used, when the process was manual as all Communication, Collaboration and Integration was done through written communication.

The reference portal develops an online interface between the Mission and the stakeholders and reduces the need of documents or invoice submission in hard copies, saving use of paper and thereby resolving the problem of its disposal.

By providing a complete end to end digital alternative, it moves towards promoting a new age tech savvy environment where the process of automation would do away with the archaic model of governance.

The Mission and stakeholders which were ought to consume great heap of paper and other gadgets would be able to bring down their consumption to a considerable extent thus saving the environment and also mitigating the menace of problem of disposing the waste material.

Shri Kunal Silku, **IAS**, *Mission Director, Uttar Pradesh Skill Development Mission, mdssdm-up@nic.in*

Shri Rajeev Kumar Yadav, *Assistant Director, Uttar Pradesh Skill Development Mission, dde2.lu-up@gov.in*

Shri Hemant Arora, *Technical Director, NIC, Lokbhawan, Lucknow, hemant.arora@nic.in*

Te-POLL- Election Management System

Telangana State Election Commission (Telangana)

C Partha Sarathi, Purushottam Maramamula and Rajendra Nimje

PROJECT OVERVIEW

Vision & Objective

To establish a State wide integrated e-Governance Solution for Election Management System of Local Bodies in the Telangana State that enhances efficiency in transactions, effectiveness in control, transparency in operations, accountability at all levels, sustainability in the long run and convenience to all the stakeholders in the Election Ecosystem.

The principal objective of this initiative is to ensure effective management of the processes relating to elections of rural and urban local bodies and help ensure fair election of peoples' representatives.

Te-Poll is a comprehensive e-Governance solution involving both modes of web and mobile is developed and deployed by CGG. The Te-Poll covers the major domains of preparation of draft and final voter lists, Online nomination of candidates, Support for finalizing candidates list, Downloadable Voter Slip for all voters, Randomization of Polling and counting persons, Publication of results and Expenditure monitoring, EVM management etc.

Manual process is prone to errors in preparation of voter rolls, voter slips and randomization of polling personnel leading to complaints from the Political Parties and Voters. Also, manual preparation of the Electoral Rolls used to take 10-12 days of time and the Government had to allocate sizeable funds and manpower. Election machinery's time was mostly spent on preparation of rolls thereby losing focus on grievances on various activities which are equally crucial for the success of elections.

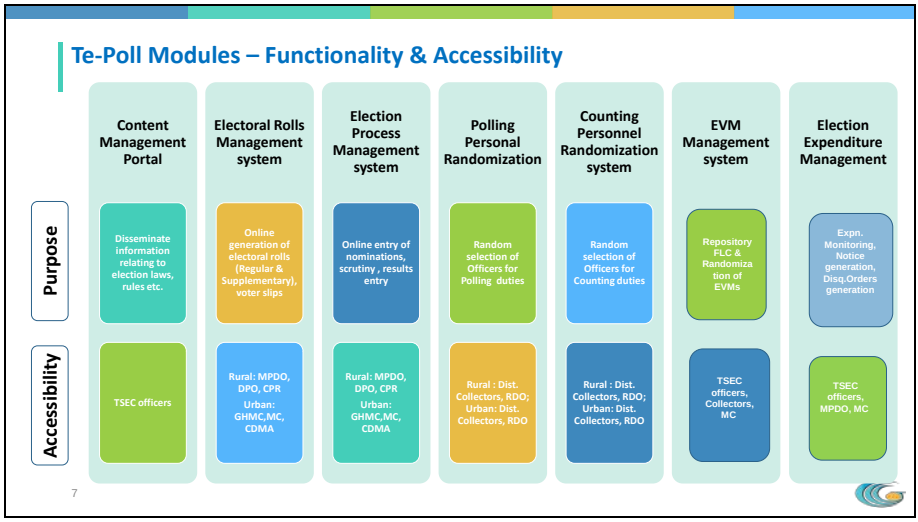
Telangana State Election Commission (TSEC) conducts elections to Rural & Urban Local bodies in the State in 5 years. Before the implementation of e-Governance Solution, there were several challenges in terms of error prone Electoral Rolls and tremendous efforts to publish the same, information gaps to the voters and political parties, influenced randomisation of polling & counting personnel and decision making based on non-real time data etc due to the manual implementation of Elections.

For State Election Commission, Te-POLL has completely transformed end to end election process for the voters, candidates, officials and political parties. Now Contesting candidates can file their nominations, affidavits and expenditure details online. There is a drastic reduction in the workload of District & field level officials and they have time to handle the grievances filed by the voters and political parties. On the other hand, citizens are now feeling digitally empowered, check their updated information from the system and can download voter slip using Te-Poll mobile app.

The Te-Poll covers major domains of Generation of draft and final voter lists at GP level, Online nomination of candidates, support for finalizing candidates list, online Voter Slip for all voters, randomization of Polling and counting personnel, EVM management, Dashboard and MIS for Election Commission and District Election officers, publication of results and expenditure monitoring.

Functional Scope

Some of the innovative modules developed in Te-POLL e-Governance Solution are:



Electoral Rolls Generation module

- Te-Poll maintains a common database of all the unique voters which is a 'Single Source of Truth' for all the stakeholders. Duplicate voters can be easily detected and removed from the system.
- Te-Poll facilitates online generation of electoral rolls both in Telugu and English at a click of a button. This has reduced electoral rolls preparation cycle time from 10-12 days to less than 30 minutes.
- For Electoral Rolls generation, TSEC obtains Electoral Data of recent Assembly elections from CEO of the State. Te-Poll maps the Assembly data to Mandals (Blocks). The concerned Mandal (Block) Development Officer maps the Electoral Rolls data to the concerned GP ward (Booth wise) & District Panchayat Officer confirms/validates the ward wise Electoral Rolls through Te-Poll.
- Te-Poll generates bilingual (Telugu & English) draft and final Electoral Rolls which are published online apart from in Gram panchayat buildings
- Online Electoral Roll generation has immensely helped the Government to deliver the services efficiently in the transparent and speedy manner and helped in reducing the wastage of paper
- The enhanced reach of online draft and final Electoral rolls provided enough time to the political parties and voters to approach authorities for rectification of errors.

Download of Voter slips

- Citizen can download Voter Slips through web portal or mobile application conveniently as Te-POLL is highly user friendly.
- This service has reduced the transaction cost and information asymmetry among the stakeholders and ensured 'Right to Vote' of common citizen.

Voter slips are provided for mapping the polling booth and easy identification of serial number in the voter list. Political parties provide voter slips to voters which can influence voters. Election Commission through Te-Poll has provided online Voter slips on its website and on the Mobile App. The complete voter slip process is made fast, reliable and transparent. It also reduced the transaction cost and information asymmetry among the stakeholders.

Polling and Counting personnel randomization

- The allocation of polling and counting personnel to various polling and counting stations is done through Te-Poll based on election rules, resulting in accountability, transparency and accuracy without any manual interventions and bias.
- District Collector obtains list of employees to be assigned for election & counting duties and upload employee's data in the Te-POLL system. For Polling Staff randomisation, system will segregate and group employees based on their pay scale and designation into Presiding officers, Assistant Presiding officer and Polling officers. System will randomly form polling team and counting team and map with the Polling stations incorporating all rules. Thereafter, Te-Poll will also generate and print individual orders and team orders saving huge amount of time.
- This module is quite innovative on account of transparency, accountability and reposing Trust in Government systems

Achieving true randomization of polling personnel was a big challenge due to multiple constraints of geography of work and nativity, gender consideration and distance of travel for this machinery to polling and counting booths. The proximity of grass root political party workers with the polling officials in some cases led to allegations and counter allegations of bias. Te-Poll is providing rule-based randomization of polling and counting personnel without giving a chance of manual intervention and hence ensuring total transparency. It also generates individual and team orders saving enormous time

Election Process Management System

- End to end management of Election Processes
- Online entry of nominations by the contesting candidates, scrutiny of the nomination, publication of final list of candidates etc,
- Te-Poll provides publication of election results which is used by the State Election Commission.

Decision Support System

- Dashboard, MIS Reports and Analytical report (Graphical &text based) are available in real time for effective decision making by the State Election Commission and District election machinery for conduct of elections. Dashboard online tracking can be drilled down into the granular levels and are colour coded based on the stage of the election process
- MIS reports are for close monitoring of election process such as vacancy identification, notification, results declaration etc.
- Analytical reports also generate alert to officials of Election Commission and District officials to take up timely discussions with the Stakeholders.

Real time dashboard has put TSEC in commanding position for effective Management of Election Process in the Telangana State. Telangana State Election Commission, Panchayat Raj Departments, Municipal Administration & Urban Development Department, District Collectors and Block, Ward and GP officials have used Te-POLL real time Dashboards, MIS reports and Data Analysis for effective decision making and monitoring during the Gram Panchayat Elections up to the grass root level. Real time dashboards have put the TSSEC in commanding position for tracking all processes.

Face Recognition System

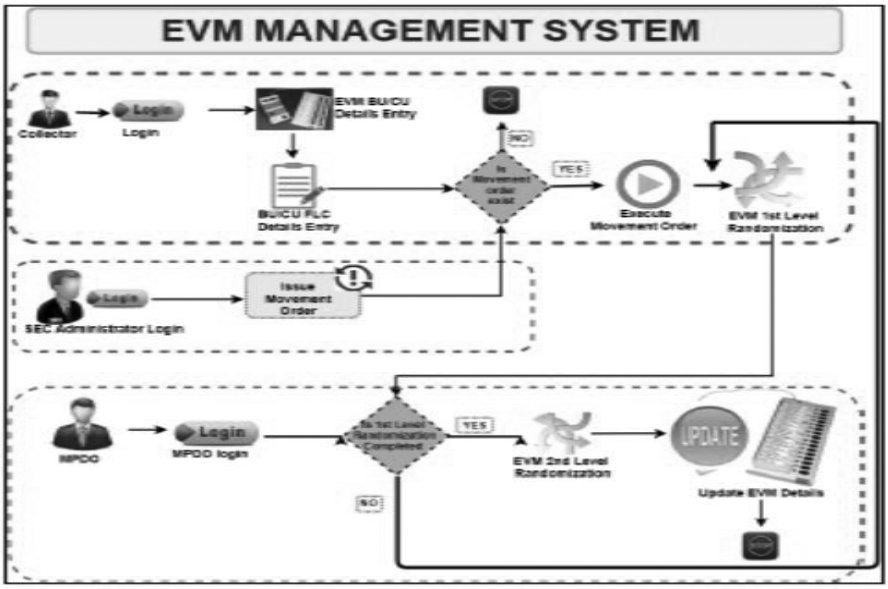
Telangana State Election Commission has used innovative emerging technology based on 'Face Recognition System' in order to counter

impersonation by the voters on a pilot basis in 10 polling stations in the State.

Electronic Voting Machine Management

EVM management sub system consists of the following

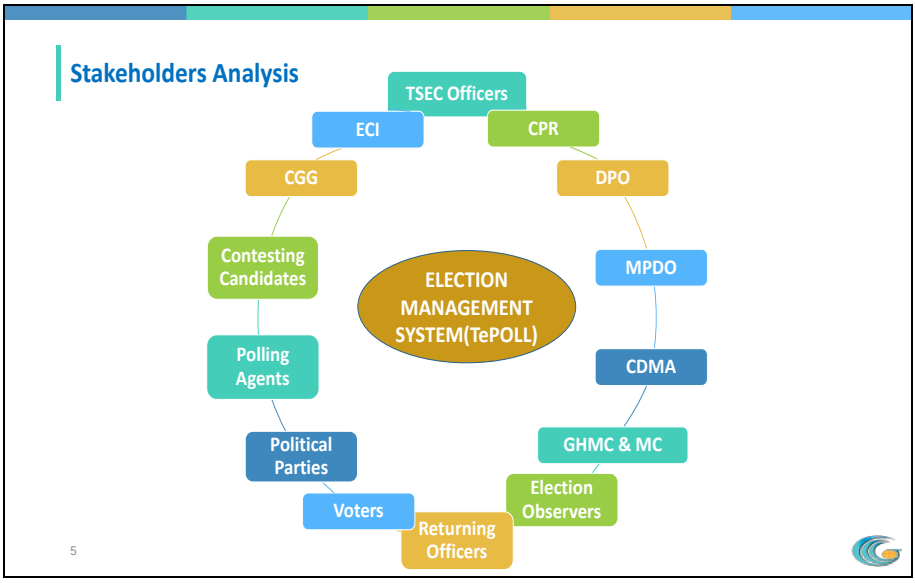
- Creation of EVM database
- Transfer of EVMs to the Districts Election Authorities
- Randomisation of the EVMs



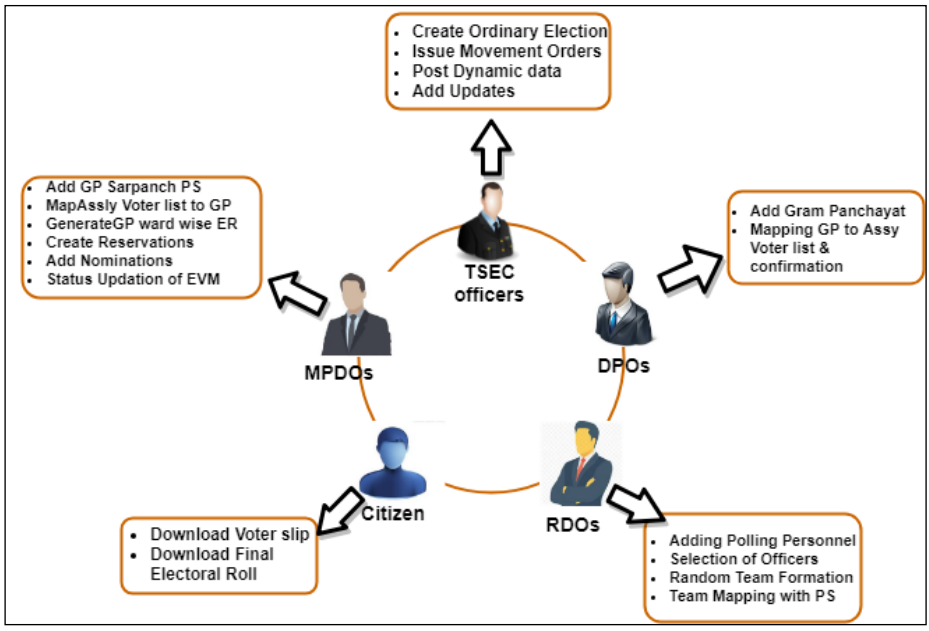
Geographical Scope

All the Voters residing in rural and urban local bodies of Telangana State

Key Stakeholders of Te-Poll



Key Stake holders: Citizens (Voters) ,TSEC officers, District Panchayat officers, CEO ZPP, MPDOs



Benefits

The impact of Te-Poll was felt by 1.6 Crores Voters, all political parties, Panchayat Raj & Rural Development Department, Municipal Administration & Urban Development Department, District and Election Commission officials etc. It has completely transformed the election processes for highest order of reliability, efficiency and trust. Now Contesting candidates can file their nominations, affidavits and expenditure details online. There is a drastic reduction in the workload of District & field level officials and they have time to handle the grievances filed by the voters and political parties. On the other hand, citizens are now feeling digitally empowered, check their updated information from the online voter list and can download voter slip using Te-Poll mobile app.

Te-POLL software was used in the following Elections

- Gram Panchayats during January 2019
- MPTC/ZPTC during May 2019
- Urban Local Bodies during January 2020

The outcomes of Te-Poll are highly encouraging for all the stakeholders in the Elections Ecosystem. Elections were scheduled in three phases and the 3rd phase recorded 88% turnout of the voters. Some Districts have witnessed more than 90% of the voting during GP Elections. The following are the significant achievements of Te-Poll:

State Election Commission

- Implemented end to end seamless Election Process Management for Gram Panchayat Elections 2019 for 12,751 Gram Panchayats (GPs) with 1,13,354 GP Ward Constituencies and 32,045 Polling Stations
- Successfully generated bilingual draft and final electronic Electoral Rolls of 1.6 crores voters for 12751 Gram Panchayats
- Successfully implemented system driven randomisation of Polling and counting personnel leading to total transparency in conduct of elections
- Successful generation of Voter slip downloadable through mobile APP in remote areas

- Enforcement of standard statutory formats and procedures for publication of Electoral rolls across the Telangana State
- Effective monitoring of the election process from Election Notification to Results declaration
- Facilitated the Election Observers to submit online reports
- Taken timely action through real time Dashboards, MIS & Data Analysis
- Provided better Services to all the Stakeholders especially Citizens & Government
- Te-Poll helped TSEC in conducting 'free & fair' Gram Panchayat Elections in the State.

Functional Departments (PR&RD & MAUD)

- Addition, Deletion, edit in the electoral rolls was carried out through TePOLL only.
- With Electronic Electoral rolls, District & Block officials have had more time and energy to handle other important Election related activities such as Grievance redressal etc
- After final publication, user can download entire Electoral list (for that particular Gram Panchayat) in PDF format with voter photo and without voter photo. This has helped in massive saving of paper and also carbon credits
- Facilitated Government to generate Electoral Roll in one minute.
- Drastic reduction in the workload of District & Block level officials.
- Facilitated Officers to take timely action through real time Dashboards, MIS & Data Analysis
- System based 'Central rule bound' automation of randomization of Polling and counting personnel selection in 1 minutes
- This online random allocation of polling & counting personnel of apprx. 1,40,642 employees have helped in removing personal bias and made the system more robust without any manual interference.

Political Parties and Contesting Candidates

- Facilitated with the timely publication of online draft and final Electoral Rolls and providing opportunity to parties to take care of inaccuracies in the rolls, if any.
- Facilitated the Contesting Candidates to file online nomination, affidavits and submit the same to the returning officer
- Facilitated to submit online expenditure details etc.

Voters

- Ensured 'Right to Vote' with the timely publication of online Electoral Rolls and providing opportunity to voters to take of inaccuracies in their record, if any.
- Tremendous saving of Time and facilitated the Voters to download voter slips from mobile application in 30 seconds.
- Citizens have located nearby polling stations through 'locate your nearby polling station' through mobile application during elections.

Accomplishments

- Paper on Te-Poll was published in the compendium of DARPG, GoI
- Te-POLL has received e-INDIA Awards in December 2018
- Telangana Democracy Award in January 2020
- Te-Poll was highly appreciated by various State Election Commissioners in the 'State Election Commissioners Conclave' held on 9th-10th

January 2020 at Hyderabad and various States such as Gujarat, Punjab, Maharashtra and Bihar have shown their interest to implement this e-Governance Solution in their States.

Current Status

- Te-Poll is planned to be used in Greater Hyderabad Municipal Corporation Elections in December 2020.
- CGG is working in close coordination with Telangana State Election Commission for the customization/modifications in Te-Poll apropos to GHMC Elections
- TSEC is planning to implement Facial Recognition System in 150 polling Stations on an experiment basis
- TSEC is planning to conduct online 'e-Voting' for Physically handicapped, senior citizens and polling personnel as a pilot project on experiment basis. Online e-Voting will use Blockchain Technology.

CGG has its own Data centre and near line Disaster Recovery Centre with STPI, Hyderabad.

Technology Stack for Web based application of Te-Poll:

- *Application development:* Te-Poll for Rural Local Bodies is developed using open-source Java Technologies i.e., Java Development Kit version 1.7, Java server pages, Jquery, Ajax, Java script, Servlets, JDBC, Struts frame work, My Eclipse 10, CSS, HTML 5 for the UI development.
- *Database:* MS SQL server 2012 database is used for storing and retrieving electoral data. Postgre SQL 9.3 database is used for generation of dash board reports and various analysis reports.
- *Operating System:* Windows 10/ Red Hat Linux Enterprise edition 5.0(RHEL 5.0)
- *Web Server:* Apache Tomcat 7.0

Technology Stack for Mobile based application of Te-Poll:

- *Mobile Application:* Android
- *Database:* The application has a built-in database, designed and developed using Postgre SQL 9.3 and MS SQL server 2012 version.
- *Operating System:* The application runs on Windows/ Red Hat Linux Enterprise edition 5.0(RHEL 5.0).
- *Web Server:*The hosting of applications is done using Apache Tomcat

Hardware: RAM: 32GB, CPU Cores: 16.

Note: CGG is maintaining approximately 4 TB of Elections Data @CGG Data Centre

Te-POLL application is Security Audited by CERT-IN empanelled agency

CGG, as the technology partner, has its own data center and uses information technology to quickly and effectively process information. CGG processes information and stores large amounts of data in its state-of-the-art datacenter at its premises.

- An information technology disaster recovery plan is being implemented by CGG in conjunction with the business continuity plan. Priorities and recovery time objectives for information technology are developed during the business impact analysis. Technology recovery strategies are developed to restore hardware, applications and data in time to meet the needs of CGG business recovery.
- Centre for Development of Advanced Technology (CDAC) has prepared Security Policy for the Data Centre of CGG

- CGG is certified with ISO 27001:2013 for establishing, implementing, maintaining and continually improving Information Security Management System (ISMS)
- CGG uses the following technologies for Disaster Recovery and Business Continuity:
  i. Data Centre-Disaster Recovery replication between and within the same Data Centre at the storage level with latest technologies such as "HyperSwap" for high-availability of services to the Government and the citizens.
  ii. Near line Disaster Recovery Centre is set up at Software Technology Park of India (STPI), using OEM proprietary technologies with VMWare for high-availability of services to the Government and the citizens. The Disaster Recovery Centre for CGG's Data Centre, is equipped with state-of-the-art Hardware, Software and Control Infrastructure, to achieve optimum operational performance, safety and security.
  iii. CGG Business continuity is achieved by VDI (Virtual Desktop Infrastructure).
  iv. CGG has its own infrastructure of power source, for its Data Center and a renewable energy source through solar plant is being set up @CGG Gachibowli office.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Services relating to Electoral Rolls preparation	These services help the TSEC officers to prepare the draft and the final electoral rolls and publication of the same. *Benefits Accrued:* Time saved in manual preparation of electoral rolls and analysis of results by the officials. This has resulted in increased focus to other pain areas and grievances during the election process	37	40	42
Services relating to Election process management	These services help the TSEC officers in assimilating and understanding the information during election process i.e., from nominations to results declaration. *Benefits Accrued:* Centralized electoral database with on-line database management system made the Election Process transparent and efficient.	40	45	48

Services relating to Randomization of polling & Counting personnel	These services help the TSEC officers to randomly select and allocate polling personnel (Presiding officers, APO and other polling officers) to Polling Stations identified for the purpose of elections. *Benefits Accrued:* Database of all eligible polling personnel were maintained in electronic format, which has facilitated computerized randomization. Printed duty slips were given to each polling personnel. Randomization helps remove biases.	9	11	13
Services relating to Electronic Voter Machine Management (EVM) management	These services help the TSEC officers for effective management of EVMs available in the State. *Benefits Accrued:* Issue online movement orders. The software is made totally error free and more user-friendly. The accuracy of this service helps in preventing result tampering and bogus voting.	9	11	12
Down load of online Voter Slips (bilingual) through Web & Mobile based Te-Poll	These services have helped the TSEC officers, Field officers and Citizens to access and generate Voter Slips. *Benefits Accrued:* The complete voter slip process is made fast, reliable and transparent and accessible to all the Voters. It also reduced the transaction cost and information asymmetry among the stakeholders and ensured the '*Right to Vote*'.	1.3 Crores	1.6 crores	85.6 Lakhs

Implementation

Geographical Area

- The Urban Local Bodies Elections through Te-Poll were conducted in all the ULB Wards etc in the Telangana State in the past 2.5 years.
- The Rural Local Bodies Elections were conducted in all the Gram Panchayats in January 2019 in the Telangana State.

Functionalities

- All the functionalities developed in Te-Poll are implemented in both the Urban Local Bodies & Rural Local Bodies Elections through Te-Poll.
- EVM randomization module was developed by CGG but are not used due to ballot paper-based elections

Delivery Channels

- Te-Poll is broadly a web-based application for the efficient functioning of various modules by the TSEC & Field Officers
- Voter Slips download facility to 1.6 crores of Voters is available in Web based Te-Poll as well as its mobile application

Category of Stakeholders

- All Categories of Stakeholders are covered in the implementation of Te-Poll as described in detail in Section 3.1

Improvements / Enhancements

Following *improvements are made in the modules in the last 1 year*:

- The randomization of Polling Personnel.
- The randomization of Counting Personnel.
- Postal Ballot Management System.
- Management of Expenditure Details of the contesting candidates.
- Dashboard and Data Analysis.
- Implementation Face Recognition System in 10 Polling Stations by TSEC.

Following *improvements are proposed during the upcoming Greater Hyderabad Municipal Corporation Elections in 2020*:

- CGG is working in close coordination with Telangana State Election Commission for the customization/modifications in Te-Poll apropos to GHMC Elections.
- CGG is using *AIML chatbots* in the Te-Poll for the ease of interactions of Te-Poll with 85 lakhs of GHMC voters.
- TSEC is planning to implement *Facial Recognition System in 150 polling* Stations on experiment basis.
- TSEC is planning to conduct online *'e-Voting'* for physically handicapped, senior citizens and polling personnel as a pilot project on experiment basis. Online e-Voting will use Block chain Technology.

ENABLER

Processes Re-engineered

Earlier, there were considerable challenges due to manual preparation of Electoral rolls, leading to inaccuracies and the time taken for the preparation of Electoral Rolls was 10 to 12 days. In the manual system, expenditure on manpower, paper and other requirements was high. Due to manual implementation of Elections and translucency at the Gram Panchayat level, there were plethora of complaints, court cases and grievances given by the voters and political parties.

The manual processes that had existed for the generation of electoral rolls, generation of voter slips etc. are replaced by automated processes through Te-Poll and have resulted in saving of time, cost and resources. The automated generation of electoral rolls helps officials with easy availability of information resulted in increase of efficiency of officers engaged in the election activities by dedicating more time in effective monitoring. The Election processes are also re-engineered to remove human interference by randomization of polling and counting personnel to ensure transparency and accountability.

The following process improvement methodologies and areas are given below which are achieved by using Te-Poll e-Governance Solution:

- Identified process improvement areas through brainstorming sessions with the stakeholders of the project. The overall objective of the process transformation was to cut down the redundant processes and avoid

physical touch points or manual interventions throughout the Election Management Process in the Telangana State.

- Standardization of Electoral Roll generation procedures across all the districts in the Telangana State through Te-POLL. Earlier different districts were adopting different processes etc.
- Modular design approach and reengineering is in place. This re-engineering process involves source code translation, reverse engineering, program structure improvement, program modularization and data re-engineering. Re-engineering involves adding effort to make it easier to maintain and reorganize data structures.
- Te-POLL is designed and developed as bilingual (Telugu & English) web & mobile solution. System is designed and developed as a user friendly system by keeping Citizen Experiences in mind (especially voters in the rural areas).
- System is Contactless, Paperless and Seamless as per Digital India guidelines.
- All the stakeholders are seamlessly connected with the system as per their user access and privileges.
- Using the Te-Poll, Electoral Rolls draft and final were published on TSEC web portal. This has resulted in increased transparency, improved governance and trust of general public/voters on the Government.
- Errors and duplicates during the preparation of Electoral Rolls are eliminated due to online system designed on the premises of 'Single Source of Truth'.
- Time for preparation of Electoral Rolls are reduced to 30 minutes at Gram Panchayat Level from 10 days
- Huge savings in resources and funds as data is created and saved in electronic format and enormous reduction in the paper wastage.
- Search & retrieval of records is quick online, leading to increased savings in time and money.Poll and counting personal randomization and allotment letter generation is done online within minutes. This has increased the efficiency of State Election Commission and functional Departments.

Challenges & Pain points before Te-POLL	**Business Process Re-engineering initiatives taken by TSEC (Enablers)**	**The Current Systems based on Lessons Learnt, Best Practices studied and institutionalizing of Enablers and Sustenance plan for Continuity**
No uniformity of procedures in preparation of photo Electoral rolls, leading to inaccuracies and inefficient system	Uniform instructions in the form of guidelines are issued to all the related offices in the Divisions, Mandals/ Blocks, Gram Panchayats, GP wards by the Telangana State Election Commission for the transparent and fair conduct of Rural Local Bodies Elections. Te-POLL e-Gov Solution for Rural & Urban Local Bodies Elections is designed and developed based on these uniform instructions. The Te-	Bilingual Photo Electoral Rolls (ER) generation procedure is standardized across the Telangana State up to Gram Panchayat ward level.

	POLL system ensure the *uniform adoption of procedures, formats and practices across the state of Telangana*	
Time taken for the preparation of Electoral Rolls was *10-12 days*	TSEC had series of meetings with the stakeholders of the system to work out the redundancies & issues involved while preparing the Electoral Roll manually. Accordingly, TSEC *has designed improved business processes for the Electoral Roll generation through Te-Poll.*	Time taken for preparation of Photo Electoral Rolls is cut short *from 10-12 days to 30 minutes.* Standard electronic templates are in use across the State of Telangana ensuring accuracy.
Instances of *mistakes and duplicates* in the final Electoral list	These use cases of mistakes/errors w.r.t mistakes and duplicates were discussed with CGG by TSEC in order to ensure that the system should take care of the same.	System is designed and developed in such a way that *100% Error free Electoral Roll* generation had taken place.
Huge amounts of resources and funds spent, leading to *loss of time and money*	*In 12751 Gram Panchayats, apprx. 3-4 resources* used to prepare the Electoral Rolls *for 7-10 days*. This is coming to apprx. *3,82,530-man days* of efforts with a costing of apprx. *Rs. 30 crores towards their Salaries*.	*Huge savings in terms of resources & time* now. All these resources are now spared from this hectic manual Electoral Roll Preparation and are available for other important election works of Gram Panchayat/ULBs. *Huge savings in terms of funds* as data is created and saved in the electronic format and is real-time based on single source of truth.
Huge amount is required to spend towards *stationary & printing charges.* This is because, as per existing procedure, Electoral rolls have to be communicated in multiple copies to all the registered political parties	There was substantial use and wastage of Stationery and Xerox. *The acceptability w.r.t use of electronic form of Electoral Roll.*	The *Stationery & Xerox printing cost is almost reduced to half* as the digital copy of the electoral rolls Gram Panchayat ward wise and Polling Station wise made available online free downloadable format from the Telangana State Election Commission portal for use of the contesting candidates, political parties and Voters spread across the Telangana State. This facility of downloading electoral rolls is provided to stake holders in advance during pre-election phase itself resulting in more transparency and awareness. With this facility voter need not to search for

		polling station where to cast vote.
Plethora of *complaints, court cases and grievances* filed by voters, further increasing the process time	These complaints, grievances etc were discussed thread bare by TSEC with CGG. Based on the pain points & challenges, CGG has designed Te-POLL *to weed out possibilities of complaints, grievances* more related with the anomalies in the Electoral Rolls	Electoral Rolls are straighten out and generated with 100% accuracy. Zero complaint, court cases and grievances filed by the voters, contesting candidates or by Public during the Rural Local Bodies or Urban Local Bodies Elections in the State of Telangana.
Lack of Transparency and trust as rolls were controlled at GP Level by local officials.	The Te-POLL system is designed and developed with the following aspects: *Single source of Truth* *Real-time availability of Information* to all the Stakeholders of the system *No provision to manipulate with theElection Data.* It is accessed with restricted access and privileges	Using the Te-Poll, Electoral Roll is published on the TSEC website. This led to increased transparency, efficiency, Convenience to the Stakeholders and finally TRUSTS among the general public/voter.
Electoral Rolls were stored in hard copy format i.e., paper. This had reduced lifetime compared to digital.	As per TSEC rules, these records are permanent record and therefore need to be stored. This takes a lot of space and incurring huge amount on stationery.	*Electoral Rolls are stored in electronic formats* without any physical requirement of space.
Search & retrieval of old ER takes huge time and resources.	This issue was discussed with the stakeholder's consultation meetings and accordingly Data design, *backup & retrieval policies were formulated*	Search & retrieval of records is quick online, leading to increased savings in time and money. For the *retrieval of legacy data, Daily Backup is maintained and the Data is stored in Disaster Recovery Centre to avoid any data losses.*
Randomization of polling & Counting personnel along with generation of allotment letters is a manual process, consuming time and resources. The manual process had lot of scope of *manipulations,*	The manual process for the polling and counting personnel randomization used to take 20 days of time with 3-4 resources per Mandal in 539 mandalas along with generation of appointment orders. *Introduction of Rule based randomization of Polling & Counting Personnel*	Polling & Counting personal *randomization and appointment letter generation is done online* within minutes and with increased accuracy and without any manipulation and is rule based. With TePOLL there is a saving of *43,120-man days with an approximate cost of Rs.3 crores*.

exclusion of employees from the Election Duty.		
Sustenance Plan for Continuity	Requirement of *Centralized Database with 'Single Source of Truth'* and based on Real time information	Te-Poll Database is residing in *'State of Art' Data Centre @ CGG with near line Disaster Recovery set at STPI Hyderabad ensuring Business continuity*.

Other measures taken in the direction of automate, simplify & standardize the project are as given below:

Dedicated Project Team

- CGG has a dedicated e-Governance Software professional working on web & mobile based solutions as well as new emerging Technologies to develop required applications for departments of State Governments and GoI.

Eliminating Paper Based Processes:

- The need for paper-based processes was eliminated through automation of Electoral Rolls, forwarding of files and generation of proceedings and orders for randomization of polling and counting personnel.
- Eliminating paper-based processes coupled with digital validation results in faster movement of information and ultimately decreases the processing time.
- Reduction in Carbon Footprints and expenditures on stationeries

Driving Value and Action:

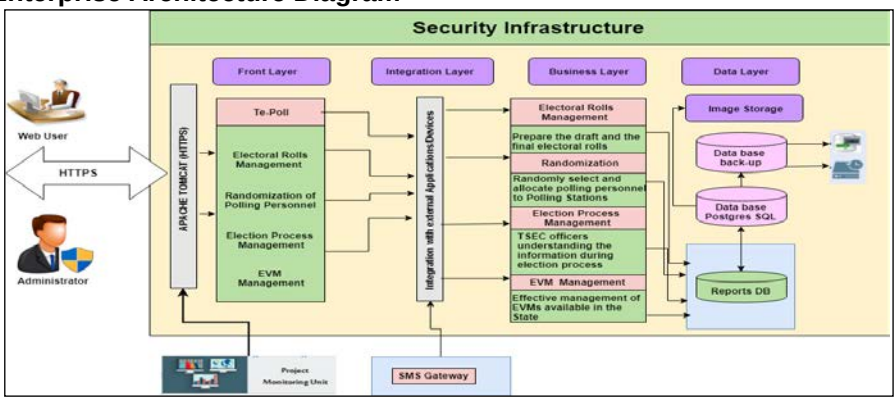
- Comprehensive set of monitoring simplified and standardized reports with drill downs allow users to identify bottlenecks and take corrective action. Complete and precise knowledge of the issue allows for faster remedial action both at the software and implementation end.

Technologies

- *Web architecture* **-** Three tier (Presentation, Application, data tiers) model is used in this software.
- For facilitating the Voters, Android based *Mobile application* is developed for downloading Voter slips

Using 3-tier architecture deployment would have the presentation tier deployed to a desktop, laptop, and tablet either via a web browser or a web-based application utilizing a web server. In addition, the data layer would normally comprise of one or more relational databases.

Enterprise Architecture Diagram



Benefits:

- Open Source, Navigation control is centralized, Easy to maintain, Easy to extend, Easy to test
- Better separation of concerns, Custom class based controlling component
- Full support for internationalization through provision of resource bundles for all the HTML elements.
- Custom Tag libraries for easy integration with existing JSP's
- An elegant way of handling forms related errors

Data Analytics

- Data visualization reports through Business Intelligence tool.
- Graphical representation of reports.

Social Media

- Internal communication is performed through Whats App Group.
- Te-Poll documentary is posted in You Tube
- Video User manuals are prepared

Emerging Technologies

- Implementation of Face Recognition System by TSEC to counter impersonation
- Implementation of AI Chatbots for automated online conversation related to customer service
- Proposed implementation of e-Voting based on Block chain Technology to enable Physically handicapped, Senior Citizens & polling personnel to vote online with ease

Outcome

- Gaps identified through the visualization reports made monitoring easy
- Data driven decision making is enabled for all the services for quick understanding
- Core operations of the application improved for ease of use saves time & paper
- Information, Education and Awareness made through uploading of documents in Social Media and ease of understanding of the system through video user manuals

People

Capacity Building

- Prior to the implementation, awareness was created at individual and organization level on the Te-Poll applications usage.
- Post implementation, trainings were given to all the users of web applications. Training on developed software has been given to all Chief Executive Officers (CEO) of ZPPs, District Panchayat Officers (DPO), MPDO and TSEC officers and user manuals have also been provided in Te-Poll software logins.
- User instruction manuals & video manuals are provided in the Te-Poll e-Governance application for reference
- Helpdesk facility is given for Stakeholders to attend to any queries.

Leadership Support

- Commissioner, Telangana State Election Commission and officials have contributed a lot in conceptualizing Te-Poll as a citizen centric e-Governance Solution apart from TSEC and Field Officials related

components. The Te-Poll software is designed and developed by keeping the citizen experiences in mind.

- CGG leadership has a long-term vision and brainstorm & motivate teams to achieve project goals. This project being very important to the State, Director General, CGG has reviewed the project frequently and guided the team for adoption of relevant technologies during the design and development stage.

Change Management

- CGG has ensured involvement of all the Stakeholders during the entire project life cycle along with communication of clear roles and responsibilities at all the stages of the project. Further, reasons for change were also explained to all the stakeholders, ensured smooth implementation.
- In case of project transition, a customized plan shall be prepared to ensure less impact on the project deliverables. For ensuring continuity, project documents, training and knowledge transfer shall be provided so that the transition is smooth and successful

VALUE INDICATORS

Learnings for sharing

Challenges

- Managing frequent changes in the requirements, for the development of web & mobile based Integrated e-Governance Solution at the eleventh hour
- Working with the end users i.e. section officers/nodal officers and taking them into confidence for getting the necessary data
- Ensuring validity of data with the end users

Opportunities

Te-Poll can be implemented in the other states as Election processes are similar in the country.

Key learning's

- Maintaining frequent change requests in a registry, helped in showcasing CGG team's effort and maintained the required transparency in development
- Chalking out a training plan for the TSEC to explain them about the benefits, helped the CGG team to get the officers confidence on the project
- Modular design achieved through incorporation of new initiatives
- This project tried out new ideas to improve the existing system. The same will be used in upcoming projects.
- Leveraged transparency in communication between TSEC and CGG ensured close collaboration between TSEC and CGG for the success of the project

Best Practices

- CGG had studied similar projects through the secondary research. However, TSEC has showcased this project fit for replication across all the states in the country in 'State Election Commissioners Conclave' held on 9th-10th January 2020 at Hyderabad and various States have shown their interest to implement this e-Governance Solution in their State

- *Helpdesk Facility* - All mail issues related to new features and issues are addressed on the same day
- *Maintaining a requirements registry* – All the requirements along with changes given by the TSEC were maintained online post their approval and continuous updation of SRS. This reduces re-work
- Trainings and workshops conducted on a regular basis on new features in the application software
- *Systematic SMS Alerts* – To alert on pendency and to provide hassle free services.

Use of Disruptive Technologies:

- Implementation of *Face Recognition System* by TSEC to counter impersonation
- Implementation of *AI Chatbots* for automated online conversation related to customer service
- Proposed implementation of *e-Voting based on Block chain Technology* to enable Physically handicapped, Senior Citizens & polling personnel to vote online with ease

Recruitment of right resources:

CGG follows the best recruitment practices which are vital to the project's success. People with talent, multiple skills and relevant experience were identified for this project and from them the right people were assigned the right kind of work.

Selecting the right development process:

The development life-cycle depends heavily on the process implementation. CGG developed well-structured and flexible design documents at the initial stage of development and that is why it could handle change management in software requirements so effectively.CGG team made sure it performed the code reviews and Quality Assurance testing, essential ways of promoting code quality and the desired software output.

Process adoption and sustainability:

A process-oriented approach, in accordance with the *ISO 9001:2015, ISO 27001:2013 & CMMi L3 processes are adopted in SDLC, Information Security Management System (ISMS) etc* for reliable and consistent outcomes and minimization of mistakes.

Digital Empowerment

1.6 Crores of voters are digitally empowered through the System and they can generate their Voters Slip through Web & Mobile based Te-Poll. There is no demographic or cultural barrier in the Telangana State which may impact Te-Poll benefits to the Stakeholders. However, following measures are taken to counter the same:

- *System is Bilingual (Telugu & English)* which covers entire voters base in the State of Telangana and therefore citizens are fully benefited
- *Information, Education & Communication:* TSEC & CGG are training field officers and making available the user manuals (video versions also) to educate the users of Te-Poll so that they can extract the full benefit of the system. This has specifically helped the citizens in downloading their voter ID cards electronically without any assistance.
- *User Friendly System with Ease of use of Te-Poll by TSEC & Department Officials:* As a result of the guidance provided by CGG the Chief Executive Officers (CEO) of ZPPs, District Panchayat Officers (DPO), MPDO and TSEC officers have been able to use the various e-services,

relevant to them, such as Electoral Rolls preparation, Services relating to Election process, Randomisation of Polling & Counting personnel, EVM Management etc. on their own.

Green e-Governance

Reduction in Carbon Footprints

- Preparation of Electoral rolls process is completely digitized through Te-Poll. Electoral rolls are accessible to Department Officials, Contesting Candidates, Political Parties, Citizens through web & mobile applications. This has resulted in humongous saving of papers, manpower, information asymmetry and transaction cost.
- The mobile application for Te-Poll software, developed by CGG, enables citizens to download their voter ID and save it on their mobile. This has also resulted in saving of printing cost and reducing of paper wastage.
- The Stationery & Xerox printing cost is almost reduced to half as the digital copy of the electoral rolls Gram Panchayat ward wise and Polling Station wise is made available online in a free downloadable format

Environmentally Friendly practices

- For Te-Poll the Data Centre is IT Infrastructure CGG uses state of the art IT infrastructure that consumes less power and enhances power efficiency, thereby saving electricity
- CGG uses and disposes *e-Waste* i.e., computers, servers, and associated subsystems efficiently and effectively with minimal or no impact on the environment.
- CGG is in a process of *erecting Solar Panels* to tap Solar Energy as a non-conventional energy for CGG office @Gachibowli.

Shri. C Partha Sarathi, *Commissioner, Telangana State Election Commission (Telangana), sec.telangana@gmail.com.*
Shri. Rajendra Nimje, ex IAS, *Director General, Centre for Good Governance (Telangana), dg@cgg.gov.in*
Shri. Purushottam Maramamula, *Sr.Project Manager, Centre for Good Governance (Telangana), purushottam.m@cgg.gov.in*

Voter authentication through Real-time digital verifiability (RTDV) in Kompally Municipal Elections

Telangana State Technology Services (TSTS)

G T Venkateshwar Rao

PROJECT OVERVIEW

Objectives

Telangana State Technology Services (TSTS), Government of Telangana has developed a document-less governance mechanism that can be used at polling booths to authenticate voters of that particular polling booth. A smartphone installed with T App Folio's custom-built RTDV elections module (T App Folio - flagship m-Governance initiative of Government of Telangana) is used for this purpose. The authentication is performed by the election module using the photo taken over the smartphone using emerging technologies such as Deep Learning, AI, etc.

The voter Authentication system is a first of its kind solution in India and the pilot conducted in Kompally elections in January 2020 was the first live digital voter authentication to ever happen in India. The key objectives of the project were to use a digital means to authenticate voters without having to rely on the traditional method of manually checking the voter ID for each voter. Through this method, the project was looking to bring about the following intended benefits

- Eliminate voter impersonation
- Prevent multiple votes cast by the same citizen using multiple voter IDs
- Protect the voting rights of the rightful citizen
- Minimize the discretion of the Polling booth officer in allowing/ stopping a voter from voting in the polling booth
- Streamline and simplify the voting process

Scope

The project was intended to serve as a POC for future elections across Telangana and the country. And for this reason, the POC was designed as a pilot across 10 polling booths with an electorate of 7000 in the Kompally m unicipal elections conducted in January 2020. Each polling booth has 1400 voters registered in that booth. The photo and anonymized ID (based on the Voter ID) of each voter is uploaded into the system which is segregated into buckets based on the polling booths.

The Polling official captures the photo of the Voter using a smartphone that has the installed RTDV module. The captured photo of the voter is matched with the database of the photos of the 1400 voters eligible to vote in that polling booth using a 1:N matching algorithm. If the system generates a positive match response, he/she is an authorized voter and can proceed to vote. Digital logs of the authentication are stored and can be tracked anytime. The system generates a match response in 2-4 seconds with an accuracy of more than 80%. The accuracy of the authentication can be increased to more than ~100% by ensuring good lighting at the polling booths and ensuring all the citizen photo data with the EPIC department is clean. If there are some failures, the existing manual process of verification using EPIC cards can be used. The matching algorithm ensures that the voter will be matched only in his/her designated polling booth and cannot vote in any other polling booth. The module used a deep learning image comparison algorithm which compared between

multitudes of photos (variations across age of 30+ years, color & black and white photos, different light & background conditions etc) in seconds.
All the data was stored and processed in secure servers in the Telangana State Data Center. Insights drawn from the analysis of data (bogus voters, impersonation of voters etc) were shared with the Election commission within two days for their reference and approval on future implementations. After this activity, the pictures captured for authentication on the election day were permanently deleted.

Key Stakeholders

- Election commission, Telangana
- Electronic service delivery wing, ITEC Dept., Govt. of Telangana
- 7000 strong electorate of Kompally

Software

RTDV is developed using multiple components
For the deep learning-based image comparison algorithm, a cloud-based solution from a Global MNC was used through an API based integration. This solution is currently being used by several countries across the world for facial recognition.
T App Folio is Telangana's flagship initiative mobile App – it is currently being operated and maintained by a 3rd party SP based out of Hyderabad
The hardware and software details of various components are as follows:
Image Comparison

- Cloud based services; API based integration.

T App Folio

- # of VMs: 2; OS: Windows Server 2012 R2 Std Edition 64 bit; RAM: 16 GB; CPU: 4 Processors

Cyber Security

Voter authentication services is delivered on the Elections Module (T App Folio's custom-built module). T App Folio separately has undergone a security audit and hence, there was no requirement of a separate security audit for the elections module as all of the systems being used were leveraged from T App's existing resources.
The audit of T App Folio was performed by Cyber Security Works Pvt Ltd.

Disaster Recovery and service continuity

Since the project contained highly sensitive information, all of the servers and processes were mandatorily conducted within the state of Telangana. All of the collected data was deleted within two days of project completion.
All the standard measures are kept in place for service continuity and disaster management. A dashboard is developed, to monitor service effectiveness and efficiency. RTDV servers are located in the Telangana State Data Center and the Back-ups are taken every day. In case of any disaster, a predefined process is established to restore the data and resume the service in a few hours.
Coming to the service Continuity, in case of any disaster voters can still vote by showing their EPIC card to the polling booth officer.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21

Real-time digital verifiability (RTDV) of the citizen in Kompally Municipal Elections	Authenticates the voters digitally at the Polling Booths			~4500 voters who voted in the municipal elections

Implementation

Implementation Coverage achieved in comparison to the plan / target

RTDV has revolutionized the traditional voter authentication system and has provided election officials a tool to verify the voters accurately using just a smartphone. The target was to screen all of the ~7000 strong electorates through our voter authentication system. The Voter turnout on the day was close to ~4500 and the module achieved a success rate of more than 80% in screening the inbound voters. Due to the ease and success of the solution, it is being integrated with multiple departments for intelligent 1:N facial recognition.

Improvements/ enhancements specifically planned out during next one Year

The solution has been integrated with the Telangana State Election Commission (TSEC), an autonomous, independent constitutional and statutory authority of Telangana. TSEC monitors the work relating to the conduct of General Elections and Bye-Elections local bodies within the state sanctioned by the 73rd and 74th constitutional amendment acts. In addition, TSTS is engaging with other departments, corporations, boards, etc to implement RTDV in areas such attendance system, pensioners identification pilot (1:N matching) to ensure the right beneficiaries are receiving the pensions.

ENABLER

Processes Re-engineered

Before the launch of RTDV, the traditional process of voter authentication required the polling booth officer to manually verify the citizens based on their EPIC cards. This is fraught with problems such as bogus votes and voter impersonation which was reported in almost all elections.

RTDV simplifies the manual, traditional and discretionary process of authenticating a voter by replacing it with a 1:N facial recognition technology which correctly identifies voters and matches them with their voter IDs and eliminates the necessity for the polling booth officer to physically verify a citizen if he/she is eligible to vote in that particular booth. The officer can click a photo of the citizen on a smartphone for verification, making the process seamless and extremely simple. RTDV has automated the processes of,

- Identification of voters registered in a particular polling booth
- Comparison of the photograph taken of the Citizen at the polling booth with the photograph provided by the department against their voter IDs (anonymized in the system)

Technologies

Deep Learning Based Photo comparison (1:N):

The process flow of RTDV requires a check whether the live photo captured from the mobile phone is same as any of the photographs available across the database provided by the election department. The image comparison service needs to be robust enough to work over quickly, across huge volumes (since it is a 1:N comparison), variations, quality of photos, facial modifications across time, colour and light conditions etc.

People

Principal Secretary, ITE&C department of Govt. of Telangana and

Commissioner ESD were the pioneers in identifying the need to revamp the existing process and pioneering a solution that curbs impersonation and bogus votes in elections.

A strong technical team and a competent PMU team were set up and directed by the Commissioner. The PMU team chalked out an overall strategy, work allocation plan and timeline for the project.

Capacity building:

A series of training programs for the user department, campaigns for awareness generation of the initiative are being carried out across multiple media to create awareness among the citizens.

Management of Change:

RTDV was conceptualized with a vision to revolutionize the existing authentication process during elections at polling booths that involved drastic changes in the processes at the department's end. Several product ideation meetings were conducting to understand the requirements of the departments, crystallize the use cases to arrive at a fraud proof solution.

VALUE INDICATORS

Learnings for sharing

Driving Adoption:

RTDV has been a radical revolution in the existing voter authentication process and driving adoption of the new process with the citizens has been challenging due to the novelty of the solution and the wide range of the age group (above 18 years) who have participated in the Kompally elections.

Implementation:

Implementation of the initiative involved training the partner department in the usage of the product and creating awareness among the citizens regarding the ease of authenticating themselves through this application.

Process re-engineering:

Conceptualization of the solution involved process reengineering of an extremely traditional process, it involved discussions with the user departments, multiple technology partners for the solution and development teams to design the solution for the use case.

Digital Empowerment

Technology Inclusion:

The services of this module are for the benefits of all the citizens of the electorate, given that they have registered with the election commission of Telangana. No Voter is discriminated based on cultural, language or demographic differences and all of voters are equally likely to be authenticated through this module.

Green e-Governance

Since the project uses digital means of voter authentication, there is no need to produce a voter slip, take signature of the voter and mark with indelible ink at the polling booth reducing the carbon footprint from voting of the biggest democracy in the world. All of the authentication is carried out digitally. This drastically reduces the amount of paper and printing required in the traditional process.

Shri. G T Venkateshwar Rao, IRS, *Managing Director, Telangana State Technology Services (TSTS) (Telangana), mngdirector-tsts@telangana.gov.in*

Digital Transformation & Automation of Fair Price Shop operations in Public Distribution System

Food & Civil Supplies Department, Uttar Pradesh

Maneesh Chauhan and Sunil Kumar Verma

PROJECT OVERVIEW

Objective

As per guidelines of Government of India (GoI), Food and Civil Supplies Department, UP envisaged automation of Fair Price shop (FPS) operations to bring-in high-level of transparency, accountability and efficiency in their Public Distribution System. The aim was to help them in ensuring distribution of food grains to intended beneficiaries under NFSA and prevent diversion of food grains. In this regard the department initiated the process to automating the sale of subsidized food grains by Fair Price Shops based on Aadhar based beneficiary authentication model. There are around 80,000 Fair Price Shops in the UP and the approximate number of beneficiaries are 14.70 crore (3.58 Crore Households). Total distribution of food grains to beneficiary is around 8 lakh metric ton.

The primary project objective is the implementation of FPS component of E2E computerization of TPDS. The project objectives are as follows.

- Timely and need based food grain allocation.
- Prevention of diversion of essential commodities.
- Induction of transparency and accountability in operations.
- Reduction of stakeholder's grievances.
- Dissemination of the information as per the public requirements.
- Monitoring and quick decision making through MIS generated by the data of PoS device.
- Protecting the interest and empowering the end beneficiary.
- To ensure Government F&CS scheme benefits are delivered only to intended beneficiaries using biometric authentication.
- To record real time information related to the FPS transactions and make them readily available for future planning and analysis.

Functional Scope

- *Supply of ePoS machines and IRIS scanners***:** enabling biometric authentication system to ensure intended beneficiary only gets ration. In addition, to this the aim was to also prevent diversion of essential commodities
- *Development of applications:* use of information technology to bring in digital transformation to the PDS distribution and to become a scalable system that can withstand the load of millions of transactions
- *Stock management*To ensure adequate availability of PDS food grains to the eligible beneficiary in the entire month.
- *Distribution process re-engineering*
  i. This involved beneficiary identification through the Implementation of fool proof and robust Aadhaar authentication mechanism along with the bio-metric, Iris and OTP based options.
  ii. Streamlined distribution cycle, food grain challan direct stock posting to the ePos Machines from the NIC PDS Servers.

iii. Enhanced options for the beneficiaries to feed any missing member Aadhaar details.
iv. Portability implementation to provide freedom to the beneficiaries to avail food grain from any FPS of his choice across the state.
v. Centralized Transaction system having transaction frequency around 150 per seconds i.e. 9000 transactions per minute at peak times.
vi. Distribution data push automation to the Annavitran Portal at the end of each distribution Cycle.
vii. MIS and Mobile App to monitor the Live Transactions and other details.
viii. Implementation of One Nation One Ration Card Scheme to join the National Integrated Management of Public Distribution System i.e. IMPDS club. This helped beneficiaries to avail the food grains across the State Boundaries and in more than 20 States across the India during the Covid-19 pandemic.

- *Feedback and Grievance Redressal Process:* Use of helpdesk system to raise grievances and provide quick solution with a low turnaround time.
- *MIS and Analytics System:* In current system, there is real time electronic record keeping of beneficiary transactions which is available round the clock. This digital record keeping has enabled the department in high level decision making and monitoring the project implementation with use of data analysis and trends.

Geographical Scope

Uttar Pradesh state is the most populous state in India. The vast coverage of Uttar Pradesh food department extends to every single block including total 822 blocks under 75 districts ensuring its reach to every village and rural area. There are approx. 80,092 Fair Price Shops which are spread across 822 blocks in Uttar Pradesh. These Fair Price Shops are the Nodal Point of distribution to the 14.70 crore beneficiaries availing food grain under NFSA Act 2013. Out of 79.66 % population in rural, 75.92% of the rural population and out of 64.43% population in Urban, 53.38% of the urban population is covered under NFSA provisions. These total beneficiaries are further classified as Antyodaya Anna Yojana (AAY) with 40.94 lakhs card and 1.32Cr. beneficiaries and Priority House Hold(PHH) with 3.17 Cr. cards and 13.37Cr. beneficiaries as per NFSA guidelines.

Stakeholders

- Food & Civil Supplies Department, Uttar Pradesh Government
- UPDESCO (Uttar Pradesh Development Systems Corporation Ltd), Dept. of IT, GoUP
- NIC is providing Application support for Ration Card Management, Allocation, Supply Chain Management & Aadhaar Authentication for ePoS devices.
- Ernst & Young LLP (Monitoring Consulting Agency)
- System Integrator for the implementation of FPS Automation in Urban Areas are M/s Oasys Cybernetics Pvt. Ltd (36 Districts), M/s Linkwell Telesystems Pvt. Ltd. (26 Districts) & M/s Integra Micro Systems Pvt. Ltd. (13 Districts)
- System Integrator for the implementation of FPS Automation in Rural Areas are M/s Oasys Cybernetics Pvt. Ltd (49 Districts) & M/s ArMee Infotech Pvt. Ltd. (26 Districts)

Benefits

With the introduction of the Point of Sale (PoS) the distribution and record keeping of 14.70 cr beneficiaries has become easier with increased transparency and cooperation from FPS dealers. Broadly the impact on client and citizens can be summarized as follows:

The impact on client:

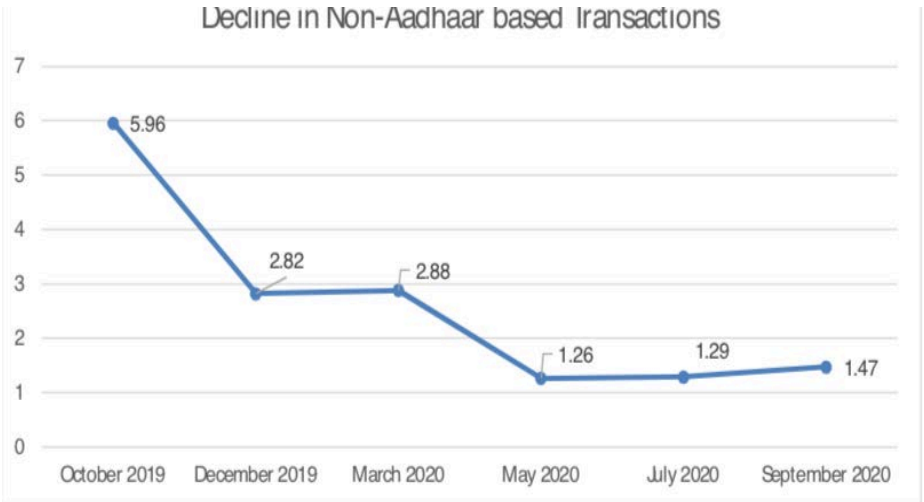
- Digital automation has helped bring in a high-level of transparency, accountability, and efficiency
- Ensures the right beneficiary gets the right quantity at the right price
- Transactions are recorded and receipts issued
- Electronic recordkeeping of transactions
- Enhanced monitoring and utilization of subsidy

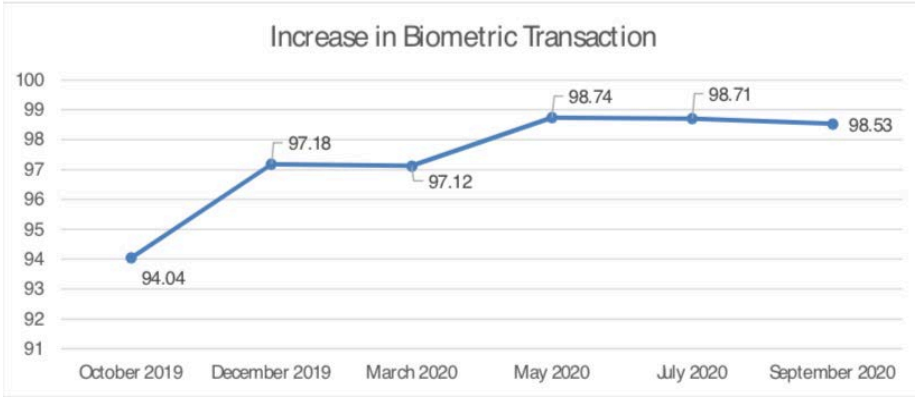
The impact on Citizen

- Timely allocation of food grains to help the needy lead a life of dignity and security
- Biometric authentication used for identification instead of paper ration card

Current Status

- All 75 districts of Uttar Pradesh have gone live with the introduction of PoS devices and IRIS scanners
- 100% distribution of Ration to entitled beneficiary on the basis of Authentication (Aadhaar based or OTP based)
- Around 99% Aadhaar based distribution of foodgrains has been achieved. Highest transactions in a day was recorded at 77 lakhs using Point of Sale (PoS) device
- Helpdesk is available for grievance redressal of FPS dealers
- FCS department has implemented State Level and National Level portability in the state and become part of 'One Nation One Ration Card' scheme.
- FCS department has come up with an inhouse Mobile App for beneficiaries using which they can get real time ration information, navigate nearby shops, file complaint and generate QR code ration card on the mobile application





Software/Hardware

Infrastructure	Server Group 1	**Model** / **Count** DELL EMC VXRAIL E560F — 6 DELL R740 Backup Server — 2 Dell EMC ML3 Tape Library — 1 Dell EMC Switch S4128F — 2
Infrastructure	Server Group 2	**Model** / **Count** Web Server (Blade Server) HPE Synergy 480 Gen10. — 6 Database Server (Blade Server) HPE Synergy 480 Gen10. — 4 Backup Server (Blade Server) HPE Synergy 480 Gen10. — 1 HPE 3 PAR Store Server 8000 SAN Storage — 1
Infrastructure	Supporting Packages	Commvault, NMS, Quickheal, VMware, Microsoft Windows Data Center Edition, Microsoft SOL Enterprises Edition, IIS, Ubuntu, Tomcat, Rabbit MQ Server, Redis, MYSQL, HA PROXY
Application	Technologies	Asp.NET, CSS, JavaScript, jQuery, SQL Server, Windows Server 2016, Web API, JSF, Android, Database - MySQL MONGODB, JAVA, SQLite

Certification (Certifying Agency)

- Infrastructure and applications have been hosted in Secure State Data Center of Uttar Pradesh.
- State Data Center Policies are applicable for security aspects.
- Secure communication with the help of server certificates, SSL and Digital Signature mechanism
- Antivirus and network security are in place.

Disaster Recovery/ Service Continuity

- Regular Backup Provisioning.
- Tape Drives and Backup Servers and storage for the Archiving.
- VMware infrastructure and Load Balancing for the High Availability to ensure recovery and service continuity.
- Templates to create quick Images.

- VMware automation for quick Recovery

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Distribution of Food Grains to beneficiaries using PoS machines	Foodgrain distribution to end beneficiary using PoS machine or Iris scanners. Each distribution results in a transaction which gets digitally recorded.	Approx. 13.9 Crores	Approx. 37.5 Crores	Approx. 43.6 Crores (till September 2020)

Implementation

Organization

- Modernization of Fair Price Shops and use of Point of Sale (PoS) machines, IRIS devices, GPS technology has enabled efficient electronic bio metric authentication of beneficiary, distribution of ration and thus minimizing fraudulent practices and pilferage / diversion if any. The state is recording 100% authentication-based transactions (Out of which around 99% transactions are through Aadhaar authentications).
- Efficient monitoring and evaluation at State, District and Block level which has led to effective implementation of FPS Automation
- FPS Automation of around 80,000 has led 2300 crore savings of savings for the state government till July 2020. These saving can be spent in further improving the lives of the economic backward community through other welfare schemes. The project will also lead to improved efficiency and productivity benefits with enhanced monitoring and utilization of subsidy amount which will allow department to serve even more beneficiaries thereby increasing the total number of households covered and benefitting the FPS dealers as well.

Citizen

- Bio metric authentication has ensured that the right beneficiary gets the right quantity at the right price
- Digitization of PDS in Uttar Pradesh has provided significant convenience to beneficiaries as the automated system ensures quick distribution of food grains which has minimized ques to a great extent
- Dedicated helplines and mobile application have made lodging of complaints, giving feedback easier for beneficiaries

Other stakeholders

- *FPS dealer*
  i. Public distribution process has ensured timely disbursement of dealer commission and effortless recordkeeping
  ii. Automation of FPS has secured the future of both the economically backward community and the FPS dealers and is able to bring in strong sense of responsibility among the community members.
- *Manpower Deployed for execution of Project:* These innovations have created the direct/indirect employment of more than 1,000 manpower of the state. This manpower is working at various level till block level to resolve the field level issues and monitor the project efficiently.

Improvements / Enhancements

- *National Portability:* Uttar Pradesh enabled state-wide portability and gradually ascended to National Portability which has empowered the beneficiary to lift ration from any part of India. National portability has provided a significant boost to beneficiaries especially those who are migrating labourer's and ensured food security to them.
- *Mobile Application:* Food & Civil Supplies Department has come up with an Inhouse mobile application to provide convenience to beneficiaries at the click of a button. The beneficiary can now check real time information of lifting from his/her ration card, check nearby shops for ration availability, lodge online complaint and avail many other services.

Improvements/ enhancements planned to be rolled out during next one year

- Digital payment verification of system integrators
- FPS doorstep delivery of food grains

ENABLER

Processes Re-engineered

The Public Distribution system in UP caters to a huge population. The extent to which the benefits are availed are till every village. Uttar Pradesh being the largest state in terms of population, the state caters to approximately 14.70 crore beneficiaries.

Distribution Process to Beneficiaries re-engineering:

On the distribution side department faced difficulty in stock management, closing balance data, vague beneficiary details. The identification of eligible beneficiaries was on top priority for the department. The department initiated Aadhar feeding and seeding to make sure only eligible beneficiaries avail ration. The department's Aadhar seeding achievement is given below.

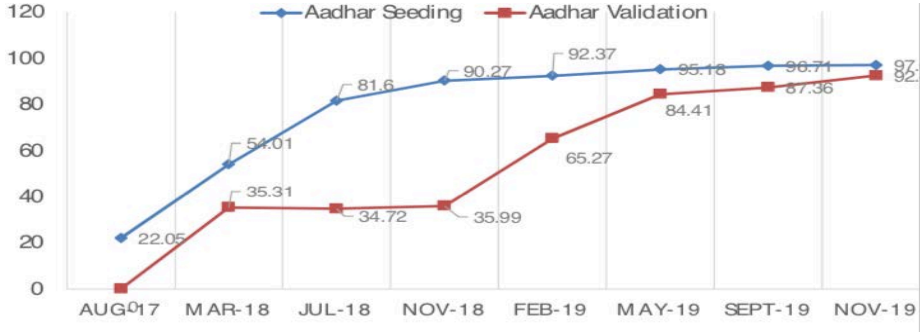


Figure above: Aadhaar Seeding and Aadhaar Validation Progress

The department had implemented phase wise transformation to the existing manual distribution methods to beneficiaries. End to End Computerization was initiated and FPS automation was a priority to the department. The below figure shows the phased approach of the department in installing ePOS machines at all 80,000 FPS shops in UP. The urban areas in UP were installed with ePOS machines. Total of around 13000 shops were equipped with ePOS machines and Aadhar authenticated transactions were initiated in June 2017. The second phase of FPS automation was carried out in the rural areas of UP and ePOS machines were installed in total of 67000 FPS of Rural Areas in May 2018. By April 2019, project has been implemented in all 80000 FPS of the state.

In addition, following tasks were undertaken for project implementation-

- To facilitate FPS automation and End to End Computerization, ePOS machines were installed in each FPS in a phased manner.
- Aadhar enabled Biometric transaction at each FPS
- IRIS Scanner included in all the FPS shops along with biometric authentication.
- Provision for two SIM Cards (3G or above) and other consumables like paper roll, antenna, additional battery for PoS devices to ensure seamless operations at FPS.
- PoS software which facilitate multiple mode of beneficiary authentication (Aadhaar based biometric authentication (both fingerprint and IRIS) and OTP based) with a provision which has enabled the department of F&CS to implement policy decision at ease.

Commodity Distribution through ePoS Devices

Supply Chain Process re-engineering: The department supply chain followed a manual method of demand generation, receipt at godowns and transportation. Manual challans were generated and accepted at each point of release and receipt. Stock management at registers were done manually. Vehicle Way Bills were generated and received manually.

Process re-engineering in the supply chain started with ensuring the stocks are managed online. The Ration Card Management System enables the entire allocation, distribution and stock management online. From headquarters the allotment for a month is based on the closing stock of previous month and further allotted to sub godowns. The food grains are then physically transported from FCI depots to Block godowns and then to Fair price shops. The FPS owners can make sure the right quantity is delivered by monitoring the weighment of the food grains bags at the 5 MT Electronic weighing machines which are placed at godowns. It has also been initiated to integrate the weighing machines data to supply chain to make the system more robust and error free.

Feedback and Grievance Redressal Process re-engineering: The use of ICT enabled grievance redressal mechanism was introduced to reduce the manual methods of grievance redressal mechanisms that existed in the system. Instead of asking the FPS dealers to send complaints over paper, a **one stop solution** was developed. Complaints will now be attended by helpdesk executives who will lodge the complaint online and these complaints will be prioritized for resolution. The complainants will receive instant messages and tracking measures are also available. Department has ensured all system integrators set up Helpdesk for resolving all ePoS related issues. IGRS-Integrated grievance Redressal

System was a one stop solution for the beneficiaries or any person availing department benefits. Complaints can be lodged, and all complaints will be prioritized by the software. The complainants will receive instant messages and tracking measures are also available.

Department has set up the below services for proper grievance redressal

i. Helpdesk has been set-up for resolving ePoS related issues
ii. Call Centre (18001800150 and 1967)
iii. Control Room has been set-up for Procurement related issues
iv. CM Helpline is common platform for receiving complaint (1076)

Monitoring and Evaluation Process re-engineering: The department has various dashboards and dedicated data analytics teams to manage the bigdata. Various kinds of analysis are performed from the raw data from the field in terms of patterns, trends etc. Separate dashboards are maintained by vendors to classify and categories their deliverables and give useful information to the department. In addition, following tasks were undertaken for project implementation-

Distribution:

i. To facilitate FPS automation and End to End Computerization, ePOS machines were installed in each FPS in a phased manner.
ii. Aadhar enabled Biometric transaction at each FPS
iii. IRIS Scanner included in all the FPS shops along with biometric authentication.
iv. Provision for two SIM Cards (3G or above) and other consumables like paper roll, antenna, additional battery for PoS devices to ensure seamless operations at FPS.
v. PoS software which facilitate multiple mode of beneficiary authentication (Aadhaar based biometric authentication (both finger print and IRIS), OTP based and Photo ID based) with a provision which has enabled the department of F&CS to implement policy decision at ease.

Various MIS Dashboard to view real time transactions

Data Analysis is the key to this section and department keenly monitors the various trends and analyse them based on raw data from the field.The distribution data to beneficiaries is evaluated and various reports generated.

Technologies

- *Ration Card Management System (RCMS*): System has been developed on Microsoft ASP.Net Technologies which has Backend Database as Microsoft Sql Server 2016. This system exposes WEB API 2.0 which are consumed by the PDS applications hosted at State Data Centre Premises. One of the best example for interoperability is, these API's are being consumed by the Mobile Platform as well.API based architecture enables this system to interact with different platforms across the server communication chain which hosts different Operating Systems line Linux and different Application Development platforms like Java.
- *MIS Dashboards:* A comprehensive online Management Information System (MIS) facilitates monitoring and evaluation of FPS Automation project from state to block level to FPS level. Real time information in electronic form is available for research and analysis which helps not only to monitor but also identify deviations if any, thereby helping us to take prompt corrective action.

- *Inspection Application:* The Food & Civil Supplies Department, Uttar Pradesh conducts regular inspection of Fair Price Shops (FPS) to ensure all guidelines are being followed by FPS dealers and there is no misconduct on their part. The Supply Inspectors are assigned a designated number of FPS which they must inspect and the record their details.Considering there were issues with proper documentation and follow up, the department decided to digitise the process of inspection. The application is being designed to encompass the needs of several users which include JC/DC, ADM, SDM, DSO, ARO and SI and is being developed in collaboration with NIC.
- *Aapurti Mobile App*: The Aapurti Mobile Application has been designed to provide real time information for empowering beneficiaries, FPS dealers and for regular monitoring of food grain distribution through Fair Price Shop at State and District level. The mobile application is functional for various users- State, District, Fair Price Shop dealers and beneficiaries which makes it a one stop shop. The broad objectives of the mobile application are as follows-
  i. To act as a mechanism for grievance redressal of FPS owners and beneficiaries
  ii. To assist the state and district in on the go monitoring of PoS transactions and field issues
  iii. To facilitate the stakeholders in monitoring project implementation and performance of districts/blocks and to assist in the decision making at the highest level
  iv. To monitor the performance of System Integrator(s)

Key highlights are as follows-

- A host of services for beneficiaries to check their ration card details, locate nearby shops for portability along with navigation using google services, generate online QR code ration card and file complaint online using the mobile application.
- Brief list of reports available on dashboard –
  i. Quantity allocated to distributed
  ii. Transaction percentage
  iii. Aadhaar based transactions
  iv. Non Aadhaar based transaction
  v. Field issues resolved and pending
  vi. Complaint registration
- Grievance redressal for FPS Owners and Beneficiaries

Benefits:

- Beneficiary empowerment with Citizen centric application having better availability of data and increased transparency
- Effective project monitoring from state to district to block level
- Real time information and MIS facilitates effective and quick decision making
- Multiple stakeholder engagement with accessibility enabled for various users from State to beneficiary

People

G2C

Government's initiative to modernize the public distribution system has benefitted the citizens (beneficiaries) in the following ways-

- Bio metric authentication has ensured the right beneficiary gets the right quantity at the right price
- Digitization has provided significant convenience to beneficiaries as it ensures quick distribution of food grains and minimizes queues to a great extent
- Electronic recordkeeping of data has empowered the beneficiaries.
- Dedicated helplines and mobile application have provided an effective means of grievance redressal
- Head quarter level monitoring has ensured on time payment to farmers
- Established verification exercises and tracking have ensured payment to the actual beneficiaries.

G2B

FPS Dealer

- Public distribution process has ensured timely disbursement of dealer commission and effortless recordkeeping
- Automation has secured the future FPS dealers

System Integrator

- Significant deployment of manpower has provided employment to 1000 plus personnel.
- FPS Automation has initiated a slew of projects like GPS Project, PFMS , which has bought private companies to bid and operate projects thus bringing measurable investment to the state of Uttar Pradesh.

G2G

Data sharing on Annavitran portal of Central Government of India has led to better efficiency and collaboration. It has further helped both the State and Central Government to undertake data analysis, understand trends and patterns which has strengthened decision making process.

VALUE INDICATORS

Learnings for sharing

Key learning's

- Internet connectivity Issue in rural areas had to be dealt with innovative solutions like offline connectivity.
- Extensive and continuous support was required for training and capacity building
- Roll-out of around 80,000 FPS across the state was challenging and had to be done in a phase wise manner.
- Setting-up of IT infrastructure to manage around 1 Cr transactions per day was achieved by collaborating with NIC, system integrators and department.
- Management of transaction data of 14.70 Crore beneficiaries was achieved by maintaining a robust and scalable IT system.
- Deploying various cycles -PMGKAY and ANB schemes during Covid-19 pandemic times was challenging as teams were working from different geographic locations and the turnaround time was less.

The following are few innovative / disruptive technologies, process changes that were used

- *National Portability (One nation, One card):* 'One nation, one ration card' scheme was launched by the Central Government. Under the initiative, eligible beneficiaries would be able to avail their entitled foodgrains under the same ration card. Uttar Pradesh is one of the few states which has successfully rolled out **state** and now National Portability which empowers the beneficiary to lift ration from any state in India .
- *UPPDS Mobile Application:* The UPPDS Mobile Application has been designed to provide real time information for empowering beneficiaries, FPS dealers and for regular monitoring of FPS Automation Project at state and district level.The broad objectives of the mobile application are as follows-
  i. To act as a mechanism for grievance redressal of FPS owners and beneficiaries.
  ii. To assist the state and district in on the go monitoring of PoS transactions and field issues
  iii. To facilitate the stakeholders in monitoring project implementation and performance of districts/blocks and to assist in the decision making at the highest level
- *MIS Dashboards:* A comprehensive online Management Information System (MIS) facilitates monitoring and evaluation of FPS Automation project from state to block level to FPS level. Real time information in electronic form is available for research and analysis which helps not only to monitor but also identify deviations if any, thereby helping us to take prompt corrective action. Various parameters are covered in these reports with reference to region, ration card number, beneficiary, Aadhaar distribution/ transaction details, point of sale machine (PoS) distribution, IRIS distribution, non- Aadhaar based distribution/transaction, portability, day wise transaction, helpdesk issues, status of field issues, category of complaints etc.

Digital Empowerment

- National Portability (One nation, One card): 'One nation, one ration card' scheme was launched by the Central Government. Under the initiative, eligible beneficiaries would be able to avail their entitled food grains under the National. Food Security Act (NFSA) from any Fair Price Shop in the country using the same ration card. Uttar Pradesh is one of the few states which has successfully rolled out State and now National Portability which empowers the beneficiary to lift ration from any state in India.
- Issuance of Temporary Ration Cards to Migrant workers: In wake of the measures to combat spread of COVID-19 pandemic, Govt. of India imposed an unprecedented all India lockdown.

Green e-Governance

Adherence of the State Data Centre Policies.

Systematic archiving of the data

Usage of Virtual Technology Platforms.
Cooling System adhered to less Carbon Emission
Equipment's adherence to the compliance
Power efficient Power Supplies
Safety and Security Manuals and Procedures

Shri. Maneesh Chauhan, *Commissioner, Food & Civil Supplies Department, (Uttar Pradesh), Up.fncs@gmail.com.*

Shri. Sunil Kumar Verma, *Additional Commissioner, Food & Civil Supplies Department (Uttar Pradesh),Up.fncs@gmail.com.*

JIT Portal – Just in time e-Payment Platform

Department of Food, Civil Supplies and Consumer Protection
Madhya Pradesh

Tarun Kumar Pithode, H.S. Parmar and Sunil Jain

PROJECT OVERVIEW

Objectives

- Design and Development of Platform to facilitate timely and rulebased e-Payments to the 14.9 Lakh farmers against the crops sold under MSP Scheme. JIT Portal also facilitates e-Payment of Labor charges, Commission, Warehouse, Loading, Unloading, Handling and other charges to Societies / Procurement Centers, and transportation charges to transporters, in a rule-based manner.
- Undertake Computerization & Automation of various offices to ensure electronic delivery of high volume and payment services to the beneficiaries.
- Efficient delivery of services with improved service levels in an efficient, secure and integrated manner.
- For Policy makers to take proficient decisions in benefit of all stakeholders, the relevant information has to flow from bottom to top in the optimum timeframe.
- Extensive Capacity Building and training to field level functionaries, to ensure smooth migration to electronic delivery of services from manual delivery of services.
- Enhance transparency in operations to mitigate leakages and diversion of funds.
- Digital and Financial Inclusion of Farmers.

Scope (Functional & Geographical)

The users of the system is spread across the length and breadth of the state of Madhya Pradesh. As of the 52 Districts having more than 4000 Procurement Centers and serves more than 19 Lakh Farmers spread across 52,000 Villages of Madhya Pradesh.

Key Stakeholders

- 19 Lakh Farmers
- ~4000 Procurement Centers
- ~ 10,000 laborers
- ~ 3000 Cooperative Societies that manage the procurement centre operations
- ~300 Warehouses
- ~200 Transporters
- 51 District Offices of Food Dept
- 717 Rural & Urban bodies
- Madhya Pradesh State Civil Supplies Corporation
- Marketing Federation
- National Payments Corporation of India
- Punjab National Bank
- Public Financial Management System (PFMS)

Benefits

- The earlier processes which had been undermined by lack of transparency, delay in payment to farmers. The Solution resulted in transparency, accountability and strengthen the service delivery mechanism by automating the entire business processes of the department.
- Digital and Financial Inclusion of more than 19 Lakh Farmers due online DBT based payments.
- Significant reduction in Turn Around Time in payments to Farmers. Elimination of delay in payments.
- Proper Utilization of Funds, Process Reengineering and use of single bank account facilitate effective utilization of financial resources as it eliminates the requirement of parking of funds in multiple bank accounts being maintained by multiple offices at multiple locations.
- The various activities of payments are being tracked and results in better control and management of transactions at state level.

Current Status

JIT e-Payments Platform is operation and catering to various stakeholders like Food, Civil supplies and Consumer Protection Department undertakes these activities through procuring agencies Madhya Pradesh State Civil Supplies Corporation (MPSCSC), Madhya Pradesh State Cooperative Marketing Federation Limited (MARKFed) and Madhya Pradesh Warehousing and Logistics Corporation (MPWLC) and National Agricultural Cooperative Marketing Federation of India Ltd. (NAFED).

The System is serving more than 19 Lakh farmers spread across two Marketing season of Rabi and Kharif every year.

The System has disbursed more than 42,000 Crs and it is proving to be the game changer during pandemic time as Paddy Procurement for 2020-21 has been started.

The system has generated more than ~10 lakh digitally Signed e-Payment Orders.

The Simple Design of System resulted in mass acceptability and used by various stakeholders including grass root level official with minimum support.

The Solution was effectively utilized for various food grain wheat, paddy, mustard, etc

More than ~4000 Procurement Centers are in place for procurement with necessary infrastructure.

It is proposed to strength the system with the use niche technologies such AI & block chain.

Software

- *Operating System:* Windows Server 2012 R2
- *Database:*
  i. SQL Server 2012
  ii. Postgres 10
- *Web Server:* IIS 7
- SMS APIs
- *Development Platform:* ASP.Net

Cyber Security

RV Solutions Pvt Ltd authorized agency of GoI

Disaster Recovery and service continuity

Necessary Disaster Recovery and Business Continuity Plan is in Place as per

the standard, best practices and policy laid down by Competent Authority. The Application is hosted in State Data Centre.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Farmers Registration	Registration for Farmers	18 Lakh	19 Lakh	19 Lakh
Crop Procurement	Amount Disbursed to Farmers	4,31,322 (3400 Cr)	20,07,412 (18,000 Cr)	23,42,241 (25,000 Cr)
Transportation Charges	DBT to Transporters for Food grain Transportation	NA	431322 (129 Cr)	431322 (Rs316 Cr)
Warehouse Storage charges	God down Charges	NA	440 Cr	72 Cr
Society Commission	Commission for procurement to societies	19 Cr	135 Cr	137 Cr
Labor charges	Labor charges in procurement	10 Cr	72 Cr	80 Cr
Handling Charges	Food grain handling	NA	2 Cr	11 Cr
Unloading Charges		NA	5 Cr	NA
Loading charges			85 Lakh	NA

Implementation

Implementation Coverage achieved in comparison to the plan / target

Comprehensiveness: The application covers Stakeholders:

- Farmers: 19 lakh farmers spread across two Marketing season of Rabi and Kharif
- Procuring societies: 3000 spread across two Marketing season of Rabi and Kharif
- Warehouse Owners:600 spread across two Marketing season of Rabi and Kharif
- Transporter: 120 transporters
- Number of Delivery centers:
  Rabi Marketing Season 20-21: 4529 procuring centers across 52 districts
  Kharif Marketing Season 19-20: 1119 procuring centers across 52 districts
- Geographical: 51 districts

Improvements/ enhancements specifically planned out during next one Year

Through Process reengineering of payment process the need gap was fulfilled through automatic the process leading to stakeholder satisfaction.

The cycle time of payment to farmer account is now reduced from several weeks to 3-7 days. And since payment is directly in the farmers account so

he/she don't need to visit societies to follow on the payment
Interactive platform for service delivery
Completeness of information: Farmer is informed through SMS about the payment. The same information is also available with district /society/DCCB login for communication with farmer in case of need.
Accessibility: Payment Data is available with the state/district users
Real on time accurate availability of information for decision making
Data history is maintained and audit trails are available to fix responsibilities.

ENABLER

Processes Re-engineered

Procurement from farmer is a complex process involving multiple stakeholders. Madhya Pradesh adopted a completely decentralized system for procurement of paddy and wheat under centre's Decentralized Procurement Scheme (DCP). Under this, the state government agencies procure, store and distribute rice/wheat/coarse grains within the state. The excess stocks (Rice after milling and Wheat) procured by state /its agencies are handed over to FCI in central pool.

In Madhya Pradesh the Food, Civil supplies and Consumer Protection Department undertakes these activities through procuring agencies Madhya Pradesh State Civil Supplies Corporation (MPSCSC), Madhya Pradesh State Cooperative Marketing Federation Limited (MARKFed) and Madhya Pradesh Warehousing and Logistics Corporation (MPWLC) and National Agricultural Cooperative Marketing Federation of India Ltd. (NAFED).

The registered cooperative societies (PACS) on behalf of these agencies procure the grains from farmers. Once FAQ quality is procured it is transported to the nearest warehouse for storage and to be further used for distribution to the PDS shops. Paddy procured by the state government is milled and then stored in the warehouse to be used for PDS distribution.

Before the start of the procurement season farmers are registered wherein their consent for selling along with validated Land record details and preferred dates of selling are captured.

Once the procurement centers are established SMS are sent to farmer inviting them to sell their maximum eligible yield on a given date. Post FAQ validation farmer procurement is captured in state application eUparjan and gunny bags are made ready for transportation to nearest ware house. Once the transportation is completed the grain is rechecked on quality parameters it is accepted by procuring agencies for storage in warehouse. Post acceptance farmer payment is triggered by state HO

- In the previous scenarios farmer MSP payment was transferred from state HO on the basis of the demand note created by districts to procuring societies account who in-turn issues cheques to farmers. Since the process involved multiple sequence of activities involving multiple stakeholders leading to significant delay (sometime months) in realization of funds in the beneficiary account.
- The macroscopic Analysis of the process highlights following areas of concern

  Key Challenges: and Implementation bottleneck

  i. Lack of integrated approach in beneficiary payment including farmer
  ii. Lack of proportionate utilization of government funds release to societies

iii. State incurring significant transaction cost
iv. The fund lies unspent in some of the societies as payments are released late in farmers account which leads to unrest in farmers
v. Absence of transparency and lack of citizen interface
vi. Manual payments to farmers through cheques led to delay, losses and corruption
vii. The sheer extent of the operation involving a number of stakeholders

Constraints:

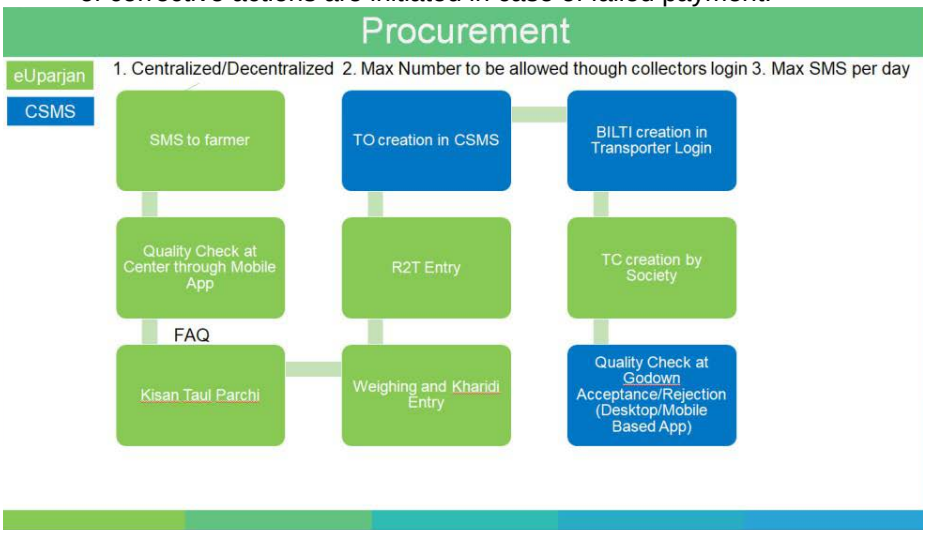
i. An inefficient monitoring and management of processes made it difficult for the authorities to check and curb malpractices
ii. No control on the final payment to farmer as it is routed through societies
iii. No provision of tracking the fund flow till late mile and no escalation mechanism
iv. Payment was done through Cheques by societies, so fund realization in farmers account wasn't known to department and procuring agencies unless complaint is raised by the farmer/s

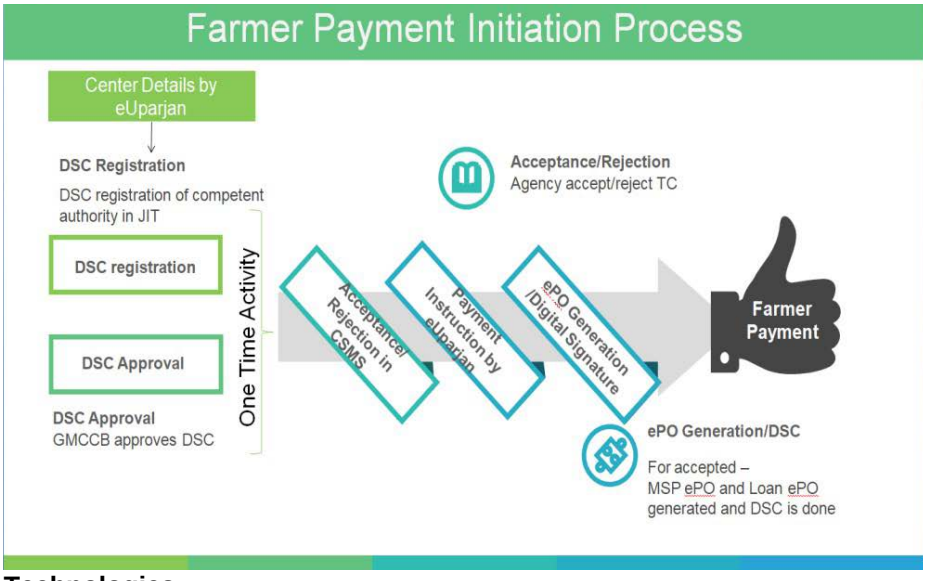
Bottleneck:

i. Unavailability of verified beneficiary account details
ii. Resistance to change in procurement and payment process
iii. Resistance to adopt new IT applications

- The famer payment processd.
- AS IS: Under the DCP operations grains are procured by Procuring Societies on behalf of sate nodal agencies. Once the gain is procured and transported to the warehouse for storage. The grain received at the warehouse/god-down is checked by the procuring agency (in this case MPSCSC or MARKFED/NAFED) on quality norms decided by GoI. Once the quality parameters are checked and passed acceptance note (is generated by the agency leading to change in ownership of grain from society to agency. Based on the acceptance notes generated districts generates demand note requesting payment to societies. Once the demand note is accepted at the agency HO level, the amount equivalent to accepted quantity is transferred to the societies DCCB account for further payment to farmers. Once the amount is realized in the account, societies issues cheques of amount equivalent to the sold quantity in the name of farmer and entry of cheques are done in the state procurement portal eUparjan. The lead time for manual process may range from 15 days to a month thus leading to inefficiency in operations. The problem was further aggravated due to the absence of transparency and lack of citizen interface. An inefficient monitoring and management of procurement processes made it difficult for the authorities to check and curb malpractices. Finally, manual payments to farmers through cheques led to delay, losses and corruption
- TO BE: To curb the malpractices in the farmer payment process a new application Just In Time Payment (JIT) platform was designed and developed where in the all societies where on boarded and e-payment order are generated to be digitally signed by societies so as to push payment to lead bank on the go. Once the acceptance is generated in the state supply chain application it is trigger to the procuring portal where farmer account and procurement details are stored. Based on the procurement and acceptance quantity payment instruction is generated

and sent to JIT platform. The JIT app reads the instruction and revalidate the details and based on the mapping (procurement centre-societyfarmer) creates an ePO which is sent to the procuring societies account for validation and signing through approved DSC. One e-PO's are signed it is push to bank's platform through secure channel for payment. Responses received from bank are further processed and set of corrective actions are initiated in case of failed payment.

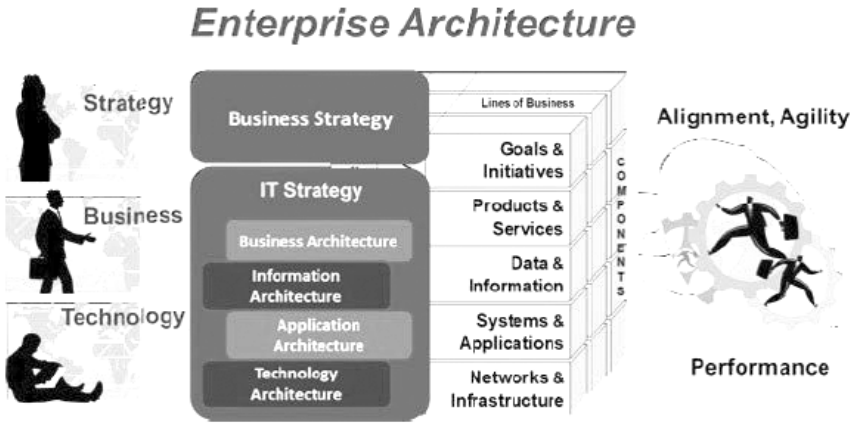




Technologies

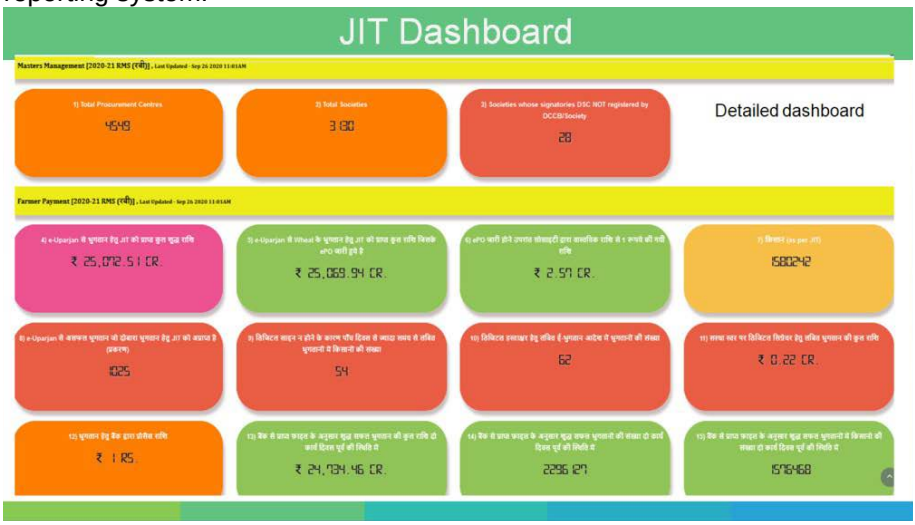
Enterprise Architecture: Solution was designed using EA Framework that focuses on layer approach starting from Strategy, Business and Technology. The Solution align Information Technology and Department Business. Solution optimally utilizes technology, people and process. Use of EA in solution resulted in increase in interoperability among various stakeholders like MPSCSC, Marked, Food Directorate,
Government. The Solution is agile enough to dynamic and real time changes.

The Solution is less complexity due separation of modules like Farmer Registration, MSP, Transportation. Standardize IT for cost effective delivery of service. The system has resulted in significant reduction in COST to the department. Eliminate possibility of duplication of efforts. Manage changes based on clear understanding of requirements.



ICT in Agriculture can be used for Dissemination of relevant, timely and reliable Information to Farmers. Improvised multilingual portal with content management framework and real time information sharing. Codification & Standardization of various entities.

Data Analytics for analyzing trends: Focuses on KPIs Instead of conventional reporting system.



Prediction using Data Analytics and Trend Analysis Following indicators were pricesly predicted and necessary and effective measure and action were taken. Earlier the decision were taken on the basis of last year prices.

- Farmers Crop yield
- Quantity for MSP
- Rate/Bonus for MSP
- Funds require to procure the crop
- Manpower requirement at various level
- SMS Scheduling

- Necessary planning for this season in pandemic times.
- True transportation cost
- Arrangement of labors for handling
- Society commission
- State share in scheme

Social Media: various Social media platforms were used to disseminate information and about money transferred and wheat procured.

People

Solution caters to various stakeholders including Farmers, Citizen, Madhya Pradesh State Civil Supplies Corporation, Marketing Federation, National Agricultural Cooperative Marketing Federation of India Ltd, Directorate, Food, Civil Supplies and Consumer Affairs, Govt. of Madhya Pradesh, Societies, Transporters, laborers, etc.

Stakeholders

- 19 Lakh Farmers
- ~4000 Procurement Centers
- ~ 10,000 laborers
- ~ 3000 Societies
- ~300 Warehouses
- ~200 Transporters
- 51 District Offices
- 717 Rural & Urban bodies

Solution has resulted in disbursal of more than ~42,000 Crore to 19 Lakh farmers, Societies, Warehouses, Transporters and other stakeholders.

VALUE INDICATORS

Learnings for sharing

Non-Standard Data: The Department was not using any generalized solution for their work process. The field offices were following their own work practices. work in isolation resulted in non-standard workflow and data.

Offline/Manual Process: Before, the advent of the online Application, the Department officials were not used to any web based online MIS for record management. Prior to this software, all the work was done manually on registers on papers that were handwritten, which was difficult for new paradigm shift and process re- engineering to an online digital MIS. But, with the launch of new system and government phase manner notifications, High level processes were made online and within a short time frame they understood the flow of the application and get used to it.

Bank Reconciliation, Audit & Stalled funds: Delay in bank reconciliation and audit due to non-availability of authentic financial transaction. Funds of Crores of Rupees were lying in bank accounts without reconciliation. Due to delay in audit. The various agencies stall the funds.

Unutilized Funds & Multiple Bank Accounts [Disruption]: More than 4000 bank accounts were operating before the systems. The Multiple Bank Accounts resulting in unutilizaton, underutilization of funds. One office is requesting the funds despite other office is keeping the funds without utilizing it. Monitoring of funds was extremely difficult at state headquarters. The process was reengineered. all offices were instructed to close the bank accounts and transfer the funds to the state accounts. There will be one operating account state-wide for MSP.

Single Platform: It was extremely difficult to onboard various organization on a

single platform. Thus, various meetings were organized to onboard various stakeholders.

Capacity Building: Multiple Training programs were organized. Supporting Documents User Manuals and FAQ have been distributed and also made available online on the web-portal. [http://jitpayments.nic.in/FAQ.aspx]

Youtube videos: The YouTube videos were uploaded and trainings were provided [https://www.youtube.com/watch?v=ChAjE7nXiQs]

Digital Empowerment

Financial Inclusion: System focuses on financial inclusion of farmers in rural Madhya Pradesh. Bank Account of Farmers were opened in a large scale. The reach of Nationalized bank is also increased over the period of time. The system supports cooperative banks also as they are in the close vicinity. Normally farmers are the one of the excluded segments. These sections are addressed by the Cooperative Banks (CBs) along with Nationalized Bank. Earlier Small and Marginal Farmers were not getting proper benefit of the scheme despite of the fact they are the most vulnerable section of societies and depend upon the selling of the farm product under MSP Scheme.

Web Based Information Dissemination: Post process reengineer of the process farmer is aware of payment status online 24x7, informative SMS are also sent to intimate the

progress in the payment process.

Email & SMS based alerts SMS: Post process reengineer of the process farmer is aware of payment status online 24x7, informative SMS are also being sent at each step of the process right from farmer registration to amount disbursal. More than ~20 lakh SMS are being sent every year.

Solution Supports Local language: System is Bilingual and Unicode Compliant. Farmers can view their registration and payment status online in their preferred language.

Less is More: Minimum entry done manually in the system hence very rare chance of typo mistake. More use of API based systems so as to integrate various systems.

Replication: Solution is architect with easy to replicate approach. The system can easily be replicated to other state.

Cloud First Approach: A web solution hosted on NIC cloud-based data centers and has round the clock accessibility and availability.

Green e-Governance

Solution facilities created under the project are taken care of Green e-Governance. Earlier, all the operations of the Department and other stakeholders were manual and maintained on the handwritten registers and printed forms.

The Complex & bulky Forms need more user time for filling-up at field offices, sending through post, data consolidation, digitization, missing productive and predictive analysis, validation, correction and report generation.

There were no proper database-oriented applications for future references and processing, it was very difficult to have yearly data analytics and comparative statements which are being maintained manually or in excel formats or google forms.

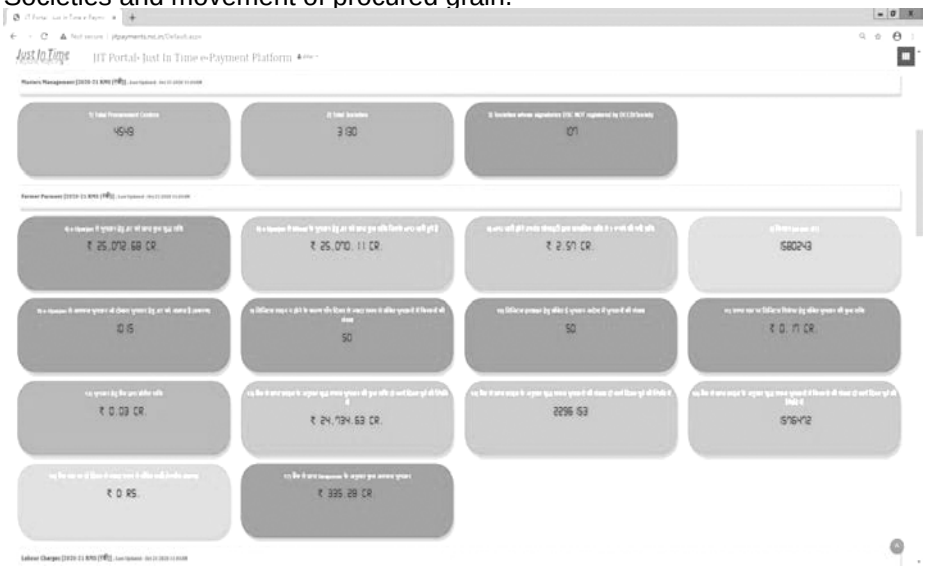
Following Initiative were taken to promote Green e-Governance. Online Farmers Registration Systems: The system facilitate online registration of farmers with their basic profile, land details, income details and crop details. Unique one time ID is generated for each farmer and banking details are also

captured.

All field offices of Food Department, Madhya Pradesh Civil supplies corporation, marketing federation, food directorate, national marketing federation, cooperative societies are made online.

The paperless operations helping in eliminating the need to collect, process and store records on paper. Moreover, the indexing and searching becomes efficient and easy. Use of digital signatures were promoted to eliminate possiblity of requirement of papers for their legal validity. Dashboard Provides real time monitoring of the data and at-a-glance views of key performance indicators which assist in effective and quick decision making.

MIS Reports MIS reports are generated by the systems to help the Department in evaluating their daily activities, online grievance filing, their resolution, monitoring and tracking progress. Email & SMS based alerts SMS and Email based alerts on transactions related to Registration of Farmers, Sale of crops, Societies and movement of procured grain.



Shri. Tarun Kumar Pithode, *Director, Department of Food, Civil Supplies and Consumer Protection (Madhya Pradesh), dirfood@nic.in*

Shri. H.S. Parmar, *Joint Director, Department of Food, Civil Supplies and Consumer Protection (Madhya Pradesh), dirfood@nic.in*

Shri. Sunil Jain, *Sr. Technical Director, National Informatics Center (Delhi), sjain@nic.in.*

National Power Portal
Ministry of Power, New Delhi

Mritunjay Kumar Narayan and Dilip Kumar

PROJECT OVERVIEW

Power sector data was being collected in online as well a offline mode mainly by Central Electricity Authority (CEA), Power Finance Corporation (PFC), Rural Electrification Corporation (REC) and POSOCO. As data was being collected by various organizations, through different software with different platform and format, inter-organizational sharing of the data and/or preparing common reports were difficult.

Ministry of Power desired that data related to all Power Sector units in India be captured and stored at a centralized location and further this data could be utilized in the form of various reports and charts as and when required by all Power Sector agencies.

Objectives:

- Design, Development and Implementation of National Power Data Management System (NPDMS) for collection of Power Sector Data online to create a centralized Database and generation of various reports in a flexible and user friendly
- Availability of Indian Power Sector data at National Power Data Management System (NPDMS)
- Dissemination of Power Sector information to Apex Bodies, Utilities & Public user via various reports and graphs at National Power Portal (NPP)
- Single source of Data collection
- Generation of dynamic Reports in a user-friendly manner
- To make Data available for Analysis, Planning and Monitoring purpose
- Minimize manual entry of data
- Standardization of Master Data

Scope:

- Data requirement study
- Designing and Development of National Power Portal (NPP) dashboard.
- Digitization of Capacity, Generation, Transmission modules under NPP.
- Digitization of Urban & Rural distribution System comprising Centralized Feeder Monitoring System.
- Integration of REC's DDUGJY web application

Key Stakeholders:

Ministry of Power (MoP): Ministry of Power had launched National Power Portal (NPP), a centralized system for accessing and disseminating power sector data. NPP facilitates online data capture/input (daily, monthly, annually) from generation, transmission and distribution utilities in the country, and disseminates power-sector information (operational, capacity, demand, supply, consumption and others) through various analyzed reports, graphs and statistics, for generation, transmission and distribution at all-India, Region, State-level for Central, State and Private Sectors. NPP facilitates the Ministries/R&D Institute /Researchers /Academia for decision making and other purposes.

Central Electricity Authority (CEA): CEA responsibility includes reliable data

collection/ management/dissemination of the power sector. National Power Portal provides a platform to CEA meeting their statuary requirements of collecting and disseminating Generation, Transmission, and Distribution data from Power entities like power plants including thermal, hydro, nuclear, transmission companies, and distribution companies.

Power Finance Corporation (PFC): Ministry of Power, Government of India, has launched the Restructured Accelerated Power Development and Reforms Programme (R-APDRP) in July 2008 with focus on establishment of base line data, fixation of accountability, reduction of AT&C losses upto 15% level through strengthening & up-gradation of Sub Transmission and Distribution network and adoption of Information Technology during XI Plan. NPP provides a system comprising capturing mechanism, and analytical dashboard w.r.t AT&C. Loss, Power Supply Position, Connections released and complaints addressed to PFC for monitoring around 41000 feeders across the country

Rural Electrification Corporation (REC): Ministry of Power, GoI has introduced a scheme namely "11 kV Rural Feeder Monitoring Scheme" to capture real time supply parameters of rural India. This can be achieved by monitoring the availability/quality of power supply in rural areas of the country by capturing actual distribution parameters- Power supply, outages etc. NPP provides a platform for capturing and disseminating power supply parameters (SAIDI/SAIFI) for each rural feeder on daily and monthly basis.

Distribution Companies (DISCOMs): NPP is facilitating DISCOMs by providing various analytics on AT&C losses, Power supply position through various graphs/charts/reports to take meaningful decisions in a timely manner and combating the worst power situation.

Software

Third party tools (Hw/Sw/Middleware):

NAGOIS – Open-source computer-software application that monitors systems, networks and infrastructure. Nagios offers monitoring and alerting services for servers, switches, applications and services. NPP/NPDMS to look after performance and health of the production environment. It responds with an alert mail message whenever there is any low, moderate or severe issue on any VM under production environment.

GIT: An open-source tool for distributed version control system to handle application code.

TOMCAT: Tomcat as application server with JAVA having framework Spring & Hibernate under Linux environment

Packages Integrated/ Deployed including dB name: JAVA (Spring/Hibernate)

Database: PostgreSql

Cyber Security

Application audit is being carried out regularly from 3rd party cert-in empanelled vendors who provide the application audit certificate for hosting on National cloud - Meghraj.

Disaster Recovery and service continuity

Presently Full Backup Strategy has been adopted and Backup Server is used to take backups of all Server configurations, databases and applications source codes. Two types of DB backup viz. Hot and Cold backups are taken on regular intervals.

Disaster Recovery site at Pune has also been setup in active passive mode and data is being replicated in a gap of 15 minutes.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21 (Till 31/08/2020)
Capacity	As and when new unit or plant is commissioned, or retired, capacity is added or reduced accordingly and disseminated on National Power Portal to project the national level capacity status	356100.19 MW	370106.46 MW	372693.36
Generation	Unit-wise Generation is captured on daily and monthly basis.	1249336.70 MU	1250783.91 MU	489092.56 MU
Plant Load Factor	National Average Plant Load	60.30%	55.99%	48.48%
Coal Stock Position for coal linkage based Thermal Plants	Daily Coal Stock report is generated to identify the critical and super critical coal plants w.r.t availability of coal in respective power stations			
Transmission	Growth in Transmission Lines	22437 cKM	11664 cKM	3511 cKM
Transformation Capacity	Growth in Transformation Capacity	72705 MVA	68230 MVA	13610 MVA
Urban Feeders	Monitoring of Urban Feeders w.r.t AT &C Loss, Power Supply Position	On-Boarded: 32117 Communicated: 19251 (59.94%)	On-Boarded: 36813 Communicated: 32637 (88.65%)	On-Boarded: 40870 Communicated: 33125 (81.05%)
Rural Feeders	Monitoring of Rural Feeders w.r.t Power Supply Position	On-Boarded: 39295 Communicated: 30326 (77%)	On-Boarded: 103297 Communicated: 89493 (86.67%)	On-Boarded: 108118 Communicated: 85616 (79.19%)

Implementation

Implementation Coverage achieved in comparison to the plan / target

Digitisation of Capacity, Generation, & Transmission is completed as planned

and Monitoring of feeders is achieved around 89% against the planned target of 100%.

Improvements/enhancements specifically planned out during next one year

- *Power Analytics Platform:* Data analytics focuses on processing and performing statistical analysis on existing datasets to uncover actionable insights and establishing the best way to present the data. Power Analytics Platform has been designed and developed to provide useful analytics in closed user group.
- *Captive Power Plant:* CPP also called auto producer or embedded generation is an electricity generation facility used and managed by an industrial or commercial energy user for their own energy consumption. These plants can operate off-grid or they can be connected to the electric grid to exchange excess generation. Captive power plants are generally used by power-intensive industries where continuity and quality of energy supply are crucial, such as aluminum smelters, steel plants, chemical plants, etc. A module under NPP has been developed to capture the data related to Captive Power Plants.
- *Digitization of Power Infrastructure:* A system developed to capture the data on metering status of Distribution Transformers, Low Tension Lines, and consumers. As per Ministry direction, mechanism is to develop to capture the data directly using IoT devices from most of the power entities.

ENABLER

Processes Re-engineered

- Process of maintenance of Capacity re-engineered to make it a single source of truth. Earlier Capacity was maintained by different divisions of CEA for different purposes but after exhaustive deliberations at higher level, a consensus was developed among different divisions to come at the same level and process was finalized to maintain the capacity by a single division only and other divisions will refer the same capacity anywhere anytime.
- Monitoring of feeders w.r.t to AT&C loss, SAIDI/SAIFI was at DISCOM level but later on process was digitized and changed from de-centralized monitoring to centralized monitoring.
- Adopted the approach of standardization of master data and its maintenance at a centralized level and provided on the portal for use by all DISCOMs for smooth exchange of data.

Technologies

Data capturing form the source of truth was challenging and a four way approach adopted to capture the data.

- *Forms:* Around 71 forms designed to capture the data related to capacity, generation and transmission. Somewhere data capturing is facilitated through bulk upload.
- *APIs:* Five APIs exposed and two APIs consumed for exchange of data
- *Bulk Upload:* As capturing Feeders data through forms was difficult, so option provided to DISCOMs to upload JSON files and after proper validations these json files are ingested into NPP database.
- *IoT:* Some of the rural feeders are pushing data directly to NIC cloud and same data is being captured through web services without any manual intervention.

People

To develop such a huge portal requires a good and dedicated team. A lot of efforts made in selection of the developers, DBAs, System Administrators, Web designers, Solution Architects and Testers by conducting regular exams followed by interviews. During regular interactions on weekly basis, these are motivated to adopt new technologies and methods. These are also encouraged to attend specific webinars, YouTube channels on the specific topics of immense usability.

VALUE INDICATORS

Learnings for sharing

Ministry of Power desired a single integrated portal for dissemination of power sector information and with a view that power sector should have single source of truth to capture and disseminate the information and could be used by policy making body/authority. This requires maintaining the consistency of primary key elements across the ecosystem.

The first and foremost learning was requirement for common masters following common meta data standards in the case of the federated structure of the power sector. In many cases, entity data is maintained separately at both the centre and state level and there is a lot of inconsistency and duplicity in the data. So, Management of Master Data in a centralised manner is the key learning to ensure that the Master Data is now the “Single Source of Truth”.

Another key learning was the necessity of a unique code for each entity. To meet this requirement a method was evolved to generate a unique code and the method is generalized and provided as a service. Code can be generated by taking a sequential number added with two-digit random number and a check digit number using verhoff algorithm.

There is another learning w.r.t development technology including framework and deployment environment that one should adopt the technology which does not impact much at the application design and coding level while upgrading latest version of development and deployment environment.

Digital Empowerment

National Power Portal is more of a portal mainly used for delivering ICT services in G2G and G2B domains. The main stakeholders of NPP are power sector entities like GENCOs, TRANSCOs, DISCOMs, researchers, academicians. So, the factors like financial inclusion, language, demographic and cultural difference has less impact on NPP.

Green e-Governance

Numerous initiatives have been taken by Central Electricity Authority to contribute effectively to the “Go Green” effort of Government by initiating social conscience and green sense of responsibility. NPP has been developed at the initiative of Ministry of Power to make available power sector data at one platform. NPP has an inherent advantage of not only actively contributing to the green initiative but also cost cutting by curbing the use of paper and promoting electronic communication. NPP has been designed to capture data Machine to Machine. NPP database has simple Master forms and instructions has been given to all data generators for data punching. NIC has issued all users Login-ID and password for them to punch data directly into the database and discourages users to send data through Fax. The reports generated are uploaded on the NPP portal for public consumption. The practice of distribution of hard copies to the respective departments have been stopped. The online accessibility of soft copies of reports on the portal not only makes reports

available as and when they are published on the portal but it also eliminates big books being printed along with postal expenses avoided. NPP has also reduced the cost of maintaining database, prevention of data loss and has added to the ease of data surfing. One of the added advantages of having e-database is that it contributes immensely to Go Green efforts like in case of any error is to be rectified at a later stage this can be done without the need to create any new physical record and subsequent printing of new report. Further these reports can be downloaded for consumptions of utilities and users.

Shri. Mritunjay Kumar Narayan, *Joint Secretary, Ministry of Power (New Delhi)*

Shri. Dilip Kumar, *Under Secretary, Ministry of Power (New Delhi)*

Panchayat Nischay Soft Portal
Panchayati Raj Department, Bihar

Amrit Lal Meena, Shailesh Kumar Shrivastava and Rajesh Kumar Singh

PROJECT OVERVIEW

Background

The state of Bihar, almost quadrilateral in shape, is bounded on north by Nepal, on the west by Uttar Pradesh, on the south by Jharkhand and on the east by West Bengal. Bihar"s total area is approximately 94.2 thousand square kilometres (sq. km), split in two by the Ganges into a Northern region of 53.3 thousand sq. km and southern of 40.9 thousand sq. km. The state constitutes of 534 blocks, 8386 Gram Panchyats and 1,14691 wards. In most of the areas, the primary drinking water source are the hand pumps (be it private or public) with some areas been covered with the PWS schemes. The State of Bihar has abundant groundwater resources as mapped and quantified by the CGWB of the Ministry of Water Resources, Govt of India. 89% of the geographical area of Bihar is under alluvium cover. The aquifers are made up of unconsolidated sands, fine to coarse and are multi-layered alternating with clay, sandy clay and silty clay. North Bihar plains have abundant groundwater reserves holding promise for future development. The Axial Ganga Plain also has significant reasons with quality issues in the shallow aquifer system. South Bihar Plains comprise of Marginal Alluvium Areas with limited groundwater reserves, susceptible to water table depletion and scarcity during years with rainfall deficit. Aquifers require artificial recharge to maintain sustainability. There are hard rock strata in patches with reserves in weathered/fractured aquifer system.

Keeping in line with this to provide safe drinking water facility in rural area is shifted from Public Health & Engineering Department to Department of Panchayati Raj, to ensure the community participation in the drinking water supply scheme. In Bihar piped water supply scheme is mainly based on the high capacity of overhead tank modal which is installed by the private party through public health & engineering department. The scheme which was installed by the PHED is mostly defunct because of purely absence of community engagement during installation time. Community participation is missing hence ownership is very poor once it defuncts to make it functional.

Schemes covered under this scheme:

Mukhyamantri Gramin Peyjal Nishchay Yojana was launched for all households in 4291 Gram Panchayats that do not have access to good quality drinking water shall be provided clean drinking water through piped water supply under Mukhyamantri Gramin Peyjal Nishchay Yojana. It aims to provide clean drinking water through piped supply to every household in rural area through community participation by 2019-2020. Phase-wise implementation of the scheme has been done by taking up small and micro water supply schemes. The requirement of water fulfilled through boring, submersible pumps and distribution pipelines. The cost of water supply works will be met by convergence of funds available on the recommendation of the 14th Finance Commission and 5th state finance commission and the state plan fund. *Mukhyamantri Gramin Peyjal (quality affected areas) Nishchay Yojana* is being implemented in Gram Panchayats, where water is totally affected with iron, fluoride and arsenic. Under this scheme 3,079 Flouride affected rural wards,

2,556 Arsenic affected rural wards, 20,637 Iron affected rural wards will be provided clean drinking water through piped water supply.This scheme is being implemented by Public Health Engineering department.

Mukhyamantri Gramin Peyjal (non quality affected areas) Nishchay Yojana is being implemented in such wards of Gram Panchayats where the quality of water is not affected or where the Public Health Engineering Department is already implementing schemes for supply of drinking water. Under this scheme, 20,637 wards of rural area. Where water is totally or partially not of good quality shall be eligible households under this scheme. All households of these Gram Panchayats will evenly get the benefits of this scheme without any discrimination.

Mukhyamantri Shahri Peyjal Nishchay Yojana is being implemented by Urban Development & Housing Department. Under this scheme all 15,71, 643 households in 3,381 urban wards of 143 Urban Local Bodies who have not yet got piped drinking water will be covered and will be supplied piped clean drinking water.It aims to ensure supply of pure tap water to each family living in urban areas in the next five years.

Objectives:

Har Ghar Nal Ka Jal Scheme aims to provide clean drinking water to every citizen of Bihar, without any discrimination. This resolution is an unflinching endeavor to provide clean drinking water in the homes of approximately 2 crore households in the state through concerted co-operation of the people of every village and locality in Bihar. Under this, schemes have been formulated to provide piped water supply to every household with a view to end their dependence on Hand-pumps (chapakal) and other sources of drinking water.

Mukhyamantri Gramin Gali Nali Puccikaran Nishchay Yojana – Mukhyamantri Gramin Gali-Nali Pakkikaran Nishchay Yojana intends to create a network of Pakka drainage and by-lanes in villages and habitations in the rural areas of the State. Panchayati Raj Department is implementing the scheme through Gram Panchayats. Under the Mukhyamantri Gramin Gali-Nali Pakkikaran Nishchay Yojana, target has been set to provide all weather connectivity and drainage facilities in all 1,14,691 rural wards of 8386 Gram Panchayats in the state. A robust IT system is needed to support project activities across state to monitor physical and financial progress as well as to bring transparency in the processes.

Stakeholders:

- Panchayati Raj Department
- District Administrations, GoB
- Public Health engineering Department
- NIC, Bihar
- PR Institutions and Citizen of Bihar through online Portal.

Scope:

Govt. is targeting to achieve following objective in scaling up community-based drinking water schemes in all districts of Bihar state.

- Empowering community, individuals with current knowledge on availability & accessibility issues related to running water in rural area.
- Enabling behavior change to people / Gram Panchayats through different tool of communication and creating the impact.
- Creating demand of “Mukyamantri Gramin Payjal Nischay Yojana - Har Ghar Nal Ka Jal Scheme” in the community and mobilizing people to avail / access the services, thus impacting on behavioral aspects.

- Capacity building of PRI members and ward vikas samite about successfully implementation of "Mukyamantri Gramin Payjal Nischay Yojana - Har Ghar Nal Ka Jal"
- Creating a robust IT system to cover processes under these schemes and facilitate transparent information flow between different stakeholders of the scheme.

Geographical Boundaries:

The project has been fully implemented in entire state covering all districts of Bihar.

- 38 (Thirty-Eight) Districts of Bihar
- 534(Five Hundred Thirty-Four) Blocks of Bihar
- 8463 Panchayats of Bihar
- 1.14 lakh Panchayat Wards
- Citizens of Bihar State through Web Site https://prdnischaysoft.bih.nic.in/
- Using Mobile App "NischaySoft"

Between 1 April and 30 June 2020, Bihar has provided functional tap water connections to 4.39 lakh households, the second-most of any state or union territory in India, as against its target of 1.5 crore households for the full financial year 2020-21. Central government has also launched similar programme inspired from state scheme. The 'Har Ghar Nal Se Jal' programme, which envisages providing potable drinking water to every rural household in India by 2024, was launched last year with a total outlay of Rs 3.60 lakh crore. While the Centre's share is Rs 2.08 lakh crore, the remaining Rs 1.52 lakh crore is to be borne by states. The 'adequate' quantity of water defined under the programme is 55 litres per person per day.

Software:

H/W and Software Specification	Name of H/W and S/W
Servers & Desktop	High End Blade Servers, Local servers, Desktops Hosted at NIC Mini Cloud Patna
OS	Windows 2012, Windows 10
DBMS	SQLSERVER 2012/PgSQL, MySQL
Web Server	IIS 7.0 or more ,
Framework	.net Framework 4.5, Java
IDE Software	Visual Studio 2012, NetBeans, Java Script
Reports	Crystal Reports
SMS	Mobile Seva of DEITY and NIC SMS Gateway
Mobile App	Android based Java Application
Unicode Support	Indic IME, Google API
Video Player	Adobe Flash Player

Cyber Security:

The application software has been developed with security by design approach and best security coding practices has been followed for creating quality software. Application Security Certification is being done by Centre of Excellence for Application Security, NIC Bhubaneshwar. After completion of the process Electoral Rolls Generation module

Disaster Recovery and service continuity:

NIC Mini Cloud /State Data Centre disaster facility at Hyderabad has been used for Disaster Management. The project has been notified by the department and

approved in highest level meetings headed by Additional Chief Secretary/Principal Secretary. The project has been funded for hiring manpower and other hardware and software requirements through department.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Data Digitization of Existing Beneficiary	Data Digitization Household Survey	1.2 Crore Family	1.9 Crore Family	2.1 Crore Family
Online Data Entry of New Schemes	Scheme Identification, Approval by Village level committee and estimation of	81,032	1,45,087	2,63,721
Account Validation through PFMS for Pachayat accounts and Ward Account personnel	These services help the TSEC officers to randomly select and allocate polling personnel (Presiding Verification of Accounts, Beneficiary Name, Active, closed, others name etc.	8463	8463	8463
Vendor Entry and Approval	Vendor Identification and approvals	1,35,730	1,85,327	2,74,342
Inspections for Working and Installations of devices.	Mobile Based Inspections of Operational Details.	1,04,024	2,78,528	1,80,045
Measurement Book Entry and Uploading	Progress of Physical completion of Works	32,045	42,734	56,033
Payment Generation	Sending Payment to Panchayats through PFMS	1,54,834	1,67,039	2,45,076
Online Query, SMS alert and Reporting Service	Query, SMS Alert and Reporting for all levels of Applications	3,07,345	5,06,249	7,34,459

Implementation

Geographical Area

The project has been fully implemented in entire state. All the schemes taken up at Panchayat or Ward level have been digitized and their monitoring is being done through online portal. Online reporting has been made mandatory for all field formations.

- 38 (Thirty-Eight) Districts of Bihar
- 534(Five Hundred Thirty-Four) Blocks of Bihar
- 8463 Panchayats of Bihar
- 1.14 lakh Panchayat Wards

Functionality

Delivery channels

- SMS Alert

- Online Enquiry
- Mobile App
- Helpdesk and Kiosk
- Call Centre Support

Category of stakeholders

- Ward Committee
- Block Administration under BDOs
- District Administration under DMs
- Banks
- PR Institutions and public functionaries
- Citizen of Bihar

The intervention focuses on the vulnerable and excluded community from the intervention area panchayats and villages. The water user committee them realized that the social inclusion is very important to maintain the harmony at community level. During the establishment of community own drinking water scheme there is no caste restriction for associating with the water user committee, the community contribution norms is also very flexible the ultra-poor family which is not able to contribute with the cash or material they can contribute with the labour work. The promotion of social inclusion is visible in the monthly meeting of water user committee Equity issue is also addressed with active involvement of water user committees, there is a common provision of all to use water for only drinking purpose as per there need depending on the family size. There is no any discrepancy for accessing the more water or consuming the less water for individual households.

Strategy and Approach:

- Establishment of state/ District/ Block project monitoring unit in leadership of the concerned officer of Panchyati Raj Department, GoB.
- Providing support in effective planning and monitoring about scheme.
- Providing the technical estimate and standard operating procedure to all districts.
- Developing operational modules to enhance capacity of PRI so that effective implementation will ensure.
- Providing different option to district based on applicability.
- Capacity building of different stakeholder.
- Development of IEC on community participation/ community based drinking water scheme.
- Exposure of existing drinking water schemes.
- Developing the modules for WIMC roles and responsibility.
- Raising awareness on water quality.
- Training calendar for capacity building will be prepared for District/Bloc level officer.

Improvements

Improvements / Enhancements specifically rolled out during last one year:

- Creation of Scheme database for both types of schemes from Pacnhayat level.
- Identification and approval of Vendors
- Enforcement of standard operating procedure for scheme management
- Proper Financial transaction managements
- Physical progress monitoring through mobile Apps
- Quality monitoring and milestone-based monitoring

- Fund Management and Utilisation Certificate
- Training to large number of field functionaries
- Measurement Book automation and recording
- Online Grievance Redressal System
- Online reporting through Mobile Apps
- Geo-Tagging of Assets

Improvements/ enhancements planned specifically during the next one Year:

- IOT based automated reporting of operations across State.
- PFMS based fund transfer to all stakeholders
- Quality Water Management and Community based service delivery
- Repair and Maintenance monitoring of Assets
- Water level Reporting and linking with Jal-Jeevan-Hariyali Yojana
- AI modeling for water assessment for future
- Alternate water sources for other activities of citizen
- GIS modeling of water based assessment
- Integration of different level of Road network on GIS platform
- Maintenance policy monitoring for Road networks within Habitations
- Coverage Analysis and upgradation requirements for future assessment.

ENABLER

Processes Re-engineered

- Scheme Identification and Approval Online
- Vendor Identification and Approval Online through Various Roles
- Measurement Book Uploading Online for Transparency
- Inspection of progress of Schemes through Mobile Phones
- Physical progress of Schemes and Quality monitoring
- Allotment to Panchayats for Expenditure Monitoring
- Technical Approval and Technical Sanction of Schemes online
- Fund transfer from Panchayats to Wards Samitee
- IOT based devices for automatically monitoring duration of operations
- Estimation of cost and monitoring of project timelines
- Account Validation through PFMS platform
- Approval for Payment at different level of Field formations and HQ level.
- Processing of Payment Files through Digital Signature
- Account Reconciliation and UC Generation
- SMS alert at every stage of Application Processing and Payment Generation.
- NischaySoft Mobile App

NischaySoft Mobile App

Technologies

- Work flow Management System with separate roles defined for each stakeholder.
- Three tier architecture for data, application and middleware management.
- IOT and GPRS based automated reporting tool (third party) for online reporting of start and stop of motors
- XML based data transfer between platforms
- Web and Mobile based integration framework.
- GIS mapping of Locations for Spatial analysis of services
- Mobile based application for online reporting and access of status
- MS and email Integration for alert
- API integration for offline applications.
- Mobile Application Development for Hybrid Platforms

People

State Apex Committee:

This is headed by Chief Minister with Additional Chief Secretary, Panchayati Raj, Principal Secretary, Finance, and Principal Secretary of Works departments, Rural Development, Minor Irrigation, Irrigation department and State Informatics Officer as Members. This is apex body for taking policy decision for 7 Nischay related activities and citizen services.

State Project Core Team:

Additional Chief Secretary, Panchayati Raj Department, Government of Bihar and NIC, Bihar has notified officers as Project Members of project team. This also have members from administrative officers etc. who advices and assist during project implementation. This team is supported by a team of hired programmers well versed in adopting online web applications, mobile applications and provides technology implementation of the Project. This team work under overall supervision of Additional Chief Secretary, PanchayatiRaj Department and State Informatics Officer, Bihar.

Project Steering Committee:

In order to support project, it is necessary to create and train a group of resource persons who can work at State HQ level and oversee progress of project and ensure smooth operations at field level. A PMU cum ICT cell has been created with hired manpower and domain experts at department level. These people have been trained on using application by Central Core Bihar team. These people not only co-ordinate with field formations such as Panchayats, blocks and districts but also interact with field formation for collecting data. In addition the PMU/ICT cell motivate decision makers to use ICT in decision making process and create ICT enabled environment for planning and monitoring. Regular meetings are being conducted to ensure smooth functioning of ICT initiative.

District/Block Level:

A team of expert of different theme has been hired at district level unit. The team works in overall all leadership of District magistrate of concerned District. The team works also with close coordination with Director Panchayti Raj, and Govt. top level of management to seek the guidance about the project implementation. Team is accountable to develop the training modules for enhancing the capacity of PRI members and another stakeholder so that scheme is being easily rolled in one block of supported district. Different IEC programme has been developed for different messages, preparation of training

calendar for all districts, rolling out the training calendar through training expert. In order to support project at District and Block level/Panchayat level large chunk of data has to be uploaded regular basis various kinds of resource persons have been hired or recruited. Project is being executed with both officers and resource personsexecutive assistants work together to achieve the objective of the project. Kind of Parameters required at decision making is being identified by the field formations but it is being aligned with organization objective at HQ level. Data Assistants/Field officials dealing with data entry, verification operations have been trained and equipped both for uploading data, data standardization and also, they can use ICT as a tool for decision making. Proper h/w and software infrastructure has been created at field formations for updating data. District Informatics Officer/IT Manager/PMU District Level officials have been trained to use the application and provide technical support to the Project.

Workshops with Stakeholders adoption of latest technologies:

Workshops have been conducted for various stakeholders of the project to make them understand about available technologies and best practices. In order to support project at division/district large chunk of data has to be verified/uploaded on Servers at regular basis. Numerous training programmes has been conducted by Master trainers. Currently there is emphasis is on using Mobile technology to deliver services and gather data from field formations. In addition, regular training has been conducted through video conferencing using NIC as well as SWAN.

VALUE INDICATORS

Learnings for sharing

- Create awareness about water quality testing and it importance in health and its economic impact in community.
- People will pay the partial cost of testing of their water sample.
- Geotagging on all drinking water schemes.
- Implimentation of " PanchayatNischay Mobile app and Portal.
- Implementation of PFMS for direct transfer of funds to benificiaries.
- Online digital verification systems make it extremely efficient system using latest technology platforms.
- Work flow of different level of field formations have been captured so that everyone has a dashboard for monitoring the progress.
- Quality check of used material.
- Documents verifications on each steps.
- The current innovation is a unique feature probably addressing the urgent needs of streamlining activities related to Nischay Yojana.
- The activities of Panchyats need to improve with creation of digital service platform.
- This helps to create standard operating procedure for delivering payment through transparent system.
- Online and Mobile App based service delivery does not require functionaries to visit Block Offices.
- SMS alert helps to deliver information at different stages of application and payment processing.
- Integration framework with Service Oriented Architecture

Through community own drinking water innovation on an average 100

households is get benefited to access safe drinking water throughout in year, the overall cost of piloting one community own water supply scheme is an around 2.5 lacks in which people were contributed 10% of total cost in terms of labor work and providing the material for constructing the stand post for establishing the syntax tank. The capital costs bared by the Govt with mutually agree with the beneficiary that monthly recurring cost will be borne by the community from day one. Due to high engagement of community at planning process of establishing the communities own water supply scheme the ownership of assets is high. The positive sign is an individual has given the land for establishing the stand post for accessing the safe drinking water, community members them self to kept syntax over there. While we calculate cost per household it is coming around 2500 (Twenty-five hundred only) for accessing the safe drinking water for entire family members for a minimum 8 to 10 years. (A minimum life of bore well). Consuming the safe drinking water will lead the better health to people. At the same time if we compare with the individual cost of having such deep bore well for getting safe drinking water the cost of installing such system is much higher side as compare to community own water supply scheme

Digital Empowerment

Parameter	Current software
Platform	SQLSERVER 2012 and .net Platform, C#, AJAX, ARCGIS Server, JavaScript, IIS
Localization	English and Unicode Support
Online	Online Software with work flow management with dashboard for each stakeholders Panchayats to State Head Quarters
Panchayat Nischay Soft Portal	On-line Web Portal and Mobile App for Scheme Management and Quality Monitoring
SMS Support	SMS Alert and SMS Monitoring facility has been added for monitoring
On-line Receipt Financial Disbursements	Direct Benefit Transfer has been done in the project through PFMS upto Panchayat Level
Help Desk and KIOSK	Available for Search Facilities and login of each beneficiary
Mobile App	Online Portal for Entry of Schemes, Online Submission of data from field formations, SMS Alert, Online Enquiry
Dashboard	User based dashboards most of the stakeholders

Green e-Governance

A smooth transition to a green economy depends upon seven related conditions which are both necessary and sufficient to produce substantial changes, and which will enable governments to take on a more proactive role in reversing the course of carbon-based activities. These include: political commitment, a legal and regulatory foundation, implementation of financial instruments, technological viability, human capital formation, appropriate institutional setup and a common language. Green Governance is a systematic life-cycle to drive us towards overall sustainability. Continuous improvement with active participation of stakeholders along with use of latest technology makes the project sustainable over longer period. The importance of environment is essential as policy decision for most of the e-governance

projects. The current comprehensive system aim to create less paper environment in working procedure and most of the work is done on digital platform. Following features enabled in the application makes the software accessible in less paper environment

- Centralised Repository of all schemes.
- Online Enquiry and reporting System
- Data driven decision making and business process re-engineering
- Paperless approach with most of the approval done through on-line process.
- Real-time reports make up-to-date information available to all the stakeholders for decision making.
- SMS alert and e-mail Communication
- Digitally signing documents
- Mobile App for field functionaries for Accessing data and uploading current images
- Group Communication through various Channels.
- Video-Conferencing for Training large number of operators

Shri. Amrit Lal Meena, IAS, *Additional Chief Secretary, Panchayati Raj Department (Bihar), amritlalmeena@live.com, secy-panchayat-bih@nic.in*

Shri. Shailesh Kumar Shrivastava, *Scientist F and Head, DGRC, National Informatics Centre, Digital Government Research Centre (Bihar), sk.shrivastava@nic.in*

Shri. Rajesh Kumar Singh, *Deputy Director General and SIO, National Informatics Centre (Bihar), sio-bih@nic.in*

Smart Water Management System under Drink from Tap Mission in Puri City

H & UD Department, Odisha

G. Mathivathanan, P. K. Swain, Sarat Chandra Mishra, Lalatendu Dash and D K Jena

PROJECT OVERVIEW

In a first of its kind, on 11th August 2019, the Government of Odisha launched the Drink from Tap Mission to provide 24 x 7 drink from tap quality water, to every household in urban Odisha. The endeavour of the mission is to ensure that water received from taps in households can directly be used for drinking and cooking without the need for further filtration or boiling.

The objectives and principles underlying the Drink From Tap Mission include the following:

- Reduce health risks to citizens caused due to supply of contaminated/ impure water
- Reduce citizens' and household investments on household level water tank/reservoir, sump, motor pump, water filter and other private arrangements by building trust and assurance on quality and quantity of water supplied by the government. This is expected to deliver savings of around Rs. 50,000 per household due to elimination of filtration and storage related costs
- Equitable, sustainable and people-centric service provision with focus on the urban poor who are the most vulnerable and for whom buying water and other private arrangements referred to above are unaffordable
- 100% metering of house connections to eliminate wastage of water, non-revenue water (NRW) and for full cost recovery,
- Adoption of innovative, state-of-the-art technology & management techniques/tools, both during construction and operation & maintenance

In order to achieve the above objectives, real-time data capture, analysis and monitoring of the water supply system was considered essential. Accordingly, WATCO with the help of NIC, Odisha conceived and implemented "smart water management under drink from tap mission in Puri city".

The smart water management system is an integrated Industrial IoT system comprising of real-time data acquisition through embedded sensors, layered on top of GIS maps combined with command and control systems to deliver on the quality and supply promise. In addition, the system includes linkage of this data to management dashboards and prediction algorithms to analyze and build prediction models on water consumption and plugging areas of leakage.

Scope of the project

As part of the first phase, the program has been implemented in two pilot zones (Bali Panda and Masani Chandi urban poor settlement) covering 3784 Households and a floating population of 50,000 in and around the Sri Jagannath Temple in Puri city.

The functional scope of the project is to establish a smart water management system to generate real time performance data plugged into a command and control (Distributed control system) system, integrated with a web enabled system to provide analytical models & data visualization for quick decision making and resolution of water supply related problems.

Key Stake holders

- Citizens: ~70,000citizens covered under the first phase
- District Administration, Municipal authorities: Senior functionaries including health officers
- Watco: 32 engineers operating the system including the QC team
- Key decision makers: Management of WATCO and senior functionaries of H&UD Department

Intended Benefits and Status

The following six different sub-systems have been deployed, each targeting a separate set of outcomes for the various stakeholders such as

- *Real time Monitoring & Management of Critical Supply Parameters*
  126 sensors and digital meters have been deployed as part of this phase 1 for real-time monitoring and management of critical supply parameters such as pressure, flow, level, pump status, energy consumption and quality of water supplied. These parameters are monitored and controlled at the various points in the supply network through a distributed control system (DCS). The DCS concept increases managerial effectiveness by localizing control functions, while providing capability for remote monitoring and supervision.
- *Water Quality Monitoring & Surveillance*
  As per CPHEEO and WHO Drinking Water Quality Standards, the chlorine content of potable water should be 0.2 ppm to 0.4 ppm, pH value should be 7 to 8 and turbidity 0.5 to 5 NTU at the consumer end for safe drinking water. 8 online water quality analyzers have been installed which measure these metrics at source and distribution end at 5 second intervals. Automatic control of the dosing is guided by the command control system and visualized in the form of charts and GIS maps. Result and status of water quality is provided to the public through web enabled systems, public display boards and SMS.
- *Reduction in Non-Revenue Water (leakage &unauthorised connection)*
  Non-Revenue Water (NRW) refers to water supplied without commensurate charges collected and arises due to unauthorized usage, unbilled consumers, leakages in pipeline and pressure factor in various parts of the supply chain. Through this system, NRW has been reduced automatically by evaluating the individual consumption patterns for the area and detecting unauthorized consumptions leakages etc., through use of an appropriate computing algorithm
- *Linkage of Consumer Complaints Redressal & Monitoring*
  Any issues related to supply of water, leakage or quality at various zones are instantly addressed as the distribution systems are linked with the online Complaint Redressal Monitoring(CRM) system which helps not just in online monitoring of complaints but which are then immediately resolved remotely, ensuring quality of service to the citizens
- *Spatial visualization of assets using GIS*
  Spatial integration of Water Supply Assets on GIS maps has made it easy to locate and monitor the functioning of the system components for strategic decision making and efficient operation and Maintenance.
- *Decision making and enhancements based on data analysis through graphs & charts*
  Custom decision making tools such as graphs, periodic charts & GIS maps have been developed for short term and long range planning

enabling easy detection of leakage, identification of asset, decision on leakage management, reduction of NRW, demand forecast and water demand during special occasions such as Functions & Festivals.

Server OS & Application

The server and data acquisition application platform is mentioned below:
Server OS: UBUNTU LTS (Linux base); *Server Service*: APACHE 2 (HTTPD Server); *Database*: MySQL
Web application and GUI
Server OS: UBUNTU LTS (Linux base); *Server Service*: APACHE 2 (HTTPD Server); *Application*: HTML5 ,PHP, Javascript, CSS, JSon; *Design Environment*: Bootstrap
Third Party Web Application: Google MAP

Cyber Security

The application has been audited by an empanelled auditor of National Informatics Centre, Government of India

Disaster Recovery

The design methodology & development of the "SMART WATER MANAGEMENT UNDER DRINK FROM MISSION" has meticulously addressed the elimination of potential threats due to cyber-attack, failure in network connection, natural disaster or power outage etc. Steps have been taken by implementing end to end encryption in data transfer, conducting cyber audit of applications, implementing SSL encryption etc.

- The network connectivity has been implemented through dark fibre optic in a ring topology thus minimizing connectivity troubles from the terminal device (connected to PLC) to local server system.
- Instant Power Generators have been installed for automatic power supply in cases of emergencies like power outage in order to support the functioning of servers.
- Regular back-ups are scheduled and taken off line in different locations. Backup server in National Data Centre (NDC) and NIC has been put to use for a disaster recovery mechanism.
- In emergencies, alarms will prompt the service engineers to respond to the situation immediately to ensure service continuity. All smart devices are controlled and managed remotely as it will help in delivering swift mitigation response in cases of disaster.

A disaster mitigation plan has been prepared in line with the provisions of State Disaster Management Policy 2005 and the Odisha State Disaster Management Authority (OSDMA) framework. Adequate equipment are deployed at regional level. Field level employees were trained in handling water supply during and after the disaster situation.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e Service	Brief service description with benefit	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21

Real time Distributed Controlled System (DCS) (G2G)	Instant decisions taken automatically based on the data recording from equipment to the server	Nil (Earlier all are manually controlled)	More than126 terminal devices have been deployed	More than 950 devices are planned to be installed in 19 zones of Puri
	Decreased Response Time using automated systems has accelerated response time considerably. No more idle times are required in between activities. No more silos from support systems such as databases, storage, and IT operations, no human interventions	1 day to 7 days Response through telephone and field visits	Few seconds, automatic through instant messaging	Few seconds, automatic through instant messaging
	Automatic control and monitoring of water supply has resulted in de-burdening of Government towards addressing the issues of no water supply, disruptions, erratic supply, maintaining uniform pressure	139 field staffs engaged in water supply operations	Managed by 4 skilled persons and 2 operators For four zones of Puri Municipality	To be managed by 20 skilled persons and 2 operators covering entire Puri Municipality
	Automatic chemical dosing through DCS has maintained Accuracy in amount required for chemical dosing instead of manual approximated dosing of chlorine, ensuring consistent water quality index. This maintains safety of drinking water quality without human intervention	Water quality rectification based on consumer complaints	100% accuracy covering 3784 house holds	100 % accuracy 32017 households to be covered
	Control & monitoring through single Computer screen anywhere- A single screen at the end device is capable of managing and monitoring the entire Water supply and energy management remotelyas it allows the concerned official to immediately attend to any troubleshoot/interruptions	NA	Available for all stakeholders	Available for all stakeholders

	System Monitoring & Alarms has been instituted in order to intimate the engineers for immediate response.	NA	8 engineers/ staffs covered through SMS and alarms	32 engineers / staffs estimated to cover through SMS and alarms
	Pump Schedule optimization -Automatic scheduling of pumping is carried on the basis of recorded time intervals when energy and time consumption are minimum.	19 pumps running in sweet water zone during office hours	19 pumps Based on time schedules (even at night)	28 pumps estimated to be covered Based on time schedules (even at night)
24X7 Drinking Water to public(G2C)	Adequate Quantity of water supply with Round the clock availability	Intermediate supply provided manually (Supply time was four hours in the morning and Two hours in the evening)	24 hours of supply from Aug, 2019 through automated supply	24 Hours of Supply till date through automated supply
	Uniform pressure at consumer location is maintained by putting pressure meters at District Metering Area(DMA), Sub District Metering area(SDMA) and at consumer destination	Manually valve controlled with a pressure of 2m head of water at consumer end	Automated Controlled pressure at consumer end for 3784 Household connections	Automated Controlled pressure at consumer end for an estimated 32017 households

	Increased consumer satisfaction by eliminating the cost of additional capital and recurring cost of water supply due to Ground level storage reservoir/Over head tanks/Pumping installations/Energy saving	Consumer has to bear the cost towards individual household storage reservoirs along with recurring energy charges	Automated pressurized water supply has eliminated the cost of household storage and recurring charges of estimated Rs. 50000/-	Automated pressurized water supply has eliminated the cost of household storage and recurring charges of estimated Rs. 50000/-
	Instant remote redressal of problem/complaints has helped the consumer in saving Time and eased the access to get service	Field Engineer Has to wait for the consumer complaints from the maintenance register.	135 numbers of water supply complaints through IVRS system and Complaint compliance through SMS reduced time to few hours	Reduced Numbers of Complaints (92 numbers) through IVRS system and Complaint compliance through SMS reduced time to few hours
SAFE Drinking Water to public (G2C)	SAFE Water Quality is ensured by installation of water quality sensors All standards in water quality is maintained by automatically dosing of chemicals to raw water Consistent Water Quality through testing monitored by WATCO Data for last three months have been found to be SAFE for Purity. http://pheowaterquality.nic.in	Quality of pipe water supply was determined based on the complaint by the consumer	Real time Water Quality Monitoring with alert mechanism are found	Real time Water Quality Monitoring with alert mechanism
Automatic chemical dosing through DCS	Accuracy in Quality of drinking water and reducing cost due to skilled manpower for operations	2 persons/ shift X 2shifts/day X 4 zones=1	Done without any human intervention	Done without any human intervention

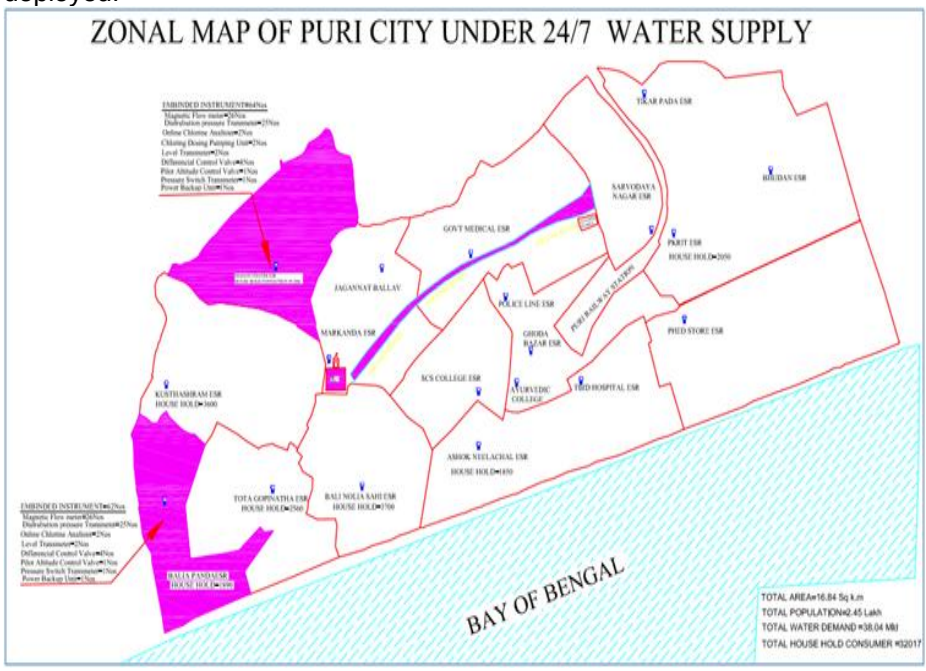
		6 skilled man powers deployed	Concerned Engineer can monitor based on alerts	Concerned Engineer can monitor based on alerts
	Decreased complaint response/ redressal time Citizens' Accessibility to Water Quality Test Results through Web/Mobiles Due to command and control through DCS, Complaint response and redressal time has reduced drastically.	Days	Complaint redressal time has been reduced to few hours for controlled problems	Complaint redressal time has been reduced to few hours for controlled problems.
Reduction in Non Revenue Water(leakage & unauthorised connection) (G2G)	Reduction of Non-Revenue water has been achieved by Real time identification of pipe bursts, leakages, unauthorized connections, minimum night flow etc	NRW = 56%	NRW = 34%	Estimated NRW = 18%
Decision making and enhancements based on data analysis through graphs & graphs(G2G)	Demand forecasting, Energy considerations Achieved towards short term and long term management	NA	Reduced to 34% due to reduction of unaccounted for water	Estimated to be reduced to 23% due to reduction of unaccounted for water
	Instant reporting – if one need to run a status report on desktop/laptop / tablets/ mobile devices then it would generate a report instantly on the live status related to the quantity and condition of all water supply equipments.	Fixed manual periodic reports	Instant reports	Instant Reports
	Data analysis- Real time graphs & charts of Supplying of water, Demand, Inlet pressure, Outlet pressure, Level of water in Tank, Excess supply and day abstract (Supply vs NRW) etc. based on date time interval	NA	Available in 5 seconds interval	Available in 5 seconds interval

Implementation

Implementation Coverage achieved in comparison to the plan / target

In FY2019-20 the project had a target completion of four zones of Puri city and the remaining nineteen zones are expected to be covered in FY 2020-21. All

the 9 AMRUT cities of Odisha will be covered by Financial year 2021-23. Implementation of the project has been carried out and made 100% functional by taking some focused zones i.e. (1) MasahaniChandi Area (2) BaliaPanda Area and all pumping stations of Puri. All the asset data has been digitized in maps and drawings. DGPS survey has been conducted to identify and digitize each valid consumer. Terminal equipments such as Flow meters (19 Nos), Pressure meter (99 Nos), Level sensors, Valves, Energy meters have been deployed.



Detailed Coverage of application with respect to target and achievements have been shown in the following table:

S. No.	Implementation strategy	Target (*Puri Municipality FY 2019-20*)	Achievement (*Puri Municipality FY 2019-20*)
1	Automation through Installation of Smart Pressure meters, Flow Meters, Level Sensors, Energy sensor replacing the manual operations by establishing a DCS towards providing required infrastructure facility for improving service delivery and attaining operational efficiency.	Puri Municipality (4 Zones) in FY 2019-20. Remaining 19 zones in FY2020-21Remaining 8 cities to be done by FY2021-23.	Puri Municipality 4 zones complete. (100%) in FY2019-20 with the intended functionalities for the project stakeholders.
2	Ensuring 24X7 drinking water and availability of adequate quantity with Uniform pressure	10.8 MLD for entire 78,000 population @ 155 litre per consumer per day with uniform	100% achieved by providing uninterrupted water supply

		pressure of 17m at consumer end.	through Maintenance of consistent pressure
3	Covering all urban area with piped water supply and all households with direct metered house connection.	Total 32017 households.	77% achieved
4	Ensuring water quality supported by an efficient and effective surveillance system.	Total Samples 8760 /year Total tests to be conducted 87,600 tests	98% sample collected and tested through manual laboratory 100% quality test for chlorine content on real time.
5	Ensuring ground water conservation by tapping feasible surface source	423 acres of sweet water zone to be recharged	Recharging through 6 tanks In sweet water zone with 2 motor pumps in summer season. 91% functionality achieved
6	Ensuring access of potable water to urban poor at affordable cost.	2394 urban poor in two slum areas	100% covered
7	Reducing Non Revenue Water (NRW)	From 54% to below 15%	Now NRW is at 23%Public water stand posts reduced to 1% of households
8	Power Factor determination	PF>95%; BEE rated equipments	100% achieved
9	Calculated Chemical consumption & dosing	Maintenance of Water Quality standard and chemical dosing.	Achieved for 4 zones of Puri municipality through Chlorine analyzer and dosing enabled integrated over automated system.

Improvements / Enhancements

Following *improvements are made in the modules in the last 1 year*:

- The randomization of Polling Personnel.
- The randomization of Counting Personnel.
- Postal Ballot Management System.
- Management of Expenditure Details of the contesting candidates.
- Dashboard and Data Analysis.

- Implementation Face Recognition System in 10 Polling Stations by TSEC.

Improvements/ enhancements specifically rolled out during the last one year

- The Smart Water Management Module was completed with embedded features
- Online Water Quality Sensors have been integrated with the module.
- Integration of Online Complaint Redressal System.
- Data Analysis and reporting have been enhanced.
- Public Display of Water Supply Services Dashboard

Improvements/ enhancements to be rolled out during next one year

- Up-scaling of the Model to all 19 Water Supply Zones of Puri
- Installations of additional 160 pressure meter(distribution), 11 pressure meters (main line), 16 level sensor, 32 control valves 16 chlorine analyzers and its integration with the application.
- Continued Training and Capacity Building of WATCO staff..

ENABLER

Processes Re-engineered

The Government of Odisha has adopted 5Tas change management tool in governance (transformation, transparency, teamwork, technology and timeliness) which focuses a standard service delivery mechanism for each service prioritizing the trust based citizen convenience. The Drink from Tap Mission was conceived under this 5T Mission of the state to provide pure and sure water to citizens.

Earlier, the prevailing water supply and quality management was being done manually and thus it was very arduous, and simply was impossible to monitor besides being error prone without having the facility to have the data recorded for later verification and analysis. Thus we have made use of “technology” as a key aspect of process reengineering. Towards this, we have made use of Industrial Internet of Things (IIOT), which has become a medium of automated, fast and accurate data collection and storage, enabling the machines to work together to enhance the decision making and thereby providing better citizen services.

In our project, we have derived the following benefits as a result of adoption of automation through IIOT. They are:

Improved consumer focus and experience

By making use of IIOT in conjunction with a suitable web-enabled data driven application, we have been able to provide higher quality of response to consumers (immediate response, IVRS based complaint lodging, SMS based status updation) as a part of service delivery. Due to 24X7 safe water supply through automation, consumer services became more responsive to the needs of the consumers.

Minimized Process Complexity

Earlier system required citizens to fill x number of forms and y clearances to be obtained for a service request. Now, the complexity has been reduced through Command and control and delivering the service automatically without human intervention.

Better Trouble Shooting & Redressal

Now, Identifying a problem (leakage/burst) through the process of automation has become very easy. In time alerts to the concerned engineer for any kind of trouble in form of SMS has reduced the response time to few hours instead of days. Standards have been framed for the time to be taken for delivery of

service by the Government to the citizens.

Transparency

Improved transparency has been achieved by providing knowledge on process for delivery of service, delivery timelines, status of service request to consumers and business.

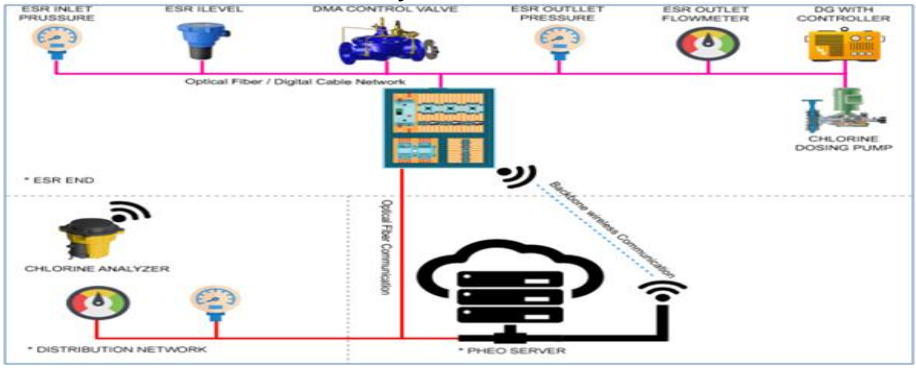
Technologies

Architecture of the system

Main architecture of the system is a three-tier system with

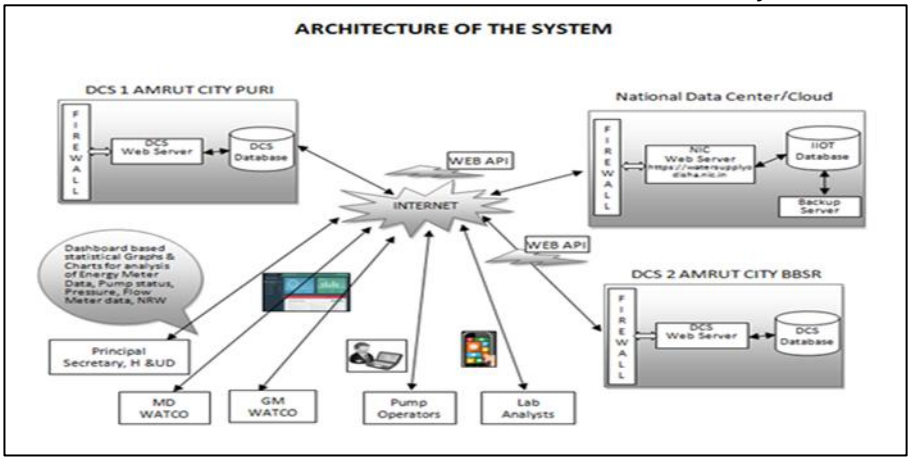
- Terminal devices connected to Programmable Logic Controllers (PLCs) at one end.
- They are connected to the WATCO Divisional server through Optical Fibre LAN on a Ring topology. The combination of the both the system is termed here as Data Control System(DCS)/ real time Command Control system and
- The data from the Divisional server is sent to the Cloud through internet for monitoring & analysis and are stored in National Data Centre of NIC by the help of a web enabled system. Both DCS and Web enabled system make use of Geographic Information system (GIS) for asset identification and tracking.

Real time Command Controlled System/ DCS



Web Enabled System

A web-based application with http://watersupplyodisha.nic.in is made available to the various stake holders external to the command & control system.



Data Analytics

Visualizing Analytics data with Dashboard

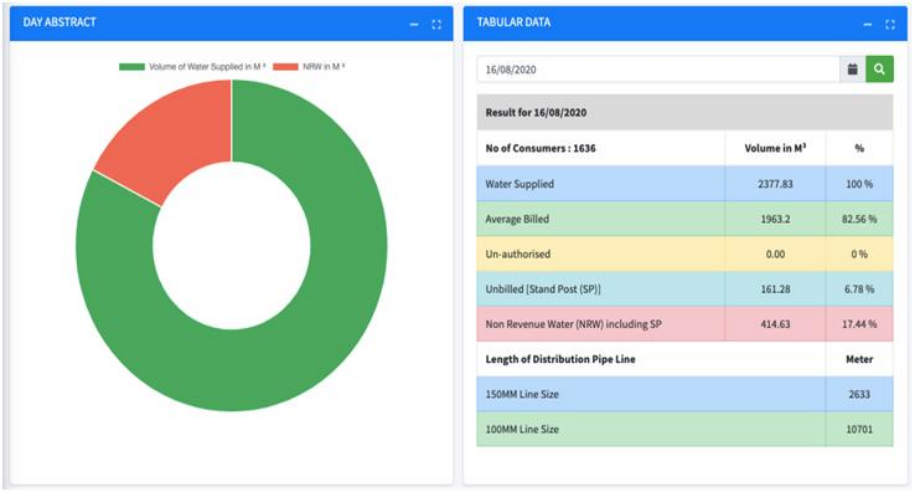
Entire scenario of the assets and their utilities are available in the form of a dashboard where in control, support and monitoring activities can be done. Real time status of each of the above mentioned parameters can be analytically viewed with the dashboard.

Data is available on both Google MAP &via satellite view. From this the user can exactly locate all field instrument locations.

Analytics on Energy

Data collected from energy meters through control panel in every five seconds interval using payload packets is stored in decimal value in database and visualized in real time graphs. Some Data visualization and analytics in real time are given below.

Analytics on Flow & Pressure



Knowledge Management

Rule-base Knowledge Management technology was introduced as the key part for applying the intelligence functions to the system by integrating the data set along with pre-defined rules.

Transfer of Data to Cloud for Web based analysis and monitoring

Data on various parameters are transferred to NIC's Cloud with a periodicity as defined for each of the parameter. The data is pushed through an API from each DCS and is made available to the stakeholders. The parameters of data which is available in cloud are-

- ESR Level
- Source Pressure (Rising Main)
- Water meters at the distribution channel and consumer end
- DMA/SDAMA Pressure (Distribution network)
- Chlorine status
- Status of Generator, Pumps
- Energy meters
- DMA/SDMA consumption data

Computation of daily NRW in 24X7 supply

In this case the IIOT application manage 1.7 to 2.0 KG/SQCM pressure by controlling of dual solenoid operated pressure and flow control valves at DMA input. Pressure meters have been installed at each DMA (District Metering Area) i.e. near the source and SDMA (Dub District Metering Area) i.e. before the streets/small areas.

Process to compute the NRW is as follows,

- Compute the sum of the pressure and volume of consumption at each consumer point on a daily basis.
- Compute the SDMA pressure/flow for a day from the SDMA pressure/ flow meter

If the SDMA pressure/flow is greater than the sum of the total consumer pressure/consumption then survey would be conducted for detection of unauthorized connections or leakage in the street.

- Compute the total pressure of all SDMAs
- If DMA pressure is greater than the sum of all SDMA pressure then leakage is identified by controlling the valves for SDMAs

This automation of some of the key calculations and variables has enabled smooth co-ordination and functioning amongst the various field staff of WATCO

PEOPLE

Challenges faced &Solutions developed

- *Leadership:* This aspirational and ambitious mission to provide drink from tap quality water to each home on 24X7 basis required leadership and speed of decision making to explore and evaluate various models, opportunities, risks and challenges which was provided by the highest level of commitment of delivering the project by the leadership of WATCO and Housing & Urban Development Department of Odisha
- *Change Management:* This was a key enabler as it was the first computerization/ e-Governance initiative undertaken by WATCO. Process reengineering was addressed to the extent feasible and resistance of operational staff was addressed with user interaction, training and handholding towards addressing digital divide. The change management arising out of lack of knowledge & resistance from operational staff also initially hindered the progress of the project. This was addressed with the identification of key-troublemakers & shifting their responsibilities to other areas with the support from Senior Officials. In their place, technology savvy/ positive people were deployed. The learning of this, was to provide technology orientation and skills to the concerned officials/ staff before the commencement of the project implementation, in order to facilitate the technology adoption and avoid resistance.
- *Training & Capacity building:* This was addressed through design of separate training programs in the form of (i) Sensitization training (ii) Operational trainings and (iii) Up-gradations trainings to the WATCO engineers. New recruits were provided extensive training including class room training and field training for a period of three months. Training for in service employees and field staff were conducted on a regular basis to enhance technical capabilities for achieving operational efficiency and skills up-gradation
- *Leakage Control:* The challenge of detection and regularization of un-authorized connection (for NRW computation). This was overcome by taking each District Metering Area (DMA) and carrying out surveys in the areas towards finding the consumers and their daily consumption. Total

consumption was computed and compared in each Sub DMA meter reading and thus identifying the un-authorized consumers based on the differential reading. This also includes the elimination of stand posts which do not have a control. Stand posts were removed (except some identified area) as uniform supply is provided to all consumers.

VALUE INDICATORS

Learnings for sharing

Key Learnings

Given the large scale of deployment and the amount of data getting generated, acquisition of real time data to server was a major challenge (as there was a requirement of data transfer rate of 200ms). Communication over internet was very slow, expensive and insecure for water supply network. GPRS based data communication with SIM cards at each devices could not be used due to the service provider network issue. Radio communication was not feasible as Odisha is highly cyclone prone state (Average two cyclones per year) thus not durable, could be bent and difficult to maintain (as it has to be installed at an altitude of 30 meter height). It was overcome by LAN connectivity to DCS by spreading dark fiber optic in the municipality and along the pipe line network.

Digital Empowerment

- To overcome the barrier of language or digital literacy, the water quality data and with water supply service particulars are displayed in digital display boards in Public Places.
- Community participation through Partnership with Women Self Help groups (Jal Sathi) has enables greater reach to each segment of the community.

Green e-Governance

One of the key areas of green computing applied in this project was around development of energy efficient and less power/fuel consuming hardware (like motor pumps). In addition, proper recycling policies and use of eco friendly equipment was prioritized. Most of the old desk top machines were shifted to the field offices for reuse in less prioritized activities. Obsolete and unused electronic waste is transported to e-waste disposal companies periodically.

Shri. G. Mathivathanan, **IAS**, *Principal Secretary, H & UD Department, Govt. of Odisha, hudsec.or@nic.in*

Er. P. K. Swain, *MD, WATCO, Housing & Urban Development Department, Govt. of Odisha, eephpuri@nic.in*

Er. Sarat Chandra Mishra, *Nodal Officer, WATCO, Housing & Urban Development Department, Govt. of Odisha, eephpuri@nic.in*

Shri. Lalatendu Dash, *Senior Technical Director, National Informatics Centre, Ministry of Electronics & Information Technology, Govt. of India*
Odisha StateUnit, Bhubaneswar, eephpuri@nic.in

Shri. D K Jena, *Senior Technical Director, National Informatics Centre, Ministry of Electronics & Information Technology, Govt. of India*
Odisha StateUnit, Bhubaneswar, eephpuri@nic.in

Central Public Procurement Portal (CPPP)

National Informatics Centre (Tamil Nadu)

Raman V and Sivarama Selvan S

PROJECT OVERVIEW

In pursuance of the recommendations of the committee on Public Procurement headed by Shri Vinod Dhal and the decisions thereon of the Group of Ministers constituted to consider measures to tackle corruption and ensure transparency, the Department of Expenditure took action for setting up a Central Public Procurement Portal (CPP Portal) [https://eprocure.gov.in/]. National Informatics Centre (NIC) was given the responsibility for extending technical support and setting up this portal which was made operational on 1st Jan 2012. The primary objective of this portal is to provide a single point access to the information on procurements made across various Ministries and the line Departments.

Objectives

- *e-Publishing*: Publishing of all tender enquiries, corrigenda thereon and Award of Contract (AoC) on the CPP Portal.
- *e-Procurement*: Complete tendering cycle starting from publishing of tender enquiries/corrigenda, online bid submission, online clarifications, bid opening, uploading of evaluation results & Award of Contract details , in line with General Financial Rules and the requirements set out by DoE, Central Vigilance Commission (CVC), Department of Electronics and Information Technology and other agencies like World bank, Asian Development Bank.
- The portal also *facilitates the Organisations using a different eProcurement* system to bring in and aggregate their tender enquiries / corrigendum's / award details to this portal using XML transfer. E.g. Indian Railways, Central Public Works Department, Other State Governments.

Scope - Functional and geographical

- OMs / GOs and all circulars related to Procurement
- Collate Tender Information PAN India
- Corrigendum, Award information, Product Category wise segregation
- Grievance Capturing and redressal
- Vendor Debarment PAN India information
- ePublish of Tenders with lower value
- Dashboard, Newsletter, Online Training

Geographically it covers PAN India as it is mandatory that all procurement information is populated to CPP portal.

Stake Holders

- Bidders / Contractors
- Government officials and Decision Making Authorities
- Procuring Entities

Intended benefits and current status

- One stop shop for all Procurement related Information
- Immense visibility leads to doing away with News Paper Advertisement
- Real time Active tender information, easy for Bidders
- Annual Workshop and Awards for Best Performers

- Annual Report

Current Status of Implementation

# Central Govt Org	# State Govt and UTs	# XML Entities	# Tenders	# Value of Tenders (Rs. Cr)
794	37	136	2,29,00,489	4,43,60,951.70

Software

Completely on Open Source technology adhering to Open Standards

- Cloud Computing
- Linux
- Apache
- Drupal CMS
- PostgreSQL Database
- Replication of data & backup facility
- Scalability

Cyber Security

- Certified by Standardization, Testing and Quality Certification (STQC). Complies with Deity's eGovernance Guidelines, mandated by Min of Finance, for eProcurement System.
- Certified by World Bank for compliance of all MDB guidelines and for use in procurement National and International Competitive Bidding.

Disaster Recovery and service continuity

- Central Public Procurement Portal is running on a huge infrastructure setup, spread across various National Data Centres of NIC at New Delhi and Hyderabad and involving number of physical servers, Data Storage, Communication network and Some of these are deployed under Cloud also. The Primary Servers / Storage are hosted in ISO-27001 certified National Data Centres, New Delhi.
- GePNIC infrastructure (Servers & Storage) has a Near DR & FAR DR arrangement.
- All the Near DR and DR infrastructures are monitored and maintained as done for the primary infrastructure.
- DR Plan is tested periodically in a simulated environment to ensure its operability and availability and ensure to educate the DR team members about the whole process. Planned Drill activities to check the migration time is also in place.
- The DR Plan is updated according to the changes in the infrastructure, changes in the internal and external teams and takes into account the changes in technology.

RESULTS INDICATOR

Information

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Overall Tenders in CPPP	Cumulative Tender count in CPPP	21,89,703	20,49,500	9,44,847
Value of Tenders in Rs. Cr	Value of Cumulative Tender in CPPP	23,91,941	18,39,496	15,11,871

Tender in Central Govt. including PSU's	Tender count – Central Government	3,10,361	2,96,568	1,35,250
Value of GePNIC Tenders in Rs. Cr	Tender value – Central Government	9,93,348	8,49,388	4,66,935
No. of Tenders from external user Organisations	Tender count – External User Organizations	5,14,471	5,35,143	1,77,973
Value of Tenders from external user Organisations in Rs. Cr.	Tender value – External User Organizations	1,60,551	2,54,454	83,740
No. of Tenders from State Government	Tender count – State Government and UT Administration	13,64,871	12,17,789	6,31,624
Value of Tenders from State Government in Rs. Cr	Tender value – State Government and UT Administration	12,38,040	7,35,652	9,61,194
No. of Organisations using it	Number of Organisation	795	105	30
No. of Debarments available	Number of Debarment	Not Introduced	976	295

Implementation

Implementation Coverage achieved

The portal was launched in January 2012 with a direction from Procurement Policy Division; Ministry of Finance to adopt electronic tendering for all procurement in the country over Rs.10 Lakhs. The threshold for mandatory electronic tendering was gradually reduced to Rs 5 Lakhs and Rs 2 Lakhs. Since April 2014, gradually most of the Central government organizations switched over to electronic tendering. The number of organisations / tenders over last few years is depicted in the graph below:

CPPP has witnessed gradual increase in usage and to meet the ever increasing load few dedicated portals we put up :

- Defense procurement Portal – This caters to organizations under Ministry of Defense like Indian Army, Indian Navy, Military Engineering Services, Defense Estates, DRDO and others.
- Central Public Sector Enterprises – With is the increasing demand from CPSEs a dedicated portal was put up – etenders.gov.in
- Central Government Originations – Central Government Ministries , Departments
- Autonomous Bodies having similar kind of procurement practices use the https://eprocure.gov.in/eprocure

Improvements / Enhancements

Major enhancements rolled out recently include:

- Grievance Module
- Debarment module
- Integration with the GEM

Planned for next year:

- Building an advanced Analytics Dashboard

ENABLER

Processes Re-engineered

- One single point portal to look for all active tenders

- Bidder need not check multiple portals for tenders related to their area of interest.
- Meta-data of tenders/ corrigendum from various orgnisations across the country is assimilated. Active Link takes to the specific RFP of each organisation reducing the time to search for bidders.
- Grievance/ Suggestions module enabled to capture the grievances from the point of origin and it reaches the highest authority of the Organisation (Secretary/CMD)
- Debarment/ Blacklisting of vendor by procuring entity across the country is reflected in home page for benefit of all.
- All the old tenders are Archived for future references

Technologies

- Integrations through the API / REST web services
- Central Public Procurement Portal adheres to the responsive web design.
- The data/ content through the web services are digitally signed and verified
- with the concern officers digital signature certificates
- All the external agencies are integrated through the REST web services
- The portal adheres to the security guidelines of the STQC

People

Key criteria for success of such a wide scale adoption of the Central Public Procurement Portal is the multifold Capacity Building exercises taken up.

- Daily Online Web based training for last 5 years
- MDP programme at National Institute of Financial Management
- Customised Classroom Trainings at User Premises
- Specific Supplier Capacity building

In addition to these trainings the following steps were taken for smooth handling of user queries and issues:

- Setting up of Project Monitoring Unit (PMU) at various levels.
- Setting up of 24 x7 x 365 Telephonic Help desk for Procuring Entities and Bidders
- Modular Training videos are available
- Training videos in Social Media such as YouTube by users of the system itself.
- Provision of hiring trained onsite support personnel to be positioned dedicated in thedepartment.
- NICSI empanelled agencies trained in eProcurement rollout
- Availability of demo portal for hands on and practice with mock tenders.

Encouragement and Recognition:

- National Workshop for Users of Central Public Procurement Portal -2018
- National Workshop for Users of Central Public Procurement Portal.-2019

These workshops were held for exchanges of ideas and feedback from users. Bestperforming entities for Central Government, State Government and CPSEs wereawarded by Secretary Expenditure and Secretary MeitY.

VALUE INDICATORS

Learnings for sharing

Major learning with this wide spread implementation across the country in varied kind of organizations are:

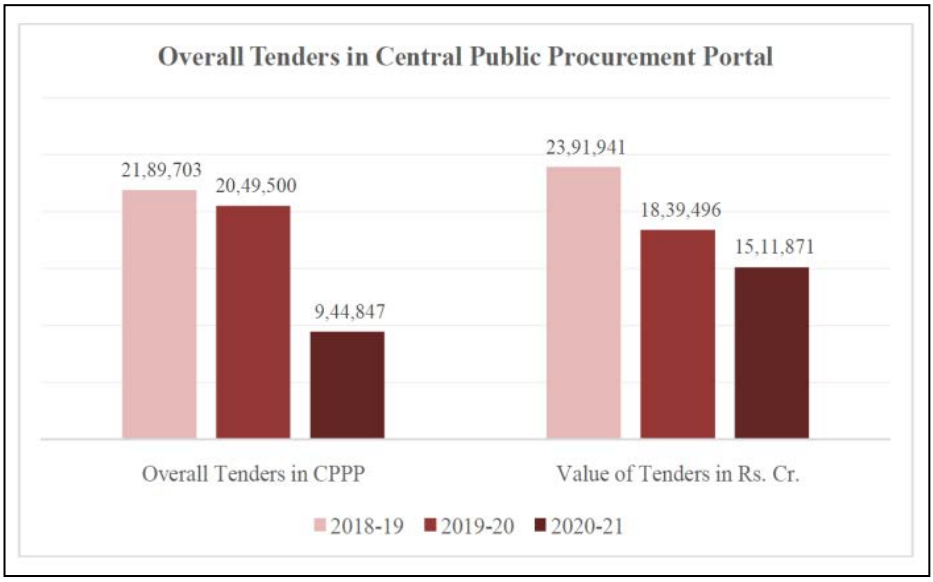
- The system has to be robust, scalable and responsive
- Quick and timely redressal of operational issues to keep users satisfied.
- Such initiatives need active support from top management
- Planned and phased implementation helped accelerating the pace.
- System must not be thrust upon, it must win the acceptance for wide adoption
- Periodic reviews and higher targets.

Digital Empowerment

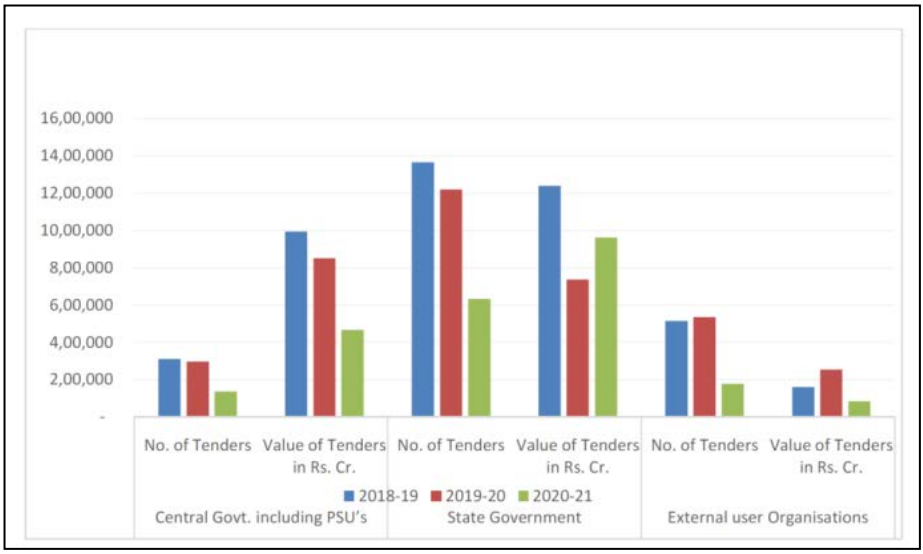
- Digital Empowerment
- Bilingual
- Mobile app
- Use of Digital Signature Certificate
- PAN India presence
- 24X 7 availability of Tenders Comprehensive Information's
- Tender Status and other decision are available in public domain
- Helpdesk support similar to CSCs

Green e-Governance

- Paper Less Bidding
- Digital Archival of Documents
- Online Reports Generations
- Use of Digital Signature Certificates for Signing
- Easy access to Tender information.
- Offices have lesser documents to maintain



Comparison of State/UTs vs Central Govt vs External



Shri Raman V, *Deputy Director General, National Informatics Centre (Chennai), v.raman@nic.in*

Shri Sivarama Selvan S, *Technical Director, National Informatics Centre (Chennai), ss.selvan@nic.in*

PM Mementos Auction- Online Auction of mementoes presented to Hon'ble Prime Minister

National Informatics Centre, New Delhi

Adwaita Gadanayak**,** Nagesh Shastri and Usha Saxena

PROJECT OVERVIEW

As per the direction of Prime Minister's Office, NIC had developed an online e-auction portal in colloboration with Ministry of Culture for auctioning the mementos presented to Hon'ble Prime Minister. The auction was conducted by National Gallery of Modern Art (NGMA), Ministry of Culture, Govt. of India. This portal facilitates any citizen of India to participate in the e-auction. The url to access this portal is https://pmmementos.gov.in

The e-Auction portal was developed in a very short span of time with all flavours required for an ecommerce portal and developed as a product that can be configured to any organisation going for e- auction. The product has been built as a single reusable system by bringing together independent functions and systems under a single framework. It has a beautiful display of Most sought items, up coming items for auction, for those where bidding is yet to start as well as closed auction with full details.

Objective :

Main objective was to provide a state of art, robust, scalable, authentic platform as this was a very prestigious event. This is generic in nature and can easily be adopted for all kinds of auctions like Sale/lease of Flats, Plots, Artifacts by Government offices/Public Sectors Units &Autonomous bodies. It aims at transparency and non-discrimination amongst participating buyer, by allowing free access to the items on display with the detailed specification like Category of the item, Type of item, Dimensions like size, weight, height, start price, increment amount,. Any one can access the same from any place on 24X7 basis, using any device.

Key stake holder

- Ministry of Culture/PMO – Process/policies related to Auction
- NGMA, Ministry of Culture for Exhibiting/Auctioning/Receipt of payment/ Dispatching
- SBI- Providing payment gateway support for receipt of online payment as well as setting up of POS at NGMA. All modes of online payment like net banking, card payment and BHIM UPI thru SBI MoPS.
- Public / Buyers - This platform enables to easily show case all the items and people can see any buy it at their convenience. Any one residing in India can participate.
- NIC-Design Development andHosting of website https://pmmementos.gov.in, its management and positioning of 24x7 telephonic help desk to answers to technical queries.

Intended benefits and current status

- Most important benefit is the transparent as well as ease with which the auctions can be conducted. No need of any physical gathering or physical display of items.
- Wide participation with social media interface and publicity
- Easy to manage the conduct of auctions like extensions, cancellation , suspension etc

- Online auctions remove physical limitations of traditional auctions such as geography, presence, time, space, and a small target audience

Tools used for development of this portal are:

- Front end :- HTML5, CSS3, JS & Vue JS
- Back end:- RESTful Web Services with Java Spring Boot Frame work and PostgreSQL. It was implemented as Service Oriented Architecture (SOA).

The portal is deployed on a robust infrastructure setup, spread across various National Data Centres of NIC and involving number of physical servers, Data Storage, Communication network and Some of these are deployed under Cloud also. The Primary Servers / Storage are hosted in ISO- 27001 certified National Data Centres, New Delhi. Near DR & far DR arrangement is made available.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	**Brief service description with benefits**	**Volume (Nos) of Services year wise**		
		2018-19	**2019-20**	**2020-21**
Auctions conducted for Items	Number of items for which the online auctions were conducted.	1,541	2,772	
Start Value of these itemsin Rs. (approx.)	The base price or start value as decided by the Auction inviting authority.	27,87,100	93,42,350	
Bids Received	Number of hits/participations	7,356	11,995	
Online Payment Worth Rs	Payments received inINR	2,62,50,400	36126250	
Number of categories	Categories in which the items were segregated	12	24	
Buyers enrolled	Number of buyers enrolled in the portal	3,946	7,555	
Highest increment in value for	Number of times the final price was more	Increment – 99,920% Start Price – 1000	Increment – 1,99,910% Start Price	

a specific item	than base price	Buyer Value – Rs.10,00,200/- Product - Shawl	– 1000 Buyer Value – Rs.20,00,100/- Product Name - Photo of Prime Minister Shri Narendra Modi with his mother	

Implementation

- As the auction of Gift items was being organized at the behest of PMO, all efforts were put in to make it very responsive. Wide spread coverage was given in all media. This include ample advertisement across the country by all mediums like Print/ Television/ Social Media like Twitter, Face book etc
- The response received from the public was amazing. Across the country people had participated enthusiastically and the portal functioning was really appreciated. Anyone could participate using any device.
- It was decided to open the auction PAN India only. The portal was not made available outside India as per decision of PMO . No challenges were faced in implementations. Proper Load testing was conducted to take a maximum of 4000 simultaneous hits.
- 24x7 Telephonic Help Desk was made available for any assistance
- All OTPs were delivered as priority OTPs.

Improvements / Enhancements

Enhancements planned – Bulk creation of catalogues and its approval. Bulk creation of auctions and its approval. Facilitation of EMD deposit for participation in auction. Separate 4th level domain for each Department/Organisation and a common page with aggregated information.

ENABLER

Processes Re-engineered

The auction process took off as a physical/manual auction by a professional agency, organized at the National Gallery of Modern Art for two days in January (27th & 28th). In two days only very few items could be sold and turnout was also not encouraging. Then it was decided to conduct all auctions online only. The online auctions removed the physical limitations of traditional auctions. Major advantages buyer experienced in online auctions were :

- One could see all details of the items very well, many times and at ones leisure compared to the one minute display during physical auction when the auctioneer announces the price and works for instigating bids and increasing the bid amount.

- One has to sit along as auction of items happen sequentially. Whereas in Online auctions facilitates simultaneous ongoing auctions and buyer can set notifications too.
- Buyer can see the trends of items with maximum Bids/Hits , Items which has been most viewed, Items Sold and the ones which are yet to be sold.
- Viewing by category , type, price range are all very handy for buyer.
- Auto extensions , Mail / SMS notifications, Online Payment etc are other salient aspects.

Technologies

- Wide coverage was given in all media including Print/ Television/ Social Media like Twitter, Face book etc by Ministry of Culture & NGMA, Min of Culture
- Buyer/ publish can also share interested item on Twitter/ Facebook

People

- Extremely user friendly and self-navigating screen
- Have in-built features that are common to an eCommerce portal and hence no major capacity building was needed.
- User Guide on Home page
- Simple registration process
- Exhibition of items as well as constant monitoring by NGMA, Min of Culture
- Bilingual Telephonic Help Desk 24x7
- Wide publicity in print media, TV /Radio News Channels as well as social media.

VALUE INDICATORS

Learnings for sharing

- Handling sudden spike in Load
- Handling changes in auction rules, configurable
- Can be configured to bring in various parameters like EMD etc
- Easy to meet similar requirements of other organisations
- Very useful for Government museums, art galleries to sell their artifacts

Digital Empowerment

The proceeds of auctions went to a noble cause to ‘Namami Gange’ project, a Central government project to clean the Ganga River. This sent a strong message across the linguistic, demographic and cultural set up of the country about the noble intentions in auctioning of gift items.

Green e-Governance

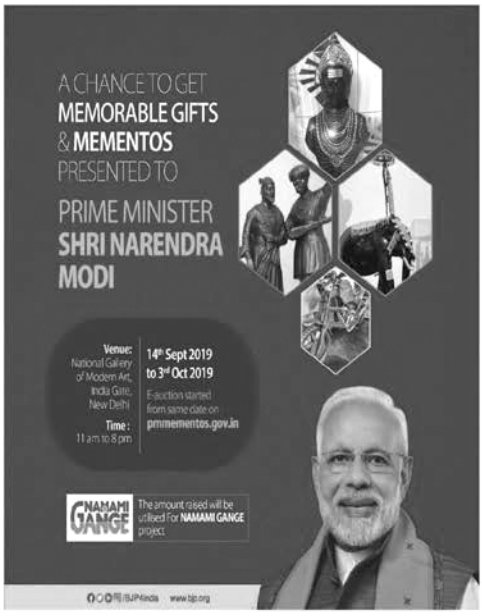
- The process is completely paperless.
- High quality digital images of items along with its description including curative description are captured and are catalogued.
- Items from catalogues are then selected for auction.
- Online auction is conducted against selected items during designated date/time with auto extension facility.
- Online payment gateway facility is also provided to public to receive payment against item won in auction.
- Even though, dispatch of items is offline, online provision has been provided to view delivery of items.

PM Mementos

A NOBLE CAUSE TO 'NAMAMI GANGE'

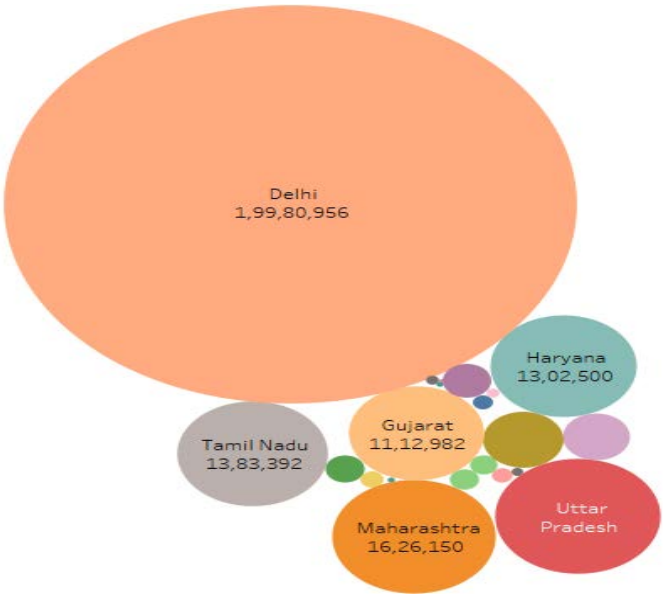
At the behest of Prime Minister's Office Gifts / Mementos presented to Hon'ble PM since 2014 were auctioned in two phases National Gallery of Modern Arts, Min of Culture using the Open Auction, eAuction India Portal. The proceeds of auctions went to a noble cause to 'Namami Gange' project, a Central government project to clean the Ganga River.

These auctions were well received by general masses. Prior to start of the auction, Ministry of Culture publicized the event well in electronic and print media. Items were kept for display in NGMA Delhi for the public to view.

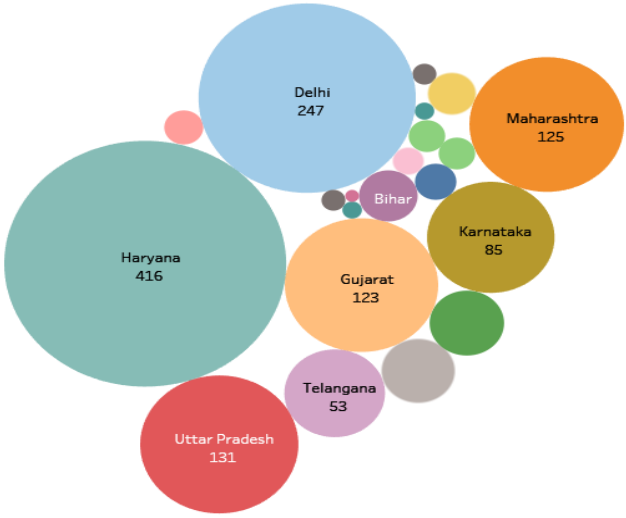


The items like statues, photographs, paintings and articles such as angavastram, shawls, commemorative coins, traditional musical instruments, hats, pagris and jackets, etc were auctioned. Several mementos fetched 200 times of base price at auction. In online auction, Wooden Replica of Ashok Stambh was sold at Rs.13,00,100/-

State/ UT's –Revenue Wise



State/ UT's –Item Wise



Shri. Adwaita Gadanayak, *Director General, National Gallery of Modern Arts, Ministry of Culture, ngma.delhi@gmail.com*

Shri. Nagesh Shastri, *Deputy Director General, National Informatics Centre, nagesh@nic.in*

Ms Usha Saxena, *Senior Technical Director, National Informatics Centre, usha.saxena@nic.in*

Tenders, Madhya Pradesh – The Madhya Pradesh Government eProcurement System of NIC (GePNIC ©)

Madhya Pradesh State Electronics Development Corporation Ltd.

Nand Kumarum, Anju Pawan Bhadoria and Awantika Varma

PROJECT OVERVIEW

About Madhya Pradesh tendering and its importance

The Government e-Procurement System of NIC (GePNIC) pioneered by National Informatics Centre (NIC) in consultation with Department of Expenditure, Ministry of Finance aims to support Governance by ushering in more effective and transparent inter and intra-Government processes. The product has been built as a single reusable system by bringing together independent functions and systems under a single framework. Within the framework and guidelines of GePNIC MP State Electronics Development Corporation has created dashboard of MP Tenders portal for departments using data analytics for deep study of tendering process. Also has engaged School of Good Governance for study and creating better understating of the project implementation by various departments utilizing the services of MP Tenders portal.

Objective & Scope:

MP Tenders GePNIC system has been implemented with an objective of providing a transparent and robust platform for conducting online tendering and tender cum auctions. It is being used by various departments of state govt. of Madhya Pradesh. In counting they are 53 Major departments of MP Govt. counting 3700+ participating entities.

Scope - functional and geographical

MP Tenders provides Tendering and Tender Cum Auction facility for procuring goods, services works and sale of land & properties. MP Tenders portal has been implemented across all the departments from Nagar Palikas to Directorate and PSUs of MP govt. Major functional aspects include Organisation Onboarding, User Management, Tender creation and Publishing which caters to Open/ Single/ Limited/ Global tender, with multi cover options, Two stage tendering, QCBS, Non-Disclosure Agreement and so on.

Key stake holders –

- User Departments/organizations using the system for online tendering
- Bidder / Contractor who participate in the tenders and auction

Intended benefits are:

- Centralized tracking of tenders, corrigendum and awards
- Reduction in paperwork, Easy to rework and avoid errors
- Visibility of tenders across the state
- Ensuring compliance with Government guidelines
- Standard templates leading to easy analysis
- Bidders are notified at requisite milestones
- Bidders get their EMD refund quickly enabling more float money in hand, in turn more participation
- High visibility of the tenders of MP as it gets populated to Central Public Procurement Portal
- Reduction in advertisement costs, transaction cost and other operational costs.

- Bringing in transparency and speed in tendering process.

Current status:

Over the last 2 years Govt of Madhya Pradesh has processed 1,19,862 tenders worth Rs 2,12,328 crores and 3732 Department users and 33364 Bidders are seamlessly accessing the system.408 Trainings are held and 6687 users have Participated.

Software

Completely on Open-Source technology adhering to Open Standards

- Hosted in Cloud
- Linux OS
- Apache Tomcat
- PostgreSQL Database
- Front end-Java Enterprise Environment (JEE), Tapestry Framework, Hibernate etc.,
- Two factor authentications with Digital Signatures
- Digital Signing of all documents
- Secured Encryption of all bid documents at client end.
- Replication of data & backup facility
- Scalability
- Flexibility in deployment parameter configuration
- Log Management through Log4J

Cyber Security

- Certified by Standardization, Testing and Quality Certification (STQC). Complies with Deity's EPS Standards, eGovernance Guidelines, mandated by Min of Finance, for eProcurement System.
- Certified by World Bank for compliance of all MDB guidelines and for use in procurement National and International Competitive Bidding.

Disaster Recovery and service continuity

The Madhya Pradesh Government eProcurement System of NIC is deployed on infrastructure setup spread across various National Data Centres of NIC at New Delhi and Hyderabad. This involves number of servers, Data Storage, Communication network. The Primary Servers / Storage are hosted in ISO-27001 certified National Data Centres, New Delhi.

GePNICInfrastructure (Servers & Storage) have a Near DR & far DR arrangement.

All the Near DR and DR infrastructures are regularly monitored and maintained in line with the primary infrastructure.

DR Plan is tested periodically in a simulated environment to ensure its operability and availability and ensure to educate the DR team members about the whole process. Planned Drill activities to check the migration time is also in place. The DR migration is well documented.

The DR Plan is updated according to the changes in the infrastructure, changes in the internal and external teams and takes into account the changes in technology.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21

Electronic Tenders	Creation and publishing of tender online leads to higher visibility, easy access	27946	65515	26328
Value of Tenders (in Rs. Cr)	Indicates the value of tenders floated online. Captured during tender creation.	36268	112627	63483
No. of bids Received	Participation Index. How many bids are received in all	44748	140342	58421
No. of tenders Awarded	Count of completed tenders. Those tenders which have completed the cycle.	11252	24002	4156
No. of Online Payment transactions	Payment like Earnest Money deposit, tender Fee, Registration Fee are taken online – Count of transaction	44748	140342	58421
No. of Tenders from municipal bodies	Municipal bodies play a vital role in last mile of governance. Numbers of tenders floated.	11915	29867	8571
Value of Tenders from Municipal bodies (in Rs. Cr)	Municipal bodies play a vital role in last mile of governance. Value of tenders floated.	10488	9170	2842
No. of Bidders Registered	Bidders registered - Count	14191	13438	5693

Implementation

Implementation Coverage achieved in comparison to the plan / target

MP Tenders portal has been implemented across all departments of state government of MP within a year. Providing the functionality of Tendering and Tender Cum Auction by MP Tenders system, Departments are using it for Purchase of Goods, Works and Services Tenders as well as For Auction of Sand Mines, Liquor Shops, Sale of Land and properties. MP Tenders system is now being used by Directorates to Local bodies in each districts of State. It is widely used by the educational institutions, Pradhan Mantri Gram Sadak Yojna, Health departments.

Excise auction were carried out at district level. All districts were equipped with nuances of online auctions. Bidder training and capacity building was undertaken in a big way.

Challenges faced:

As government of MP were migrating from one system to another the challenges were very different. As officials and Bidders were very used to a particular system for long they took some time to adjust to the new system. It was mitigated by providing trainings, User manuals, Online support by Help desk etc.

The present system needed four Bid openers to be assigned at the time of creating a tender. This was to give a wider choice of selection of Bid openers during the technical and financial bid opening. Any two of the assigned four could exercise the option.

Improvements/ enhancements specifically planned out during next one Year

Periodic enhancements are part of the system life cycle.Latest accomplished ones are:

- PAN India Vendor Debarment information
- Dash Board for Madhya Pradesh
  https://eprocure.gov.in/eprocdashboard/?sitecode=MP

- Tenders with Non-Disclosure Agreement Clauses can be processed online
- Tender cum Auctions - Reverse and Forward
- Quality and Cost Based System
- Two Stage Tendering
- Integration with MSME, Start UP
- Mobile App, Vendor Performance / Participation History

New features planned for the coming year:

- Repository of all Tender Documents for analysis to cull out Best practice
- Seamless auto extension for tenders with stipulated bids
- Integration with Departments having ERP system for pre- and post-tendering
- Chat Bot for first level assistance.

ENABLER

Processes Re-engineered

- Tender documents were standardized, Departments encouraged to follow Standard Bidding document
- Price Bids for tenders were standardized in few select templates. This enabled department to adopt one amongst the standard ones leading to uniformity.
- Another salient step in this system was all bid get encrypted in client end. No form-based price bids
- Tender Input Form / Corrigendum Input form was made available for users to easily adopt the system
- All essential documents are kept in a section Called Download in Homepage for easy access. This enabled quick retrieval by respective stake holders rather than circulation to all.
- Well defined process of System Malfunctioning is made available. In case of any issues of portal mal function the active tenders are extended as per policy. This has brought lot of faith in the system for Bidder community.
- Automatic display of tender information/decision at respective milestones as soon as the process is completed by TIA in the workflow thru Tender Status.

Technologies

Dashboard has been built in to highlight the achievements and shortcomings. Various KPIs for Time overrun, Cost Overrun, participation trend has been developed.

People

Key criteria for success of such a quick adoption of across the state:

- Daily Online Web based training
- Customised Classroom Trainings at User Premises
- Specific Supplier Capacity building
- Setting up of Project Monitoring Unit (PMU) at Bhopal
- Setting up of 24 x7 x 365 Telephonic Help desk for Procuring Entities and Bidders
- Modular Training videos are available

- Training videos in Social Media such as YouTube by users of the system itself.
- Provision of hiring trained onsite support personnel to be positioned dedicated in the department.
- NICSI empanelled agencies trained in eProcurement rollout
- Availability of demo portal for hands on and practice with mock tenders.

VALUE INDICATORS

Learnings for sharing

- One challenge faced was in change management everyone cited lack of time to learn the new system. This was mitigated with enhanced modular training.
- The user-friendly software also played a major role in quick adoption.
- Issues faced were addressed immediately giving a sense of

Digital Empowerment

- Digital Empowerment
- Mobile app
- Use of Digital Signature Certificate
- 24X 7 availability of Tenders Comprehensive Information's
- Tender Status and other decision are available in public domain
- Helpdesk support similar to CSCs Paper Less Bidding

Green e-Governance

- Paper Less Bidding
- Digital Archival of Documents
- Online Reports Generations
- Use of Digital Signature Certificates for Signing
- God ownswere hired to store paper bid documents prior to using this system. Now everything is electronic.
- Offices have lesser documents to maintain as all bids can be retrieved as per role and responsibility assigned at the click of a mouse.

Shri. Nand Kumarum, *Managing Director, Madhya Pradesh State Electronics Development Corporation Ltd. (Madhya Pradesh), md@mpsedc.com*

Ms. Anju Pawan Bhadoria, *Chief General Manager, Madhya Pradesh State Electronics Development Corporation Ltd. (Madhya Pradesh), awantikavarma@mpsedc.com, mptenders@mpsedc.com*

Ms. Awantika Varma, *Officer-in-Charge MP Tender Portal, Madhya Pradesh State Electronics Development Corporation Ltd. (Madhya Pradesh), awantikavarma@mpsedc.com, mptenders@mpsedc.com*

Aarogyasetu

National Informatics Centre, New Delhi

Seema Khanna and Hariharan M

PROJECT OVERVIEW

Objective/Scope

Aarogya Setu is a mobile application launched by the Government of India on 2-April-2020, to aid the COVID-19 efforts of the Government. The App caters to the whole nation. The App works based on contact tracing method and helps the Government in identifying, monitoring and mitigating the spread of COVID-19 across the country. The App also augments the COVID-19 initiatives of the Government in proactively reaching out to and informing the users of the app regarding risks, best practices and relevant advisories pertaining to the containment of COVID-19. Aarogyasetu has successfully predicted a large number of potential COVID-19 hotspots, way before the actual COVID-19 outbreak started in many regions across India. Most of the predictions have come true and the advance prediction has indeed helped the Government to plan in advance and deliver necessary medical interventions to control the spread in a proactive manner.

The following are some of the key benefits of the App:

- Automatic contact tracing using Bluetooth
- Self-Assessment test based on ICMR guidelines
- Open API based Health Status Check
- Updates, advisory and best practices related to COVID-19
- Integration with e-Pass
- Geo-location based COVID-19 statistics
- Nation-wide COVID-19 statistics
- Emergency COVID-19 Helpline contacts
- List of ICMR approved Labs with COVID-19 testing facilities
- Risk Status of User
- QR Code scan feature to share Risk Status
- Recent Contacts Feature to check health status of recent contacts
- Support for 12 Languages
- Aarogyasetu IVRS

The App is currently being used by over 16 Crore users and it is leading the nation's fight against the COVID-19 pandemic.

Hardware/ Software

- Aarogyasetu App has been made available for Android, iOS and KaiOS
- The Application backend is hosted in AWS Cloud
- The technology stack used are :
  i. ContainerPlatform o Dynamo DB
  ii. MySQL
  iii. Apache Spark
  iv. Hadoop o Python o NodeJS o Kotlin o Swift
  v. Java
  vi. S3

Certification (Certifying Agency)

The App was Audited by IIT Madras

Disaster Recovery/ Service Continuity

Aarogyasetu Application architecture is designed based on a modular and highly scalable architecture. The failure of any one component, may have very little or no impact on the other components. For example, the contact tracing functionality works locally over Bluetooth, without any dependence on the backend infrastructure, so this ensures that the contact tracing is not affected due to any failure or downtime at the backend.

The Application backend infrastructure is hosted in 2 separate AWS Availability Zones, with Additional Backups stored on AWS and NIC's Data Centres. The AWS resources are configured with auto-scaling feature, which enables the infrastructure and services to scale up and scale down dynamically depending upon the actual load.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Contact Tracing	Bluetooth based contact tracing, to identify users who have come in close proximity. If any user tests positive for covid-19, then his/her contact tracing information can be used to identify the persons who have come in contact with the person (who has tested positive), based on the duration and proximity of the contact and other factors, necessary advise like covid-19 testing, self-isolation/quarantine...etc., are provided to the users.	-	-	16 Crore
Self-Assessment	Chat bot based Self- Assessment service, enables the user to self-assess his/her health status. The responses to the self- assessment are correlated with the User age, pre-existing medical conditions, contact tracing information...etc., based on which a Health Score is provided. This score signifies the risk of the user.	-	-	32 Crore
IVRS	AarogyaSetu Interactive Voice Response System (IVRS) has been launched as a service, with an IVRS number 1921. This service can be availed by anyone in India, including the users of feature -phone (who are not able to use the App). The users can give a missed call to 1921 and they will receive a call- back from AarogyaSetu IVRS, then they are asked questions on their self-assessment which are similar to the	-	-	1.32 Crore

	questions on AarogyaSetu app. This IVRS service is available in 11 languages. After the self-assessment, users get a summary of their health condition on SMS. Those who report that they are unwell through their self-assessment also get calls for further assistance. Those who are assessed unwell on the Self-Assessment of Aarogya Setu are also called back by Ayushman Bharat and those who need medical help are also spoken to by doctors.			

Implementation

Out of the 45 crore smartphone users in India, around 16 crore users have been onboarded to Aarogyasetu platform. Which constitutes around 35.56% of the total smartphone users. Aarogyasetu is supported only on Android Version 5.0 & Above and iOS versions 10.3 & Above, so if the smartphone users using unsupported OS versions are discounted then, Aarogyasetu's coverage of the target users would have surpassed 50%. Moreover, the download and use of the Aarogyasetu App is voluntary. Aarogyasetu was the fastest growing App (in the world) in the Health & Wellness category and it crossed 100 million downloads within 40 days of its launch. The App has a wide reach and is being used in all states across India.

Improvements / Enhancements

Some of the key improvements/enhancements that were rolled out are:

- Introduced a Recent Contacts Health Check feature, where Users can voluntarily upload their contact tracing data from their phone to the backend server and get an analysis on the health status of the individuals with whom they have come in contact with, during the past 2 weeks.
- OPEN API feature launched for Businesses, Organizations, SMEs...etc., using the Open API the entities can query the Aarogyasetu API and get the health status of their employees (with employee consent). This facilitates the opening up of Offices & work places during the Unlock phase.
- QR Code based real-time health status sharing
- E-Pass integration during Lockdown, to facilitate movement of people
- Improved the compatibility of the App in lower versions of Android
- Nearby anonymized COVID-19 Stats
- Details of Nation-wide ICMR approved COVID-19 testing centres

ENABLER

Processes Re-engineered

Process Re-engineering was done to automatically fetch details of COVID-19 test results from labs across India and feed the data into Aarogyasetu, through ICMR. This ensured that COVID-19 test results are updated almost in real-time and once the test results are ingested into Aarogyasetu, the contact tracing algorithm fetches the contact tracing data from the mobile of the Users who have tested positive for COVID-19. The contact tracing data is then extrapolated to identify risky contacts and appropriate medical and

administrative interventions are effected to those risky contacts. The details of the risky contacts are also shared with the state governments and district health authorities, in real time to ensure rapid response on the ground level and isolate the risky contacts and carry out testing where necessary and implement further measures as per Government guidelines. All these manual processes, were completely automated through Aarogyasetu, which enabled in timely action and containment of COVID-19 in many places across the country.

Technologies

Aarogyasetu leveraged Machine Learning, Data Analytics, Social Media and Smartphone to a great extent to deliver the desired outcomes.

The Machine Learning module of Aarogyasetu, helped in early prediction of potential COVID-19 hotspot areas across the country. This potential hotspot information is shared with the respective State Governments and the District Authorities. This advance information about potential hotspots, helped the local authorities to implement necessary interventions like limiting travel, declaring of areas as containment zones, door to door testing...etc., and helped avert a larger outbreak of COVID-19 in these areas.

The Data Analytics of Aarogyasetu helped the health authorities, Government Authorities, Scientists...etc., to get access to valuable insights over the overall COVID-19 spread across the country. Some key insights which helped them to correlate relations between COVID-19 infection and age /sex of the individual or the geo-graphical location of the individual or any pre-existing ailments. The analytics provided nationwide, state wide and district wide trends, patterns ...etc., which played a crucial role in shaping the COVID-19 mitigation strategy across the country.

Aarogyasetu maintained an active social media engagement with its Users and the general public at large. Announcement of new features, clarifications of User queries, response to criticisms...etc., were handled effectively through Aarogyasetu's social media handle. Responsible disclosure of vulnerabilities or security issues, were also acknowledged through the social media handle. Aarogyasetu maintained complete transparency through social media, and it helped to directly engage with users, receivetheir feedback in real-time and work on new features based on the user's feedback.

People

From day one, Aarogyasetu was wholeheartedly supported by PMO and MeitY. NIC led the project with various volunteers contributing from industry and academia. The project was designed and commissioned in record time. As many advanced/developed countries are still struggling to come up with a national level contact tracing App, India was one of the first few nations which rolled-out a nation-wide contact tracing app in a few weeks, during the initial stages of the COVID-19 outbreak.

The Aarogyasetu team worked from different parts of the country. The code was maintained through a git repository, which followed proper change management process. The team worked day and night, over VC calls, which stretched over several hours.

The necessary administrative approvals and the required resources for the project were provided immediately, which helped the team to deliver the project in record time.

Various capacity building and training sessions on the Cloud, Security, Operations etc., were organized for the team members to augment their skill set and expertise.

VALUE INDICATORS

Learnings for sharing

The Aarogyasetu Team faced 2 key challenges. The first is developing a contact tracing platform with a high level of accuracy and the second is interpreting the contact tracing data in terms of potential risk of covid-19 infection. Aarogyasetu was the first mass level contact tracing platform built indigenously for the nation. The challenge is different smartphones use different Bluetooth chips and the Bluetooth radio power differs from one smartphone to another. So calibration of the Bluetooth signal strengths needed to be done and the calibrated values had to be adjusted for error correction. After multiple trials and testing an ideal signal strength value range was chosen for the contact tracing. This solved one problem.

The second challenge is how to make sense of contact tracing data. Here joint discussions were held with renowned epidemiologists, scientists, medical professionals...etc, and different strategies and processes were discussed threadbare with all possible impacts. Then a final methodology was arrived at, which leveraged the contact tracing data, self-assessment responses, pre-existing ailments/conditions, international travel...etc., to calculate the possible risk status of an individual, with respect to COVID-19.

Once these two challenges were resolved on paper, then the team worked day and night on the programming and the backend technology part, thereby developing a prototype in a matter of days. Aarogyasetu team has accorded top priority to security and privacy of the user data. Both the frontend and the backend has been designed with appropriate encryption and anonymization techniques. The security issues reported to the Aarogyasetu team is also taken very seriously and immediately acted upon. For instance, New York Times, flagged an issue where the youtube plugin within Aarogyasetu App was leaking User's geo-location, the issue was fixed within a couple of hours from the time NYT reported it to Aarogyasetu. Also, Aarogyasetu team publicly acknowledged the issue and thanked NYT for highlighting the issue and assured the users that action has been taken to fix the issue. Aarogyasetu on its own is a disruptive technology, this is the first digital contact tracing platform in the country and the largest of its kind in the entire world. Though this App has been launched to tackle the COVID-19 pandemic, it can be further used as a common contact tracing platform for other contagious/communicable diseases. As in the coming years, some new contagious diseases could evolve and may start wreaking havoc, but as and when it strikes, we would be having the necessary tools (like Aarogyasetu) and techniques to combat the disease in its early stages.

Digital Empowerment

Aarogyasetu was initially conceived as a mobile app, but post roll-out still a significant section of population were not able to access the Aarogyasetu App, due to non-availability of smartphone. Hence, in order to address this gap, an IVRS based toll-free service was introduced with number 1921. Users have to give missed call to this number, then they will receive a call back, through which a self-assessment can be conducted and then further necessary medical/administrative interventions would be undertaken based on the responses to the self- assessment.

The App was initially designed with support for English and Hindi Language. But in order to reach a much wider regional audience, the App was further enhanced with support for 12 Languages.

Initially, the App was launched for Android and iOS platforms. But, later on many users requested to release the App for Kai OS, which is used on JIO Phones. Aarogyasetu team did a brief study and found out that more than 90 million people use Phones powered by Kai OS. So in order to ensure coverage of these 90 million + Users under the Aarogaysetu platform, an App for Kai OS was built in record time and released on JIO App store. The Kai OS version of Aarogyasetu is now successfully running on more than 90 million+ phones powered by Kai OS.

Green e-Governance

Aarogyasetu has adopted Green computing practices, the backend infrastructure is hosted on cloud, utilizing serverless architecture, thereby reducing the server sprawl, electricity consumption. The App uses Bluetooth Low Energy (BLE) to carry out the contact tracing using the smartphones. BLE consumes very little energy to communicate and thereby reducing the overall battery drain. Moreover, Aarogyasetu does not transfer any data through Bluetooth, it just uses Bluetooth broadcast for the contact tracing, which further reduces the overall power and resource consumption on the smartphone.

Dr.Seema Khanna, *Deputy Director General, National Informatics Centre (New Delhi),* rsm@gov.in.

Shri. Hariharan M, *Scientist-C, National Informatics Centre (New Delhi),*hariharan.m@gov.in

Arogya Darshak Maps – GIS Mapping of Containment Zones and Hospitals

National Informatics Centre, Maharashtra

Dharmendra Rupchand Jain and Surendra Purushottam Patil

PROJECT OVERVIEW

Objective

In order to fight Covid-19 pandemic situation the Arogya Darshak map is one of the initiatives taken by NIC Nandurbar Centre with help of GIS Delhi Team in collaboration with district administration and district health officials

Scope

Arogya Darshak Map conceptualized in order to provide reliable information in real time for Public as well as district administration and health officials. Arogya Darshak Map has following 4 important components.

- *GIS Based Maps of Containment Zones Information:* This component in GIS maps provides information about Active and Closed Containment Zones in the district and also shows buffer zone marking in 200-meter radius, Population of Containment Zone, Sample Collection in Containment Zone, Total and Active Covid+ve in Containment Zone, Death if any in Containment Zone etc.
- *Dedicated Covid hospitals and health infrastructure information:* Hospital and Health infrastructure information availability like District Covid Hospital, Dedicated Covid Hospital Centre, Sample Collection Centre, Covid Care Centre, Quarantine Centre, Fever & Flu Clinic information, etc been shown on district map with its location, address and nodal officers' details and total beds.
- *Tabulated Containment Zones Information:* This button provides information about total Containment Zone in District, Active Containment Zone, Closed Containment Zone, Total Population of Containment Zone, Total people Surveyed in Containment Zone, Total Covid+ve found in Containment Zone, Total Active Covid+ve in Containment Zone presently and total Deaths happened in Containment Zone in tabulated format.

Software

- GIS Maps integration with the help of BharatMaps division in National Informatics Centre.
- Data is maintained using Google Sheets which is shared across user base for real-time updation.
- Maps locations wise availability on existing Nandurbar district official website. Site has been developed using WordPress as CMS latest version using S3Waas framework hosted on a national cloud for ease of access and security.
- District official Website is being maintained in bilingual Unicode version with easy-to-use interface for dissemination of information using S3Waas framework. Cross browser compatibility, readability maintained as per GIGW guidelines.

Cyber Security

District Website https://nandurbar.gov.in been provided with cyber security certificate from NIC and been periodically scanned for security issues.

Disaster Recovery and service continuity

Since Maps information available using S3Waas framework hosted on a national cloud for ease of access and security hence backup and disaster recovery in real time maintained by National cloud infrastructure division of NIC.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Arogya Darshak Maps on District website	Information of Covid-19 hospitals and health facility along with Containment Zone information of Nandurbar District. (impact of information dissemination among online user using google analytics)	14915	25302	20076
	Shown Active/closed containment zones on GIS maps	15+	100+	149+
	Shown covid-19 Hospitals (including rural health center/quarantine centers on maps	50+	80+	95+

Implementation

Implementation Coverage achieved in comparison to the plan / target

- In Nandurbar district almost 90 % Containment Zones been mapped and 100% COVID-19 related Hospitals information been mapped on Arogya Darshak Maps and readily available to all citizens with web accessible as well as android/ios friendly standards.
- Presently this GIS based maps-based tool implemented at 3 districts and 1 Municipal corporation. Progress is continued for rest of the 33 districts in Maharashtra state

Improvements/ enhancements specifically planned out during next one Year

- As far as improvement is concerned the local authority been given training on importance of accurate location sharing of Containment Zone and same been reflected now accurately on maps.
- In first phase GIS based maps will be implemented in smaller districts where maintenance of containment zones and hospitals information is easy, in the next phase same will be extended for bigger districts and corporations.

ENABLER

Processes Re-engineered

Before implementation of Arogya Darshak maps District officials were struggled to maintain location information of containment zones, physical boundaries of containment zone and their changing open/closed status. For this huge man power as well as time was the constraint factor in the pandemic situation hence

crucial updated information dissemination to head offices as well as for citizens was challenging task.

Before implementation of digital Arogya Darshak maps, district administration-maintained containment zones and physical sketches of maps on paper which was tedious to add/update/delete.

This Innovative use of process re-engineered based GIS maps updation stopped manual laggard approach. GIS based maps started to provide accurate information about physical boundaries, location of containment zones. At the same time the main objective of Covid-19 information like beds availability, new hospitals, Quarantine centers and their capacity, containment zones information dissemination achieved in real time for all citizens.

Technologies

- Google analytics tools are being used for website traffic and usefulness of content.
- The underlying BHARATMAPS is a GIS Platform established by NIC, MeitY, using NICMAPS Services. This is an integrated multi-scale multi-resolution base map service using reference data from Survey of India, ISRO, FSI, and RGI and so on.
- For database / data integration Google sheets iframe been used as it provides facility of real time data update by various users from different geographical location and same been reflected in real time on maps.
- S3WaaS platform of District Website is based on Word press version 5.5.1
- This Arogya darshak maps and its link/news is widely published on District official Facebook and twitter handle. Same is been published on NIC / MeitY official Facebook and twitter handle, Instagram.

People

Stakeholder in this project is NIC district centre Nandurbar in collaboration with GIS Team Delhi, District administration Nandurbar and District health officials Nandurbar. End user of these maps was considered common citizens as well as monitoring authority at various levels in administration. NIC GIS Team Delhi and NIC senior officials at Delhi supported the project for smooth implementation.

VALUE INDICATORS

Learnings for sharing

NIC Nandurbar used innovative approach of covid-19 data integration using Google sheets in existing GIS Platform established by NIC, MeitY, using NICMAPS Services called “BHARATMAPS”. NICMAPS is an integrated multi-scale multi-resolution base map service using reference data from Survey of India, ISRO, FSI, and RGI and so on.

Digital Empowerment

Nandurbar is tribal district of Maharashtra. This Covid-19 maps idea is based on Government of India Digital India approach andmain objective of this innovative use of GIS based maps was to decipher Covid-19 information from different locations, different sites into single, reliable and authentic platform for Tribal peoples of Nandurbar district. This Arogya-Darshak Maps had given these people idea of hospital facility in district for Covid-19. Also common citizens get idea of containment zone so that they can plan their movement accordingly within district. Every citizenin the district at their fingertip can get this information on the go and in real time which makes its usability very much useful.

Green e-Governance

District administration uses manual approach of information dissemination using paper / publication boards/ flexes banners but using this GIS Map based digital approach to get detailed information to every citizen just using their existing Android / iOS devices / Windows computer where internet available is definitely a step towards successful e-Governance green initiative and digital India approach. Also, as all this hospital and containment zone information is available online, many papers been saved which may be used for information providing to different offices and different level. This saved lot many trees and in turn provided boost for Green e-Governance.

Shri. Dharmendra Rupchand Jain, *Scientist 'F' / Senior Technical Director, National Informatics Centre (Maharashtra), mahnad@nic.in*

Shri. Surendra Purushottam Patil, *Scientist 'B', National Informatics Centre (Maharashtra), mahnad@nic.in*

CoVID Odisha project

School Education Uttarakhand

Aditya Mohapatra, Sohan Lal Nautiyal and Pradyut Das

PROJECT OVERVIEW

As the COVID19 pandemic spread globally, India was no exception to it as the novel infection began its transmission in India in March, 2020. The Government of Odisha was, however, quick to identify brewing public health crisis and took pro-active steps to mitigate and manage the same through swift health infra scale-up, mobilization of medical resources etc. However, the true measure and nature of the risks posed by it could only be quantified by leveraging technology for close monitoring of multi-focal data being generated from the field level. The CoVID Odisha project provided the technological conduit for accurately quantifying these risks.

The E&IT department, being the nodal department for driving ICT interventions in the state took up the implementation of this project. The project embodies large-scale handling and management of heterogeneous data from multiple source systems and use of advanced analytical components for presenting a single version of truth and critical insights to the entire state machinery and the administrators.

The following functional scopes are covered as a part of the solution:

- Identifying virus carriers and contact tracing through stringent management of international travellers, migrants travelling into the state
- Monitoring the health of critical and high priority virus affected cases through outgoing call center setup, CRM and 360-degree health self-assessment
- GIS Platform for identification and management of COVID containment area and enforcement of strict social distancing or isolation
- Optimizing utilization of vital healthcare resources such as testing kits, beds, ventilators etc.
- Planning infrastructure augmentation for handling upsurge in incidence including quarantine centers (TMC), COVID care centers and COVID hospitals
- Provisioning of monetary relief/assistance to vulnerable groups
- Skill set mapping for socially vulnerable groups displaced due to pandemic
- Mobile app and social media bots for information sharing with citizen

In terms of geographical scope and expanse, the solution operates and augments

- Planning, resource management and decision support for authorities spanning from the state level to Gram panchayat level
- Management of quarantine and COVID care infrastructure at community health level
- Provisioning of last mile predictions and granularity for 30 districts, 314 blocks and 6700+ gram panchayats

Techno-functional Salient Features

- Analytics based, data-driven Goal setting and planning based on identified KPIs

- Execution of actionable; monitoring and reporting via transactional modules
- Controlling the parameters through data driven re-planning
- Data Analytics and Predictive Modelling using SAS
- Infection Summary reporting - Benchmarking Odisha vis-à-vis other states, Daily/Cumulative cases, Age/gender wise analysis, District/Block wise summary
- Testing Summary reporting
- Infrastructure Summary reporting

Stakeholders

- Hon'ble Chief Minister of Odisha
- 10 officials from Chief Ministers Office
- Hon'ble ministers –H&FW dept.
- Top officials including Chief Secretary of Odisha, Development Commissioner, Special Relief Commissioner, Secretary-H&FW dept.
- 22 Covid Observers
- 150+ Contact Center Advisors
- Officials of IDSP (Integrated Disease surveillance Project)
- Officials of NHM (National Health Mission)
- Citizen

Benefits for Citizens

- Repository of Govt. notifications and travel history of active cases
- COVID19 Self-assessment feature
- Single, reliable source of information for
    i. District-wise and block-wise near real-time infection,
    ii. COVID19 testing and health infrastructure
    iii. travel regulations in and out of the state
    iv. lockdown norms and other directives released by the concerned departments from time-to-time

Benefits to Officials/functionaries

- Peak Infection Analysis
- R0 analysis for Lockdown Relaxation, Infection progression and doubling Rate, test kit distribution, Ventilator Requirement and Hospital Bed Capacity/Requirement
- Effective Susceptible Population factor by Lockdown Relaxation Level

Current Status

- Total No. of Migrants registered Online at Odisha 12 lac +
- Total No. of Migrants registered by GPNOs 11 lac +
- Total No. of e-Pass applied 1 lac +
- Total No. of e-Pass approved 65 k+
- Total no. of Outbound Calls 15 lac +
- Total no. of inbound Calls 12 lac +

Software

The software environment used for development used a variety of technologies and services. Primarily, the following stack was used for the project development and deployment:

- Technology: .NET; Database: SQL server; Other tools: SAS Analytics tool

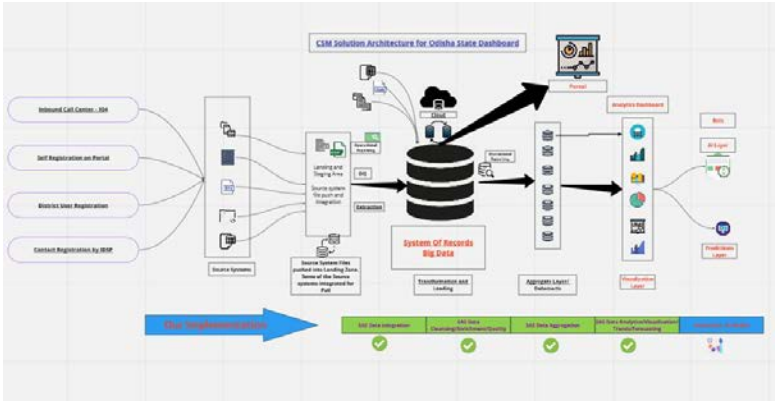


Figure 1 Solution Architecture

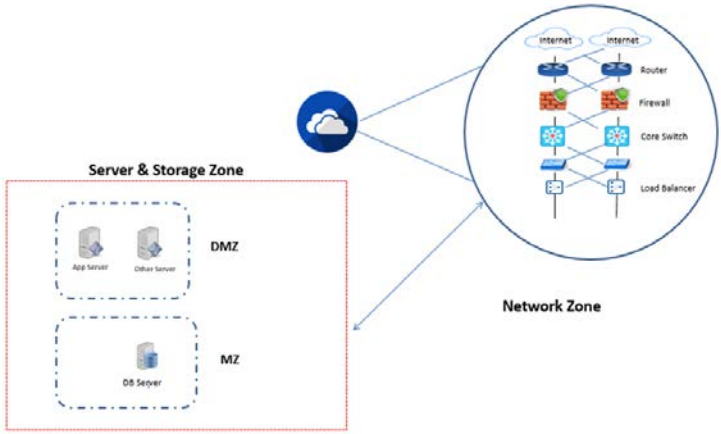
Cyber Security

The solution is SSL certified and complies to necessary cyber security protocols, however a formal, third-party certification remains to be undertaken\.

Disaster Recovery and service continuity

The following broad view approach was adopted to ensure seamless deployment of the system and service continuity:

- Dedicated Provisioning of data connectivity with each source system by the respective department to avoid the poor connectivity risk
- The solution is hosted in the OSDC environment with all necessary backup and archiving mechanism for the application and the database



RESULTS INDICATOR

Information

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
International Travellers Registration	Registration of individuals travelling from other countries.	-	-	12,403
Train manifest updation and monitoring	Registration migrant workers travelling to Odisha via special trains; end objective was to	-	-	3,58,401

movement	manage future outbreaks in local population			
Migrants Registration who wishes to come to Odisha	Registration migrant workers travelling to Odisha; objective was to manage future outbreaks in local population	-	-	21,68,689
Outgoing call center setup and CRM	Call facility to identify and follow-up critical groups such as with travel history to high infection location etc.	-	-	15,00,00+
Check in at the Border Check-post for Migrants	Check point management at state borders (via road)	-	-	2,02,332
Check-checkout in at the TMC	Management of quarantine facility at gram panchayat level	-	-	2,00,574
Skillset mapping	Data consolidation on skill sets of individuals from vulnerable groups displaced due to pandemic (for employment facilitation)	-	-	2,51,780
ePass for people going outside Odisha	Temporary pass provision for people travelling out of Odisha	-	-	99,650
Covid360, self-assessment by Deloitte, salesforce and diagnostics robotics	Self-administered test for COVID symptoms with risk grouping based on pre-existing conditions	-	-	438
WhatsApp. Facebook messenger & Telegram Bot for information sharing	Updated Information dissemination using social and other new age media	-	-	8000+ Average Monthly Users

Implementation

Implementation Coverage achieved

The implantation coverage has been achieved for Health dept., Government of Odisha as was planned.

Currently, the plan is to bring in other related depts. Such as FS&CW, Home into the ambit of the project.

Improvements / Enhancements

The following improvements/enhancements have been rolled out during the last one year:

- Modelling and predictive analytics for
- Peak Infection Analysis
- Risk profiling of the districts
- Effective susceptible population
- Daily Infection and death estimates (SIR model)
- Visualization and reporting of key data points such as for testing, infection, infrastructure, inbound travellers, hospitalization, citizen outreach
- R0 analysis for Lockdown Relaxation
- Effective Susceptible Population factor by Lockdown Relaxation Level

- R0 (R naught) analysis for test kit distribution, Ventilator Requirement and Hospital Bed Capacity/Requirement
- Infection Doubling Rate

Planned Features to be implemented

- Implementation of predictive modelling for all pandemics and other public health crises
- Analytics for assessing Public Health measures
- Planning and Forecast public health hazards vs. Essential services availability
- Performance measurement of govt. health service delivery mechanism, aligned with sustainable Development Goals (SDG) indicators and other KPIs
- Finance CoVID Odisha project on receipts vs. expenditures
- Inclusion of this initiative as a part of the state's own administrative action monitoring (5T monitoring)

ENABLER

Processes Re-engineered

The outbreak of a novel pandemic has effectively ensured that the government processes take the novel route to manage the crisis. The CoVID Odisha project has presaged a new chapter not only the current handling of the public health crises but also a holistic change in the automation, standardization and execution of government policies for evidence and data-driven decision making.

Aside from this fundamental change in the approach, some of the processes that mark as a significant process re-engineering includes:

- Multi-focal allocation of medical and other resources
- Collaborative decision making between different departments and other functionaries
- Overall management of key public health infrastructure for optimized utilization
- Management of inflow and outflow of traveller in the state

Technologies

The use of products such as SAS Visual Analytics, SAS Data Integration, SAS Data Flux, Salesforce DB, Diagnostic Robotics AI solution enabled enrichment of the core solution. The following aspects underscore how these helped in achievement of the affirmative outcomes:

- **AI based tools** developed by Deloitte, Salesforce & Diagnostic Robotics for enabling self-health assessments of citizens and flagging high risk cases for urgent medical attention. This was integrated with both the Single Unified CoVID Portal (along with app & chatbot) and the Odisha State CoVID Odisha project
- In partnership with Tirupati IIT & Facebook, we conducted an analysis of anonymized Facebook datasets (available under its Data for Good program) of users to check adherence to lockdown restrictions in CoVID hotspots and strengthen enforcement in critically affected areas with high mobility especially during nights.
- In partnership with Facebook, the WhatsApp and Facebook messenger bot for information dissemination to citizens on CoVID was launched which marked as a trustworthy source of government communication

and stems rumor mongering prevalent during pandemics on new **age social media**.

- In partnership with IIT Bombay, a Quarantine Enforcement Solution (**assisted GPS – triangulation of cell tower data and satellite data**) was also developed

People

The following capacity building and people-oriented tasks were undertaken during the course of the project implementation:

- 10200+ users trained to operate different applications under COVID19 management
- Distribution of user manuals and SOPs to all concerned Nodal Officer who were appointed to manage application suite
- Virtual training sessions were conducted to demonstrate and handhold the end users through the processes and workflow of the application
- Good leadership support and monitoring by all the internal stakeholders including health department, works department, E&IT department for ensuring not only the deployment of the project but also swift adoption by the end-use field functionaries.

VALUE INDICATORS

Learnings for sharing

During the course of the implementation of the project the following innovative frameworks were generously use to aid and elevate the project outcomes:

- Agile implementation for each feature implementation.
- Strict Implementation of RACI (Responsible, Accountable, Consulted, Informed) matrix
- Proper stakeholder involvement following Power-Interest Grid Analysis

Digital Empowerment

The following steps emphasize the digital empowerment for the various sections of the populace:

- Use of WhatsApp, Facebook messenger and telegram as reliable channels for public health information dissemination
- Unified and consistent multi-lingual messaging across different channels for the citizenry.

Green e-Governance

This project relied on the optimal resource planning and made use of **existing ICT infrastructure of OSDCfor its deployment** without resorting to creating a scope for acquisition of new infra that may lead to generation of e-waste footprint in future.

Shri Aditya Mohapatra, OAS-I (SB), *Joint Secretary, E&IT Government of Odisha (Odisha), js1.eit@odisha.gov.in*
Shri Sohan Lal Nautiyal, *Head SeMT E&IT Odisha, E&IT Government of Odisha (Odisha), sohan.nautiyal@semt.gov.in*
Shri Pradyut Das, *AVP, Business Solution, CMS Technologies Pvt. Ltd., pradyut@csm.co.in*

Covid19 Jagratha

District Administration Kozhikode, Kerala

Seeram Sambasiva Rao, Rolly T D and Mercy Sebastian

PROJECT OVERVIEW

Objective

Covid19 Jagratha was launched in Kozhikode on March 19th 2020 immediately after the outbreak of Covid19, with the most important daily health monitoring and surveillance module and thereafter facilitation of stranded people. This proved to be highly useful in monitoring the highest number of inbound travellers in Kozhikode District in the first phase of Covid Management. Teleconsultation involving prompt prescription and referrals to hospitals has been done based on the symptoms reported after house visit by the Field workers. Thereafter it gradually developed into a comprehensive solution for the management of Covid19 outbreak. GAD and Health Department issued G.Os to use this for the facilitation of inbound people and tracking and monitoring of their Health. Detailed SOP has been issued by the Health Department. Several rounds of Training were given to State Health Officials, Medical Officers, Ward RRTs, LSGI Secretaries, DMO, DSO, DPM NHM, e-Health Master Trainers and all other users. They started using it effectively and comprehensive dashboards are available to Health Secretary, GAD Secretary, War Room, Police, DHS and all other Senior Officers.

Covid 19 Jagratha Progressive Web Application is a simple and comprehensive pandemic management solution covering all aspects of a known solution for management of Covid Outbreak in an integrated workflow. The solution also has a mobile application for the features which require mobile platforms. It focuses on approach of safe travel, safe quarantining, real time surveillance and Health monitoring, Contact Tracing, Treatment as an integrated system of handling covid19 outbreak effectively. This unified system is built on agile mode as per the needs of the stage of Covid management.

The application is fully operational from 19th March 2020 onwards. This Covid19 information and management solution is conceptualized and designed by District Administration Kozhikode engaging District NIC and IT Mission teams, implemented with the support of Kerala State IT Mission and NIC Kerala. Initially it was started as an online health monitoring system. But now based on the requirements various features have been added to this on a timely basis.

Covid jagratha, as a pandemic solution utilises the good governance strategies of technological innovations, communication, implementation and monitoring in the management of Covid 19. Some of the strategies adopted in covid management through covid jagratha are:

- Lockdown to contain spread and prepare for future surge : uphold rights of people during Lockdown and monitor the welfare programs during lockdown period
- Facilitation of movements of stranded people (Domestic and International through all means of Transportation)
- Facilitation of Safe living
- Safe Quarantining
- Surveillance of People more susceptible to Corona using the Information net

- Health Monitoring
- Targeted Testing
- Detailed Contact Tracing based on accrued information and system alerts
- Visitor Register Service : to maintain visitor details of all public places and help in contact tracing
- Prompt Containment Area & Cluster Mapping declaration based on location of positives and contacts
- Hospital/CFLTC management
- Ambulance management
- Covid Brigade Management : Human Resource Mobilization

Thus covering all the requirements of a known solution for the prevention and effective handling of Covid19 outbreak. All these features are connected with each other in an integrated real time workflow. This makes the Covid19 jagratha application more user friendly. Covid 19 Jagratha Progressive web application is now being used by 14 districts across the state of Kerala. There are users from ward level to state level and are fully integrated. There are real time dashboards which will give the full statistics of the state.

Currently available active official logins in the portal are more than 60 thousand. Total registrations done by the public for permits/passes and health monitoring done during the Covid19 Pandemic etc are available in the public dashboard for ensuring the transparency of the system.

Currently application has 1,58,52,581 (One Crore Fifty Eight Lakhs Fifty Two Thousand Five Hundred and Eighty One) user hits.

Technology Stack for Mobile based application of Te-Poll:

Hardware/ Software

Software

- *Language :* Java technologies
- *Framework :* Spring & Hibernate
- *Database :* PostgreSQL

Hardware

Application Hosted at NIC Kerala State Cloud server

Certification(Certifying Agency)

Yes; NIC Security Audit Certificate.

Audited conducted by Application security division, NIC

Audit clearance certificate date: 27/06/2020

Security certificate validity: 2 years

Security certificate number: NIC/CSD/IA/16420

Periodical Penetration test and incremental audit were conducted by NIC App security division.

Disaster Recovery/ Service Continuity

Database Replication Server configured

Daily scheduled database backup to servers in physically different locations.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21

Pass/Permit System	Vehicle Permit/Operation Permit for transportation of Essential Goods and to facilitate essential services declared by the Government. This service can be availed by owners of shops/establishments by declaring their license of establishment. An SMS will be received in the registered mobile number with a link to download the permit with QR code.			18,68,678
Volunteer Registration and Deployment	Citizen's support and altruism has always been a key factor of success in the management of all difficult times. We value your kind hearted, selfless service to humanity and call upon citizens to join hands in the fight against COVID19 pandemic.			3,04,863
Migrant Labour Management	For the effective management of Migrant Labours across the country.			18,000
Hospital Management	The Hospital /CFLTC Management module has the provision of real time view of the resources of Hospitals, FLTCs, Referral by Medical Officers, Collection of information during Admission in hospitals, Categorization of patients into Asymptomatic, Category A,B,C, Allotment to Ward/Room/ICU, Daily health monitoring, Simple online case sheet with access to Specialists and Possible Surge Planning. This is done by DMO who can add Hospitals/CFLTCs in the district and Nodal officers for each facility. The Nodal officers have the provision of updating all other information under the hospital/CFLTC management.			1,007
Covid Care Center Management	Facility for the precautionary quarantine of people who was affected by Covid19			3,594
Ambulance Service	All the Ambulances across the Districts are asked to register in Covid19 Jagrata Ambulance Management Module. Ambulance owners can register through the portal for the approval from District Nodal officer who works 24*7 in the District Control Room for ambulances. Upon approval the drivers download covid jagratha mobile app and register their phone numbers given for approval. They can mark on duty or not on duty which shall be intimated to the control room. Doctor/Health Staff/Citizen can			5,229

	request for an ambulance through Covid19 Jagratha portal, Mobile Application or through calling the Control Room Number.			
Visitor Register Service	The State Government appealed to citizens to maintain the break the chain diary which shall help in tracing the contacts of positive cases. To facilitate this public register facility was added in the portal. Visitors register service record the details of visitors of any public place or any event wherein the organiser/owner can obtain a QR code through the portal and paste it at visible places of the location. Visitors can scan the code and enter the details.			17,709
Health Monitoring Service	Covid19 jagratha portal is used for effective surveillance, daily monitoring and reporting of people who are quarantined by the field teams which could be verified by the district administration. People in Home quarantine are monitored by RRTs and in CCCs are monitored by Nodal officers, CCCs. Symptom tracking tools are used for daily monitoring of contacts. Self-reporting of signs and symptoms by people is available which allows for real-time monitoring. This option has been enabled under the public services tab. For the registration, the person concerned has to receive an SMS consisting of Covid19 Jagartha ID from RRT. Once registration has been done, the person concerned can update the daily health status by him/herself. Medical Officers can create RRT, Map people to RRT (if LSGI has not already done), Add to Surveillance, Edit, Transfer CCC, Prescribe and Referral when symptoms are high. There is provision for State officials to access the Surveillance Dashboard			17,95,596
Tele Consulting Service (Audio/Video)	For the online consultation with the people under quarantine/isolation			Daily Basis
Contact Tracing Service	Targeted testing is done by tracing primary and secondary contacts of a positive case. All the information available in the portal about people's movements is used to provide 'Contact Leads' which is used by the Surveillance Team for contact tracing. DSOs can access Domestic List, Pravasi List, Surveillance Dashboard in			Daily Basis for each positive case reported.

	the portal and also add to Surveillance, Test and results, Contact Marking and tracing details.			
Vulnerable Monitoring Service	For the monitoring of the people with comorbidities. The details of people with comorbidities are captured in the portal from field level.			1,39,625
Citizen Self Reporting Service	Public (including people in quarantine) are asked to help the health department by self-reporting symptoms. People have to do self-registration, set password and then login to the system for reporting symptoms. They can also avail other services like online quarantine release certificates, online prescriptions and referral services using this. People who turned positive and are under home isolation should also report symptoms using this.			Daily Basis
Citizen Profile	Any citizen whether he is in surveillance or not in jagratha portal, can create a Citizen login in jagratha portal. This will enable him to use all the services available in the Jagratha portal without further authentication.			7,790
Containment Zone Marking Service	The LSG secretaries can mark the containment zones of their local bodies by selecting the wards (Ward layers are included) or by drawing in the map and submit for approval by the district disaster management cell. On approval details of containment zones will be visible to the public.			5,977
Arogya Sethu Integration	Data from Arogya Sethu Portal has been integrated to Covid19 Jagratha portal. Details like Positive list, Bluetooth contact list, self-reporting list etc.			On a real time basis
Cluster Mapping Service	Details of Covid19 Clusters.			82

Implementation

Implemented in the entire state of Kerala .

Major Stake Holders:

- Citizens
- Local body ward wise rapid response teams (Asha workers/ health inspectors and health nurses)
- Local body Medical officers
- Local body secretaries
- Tahsildars
- District Health Team
- District Administration
- NIC
- KSITM

- NHM
- Directorate of Health Services
- RTO
- Police Department
- NORKA
- Secretaries at State level -Chief Secretary, Revenue & Disaster Management, GAD, HEALTH, LSGD, E&IT, Home
- Shops & Establishments / Vessels and Boats Owners
- Government and Private Offices
- Health Volunteers (Covid Brigade)
- Facility management Volunteers (Sannadhasena)
- War room support users
- Labour Department

Improvements / Enhancements

Started for the management of domestic and international visitors to the state during the covid19 pandemic . During the year of implementation, we had to implement related requirements like transit management, surveillance management , health management, health facilities management, ambulance services management , tele and video consultation, visitor register management and migrant labourers management. These resulted in a suite of applications for the overall management of covid19 pandemic in the state.

The covid19 pandemic may continue for some more time and hence the covid19jagratha portal will continue to provide the current services and also meet the immediate and future requirements as we move along.

Dashboards and analytics are already available and these will be improved with detailed analytical models.

ENABLER

Processes Re-engineered

Earlier manual procedure , for permits / passes /certificates , application to be submitted by hand/email, manual verification and approval were done by local body/ district administration. Present online system, citizens can avail all services online using their registered mobile with OTP authentication.

Passengers coming through all modes of travel (Road/Rail/Air/Ship) can register online and the list will be available to the concerned local bodies for verification online. After Online verification by concerned local bodies, and online approval by the authority , approval link will be generated and available to the applicant in their registered mobile. All these passes and certificates are QR code enabled and verifiable by the authorities.

In the earlier manual system, surveillance / quarantine lists were prepared in excel sheets. In the online system, all checked in people are automatically listed in quarantine list and after completion of the period, release certificates are auto generated and available to the citizen in their mobile itself. Ambulance services - All the ambulances in the district are registered in the system and verified by the RTO for its permit, condition etc and made available for online engagement by introducing a mobile app for the drivers. The drivers once engaged in an ambulance can update in the mobile app as ON DUTY and the ambulance nodal officer can engage this ambulance online. In the manual system, the nodal officer has to call each ambulance driver to check his availability.

Containment and cluster management: The live updation of containment zones

by the LSG secretaries in the google map followed by the approval of district disaster management cell will be available in the jagratha dashboard which is very informative for the public about the present containment zones in their district. Locate in Map facility for the positive, primary and secondary in Jagratha portal is a very useful feature for the district/ Panchayat authorities to decide the area for cluster marking by looking at the intensity of positive/primary/secondary cases in an area in the map.

Technologies

- Responsive web application enabling the citizen to access the portal through their mobile.
- Reporting Tools
- RESTful web services and APIs
- Charts and Graphs
- Social Media - Facebook/ TV / Newspaper/ Zoom/Google / NIC Video Conference service etc.
- SMS, QR Code
- Tele conferencing through Voice / Video

People

District Administrations across the state supported the covid19jagratha portal initiatives. The portal was also approved by the Government of Kerala as the only platform for the management of covid19 pandemic and for surveillance of covid patients and their health monitoring.

Frequent training on different modules were conducted separately for the respective stakeholders through Zoom Meeting, google meet, NIC VC etc.

Video and audio tutorials are prepared for major modules and made available in the portal for reference.

WhatsApp groups are created for different stakeholders for updates and doubts clearance.

Promotional videos, user manual etc. were shared to the stakeholders**.**

VALUE INDICATORS

Learnings for sharing

Innovative responsive web application were developed and positioned strategically for the use of public and government towards the management of covid19 pandemic right from the beginning of the pandemic.

As the pandemic progressed, requirements like surveillance and health monitoring also came up and the team introduced the systems and services from time to time in consultation with various stakeholders. Mobile apps were also designed and developed for transit management, citizen self-reporting, ambulance service management etc.

Containment zones and cluster management marking using google maps.

Digital Empowerment

- Common citizen is benefited/received all services by using their mobile
- Prompt Containment Area & Cluster Mapping declaration based on location of positives are available to the public.
- Dash boards are available with real time data for decision making team especially availability of Beds, ICU and ventilator for covid patients.
- Seamless data services with analytics to the war room for effective management of the pandemic for the state government.
- Provision is given to people who turned positive and are under home isolation to report symptoms by their own to the system.

- Citizens can register in the portal and avail services themselves like self-reporting, referral letter to other hospitals, online consultation upon reporting of symptoms and thus prescriptions of medicine, test results uploading and request for release certificate etc.

Shri. Seeram Sambasiva Rao IAS, *District Collector Kozhikode, District Administration (Kozhikode), dckzk.ker@nic.in*

Shri. Rolly T D, *Technical Director & Additional District Informatics Officer, National Informatics Centre (Kozhikode), rolly@nic.in*

Shri. Mercy Sebastian, *Senior Technical Director & District Informatics Officer, National Informatics Centre (Kozhikode), mercy.s@nic.in*

Covid-19 Jagratha Mobile App

Kannur District Administration, Government of Kerala

Subhash T V, Andrews Varghese and Rijisha K V

PROJECT OVERVIEW

Vision & Objective

Covid19jagratha is a mobile app conceived by District Collector Kannur with quarantine monitor, door delivery information, and community kitchen information etc. during the initial days of lockdown period. The app was designed, developed and materialized by Mobile App Development Competency Centre, Kerala, National Informatics Centre during the pandemic Covid- 19. The Vehicle Transit Monitoring module concept budded from Wayanad District administration which was quickly incorporated and made available within a short span of time. The ambulance booking service for public was the idea of District Collector, Kozhikode. Covid19jagratha app was launched to play store on 31st March 2020 with a total download count of 41.8K+ as of now. The app communicates with the covid19jagratha database. Objective of the app include:

- Ambulance booking by Covid-19 patients and general public
- Counselling Service for the Quarantined/isolated persons and Covid-19 patients
- Geotagging and geo-fencing of quarantined persons
- Notifying the authorities on geo-fence crossing through SMS alerts
- Broadcast from District Collector
- Role based access control
- Vehicle Transit Module monitors the entry/exit of vehicles and its passengers to and from the district.
- SMS alerts to the driver on entry to a district with expected exit time and exit point
- SMS alerts to local body and health officials concerned, about the vehicles terminating inside the district.

Software and Hardware

Application Server: RHEL version 7.7
Webserver: Apache
APIs: PHP 7.1.6
Database: PostgreSQL 10.2
Periodical software stack update happens based on NIC version tracker release

Certification(Certifying Agency)

Internal security audit of API services conducted by NIC Kerala Security Division.
Periodical PEN test and incremental audit are conducted by NIC State App Security Division.

Disaster Recovery/ Service Continuity

Replication database server is in place with near to real-time data replication. In case of master failure, the slave takes over as master so the service remains uninterrupted and continuous. Near DR is in place.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Vehicle transit entries recorded	-	-	-	346230
Quarantine monitored	-	-	-	2711
On boarded ambulances	-	-	-	4795
Total number of downloads	-	-	-	41800

Implementation

All functionalities intended are implemented and made available to the targeted users. App development of iOS version is completed and is ready for App store distribution.

Improvements / Enhancements

Covid-19 self-assessment and reporting feature is the next major feature to be integrated in the app.

ENABLER

Processes Re-engineered

The app provides re-engineered solutions replacing many conventional systems followed. The major such systemic changes were designed to carry out many traditional procedures with a new approach. Instead of calling an ambulance service, a patient can request for an ambulance service through the app and the ambulance drivers are enabled to accept the requests instantly and proceed for pickup. During the covid19 pandemic spread, it was impossible for a face-to-face consultation with a counsellor and the app redefined the system with online chats and phone calls. The patrolling and house visits by health, local body and police officials for surveillance of quarantined persons was replaced with the geofencing of such persons and alerts to the authorities on protocol violations. During the pandemic, this app is aiding in managing the quarantined individuals and ambulance requests.

Technologies

Since the mobile app development technologies drastically emerge, the app development is always benefitted with the help of shared knowledge available online.

People

Since the app is intended for the public, it's made as simple as possible for a layman to understand the concept and use the app without much support. Due to the extra ordinary situation of Covid-19 pandemic, all the capacity building programs are conducted online on various digital platforms and the information sharing is done widespread online using various communication apps for additional support regarding the usage of the app. The key support players of this app is the medical team from district to local body and ward levels, control room staff, ambulance drivers, local body officials, Revenue Officials and police officials supporting the people affected by Covid-19 pandemic directly or indirectly.

VALUE INDICATORS

Learnings for sharing

Clarity in the concept, strict planning and time bound execution of action plans are key factors in success of any project. Sticking to software architecture, design and development guidelines considerably increases the standards of developing software. Maintaining source code and database versions for major and minor milestones prove beneficial.

Digital Empowerment

This app is a Covid-19 pandemic support mobile application which empowers individuals book ambulances, avail on call health counselling sitting at home. This app helps police officials and health authorities to keep track of quarantined individuals by geo-fencing those individuals and alerting officials in case of fence breaching. This app also has the vehicle transit management feature which improved interstate vehicle transit monitoring during the lockdown period.

Green e-Governance

This is a simple mobile app running on smart phones without any need to have additional gadgets or infrastructure. Hence, this produces zero e-waste. Booking ambulance service and availing health counselling allows individuals to stay at home during Covid-19 pandemic keeping themselves and their family members safer.

Shri. Subhash T V IAS, *District Collector Kannur, Kannur District Administration (Kerala),dcknr.ker@nic.in*

Shri. Andrews Varghese, *District Informatics Officer, National Informatics Centre (Kerala), kerkan@nic.in*

Smt. Rijisha K V, *Additional District Informatics Officer, National Informatics Centre (Kerala), adio-knu@nic.in*

e-Hospital Project

National Informatics Centre, New Delhi

Sunil Kumar and Naveen Kumar

PROJECT OVERVIEW

Vision & Objective

Under the Digital India initiative of Ministry of Electronics & Information Technology (MeitY), NIC has developed the e-Hospital, e-Blood Bank and ORS applications. ORS portal was inaugurated by the Hon'ble Prime Minister of India on 1st July 2015.

ORS is the online patient portal for citizens to book online appointment for the hospitals. ORS is accessible over Internet at https://ors.gov.in. ORS is a system to link hospitals across the country for booking online appointment and for providing patient centric services like viewing lab reports, checking blood availability status and making online payment.

The e-Hospital application is the Hospital Management Information System for internal workflows and processes of hospitals. It is a web based cloud hosted HMIS application which includes e-Blood Bank and Online Registration System (ORS). The e-Hospital, e-Blood Bank and ORS applications are hosted at the NIC's Cloud MeghRaj at the National Data Centre. The e-Blood Bank application facilitates the implementation of a complete Blood Bank Management System for internal workflows and processes of the blood banks. The availability on cloud has relieved hospitals from application and server management. The e-Hospital application is made available to government hospitals on cloud through Software as a Service (SaaS) model. The e-Hospital system is a one-stop solution which helps in connecting patients, hospitals and doctors on a single digital platform. The e-Hospital application is developed based on the global healthcare standards like HL7, SNOMED-CT, ICD10 and LOINC, and Meta Data and Data Standards (MDDS) published by the Ministry of Health & Family Welfare.

The modules of e-Hospital which are currently available on cloud are Patient Registration (OPD & Casualty), IPD (Admission, Discharge & Transfer), Billing, Lab Information System, Radiology Information System, Clinic, Dietary, Laundry, Store & Pharmacy, OT Management along with ORS and e-Blood Bank.

Currently, 390 hospitals have been on-boarded on the e-Hospital application from which 268 hospitals are using e-Hospital and reporting live transactions on a daily basis. Till date, over 17.04 crore transactions have been generated through e-Hospital with over 2.5 lakh transactions being generated every day.

ORS has been implemented in 245 hospitals. Till date, over 35.88 lakh appointments have been booked from ORS with over 3,000 appointments being booked every day.

The e-Blood Bank application has been implemented in 53 blood banks with over 1.1 lakh registered donors.

Hardware/Software

- Application Deployment Location – National Data Centre (MeghRaj Cloud)
- Operating System – Open Source (Linux)
- Web Server – Open Source (Apache)
- Application Server – Open Source (Tomcat)

- Database – Open Source (PostgreSQL)
- Development Framework – Open Source (Java)

Certification(Certifying Agency)

Security Audit Certificate provided by NIC Cyber Security Team and Third Party Empanelled Vendors.

Disaster Recovery and service continuity

Disaster Recovery (DR) is being setup at National Data Centre Pune for all live instances of e-Hospital application at National Data Centre Shastri Park New Delhi.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Hospitals on e-Hospital	Number of hospitals on-boarded on the e-Hospital application	321	345	390
e-Hospital Transactions	Total number of transactions generated through the e-Hospital application	5,98,51,278	6,96,99,883	1,31,75,654 (till 5th Oct 2020)
Hospitals on ORS	Number of hospitals on-boarded on the ORS portal	189	240	245
ORS Appointments	Total number of appointments booked through the ORS portal	10,75,204	11,03,216	1,31,752 (till 5th Oct 2020)

Implementation

The modules of e-Hospital which are currently available on cloud are Patient Registration (OPD & Casualty), IPD (Admission, Discharge & Transfer), Billing, Lab Information System, Radiology Information System, Clinic, Dietary, Laundry, Store & Pharmacy, OT Management along with ORS and e-BloodBank.

Currently, 390 hospitals have been on-boarded on the e-Hospital application from which 268 hospitals (69 hospitals in Karnataka, 65 hospitals in MP, 41 hospitals in UP, 26 hospitals in Delhi, 17 hospitals in Chhattisgarh etc.) are using e-Hospital and reporting live transactions on a daily basis, across 22 states in the country. These 268 hospitals include 137 District Hospitals, 49 Medical Colleges, 39 General Hospitals, 15 PHC, 9 CHC, 8 Central Govt. Hospitals, 7 Sub-Divisional Hospitals and 4 Cantonment Board Hospitals. Till date, over 17.04 crore transactions have been generated through e-Hospital with over 2.5 lakh transactions being generated every day. ORS has been implemented in 245 hospitals (55 hospitals in MP, 46 hospitals in Uttarakhand, 40 hospitals in UP, 25 hospitals in Delhi etc.). Till date, over 35.88 lakh appointments have been booked from ORS with over 3,000 appointments being booked every day.

The e-BloodBank application has been implemented in 53 blood banks with over 1.1 lakh registered donors.

Improvements / Enhancements

The e-Hospital application has been integrated with the DARPAN Dashboard of MeitY, Central Dashboard of MoHFW and CM Dashboard of the Govt. of Uttarakhand. The e-Hospital application has also been integrated with Mera Aspataal where NIN (National Identification Number) has been shared by over 198 hospitals.

The Lab Information System (LIS) module of e-Hospital has been integrated with the Lab Analyzers in major hospitals like AIIMS Delhi, Dr. RML Hospital Delhi, KGMU Lucknow, NIMHANS Bengaluru and NDMC Charak Palika Hospital Delhi. The integration with Lab Analyzers is under process in Lady Hardinge Medical College Delhi, AIIMS Rishikesh and various hospitals in Madhya Pradesh & Karnataka.

The e-Hospital application has been successfully integrated with the e-Raktkosh application of C-DAC in Dr. RML Hospital Delhi, where the demographics details of the patients registered in the hospital through e-Hospital can be fetched from e-Raktkosh application through API.

The interoperability between e-Hospital and C-DAC's e-Sushrut has been successfully tested, as directed by Joint Secretary (e-Health), MoHFW, and needs to be made public now. NIC has also done the proof-of-concept and integration of e-Hospital with e-Prescription using speech-to-text technology of C-DAC, and the API has also been tested for the same.

NIC has also developed and provided the functionality to provide death notifications in the e-Hosptial application to KGMU Community Eye Bank for organ donation of deceased patients in King George's Medical University Lucknow.

During the ongoing COVID-19 pandemic, many hospitals raised change requests and requested for multiple functionalities in the e-Hospital application especially for COVID-19 patients. NIC provided a link for COVID-19 helpline number and dashboard of the Ministry of Health & Family Welfare on the e-Hospital website (https://ehospital.gov.in) to facilitate the hospitals with the mentioned information.

NIC has also provided the same link for on the Online Registration System (ORS) portal (https://ors.gov.in) to facilitate the patients with the useful information available on the website of Ministry of Health & Family Welfare, which includes the Central helpline number, States' helpline number, toll free and helpline email id etc. and the data of active cases, cured/ discharged, deaths and migrated along with latest updates on COVID-19.

NIC has also put an informative message on the ORS portal (https://ors.gov.in) stating that the future online appointments for few hospitals have been temporarily suspended in view of the COVID-19 crisis. This move has been taken upon the requests received from hospitals due to temporary closure of OPD services amidst COVID-19 situation. NIC has put up a link for the advisory of voluntary blood donation during the COVID-19 scenario, provided by the Ministry of Health & Family Welfare, on the website (https://server3.ehospital.gov.in/ebloodbank) of the e-Blood Bank application.

NIC has developed a functionality in the e-Hospital system to send SMS to the patients on request of the concerned hospitals, in case of any change in the timings, schedule and functioning of the OPD in the hospitals. This has helped the patients by making aware of the availability and timings of OPD services provided by the hospitals. NIC has also developed and provided various ad-hoc reports to various hospitals across the country for the details of patient

demographics, admission date, department, duration of stay, diagnosis etc. of the patients admitted in COVID-19 isolation wards created in the hospitals. NIC has also developed the functionality in the e-Hospital system for the doctors and hospital staff to capture the foreign travel history and return date of the patients to make sure the availability of essential information in affected cases. NIC has also provided the facility to create separate departments, ICU wards and isolation wards in the e-Hospital system to uniquely register and identify the COVID-19 patients.

Recently, for the 10,000-bedded COVID hospital being set up by the Government of Delhi at Radha Soami Satsang Beas at Chhatarpur Delhi named as Sardar Patel Covid Care Centre & Hospital, NIC designed the COVID module for screening, admission, facesheet generation and treatment of COVID-19 patients in the hospital. NIC also re-configured the e-Hospital application and provided all the necessary technical and ICT-related support for implementation in Sardar Patel Covid Care Centre & Hospital. Further, NIC also on-boarded a new hospital for COVID-19 patients in District Hospital Sambalpur, Odisha for implementation of e-Hospital application.

NIC is providing all the necessary support/ training to hospitals in understanding new functionalities being provided in e-Hospital for helping the authorities fighting the COVID-19 crisis, as well as the above mentioned development/ testing/ integration/ implementation tasks through the outsourced manpower resources deployed in the e-Hospital project.

ENABLER

Processes Re-engineered

The e-Hospital solution provides a unified HMIS application which has been implemented in over 268 hospitals across the country and has eased the patients' journey at the hospital. The implementation of e-Hospital application in hospitals across the country has digitized the internal functions and processes of the hospitals including Online Appointment, OPD, IPD, Billing, Lab, Radiology, OT, Clinic, Dietary, Laundry, Store & Inventory and Pharmacy.The implementation of e-Hospital also helps in the creation of Electronic Health Records of patients across the country.

The e-Hospital application is developed based on the global healthcare standards like HL7, SNOMED-CT, ICD10 and LOINC, and Meta Data and Data Standards (MDDS) published by the Ministry of Health & Family Welfare. The adoption of these standards makes the solution interoperable with other health systems.

The e-Hospital application has been integrated with the DARPAN Dashboard of MeitY, Central Dashboard of MoHFW and CM Dashboard of the Govt. of Uttarakhand. The e-Hospital application has also been integrated with Mera Aspataal where NIN (National Identification Number) has been shared by over 198 hospitals.

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Hospital can be fetched from e-Raktkosh application through API. The interoperability between e-Hospital and C-DAC's e-Sushrut has been successfully tested, as directed by Joint Secretary (e-Health), MoHFW, and needs to be made public now.

The availability of e-Hospital solution on cloud through SaaS (Software as a Service) model has relieved hospitals from application deployment and server management. E-Hospital also provide quick and simplified onboarding processes and master data management for hospitals. ORS is a single window patient portal for providing patient centric services like booking online registration, viewing lab investigation reports, checking blood availability status and making online payment.

People

NIC provides all the functional as well as technical support to the hospitals in implementation of e-Hospital and understanding the functionality/workflows of new modules with the help of a centralized team of master trainers and 24x7 helpdesk/ call centre of e-Hospital project.

NIC is also providing all the necessary support/ training to hospitals in understanding new functionalities being provided in e-Hospital for helping the authorities fighting the COVID-19 crisis, as well as the above mentioned development/ testing/ integration/ implementation tasks through the outsourced manpower resources deployed in the e-Hospital project.

VALUE INDICATORS

Learnings for sharing

The biggest challenge in any digital transformation is the adoption of the solution by the users. NIC overcame this by providing regular trainings on the benefits, features and functions of various modules of the e-Hospital application making it easier for the hospitals and clinicians to adopt. Once the e-Hospital solution was made available to the hospitals, the next challenge was to connecting hospitals with e-Hospital and bringing them under one umbrella. NIC conducted several workshops and video conference meetings with the NIC State Coordinators to make aware and associate with the concerned State Govt. Health Departments to increase the awareness and adoption of e-Hospital solution.

Hospitals have to spend a lot of resources on application development and ICT infrastructure (e.g. servers) but the availability of e-Hospital application on Cloud through SaaS model has relieved hospitals from application and server management.

The primary challenge was to implement the e-Hospital solution in the hospitals at the block/district level. NIC's e-Hospital application is suitable for any type of hospital whether it's a PHC/CHC or a District Hospital/ Medical College. The 24x7 helpdesk/ call center of the e-Hospital project provides round the clock functional as well as technical support to the hospitals across the country. Another challenge was the variety of specific change requests raised by the hospitals for which NIC had setup a Change Request Committee to analyze the generic change requests useful for all the hospitals and provide the necessary changes in releases.

Digital Empowerment

The e-Hospital application has been implemented in 268 hospitals spread across 22 states across the country, which majority of the hospitals covered in states like Karnataka, UP, MP, Delhi and Chhattisgarh. One of the challenges with any nation-wide implementation is the language and demographic barrier.

NIC has successfully implemented e-Hospital in varied geographies with the help of its presence at the state- as well as district-level i.e. NIC State Unit and NIC District Informatics Officer. NIC State Unit and NIC District Informatics Officer helps bridging the gap between the NIC HQ team and the hospitals for smooth and effective implementation of e-Hospital.

Shri. Sunil Kumar, *Scientist-G, National Informatics Centre (New Delhi), naveenkumar@nic.in*

Shri. Naveen Kumar, *Scientist-F, National Informatics Centre (New Delhi), naveenkumar@nic.in*

eSanjeevani – National Telemedicine Service

Ministry of Health & Family Welfare, New Delhi

Sachin Mittal and Sanjay Sood

PROJECT OVERVIEW

Objective

To facilitate equitable healthcare services delivery by leveraging telemedicine to address the following issues:

- Non-availability of Doctors / Specialist doctors at ground level
- High burden on District Hospital and tertiary care facilities due to non-availability of services at primary level.
- Lack of health record creation at Primary and Secondary level

The Union Budget 2018 included a commitment under Ayushman Bharat of transforming 1.5 lakhs SHCs and the PHCs into the Health and Wellness Centres (HWCs) which will lay the foundation for India's health system as envisioned in the National Health Policy 2017. This is proposed to be accomplished by December 2022.

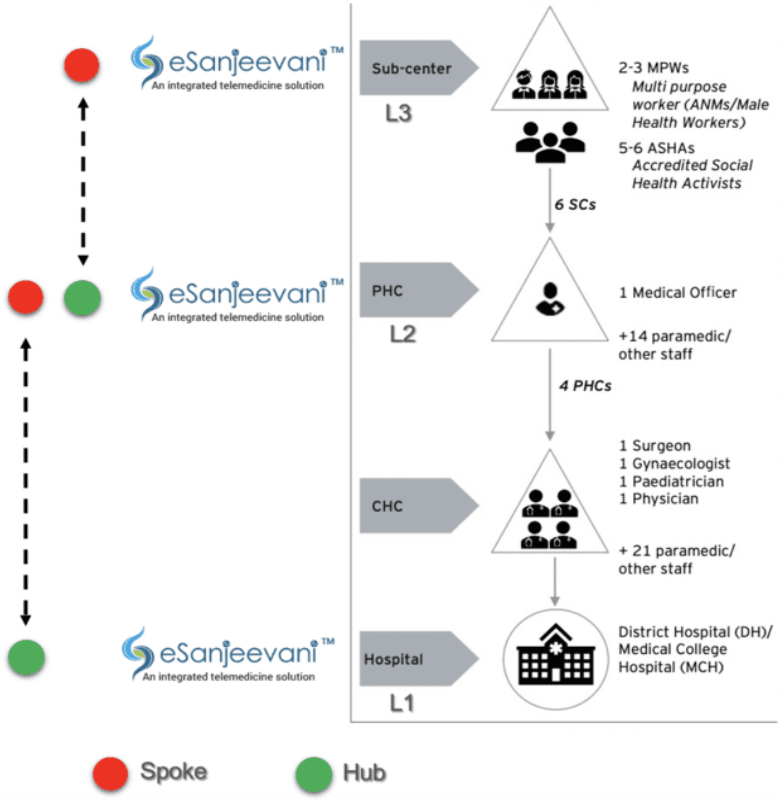
- These HWCs aim at expanding primary healthcare from selective (reproductive and child health / few infectious diseases) to comprehensive primary care including screening and management of NCDs, screening and basic management of mental health ailments, care for common ophthalmic and ENT problems, basic dental health care, geriatric and palliative health care, and basic trauma and emergency care.
- Sub-centre level HWCs will provide basic medical services to a cluster of population of about 5,000 in rural and sub-urban areas while the PHCs will cater to a larger population of about 30000.
- MoHFW has decided to leverage the ICT innovations proposed in Ayushman Bharat- HWCs under the NHM scheme has decided to rollout the Tele-Medicine services under the ambit of NHM in all HWCs on a Hub and Spoke model.

Scope:

Under Ayushman Bharat Scheme, Govt. of India aims to transform 1.55 lakhs Sub Centres and the Primary Health Centres into AB-HWC to deliver the comprehensive primary health care. Further it has also been envision that telemedicine technology will be leveraged to enable access of medical specialists to the beneficiaries in the rural areas and smaller towns This would not also facilitate equitable access to healthcare services but will also deliver comprehensive healthcare at beneficiary's doorstep across the country in sync with MoHFW's guidelines (2019) for telemedicine services in Ayushman Bharat - Health and Wellness Centres (AB-HWCs). Accordingly, MoHFW funded the customization of eSanjeevani and PAN India roll out of telemedicine services at country's 1.55 Lakh HWCs. In view of this eSanjeevani (HWC) - a doctor to doctor based real time teleconsultation system has been developed and deployed.

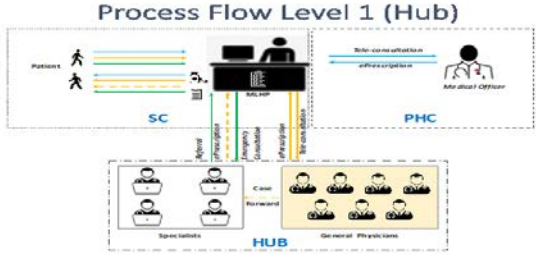
eSanjeevani (HWC) architecture supports a a double-deck 'Hub and Spoke Model', HWCs set up at State Level are the spokes and HUB of Doctors (comprising of MBBS/Specialty/Super-Specialty doctors) at Zonal level, to provide the first level of tele-consultation and subsequent prescription to Mid-Level Health Providers (MLHPs) or Community Health Workers (CHOs) or

Multi-purpose Worker (MPWs) at HSC-HWCs and specialist services to the Medical Officers at Primary Health Centres (PHCs).



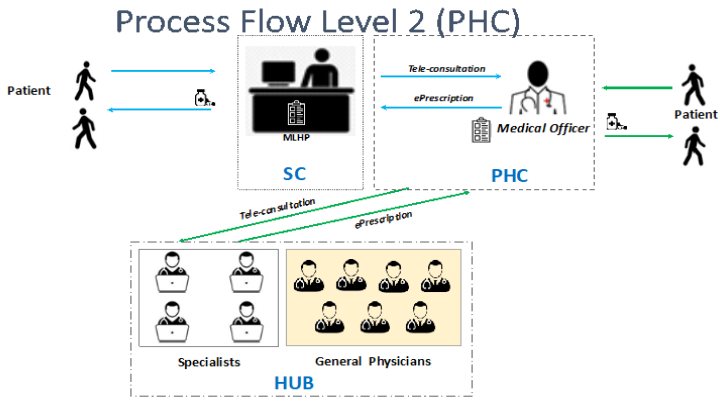
eSanjeevaniAB is globally – a first of its kind of a country wide implementation that facilitates the benefits of Ayushman Bharat Scheme to reach its beneficiaries including those residing in isolated and rural communities. The national telemedicine network that eSanjeevani is putting together is poised to be the world's largest doctor-to-doctor telemedicine system which has immense societal impact in terms of health services delivery and wellbeing of a significant section of the Indian populace. It facilitates equitable delivery of healthcare services. The workflows at three levels are detailed/depicted below:

Level I: HUB(s) are created at State Medical College for providing Specialist/Super-specialist Consultation to Doctors at PHC and Specialist/Doctor consultation to MLHPs / CHOs at Health Sub-Centre (HSC).

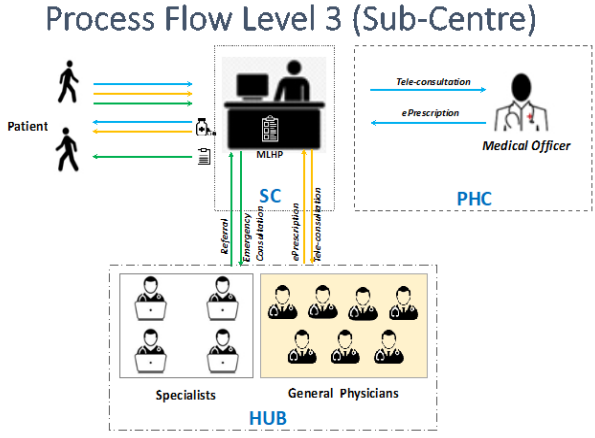


Level II: PHCs are upgraded as Tele-Medicine center with required infrastructure for providing Tele-Medicine services to Health Sub Centres and

for seeking Specialist/Super Specialist Consultation from HUB.



Level III: Health Sub Centres with Telemedicine Infrastructure can connect to Medical Officer at PHC or directly seek Tele-Medicine services from MBBS/Specialist Doctors stationed at HUB. The specialists available at District Hospitals may also be utilized by establishing the tele-consultation facility there.



Key Stakeholders

Key stakeholders / users include all the State Health Departments / National Health Missions in all States across the country.

Intended Benefits:

- This double-decked Hub & Spoke model telemedicine network would not only ensure equitable delivery of healthcare services across the country's primary healthcare.
- It would also speed up the delivery of healthcare services.
- It would also reduce medical errors (in hand-written prescriptions) – as eSanjeevani generates ePrescriptions.
- This initiative being first of its kind will be a pathway to a rich digital health ecosystem in the country

eSanjeevani (HWC & OPD) Status
21 October 2020

Sr No.		Consultations		
		GRAND TOTAL(HWC + OPD)	HWC	OPD
			Total(HWC)	Total (OPD)
	INDIA	560253	108567	451686
1	Tamil Nadu	189107	0	189107
2	Uttar Pradesh	154419	105	154314
3	Kerala	44648	3 *	44645
4	Himachal Pradesh	40815	39880	935
5	Andhra Pradesh	31544	26400	5144
6	Madhya Pradesh	19411	18300	1111
7	Uttarakhand	19374	1	19373
8	Gujarat	12981	9570	3411
9	Karnataka	11903	7508	4395
10	Maharashtra	8404	2243	6161
11	Delhi	6914	0	6914
12	Punjab	6691	4450	2241
13	Rajasthan	5564	0	5564
14	Manipur	1988	0	1988
15	Jharkhand	1971	0	1971
16	Chandigarh	1683	0	1683
17	Haryana	1493	0	1493
18	Assam	568	0	568
19	Telangana	301	0	301
20	Jammu And Kashmir	194	0	194
21	Chhattisgarh	101	101	0
22	Arunachal Pradesh	58	0	58
23	Goa	57	0	57
24	Mizoram	51	2	49
25	Puducherry	9	0	9
26	Bihar	4	4	0

* Between COVID Hospital - CFLTC

Current status

So far eSanjeevani has been implemented at around 4000 health and wellness centres have been and over 12000 users (community health officers and doctors/specialists) have been trained. In the patient to doctor telemedicine variant, eSanjeevaniOPD is LIVE in 24 States and more than 5,600 doctors have been on-boarded on eSanjeevaniOPD. On an average eSanjeevani is logging around 7,000 teleconsultations per day. Android app of eSanjeevaniOPD has also been designed and developed & till date it has over 3,00,000 installs from Google Play Store. As on date eSanjeevaniOPD app accounts for over 80% of the totalteleconsults in a day.

Software

eSanjeevani is a cloud-based telemedicine system – it has been developed using open-source tools/stack. It uses third party services as well these are:

- Open SourceStack
- Hosting – Amazon WebServices
- Video Consultations – Peoplelink for Video Consultations (Audio-Video)
- Bulk transactional SMS Service – SMS Gateway, MSDP, GoI

Technology Stack:
Front-end: Angular 6.0 with Typescript, HTML/CSS, Bootstrap 4
Server-end: .Net Core 2.2, SignalR, JSON, Restful API (Using JWT Token)
Database: MySQL 8.0.16
Security: JSON (JavaScript Object Notation) web technology is used for signed content using JSON data structures including claims to be transferred for authentication. Claims in JWT (JSON Web Token) are encoded as a JSON object that is signed & encrypted using HMACSHA security algorithm.
Hosting:
eSanjeevani has been deployed on MeitY, GoI approved secured Amazon Cloud (Amazon Web Services), the application is scalable and secure. The servers are located in Amazon's data Centre in Mumbai.

- Three servers have been configured, these are: A. Application Server & B. SNOMED Server VM (LINUX, Apache Tomcat) - 8 vCPUs, 3.1 GHz, 32GB RAM C. Database Server VM/RDS-Managed Service (MySQL) – 16 vCPUs, 3.1 GHz, 64GB RAM
- Storage: 2TB
- Bandwidth: peaked up to 2Gbps (provision is for unlimited bandwidth)

Security: eSanjeevaniOPD is using SSL Certificate (Secure Sockets Layer) and application also uses WAF (Web Application Firewall) that protects the application against known bad (blacklisted-by Amazon) IPs, SQL Injection attacks, Cross-site Attacks etc. from edge locations. The Load balancer also has been restricted to Cloudfront Content Delivery Network and can't be accessed directly. Therefore, each request has to pass through WAF protection. Besides hosting, storage and bandwidth the application numerous services of Amazon are being used these include:

- Application Integration: A. Simple Queuing Service (SQS) that takes care of token generation and queue management B. Simple Notification Service (SNS) – this service is used as a backup for bulk SMS service from our vendor. In case vendor's service fails, then SNS takes over.
- Database: Relational Database Service (RDS)
- Management: Cloudwatch – provides a comprehensive console for managing services and configuration of servers and services etc
- Compute: Elastic Cloud (EC2) and Lambda – for servers
- Security: Identity and Access Management (IAM), AWS Firewall Manager - for authentication and security, respectively.

Few more at the back-end
eSanjeevaniOPD's staging environment (for testing and demonstrations) is also deployed at Amazon servers. At present the configurations are good for two times its current peak levels and can be scaled up to 100 times its current peaks in a matter of 15 minutes.
Video Conferencing:
Video Consultation (Audio-Video, full-motion, full colour) is enabled through – People Link's services (Hyderabad-based).
Bulk SMS Services –
to send OTPs, notifications and alerts to users. 'SMS Gateway, MSDP, GoI

Cyber Security

As the system is continuously evolving, preliminary in-house vulnerability testing has been done. Soon the application will be audited from security standpoint.

Disaster Recovery and service continuity

eSanjeevani has been deployed on MeitY, GoI approved secured cloud, the application is scalable and secure. The servers are located in service provider's data Centre in Mumbai.

Disaster Recovery with CloudEndure

A revolution in disaster recovery came with the advancement of cloud technology and the enormous growth of public cloud infrastructure. In parallel, replication technologies evolved to leverage cloud infrastructure cost-effectively. There are numerous cloud-based DR technology solution vendors. Top-of-the-line solutions provide enterprise grade recovery objectives, and agnostic protection for any application, workload, or database, without any impact on source servers. Business continuity and IT resilience are a click away with CloudEndure® Disaster Recovery. This one-touch disaster recovery solution utilizes block-level continuous replication, as well as highly automated machine conversion and orchestration, to ensure minimal RPO and RTO for all applications and to significantly reduce traditional disaster recovery expenses. CloudEndure Disaster Recovery is available on AWS Marketplace as a SaaS Contract and a SaaS Subscription, which means AWS customers can sign up directly through their AWS accounts and start replicating machines straight away — no paperwork, no long-term commitment, no minimum number of machines

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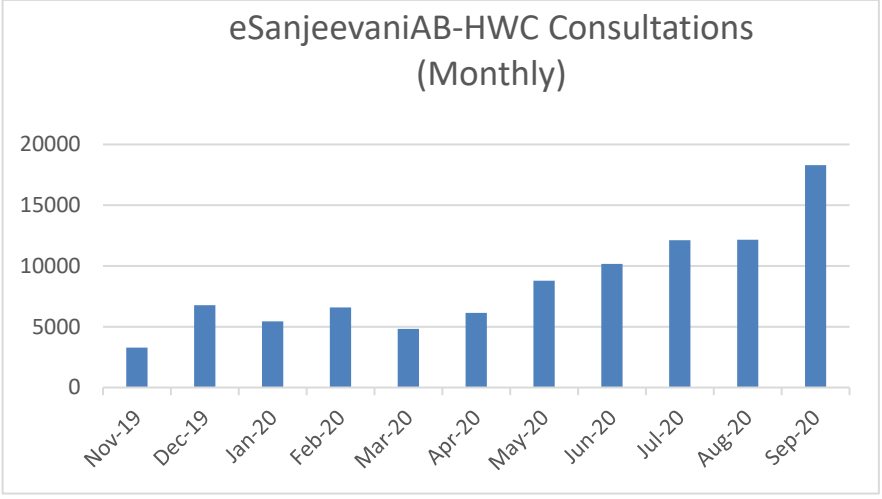
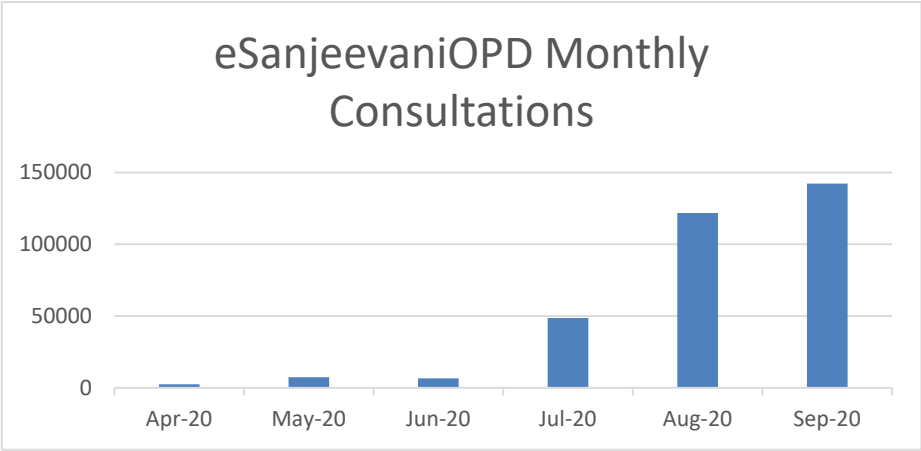
RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
eSanjeevani AB-HWC	Doctor to Doctor teleconsultation modality	NA	Please refer attached graph	Please refer attached graph
eSanjeevani OPD	Patient to Doctor teleconsultation modality	NA	Please refer attached graph	Please refer attached graph





Implementation

Implementation Coverage achieved in comparison to the plan / target

So far eSanjeevani has been implemented at around 4000 health and wellness centres have been and over 12000 users (community health officers and doctors/specialists) have been trained. In the patient to doctor telemedicine variant, eSanjeevaniOPD is LIVE in 24 States and more than 5,600 doctors have been on-boarded on eSanjeevaniOPD. On an average eSanjeevani is logging around 7,000 teleconsultations per day.

The Union Budget 2018 included a commitment under Ayushman Bharat of transforming 1.5 lakhs SHCs and the PHCs into the Health and Wellness Centres (HWCs) which will lay the foundation for India's health system as envisioned in the National Health Policy 2017. This is proposed to be accomplished by December 2022.

Improvements/ enhancements specifically planned out during next one Year

Key features of eSanjeevani cloud-based telemedicine system designed & developed in the last one year are:

eSanjeevaniAB-HWC:

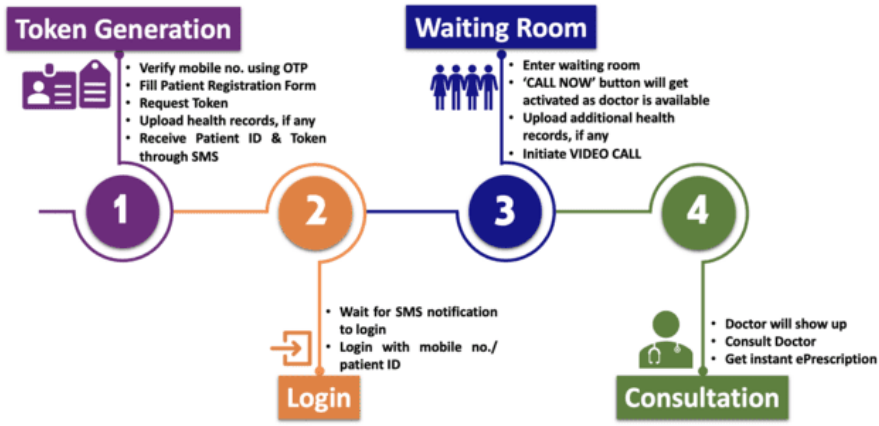
- Modelled on EHR guidelines issued by MoHFW, GoI
- SNOMED – CT compliant
- Two level consultations (two-hops)
- Real time telemedicine application
- ePrescription enabled (generic drugs)
- Inbuilt video conferencing & DICOM viewer
- Comprehensive dashboard for users & policy makers
- Integrated with diagnostic device - for Wireless import of results PoCTs& RDTs
- SMS based notifications

eSanjeevaniOPD:

Salient features of this citizen friendly web-based National Teleconsultation Service (eSanjeevaniOPD) are:

- Patient registration
- Token Generation
- Queue Management
- Audio-Video Consultation with a Doctor
- ePrescription

- SMS/Email Notifications
- Serviced by State's Doctors
- Free Service
- Fully configurable (no. of daily slots, no. of doctors/clinics, waiting room slots, consultation time limit etc).
- Mobile Android app for Patient's



The new features in eSanjeevani (for both variants) for the next year are guided and directed by Ministry of Health & Family Welfare as well as various States/UTs NHM.

ENABLER

Processes Re-engineered

Numerous Government processes were re-engineered through eSanjeevani. The primary process re-engineered was transforming a real face to face in person consultation into a virtual remote teleconsultation. This massive transformation was affected by meticulous deliberations and studying the existing processes. The guiding philosophies those enabled the process re-engineering were 1. remote consultations must mimic traditional face to face in person consultations at an OPD. 2. To encourage patients to use this virtual medium it was decided that the entire process must be public centric and user friendly. 3. Since eSanjeevani pertains to telemedicine that is health information the system must be safe and secure and must ensure appropriate privacy and confidentiality.

Automation was used to re-engineer a process to reduce patient waiting time. Patient's Time between registering and actually entering into a consultation with the doctor was managed creatively. As per the re-engineered process after registering the patient was not held in the system, a SMS based notification system was enabled that invited the patient to log in into the system only close to his / her turn thereby saving lot of time.

Standardisation in use of clinical nomenclature lead to simplification of analysis of health-related information by policy makers and health administrators. SNOMED CT (Systematised Nomenclature of Medical & Clinical Terminology). This not only simplified the use of eSanjeevani the power of SNOMED CT lead to analytics and medical insights and also facilitated data driven decision making besides making the system interoperable in various ways

Technologies

eSanjeevani - National Telemedicine Service is an enterprise wide system that has enabled paradigm shift not only in the way health services are delivered but also in a manner as they are availed. Data Analytics in basic form enabled patients to save time and also enabled health administrators to plan deputation of doctors on the system. The potential of Social media was tapped appropriately, posts are being regularly tweeted, video tutorials and adverts have been created for people to understand the platforms. Medical Internet of things have further enriched the system by interfacing it with an integrated diagnostic device that runs / conducts Point of Care tests and Rapid diagnostic tests and populates patient record wirelessly.

People

The People element plays an important role in the success of eSanjeevani - The National Telemedicine Service. At the top of the institutional set up the leadership support was extended by the Ministry of Health and Family Welfare at the National level, at the State Level the leadership was extended by National Health Mission and at the Implementation Agency the leadership role was played by the Projet Director.

Capacity building was carried out by the implementation agency in a rapid mode. Remote trainings were provided to doctors which were manged by trainers of the implementation team.

Management of Change was carried out in a structured way at all levels be it by the implementation agency or at the State level. The change made in the system was conveyed to the stakeholders in the States.

VALUE INDICATORS

Learnings for sharing

The conceptualisation, development, deployment, roll-out including operations and management of eSanjeevani – National Telemedicine Service has been a great learning for all in eGovernance at both G2G and G2C levels. eSanjeevani - National Telemedicine Service has for the first time transformed delivery of health services (G2C) in OPD into a eGov service. Planning for this National Service was done in consultation with all stakeholders at Central and State level.

Innovative aspect in the two-tiered telemedicine system set up is one of its kind to be set up by any country government for the fact that the eSanjeevani continuity of care. The processes have been designed in such a way that it enables access of specialised health services to the beneficiaries right in their villages and to the citizens right in the confines of their homes.

The challenges faced by the teams conceptualising planning and implementing the project included that the teams had nothing to look up to as the concept makes use of telemedicine technology in a very innovative manner. A huge challenge for the implementation team was finding the IT infrastructure to host this mammoth system that would be used by almost every citizen in the country – Ministry of Health and Family Welfare sought support from the Ministry of Electronics and IT to enable cloud infra for deployment of eSanjeevani.

eSanjeevani - National Telemedicine Service presents a huge opportunity for the policy makers and health administrators wherein eSanjeevani is supposedly country's first IT based health delivery system that enables initiation of digital health ecosystem which would facilitate implementation of National Digital Health Mission of Govt. of India.

Digital Empowerment

Since eSanjeevani – National Telemedicine Service has two variants, the doctor to doctor variant faces no challenge w.r.t. the local language but the patient to doctor variant is a public facing system. In this case efforts are on to present the system in local languages. Home pages in local languages have already been set up for states like Kerala and Tamil Nadu. Android application is being transformed to have a multilingual interface. Since eSanjeevani is a free G2C service, hence as yet there is no case pertaining to financial inclusion.
Since health is a State subject – eSanjeevani the National telemedicine platform is a cloud based system that can be used by any State. Doctor to Doctor variant has already been rolled out in 13 States and other States are in the process of roll-out. The speed had slowed down because of the onset of COVID 19 pandemic, however during lockdown 1, as the entire country was shut down the OPDs in all hospitals too had closed. Hence COVID 19 presented an unprecedented scenario that presented an opportunity to empower health service providers and the consumers alike. Both the key actants realised the importance of telemedicine and were quick to adopt the concept of remote consultations which had recently been legitimised by the Board of Governors, Medical Council of India by way of issuing Telemedicine Practice Guidelines.

Green e-Governance

eSanjeevani – National Telemedicine Service can be categorised as another step towards Green eGovernance as it does not entail newer IT infra, citizens can avail health services using their smartphones. Few State Governments have enabled access to health services for the section of society that is not economically advanced to own a smartphone in semi-urban settings. In this case the health workers during their door-to-door visits / surveys extend the use of their tablets for enabling members of household they visit to teleconsult a doctor/medical specialist.

In light of this as yet there is no eWaste being generated because of the initiative. Furthermore, this is one of its kind of a forward looking high social impact initiative that is pretty new and has been rolled out not more than a year earlier.

Dr Sachin Mittal, *Director eHealth, Ministry of Health & Family Welfare (New Delhi), mittal.sachin@gov.in.*

Dr. Sanjay Sood, *Project Director – eSanjeevani and Associate Director (Head, Health Informatics) (Punjab), spsood@cdac.in.*

Healthy Haryana Portal and Mobile App

Department of Information Technology, Electronics & Communications

V. Umashankar and Munish Chandan

PROJECT OVERVIEW

The main objective is to eradicate Covid-19 completely by micro-management of the existing Covid-19 positive cases and secure families. Healthy Haryana is a web based as well as mobile application for door to door household survey of symptomatic patients. Since the survey involves collection of patient's confidential data, security is a key pillar to the success of the project.

The survey will capture full medical conditions of a citizen and complete details of his/ her co-morbidity. This will help the state develop an extremely important database to further plan its COVID-19 containment strategy and make targeted interventions for the community. Additionally, the survey will give better direction to all State Health programmes by providing ideas for MIS based monitoring.

The other objective is to bring transparency & effective monitoring of the COVID-19 survey by maintaining the confidentiality of public data security. Using survey data, required reports can be generated and heat maps can also be generated on map of Haryana to visualize the spread pattern COVID-19 patients across State and define the containment zones as red, green etc. accordingly.

Healthy Haryana portal have reached people across all the 22 districts of Haryana. As on 05.10.2020, Health survey data has been recorded for more than 6,72,580 households through mobile application and more than 21,570 surveyors have been registered.

Software

The technology stack of the Healthy Haryana Portal and Mobile App is as follows:

- Healthy Haryana Portal is a web based application, which is built in Dot Net and the mobile application has been developed on Android platform
- It is using MySQL Database, which is open source and free.
- Application Server information: Web Server Package: IIS 8.5, Operating System: Windows
- Database Server Information: MySQL Database Server, Operating System: Linux
- Framework: Portal: Dot Net Framework, HTML: HTML5, Language: C#

Cyber Security

Security Audit for Healthy Haryana Portal and Mobile App is under process by the Haryana Information Security Management Office (ISMO) team.

Disaster Recovery and service continuity

Healthy Haryana Portal and Mobile App is hosted at Haryana State Data Centre and the state policy for Disaster Recovery applies on the same

RESULTS INDICATOR

Implementation

Implementation Coverage achieved in comparison to the plan / target

To defeat COVID-19 and to protect the well-being, safety, health of the citizens of Haryana in this emergency situation, the project "Healthy Haryana" was conceptualized and the team was given a task to execute this project within 1

month while taking care of the security features, good coding standards, etc.
Since this project was developed during the COVID-19 lockdown with focus on maintaining the confidentiality of public data security, the project team has collaborated with Haryana Health Department, CMO office, ISMO (Security Audit department), Internal divisions in DITECH and other Important departments during gathering information, analysis, defining scope of work and project execution.
Healthy Haryana App/ Portal is designed for use in all districts of Haryana.
Improvements/ enhancements specifically planned out during next one Year
The application was made live within a span of 1 month and the Districts are using the household survey on full scale. More than 21,570 surveyors have been registered. Health survey data for more than 6,72,580 households has been recorded through mobile app. The project is helping district administration in division of red, orange and green containment zones. District Admins can see district level survey reports. This is a user-friendly app and is being replicated by pother States as well.
This mobile application is highly scalable as multiple additional stakeholders can be easily added in this application. The infrastructure allocated for the application is very minimal and can be upgraded to cater to the ever-changing business requirements. Since the development of this application has been created in-house, the customization or additional features in the application can be dealt easily and quickly. While development of this application, due consideration was given to the code reviews and coding standards in order to enable scalability. The framework & architecture have been created in such a way that any increase in the user base or additional requirements/ features would have very minimal effect on the performance of the application.

ENABLER

Processes Re-engineered

This project was developed specifically to deal with testing related to COVID-19 pandemic situation since there was no existing system available.
Healthy Haryana is web based as well as mobile application created to conduct door to door household survey of symptomatic patients using android based mobile App and Data entry of physical surveys done previously.
Using survey data, required reports can be generated and heat maps can also be generated on map of Haryana to visualize the spread pattern COVID-19 patients across State and define the containment zones as red, green etc. accordingly which in turn helps the District Administrations in getting the correct communication to the citizens.
The citizens can be made aware of the accurate information regarding the containment zones to enable them to plan accordingly. Health survey data has been recorded for more than 6,72,580 households through mobile application.

Technologies

- Facility to generate heat maps on map of Haryana to visualize the spread pattern of Covid-19
- MIS based monitoring and decision making for containment zones
- Since the development of this application has been created in-house, the customization or additional features in the application can be dealt easily and quickly
- While development of this application, due consideration was given to the code reviews and coding standards in order to enable scalability

- The framework & architecture has been so created that any increase in the user base or additional requirements/ features would have very minimal effect on the performance of the application
- Encouraging good performing platforms and replicate their good practices in other modes/ methods.

People

To defeat COVID-19 and to protect the well-being, safety, health of the citizens of Haryana in this emergency situation, the project "Healthy Haryana" was conceptualized and the team was given a task to execute this project within 1 month while taking care of the security features, good coding standards, etc.

A cross-functional team of 5 resources were involved for 1 month to execute this project (Healthy Haryana). The team included 1 Project Manager, 2 Developers, 1 Software Tester and 1 Designer. As most of the team members and stakeholders were working from home, coordination among them was a challenge. However, the tasks were allocated accordingly to make sure most of them could work independently. To combat the frequent changes in requirements and need of project team had followed Rapid Application Development (RAD) approach.

The application had very strict timelines for launch, so the development was done using Agile methodology. Coordination with stakeholder were routed through high authorities to get quick response.

Since this project was developed during the COVID-19 lockdown with focus on maintaining the confidentiality of public data security, the project team has collaborated with Haryana Health Department, CMO office, ISMO (Security Audit department), Internal divisions in DITECH and other Important departments during gathering information, analysis, defining scope of work and project execution.

VALUE INDICATORS

Learnings for sharing

To defeat COVID-19 and to protect the well-being, safety, health of the citizens of Haryana in this emergency situation, the project "Healthy Haryana" was conceptualized and the team was given a task to execute this project within 1 month while taking care of the security features, good coding standards, etc.

As most of the team members and stakeholders were working from home, coordination among them was a challenge. However, the tasks were allocated accordingly to make sure most of them could work independently. To combat the frequent changes in requirements and need of project team had followed Rapid Application Development (RAD) approach.

The application had very strict timelines for launch, so the development was done using Agile methodology. Coordination with stakeholder were routed through high authorities to get quick response.

Some of the key steps that were undertaken as part of the development were as under:

- Create list of all stakeholders involved in the process.
- Arrange meetings with stakeholders. This was a daunting task since it required voluntary participation from stakeholders. Diligent follow-ups were required to execute workshops/ meetings. Level of participation from stakeholders differed from stakeholder to stakeholder. To top it off, COVID-19 pandemic made it even harder to coordinate with all the stakeholders initially.

- Enthusiasm of stakeholders in sharing of data/ information varied so extensive coordination was required
- Displaying data, tackling both relevancy and user friendliness was also a challenge. Bucketing of users and effectively leveraging a complex database strategy therefore was extremely important.
- To generate and display filtered and non–filtered reports to stakeholders was also felt necessary. The reports were designed and tailored to fit each user/ stakeholder bucket.
- Security was of utmost concern while designing the portal.

On-ground door to door household survey is being done for the first time using Healthy Haryana application. The application provides facility to generate heat maps on map of Haryana to visualize the spread pattern of Covid-19. This application also helps in MIS based monitoring and decision making for containment zones related to COVID-19. So far, more than 21,570 volunteers have been onboarded for conducting the survey. The other key innovative feature is that the app is designed to work in poor connectivity in rural areas and its security features.

Digital Empowerment

Healthy Haryana App/Portal is designed for use in all districts of Haryana.

- The application was made live within a span of 1 month, many Districts have already started the household survey on full scale
- No. of Surveyors registered: 21,570+
- No. of households for which health survey data has been recorded through mobile app: 672,580+
- The project is helping district administration in division of red, orange and green containment zones
- This is a user-friendly app and is being replicated by pother States as well

Green e-Governance

Since Healthy Haryana App/ Portal is hosted at Haryana State Data Centre and the state policy for the same applies

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Shri. V. Umashankar, IAS, *Principal Secretary, Department of Information Technology, Electronics & Communications (Haryana), officeapscm@gmail.com, v.umashankar@gov.in*

Shri. Munish Chandan, *Head State eGovernance Mission Team (SeMT), Department of Information Technology, Electronics & Communications (Haryana), munish.chandan@semt.gov.in*

KHUSHI Scheme (KHUSHI)

Department of Health & Family Welfare, Odisha

Yamini Sarangi, Puspalata Sahoo and Nirupama Mohapatra

PROJECT OVERVIEW

Khushi (meaning "Happiness" in Odia) is a female health and hygiene program run by the Government of Odisha to provide free sanitary pads to girl students in Odisha. The web-application “KHUSHI” have been developed and implemented for monitoring the main functions of the scheme like master data preparation, entry of eligible girl students, Purchase order generation, Receipt of items (sanitary napkins) and Issue of the same, Helpdesk etc.

Modules of KHUSHI

Admin

- *Master data preparation:* This module facilitates Admin to add/edit master data like User, Warehouse, supplier and School etc
- *Purchase module:* This module is being used to generate Purchase order quarterly in financial year for procurement of items (Sanitary Napkins)
- *Privilege Module:* Helps to Receipt and Issue of voucher against the items procured.
- *HelpDesk:* This module is meant for providing immediate solution to the users at ground level who are the main stakeholders of the system. The user raises a complaint and Admin has to solve it.
- *Report Module:* Provide reports all types like Ledger, Stock, Purchase, Receipt and Issue.

User (Warehouse)

- *Receipt Module:* When items (Napkins) reach at warehouse, this module facilitates the user to receive the items and enter in the system.
- *Issue Module:* When the items are being issued to the schools for distribution of napkins to the girl students, the details are entered in this module.
- *Help Desk:* When any problem arises in the system, the same has to be posted in this module so that Admin can solve it.

Key Stakeholders

H& FW department, OSMCL , Block Warehouses (314)

Intended Benefits/Current Status

- The application will provide the State, Block officers and MIS level officers to monitor the distribution of sanitary napkins to the schools through the hierarchy from State through block. So, transparency is maintained in the whole process
- The system provides good MIS reports at State and Block level which helps them in monitoring the scheme efficiently.

No. of Girl Students enrolled: 17.25 lakh

No. of Warehouses: 314

No. of Supplier: 1

Software

- Server: PostgreSQL
- Front End: PHP 7

Cyber Security

Security Audit Done by the empaneled CERT-In third party followed by NIC Audit

SecurEyes Techno Services Pvt Ltd has completed the first audit.

Disaster Recovery and service continuity

Application is hosted in National Data Centre, Bhubaneswar. DR and BCP will be taken care by NDC.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
PO generation	Purchase Order is generated online	1	1	1 (5068098 packets)
Receipt	Block Warehouses dashboard is updated and they will receive the quantity of item which is pre-determined as per the eligible students	314	314	314 (20272392 packets)
Issue	Schools will be issued the items as per no. students registered in the schools.	-	-	-

Implementation

Implementation Coverage achieved in comparison to the plan / target

- The geographical area is the entire state of Odisha and the designated warehouses (Blocks).
- Stakeholders are Health and FW Department, OSMCL and Blocks.

Improvements/ enhancements specifically planned out during next one Year

- HelpDesk module has been incorporated last year in the application
- This application will be further enhanced with development of one Mobile App to capture the information during supply of napkins to school authorities.
- API will be developed which will pull data of girl students (of class 6-12) from student database (other project) and KHUSHI database gets updated.

ENABLER

Processes Re-engineered

Since it is a new Scheme, Process Re-engineering is not done

Technologies

Social media like TV and daily Newspaper have been used to publicize the application and make aware the citizen mainly girl child about the scheme and link is provided in OSMCL website

People

Trainings and demos have been conducted for block level officers who are the main stakeholders of the application. Audio enabled user manual has been

provided to Block level officers for reference

VALUE INDICATORS

Learnings for sharing

- Admin will create Users for 314 Block Warehouses who receives and issues the items from supplies and schools respectively. They will update the stock position each time when transaction happens.
- HelpDesk module helps Block Warehouses and Admin to raise and solve the issues in right time which makes the system very effective.

Digital Empowerment

Since this is purely a G2G e-Governance application and State Govt. Officials at State and Block level use this application, stakeholders are not facing problems in any respect. To facilitate Schools where items are being delivered, mobile App is planned to be developed so that State Authority can know the delivery of item position instantly where School Authority will update the status and SMS will be going to all line Authorities.

Green e-Governance

Achieving environmentally friendly practices through the application work-flow process. Sending paper reports are being reduced as the authority generates required reports through the software.

Ms. Yamini Sarangi, IAS, *Managing Director, Odisha State Medical Corporation Ltd. Department of Health & Family Welfare (Odisha), mdosmcl2013@gmail.com*

Ms. Puspalata Sahoo, *General Manager, Odisha State Medical Corporation Ltd. Department of Health & Family Welfare (Odisha), puspalatasahoo19@gmail.com*

Ms. Nirupama Mohapatra, *HOD &Senior Technical Director, National Informatics Centre (Odisha), n.mohapatra@nic.in*

MEDHAS – Medical Education Health Administrative System

National Informatics Center, Andhra Pradesh

Madhusudhana Rao Sanaboyina and K Shankar

PROJECT OVERVIEW

The computerization of Dr. N.T.R UNIVERSITY OF HEALTH SCIENCEShas been named as MEdHAS (Medical Education Health Administrative System) by NIC, APSC, Vijayawada. MEdHAS is a comprehensive solution being developed and implemented by NIC APSC to addressvarious needs of Dr.NTR University of Health Sciences, Vijayawada, as part of computerization.

The portal has below modules such as

e- Affiliation: to conduct the affiliation process online and thus minimizing the paper work and increasing the transparency.

e- USN: a system to approve the admission of a student, generate and allocate a unique number (USN University Student Number)

e- Hall tickets: A system to generate and disburse hall tickets online.

e- Results: A system to capture internal assessment marksattendance, process and publish results online.

e- Sandesh: A portal to broadcast any announcement to affiliated colleges and students through SMS and email.

e Services: A solution to cater online services such as apply for Original degree, Duplicate degree et. al by completing the payments and processes online without the student having to visit the University physically.

e- Pariseelana: a tool to monitor and assess the performance of the employees in the section, being developed and implemented parallelly.

e-QPODS: Electronic Question Paper Online Delivery System. A secure system to deliver Question paper.

OPTMIS – Online Payments and Transactions Monitoring Information System: This is portal for finance department to monitor the incoming payments made online with respect to the services being catered online.

Scope:

Functional: Meeting all the requirements of University with regard to computerizing the entire process flow and work flow.

Geographical: All the colleges under the University in Andhra Pradesh, India.

Key Stakeholders:

- Principals, students, Faculty and Management of all the colleges affiliated to Dr NTRUHS
- All the University Staff including Hon'ble' Registrar and Hon'ble Vice Chancellor

Intended benefits:

- Ease in operation
- Transparency
- Data consistency and integrity
- Cost Benefits
- Time efficient

Current Status:

First version with the above-mentioned modules is live. Second version is in Staging and development is in progress.

Software

IDE: Visual Studio
*Programming Language:*c#
Database: MS SQL Server

Cyber Security

Received Security Audit Certificate from APTS for the below modules.

- http://ntruhs.ap.nic.in/ Dr NTRUHS website
- e-QPODS portal

Disaster Recovery and service continuity

DRP takes all of the following areas into consideration:

- Network Infrastructure
- Servers Infrastructure
- Communication System
- Data Storage and Backup Systems
- Data Output Devices
- End-user Computers and Services
- Organizational Software Systems
- Database Systems
- IT Documentation

If a disaster occurs in Dr NTRUHS, the first priority is to ensure that all employees are safe and accounted for. After this, steps must be taken to mitigate any further damage to the facility and to reduce the impact of the disaster to the organization. Regardless of the category that the disaster falls into, below strategy will be adapted:

- Disaster identification and declaration
- DRP activation
- Communicating the disaster
- Assessment of current and prevention of further damage
- Standby facility activation
- Establish IT operations
- Repair and rebuilding of primary facility

Walkthroughs- Team members verbally go through the specific steps as documented in the plan to confirm effectiveness, identify gaps, bottlenecks or other weaknesses

Migration to tier 3 Data Center is in progress for the existing Data Center.
Migration to Cloud is in progress.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
e-USN	Generation of USN for all the students of University and approval of the data.	1848	17565	348

e- Hall tickets	Offline Hall tickets sending manually is replaced by online delivery.	0	14289	9011
e- Results	Existing system which involves a lot of manual work is automated anddelivered.	0	7864	348

Implementation

Implementation Coverage achieved in comparison to the plan / target

Geographical coverage: The listed modules are available across the regions Andhra Pradesh.

Users: All the colleges and the management are the users of the MEdHAS portals.

In the coming years, the services which can be directly used by Students will be increased.

The delivery channels will be extended to mobile phones with our newly emerging MEdHAS mobile Application, this can be very beneficial to the students, all the stakeholders of the university.

Improvements/enhancements specifically planned out during next one year

During the last one year:

- E- Affiliation is made live and all the master data from colleges is taken, thus digitizing the information that was once confined to only papers.
- E-Pareeksha is live and has reduced a lot of manual intervention and decreased the caseload on the case worker.

Plan for the next one year: the project is going to focus over the other needs of the university such as computerizing Employee management through a portal e-Chanakya, making the payments completely online, Move few more e-Services to production.

ENABLER

Processes Re-engineered

Standardized:

- USN process is re-engineered and standardized
- Codification of the Master data of University helped establish a consistent flow between departments. A link between Academics, Admissions and Examination Section Data is established and streamlined.

Simplification:

- Data correction process is re defined, letting the college user correct the name of student as per qualifying degree certificate. This reduced the overhead on the University end.

Re Engineering:

- e-Hall tickets process reduced a lot of human intervention and minimized the delay and postal charges.
- Data collection is made online and is secure.
- The process of results publication is re structured by minimizing the manual process.

Technologies

Data Analytics: Various dashboards were developed to view the statistics of the portals.

This gives a clear picture of the numbers and the usage. The dashboards developed are of great aid to the leadership team in the Dr NTRUHS.

People

- Medical, Dental, AYUSH, Physiotherapy, Nursing college Principals.
- Dr NTRUHS wing officials of all Departments.
- Registrar, Dr NTRUHS,
- Vice Chancellor, Dr NTRUHS.

VALUE INDICATORS

Learnings for sharing

Project Estimates: The leadership team from NIC was very judicious with regard to the project estimates with regard to the costs, volume of work and the resource identification and allocation.

Process Changes: NIC came up with many proposals to overcome the limitations in the current system where there are lot of gaps and inconsistencies. USN generation is of among such process changes. Similarly, reducing the steps of human intervention in various other processes is made thus paving way to the growth of more robust and effective services and solutions by MEdHAS.

Digital Empowerment

Online Payments are enabled and thus empowering the citizen to making a payment for a service.

e-Affiliation: The process of filing the affiliation process enabled and improved transparency.

Green e-Governance

The below portals contribute towards paper less work. Thus contributing

- e-Office
- e-Sandesh
- e-Services
- e-QPODS (Electronic Question Paper Online Delivery System)
- Other Green Governance Initiative: The project and the leadership team focus on reducing the e-waste and encourages Re Using. Thus, contributing towards a greener planet.

Shri. Madhusudhana Rao Sanaboyina, *Sr. Technical Director, Scientist-F, National Informatics Center (Andhra Pradesh), madhusudhanarao.s@nic.in*

Dr. K Shankar, *Registrar, Dr. N.T.R University of Health Sciences (Andhra Pradesh), registrardrntruhs-ap@gov.in, drntruhs@gmail.com*

RT-PCR/RATI Mobile Apps and Portal

National Informatics Centre, MeitY, GoI

Neeta Verma and Ajay Singh Chahal

PROJECT OVERVIEW

Objective

The main objective of the Project is the containment of Covid19 pandemic, through correct data collection in a standard format all over the country, with verified patient mobile number/ address with GPS coordinates for every RT-PCR/Rapid Antibody/ Rapid Antigen sample being collected for testing. The data collected through Mobile apps is made available to ICMR authorized Labs for entry of Test results. This data of positive cases is, therefore, available in Arogya Set up for contact tracing, nearby patients, research and analysis purposes. Quick development of software solution, without resorting to any kind of additional hardware for roll-out on Pan-India level has been the associated objective.

Scope

- The scope of the Initiative has been to develop the two mobile apps on Android and iOS (Apple) platforms, to be used by phlebotomists (Sample collectors) for capturing of Covid19 infected/ suspect patients and their sample details in standard format across the country, in a very short time, and transfer this data to ICMR for further use.
- For ensuring correct data capturing, contact tracing, deciding containment zones, it was decided to verify patient mobile through OTP and capture the GPS location of the place where sample is collected (Lat/Long).
- The development of the portal became a necessity as white-listing of sample collectors and MIS requirements of States/UTs were to be met and hence, a portal https://covid19cc.nic.in portal had to be developed for all such requirements.
- Setting up of Cloud infrastructure, with capacity to handle extremely high loads during peak hours of the day and also when Covid19 cases rise, became part of scope, in view of the Apps and Portal being used all over the country.
- The geographical scope of the project has been the entire country, India covering all States/ UTs

Key Stakeholders

The entire country is the Stakeholder as patient data is collected and used further along with the sample details for testing purposes. Earlier 34 States/UTs were part of the initiative but later Kerala, Meghalaya and Telangana developed their own applications. Since the data is used in Arogya Setu mobile app, almost 14 crore app users become indirect stakeholders. The key stakeholders are give below:

- *ICMR and Ministry of Health and Family Welfare*, Government of India for MIS purposes. ICMR portal uses the RT-PCR data and makes it available in their Laboratory interface for entry by the authorized Testing laboratories all over the country. The data standardization and authenticity of patient mobile is ensured through the Apps along with GPS location of the place where sample of patient is taken for testing.

- *Research Institutes*: All data is made available to ICMR in real time and it is the single largest collected database on RT-PCR tests of the country as it is being used in 31 States/UTs. The data is available to ICMR who may use it for research purposes because Covid19 related information is not fully known to anyone so far.
- *Arogya Setu mobile app* being used by more than 14 crore Indians for contact tracing, finding nearby Covid19 patients.
- *State and District Administration* in all 31 States/ UTs for entry of Collection Centres and white-listing of their sample collectors (Phlebotomists), MIS purposes, Contact Tracing verifying authenticity of RT-PCR test reports by searching through SRF ID or Patient Mobile in the portal.
- *State and District Health officials* in all 31 States/ UTs for MIS for downloading data, white-listing sample collectors, checking reports, data etc.
- *ICMR authorized Laboratories* who are doing the Testing of samples collected through RT-PCR mobile app and reporting results to ICMR, States, Sample Collectors, Patients. Private laboratories have also been authorized to white-list their sample collectors on their own
- *Collection Centres* who are collecting Samples for Test through their sample collectors by white-listing them in the portal so that they may use the Mobile Apps for collecting Test Sample data (and results also in case of Antigen and Antibody tests)
- *Sample Collectors*: Almost 80,000 sample collectors are using the RT-PCR / RATI apps in the country and they are the key stakeholders of this initiatives. Developing the App and Portal is one thing, but rolling it out all over the country with diverse beliefs, customs, language was the real challenge and it has been met.
- *Public/ Patients*: The patients who give their RT-PCR or other Sample for testing, get an SMS on their given mobile about the details collected and in case of Rapid Antibody Tests gets the result SMS also, they get to see their result also by visiting the portal and entering their mobile number for OTP authentication. The entire SRF details are available to them. In fact, the entire population of the user States is a stakeholder of this initiative.

Benefits

- Due to rapidly changing Covid19 situation in the country, keeping in view the Lockdowns/Un-lockdowns, the solution would be configurable so that some options can be enabled / disabled through the software. The SRF versions will need updations and the mobile apps must be configurable quickly without resorting to long back-end changes in code. Maintenance and upgradation has been kept in mind while designing the solution.
- The cloud infrastructure will be scalable and hence, handle extremely high work-loads, if the situation worsens.
- SMS based alerts to patients, sample collectors and Administrative officials will be available to stakeholders. SMS based warning will be sent to sample collectors/ labs who mis-use the patient mobile by either wrongly entering it or re-entering one number multiple times.
- Quick onboarding of Administrative / Health officials through existing NIC Email Id and password so that no new users need to be remembered/ created for the Portal. These users will white-list the sample collectors

and use data for MIS purposes, including data porting for their local State specific requirements.

- Avoiding double data entry as earlier Collection Centres/ Labs were doing entry of SRF form at their own and the again entering all data in ICMR Laboratory interface.
- Making available the business continuity plan so that the services of Apps are available round the clock on 24x7 basis in all circumstances.
- Full accountability is maintainable in the project by recording every SRF against the sample collector and lab which tests the sample.

Current Status

- Developing the App and Portal is one thing, but rolling it out all over the country with diverse beliefs, customs, language has been the real challenge, which has been met thoroughly. Judging from its quick implementation in 34 States/UTs in one proves this point. Even the 3 States who opted out later (Kerala, Telangana, Meghalaya) or the other 3 States who didn't use the solution (Bihar, Andhra Pradesh and UP), have used the same data structure and reporting their own ICT solution data to ICMR in the same format.
- *In nutshell:*
  i. Mobile Apps, RT-PCR and RATI developed on Android and iOS platforms and RT-PCR has also RT-PCR also been made available as windows 10 app. All these are security audited.
  ii. Redundant cloud infrastructure created on NIC Cloud with primary site at Delhi and DR site at Hyderabad, to mitigate any disaster situation
  iii. Performance testing of solutiondone for 50,000 concurrent users
  iv. Comprehensive documentation, FAQs, movies for users to quickly implement the system
  i. RT-PCR mobile app updated frequently for SRF changes along with required updations in the Covid19cc portal
  ii. Solution implemented completely in 31 out of 37 States/ UTs of India (with 3 out of 6 left out States using the solution partially, namely, Kerala, Telangana and UP). Total 3.83 Crore RT-PCR samples has been collected from the all the states.
  iii. Onboard
    a. 5,000 + State users
    b. 7,000 + Laboratory users
    c. 20,000 + Collection Centres
    d. 90,000 + Sample Collectors (Phlebotomists)
    e. 4.00 CRORE + Patients and their Samples
    f. 7.00 CRORE + SMS based alerts/ OTPs/ warnings/ SRF PDF URL to users

Hardware/Software

The application software system has been deployed on Government of India cloud "Meghraj" managed by National Informatics Centre and following environment is in use:

HW: 8 high end Virtual Machines (VMs) as web-servers behind load balancer and 10(5x2) high end VMs as database servers and 2 VMs as Domain Controllers at primary data center in New Delhi and same set up is available at disaster recovery (DR) data center in Hyderabad.

SW: Operating system on all VMs - Windows Server 2016 data center edition;

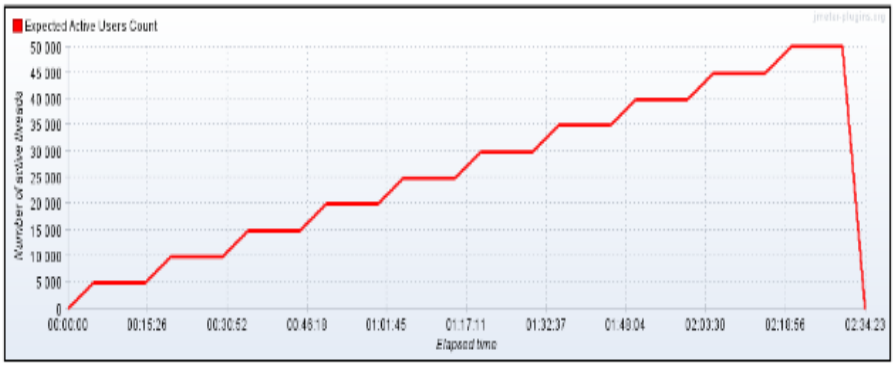
Database Management System on all DB VMs - Microsoft Sql Server 2019 Enterprise (For high availability: 5 VMs as Primary and corresponding 5 VMs as secondary for each primary, 1+1 for every Zone separately).
Middleware: Microsoft .Net framework for covid19cc.nic.in web-portal and Xamarin for RT-PCR and RATI mob-apps.

Certification(Certifying Agency)

Yes, the https://covid19cc.nic.in portal has been Cyber Security Audited through empanelled agency of Indian Computer Emergency response Team (CERT-IN). The cyber security audit clearance certificate of the certifying agency is enclosed. And Both RT-PCR and RATI mobile Apps have been cyber security audited through CERT-empaneled agencies, M/S Secure Eye and Price Water Coopers respectively.
These include all third party software or system software components used in these equipment/ machines, to support application software system at higher layers.
Cyber security audit certify that there are no security vulnerabilities in the software application, data center network and server level which may pose threat to the applications and related components/equipment.
The Mobile Apps use security token and can't be used with same User ID on more than one device. These Apps have been audited by M/S Secure Eye/ M/S Price Water Cooper (PWC).

Disaster Recovery and Service Continuity

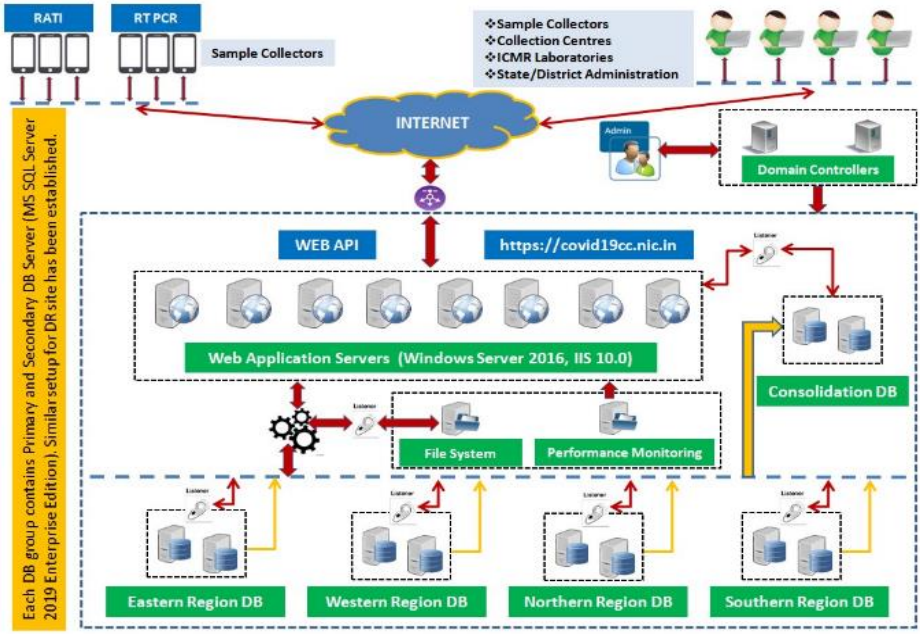
Considering the criticality of Covid19 situation in India and the ever increasing number of daily tests conducted and positive cases, the Infrastructure and software has been designed to meet all kinds of contingencies to ensure service continuity and meet any type of disaster. The DR site of portal is set up in different seismic zone at Hyderabad. The other points to ensure service continuity are as following:



- *Two level of redundancy* has been achieved through Always On feature of MS-SQL 2019, Zone wise Database servers and Consolidation Server for the country for MIS, data sharing with ICMR. The unique SRF ID can handle upto 9.99 Crore transactions for every District of India. No district of the country has a population of 10 crores.
- *SRF ID* is not dependent upon Consolidation Server, so even if one zone or consolidation server is down, RT-PCR app will keep working for other zones.

- *DR site at Hyderabad* has been readied, but yet to be tested. This will ensure that even if the entire Meghraj cloud in New Delhi goes down, the Apps and Portal will start working from Hyderabad.
- The portal and Apps have been tested for extremely high load of 50,000 concurrent users in 10 minutes to enable a very high load at any point of time on the web and database servers.
- A load balancer has been set up to equally distribute the load among 8 web-servers.
- The Infrastructure at NIC Cloud is monitored round the clock with auto-alerts if any parameter nears crosses threshold level.
- The portal has been enabled for both IPv4 and IPv6 so that it even works with networks using only IPv6 at client connectivity levelat any point of time.

Infrastructure Deployment Architecture diagram:



RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Specimen Referral Form (SRF) data collection in RT-PCR Mobile App for RT-PCR tests	The RT-PCR app captures details of every sample being collected in the country along with the patient information. The benefit of this service is that data of SRF form is collected in standard format across the country and hence easy to process further and analyse at national level.			Total SRF: 3,27,54,119 (3.27 Crore)

Rapid Antibody Test-patient data collection and entry of Result in RATI App	Rapid Antibody Test details of every person is collected in the RATI mobile app and there is option to enter the result of the test as it is available within 15 minutes to the sample collector. The benefit of this service is that the App was available all over the country by 20th April and standard data collection was initiated.			Total Test: 2,11,391 Total Result: 1,90,020
Rapid Antigen Test-patient data collection and entry of result in RT-PCR App	The Rapid Antigen Tests have been started recently and 3 kind of kits are available. The advantage is that the result is available in a short time without sending the sample to the Labs. The data is SRF format is collected of every person undergoing this test. The benefit of this service is that no additional mobile app with different functionality was needed. The RT-PCR app was modified and made available to sample collectors immediately.			Rapid Antigen Test : 57,75,352
OTP based verification of patient mobile number	This service enables every State/District to make OTP based verification of patient mobile a mandatory step in RT-PCR app. The benefit is that the correctness of mobile number is ensured and that the mobile number belong to the patient or their family member because OTP can only made available by them to the Sample collector while making entry in the App.			OTP Verified: 58,24,617
Receiving back RT-PCR results from ICMR	API shared by ICMR is scheduled, which is run at fixed time intervals, the Covid19cc portal check availability of pending result in the ICMR database and records these back in the portal for completeness and other data analytics purposes. This data is useful to planners to work out the Covid19 positivity rate, which is also shown in the Portal in GIS format-state-wise. It can be helpful in case the Government decides to inform the patients about their test results through SRF form or SMS.			Result Received: 3,35,63,380 *(including the RAT results)*
Auto Alerts-Email and SMS	Two auto-emails are daily sent to ICMR, MoHFW, GoI, State Nodal Officers, NIC Nodal Officers informing status of RT-PCR/RATI samples, classification etc. Exception report is sent to AS,			7,829

	MoHFW on every Monday on the misuse of Patient Mobile Number by Labs/ Samples collectors. The benefits are that these auto-alerts warn and keep everyone updated on any exceptions/ updates, which may require immediate corrective action by different authorities.			
Online viewing of Antibody Test Result by Patient	The result of Rapid Antibody and Antigen test are enterable in mobile apps because these are not sent to Labs for testing. Therefore, an SMS is sent to the patient with a hyperlink to the Covid19 portal from where they may download their own SRF and Test result.			1,89,940
Check SRF ID/Patient Mobile	The authorized users of the portal (either Government or Private) can view the status of any valid SRF ID based ID or patient mobile number. This is required because the User has the option to locally save SRF form data in their RT-PCR app-mobile phone.			91,71,878 Check SRF ID through OTP verification.
GIS Map of India	The GIS map based on Bharat maps provides live information of tests per lakh of population and positivity rate. This is available State wise along with the attribute data and is useful for comparison and analytical purposes.			
Check whether Sample Collector is white listed	This service enables the sample collectors to check whether they are white-listed for using any of the Apps or not. Through this feature they can check, through their mobile and OTP combination (to keep such querying minimum) if they were whitelisted and for which App. This reduced the number of queries being received through various channels at Helpdesk level.			Check whether Sample Collector is white listed (through OTP): 1,90,837
Check Laboratory Registration, Collection Centre, Portal User Creators and Portal Users information	The ICMR has authorized a number of laboratories during the last 8 months to enable testing of the ever increasing Covid19 test samples of RT-PCR, Rapid Antigen and Antibody tests. To facilitate addition of labs, collections centre and sample collectors, appropriate interfaces exist in Covid19cc.nic.in portal.			Registered Labs: 6,969 Collection Centre: 17,522 Portal User 2,243

				Portal Lab Admin 900
Addition of Sample Collectors directly by the authorized Private Laboratories	The private laboratories, authorized by the ICMR can add their own sample collectors for using the RT-PCR/ RATI mobile apps. The benefit of this service is that while Government labs have contacts with district administration, the private labs were facing issues in getting their sample collectors white-listed.			Sample Collectors by Private Labs 874

Implementation

The mobile apps and covid19cc.nic.in portal have been developed for ICMR for implementation in the whole country. Out of 37 States/ UTs of the country, 31 States/UTs are using this application. The States of UP, Bihar, Andhra Pradesh didn't use this application, whereas the States of Telangana, Kerala, Meghalaya partially used it. These States have developed their own system for capturing RT-PCR data. Lakshadweep didn't carry out any test. Therefore, 31 States/UTs of the Country are on-boarded. Number of States and UTs is 36 today since Daman and Dadar Nagar Haveli have been merged. However, we are taking these as 37 in software.

The complete data is made available to associated applications of MoHFW and ICMR, like www.nhp.gov.in, www.covid19dataportal.gov.in, www.cvstatus.icmr.gov.inportals and Arogya Setu Mobile App for positive patient details. RT-PCR data format and mobile App is the de-factor standard for all States to report their RT-PCR and Rapid Antigen Tests to ICMR. ICMR has issued strict guidelines in this regard.

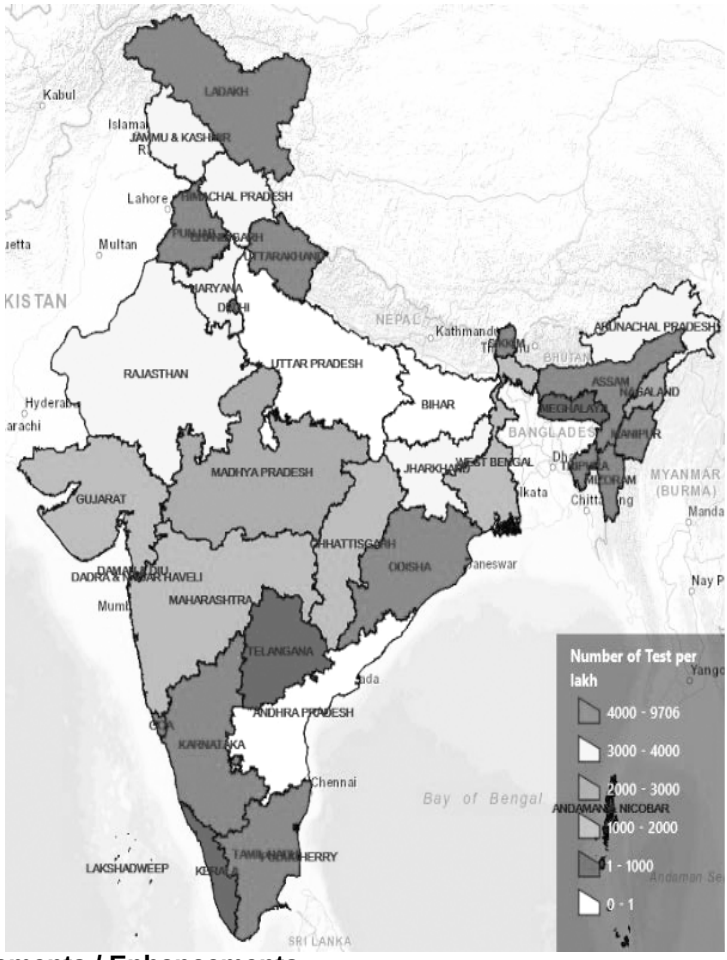
The delivery channels of this project include:

- Smart phones for using the RT-PCR and RATI mobile apps
- Apps can be downloaded from Android and iOS (Apple) and Windows play/app stores.
- SMS based SRF link for PDF file is sent to patients whose samples are taken. They may click and view their completed Sample details for three RT-PCR, Rapid Antigen and Rapid Antibody tests.
- Persons undergoing Rapid Antibody test, can view their results on the portal using their given phone number and OTP received on that phone numberin addition to the SMS which they get after entry of result.
- Web: The Covid19cc portal is a comprehensive MIS/ Source of Information/ Help to all stakeholders.

The following stakeholders are using the Apps and Portal all over the country in the 31 States/ UTs:

- Government officials at ICMR, MoHF, State, District level
- ICMR authorized laboratories for RT-PCR, Rapid Antigen and Antibody Tests
- Collection Centre officials for MIS purposes
- Sample collectors for entering patient and their sample details for ICMR
- Public: Covid19 suspects and patients whose samples have been taken for Covid19 testing

The country map on next page lists the States and usage of this portal and mobile apps along with colour coded States to show the number of tests being conducted per lakh of population. This gives correct idea on the actual implementation status of the Project across India. Some States are doing good number of tests while others need to improve their Tests/Population ratio.



Improvements / Enhancements

- *Rapid Antigen Testinclusion:*The RT-PCR mobile has been upgraded to include the Rapid Antigen Tests also as data capturing format is same, as approved by ICMR. Now, the Antigen testing labs are covered in RT PCR (Number almost 4,000 labs all over the country. The sample collector can enter the result of Antigen Test along with Patient SRF details as result is available readily.
- *Stopping mis-use of same patient mobile against multiple patients*: To save time or avoid the effort of taking patient's mobile number, some sample collectors were giving their 2nd phone number repeatedly in SRF Form. This created issues because if the tested patient with wrong mobile number came positive, Arogya Setu would mark the sample collector as positive and persons near the sample collector (s) would start getting wrong alerts that Covid19 positive patient is near them.

Therefore, RT-PCR app has been updated and now alerts can be sent to sample collectors who are misusing patient mobile number entry.

- *Skip OTP Feature/ Make it Mandatory for District/State***:** Initially, OTP based verification of patient mobile number was a mandatory condition in RT-PCR mobile app. However, due to resistance from some private laboratories that their sample collectors were being put at risk in taking this OTP from patient, this feature was made optional. Later, some States like Karnataka insisted on having it as a mandatory feature, therefore, the RT-PCR app has been updated to keep this feature as configurable, State/ District wise.
- *Auto-alerts through Email to Administrators*: Option to send Email based alerts to State/ District Administrators/ Health officials and to ICT infrastructure Admin have been added. These enable the officers to be alerted whenever some critical issue is foreseen.
- *Preview and Saving Draft SRF:* The user also provided with filled SRF preview so that any unintended data entry mistakes can be avoided by editing the entry.
- *Auto-SMS based warning to defaulting Sample Collectors/ Collection Centres/ Labs***:** Warning messages have been added in the portal so that correct patient mobile number is added in the SRF form through RT-PCR app. This SMS goes to defaulting sample collectors only.
- *Addition/Deletion of New Patient Categories in RT-PCR***:** ICMR has been changing the patient categories from time to time, based on the research being carried out. The App has been updated and categories can now be changed from back-end without resorting to App code modification.
- *Deleting the functionality for mandatory Doctor Prescription in view of Supreme Court orders for voluntary RT-PCR tests***:** Previously, upto September 2020, Doctor Prescription and name of doctor prescribing the RT-PCR test were mandatory to control the rush of people undergoing RT-PCR tests. Earlier number of test kits were in short supply and only symptomatic and doctor prescribed patients were allowed for these tests.
- *Portal enhancements:* The Covid19cc portal has been enhanced over time to provide a number of reports/ excel data to sample collectors, collection centres, laboratories, District and State authorities.
- *GIS Maps:* GIS maps have been added in the portal to show State wise the number of tests being conducted per lakh of population.

Planned functions:

- *Providing Results to patients through SMS and Portal:* Subject to approval by the ICMR, the patients can be provided SMS based results on their mobile, along with feature to download complete SRF Form with result filled in, based on OTP authentication of patient mobile.
- *Improving the GIS*, subject to display of Results data, for still better contact tracing/ containments zones in public view.

ENABLER

Processes Re-engineered

The current Project is a new project, not foreseen nor planned in advance. The Covid19 pandemic happened and effected people all over the World. New

learnings are taking place every day. Vaccine is under trial in different countries and its effectiveness is yet to be proven.

RT-PCR and Rapid Antigen tests were the first tests conducted in India to trace Covid19 patients and do the contact tracing, along with country wide lockdowns, to contain the spread of Corona virus.

Ministry of Health and Family Welfare, Government of India and ICMR were assigned the responsibility of monitoring Covid19 situation in India. A number of Empowered Groups (EG) were created to plan for ICT solution, ensure delivery of essential supplies at regular interval, create health infrastructure, manage manufacturing activities during lock-down, ensure safe and secure movement of people returning to their home, etc. EG9 group's responsibility is to provide ICT solutions during the pandemic.

DG NIC is a member of this Group and took initiative to develop Arogya Setu app for Contact tracing and warning of nearby Covid19 patients/suspects. To monitor the large magnitude of Covid19 tests in the country, she envisaged a standard mobile application, with web-portal for MIS purposes. Since two types of tests were being conducted, two mobile apps of Rapid Antibody Test of India (RATI) and Reverse Transcription Polymerase Chain Reaction (RT-PCR) were planned and developed in a very short time by NIC Himachal Pradesh (just 15 days).

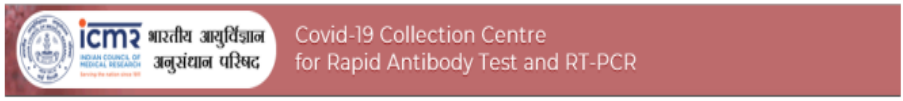
The stress was on using existing available data, wherever available. This ensured that location codes is uniform across the country and even the Specimen Referral Form (SRF) data format is standard in India. The SRF ID (13 digits), which is the de-facto standard for RT-PCR and Rapid Antigen Tests in 31 States of the country, is uniform with first two digits for State, next three digits for District and remaining 8 numeric digits for running serial number of SRF form in that particular District. This means 99 States/ UTs can use it, with every State having 999 maximum Districts and every District can do tests of 9.99 Crore patients/Covid19 suspects. Every care has been taken to ensure that SRF-ID is able to handle extremely large number of tests in every District of the country.

The mobile apps have been designed with a view make these usable by persons with very low educational qualifications. Knowledge of using a smart phone is all that is required. No extra User ID or passwords have been forced on the large number of sample collectors, collection centres and laboratory in charges. The mobile number and OTP form their User ID / Password and similar system works on the portal where MIS reports are available for download and further usage. The user interface is very simple, enables local saving in case of non-connectivity and also later filling of SRF form in case of any issue.

In retrospect, simplicity of the initiative is the reason that the Covid19cc.nic.in portal and RT-PCR/RATI apps could be developed innovatively, in a very short and implemented in the country for containment, contact tracing and accurate record tracing of Covid19 situation in India, effectively. Small teams worked day and night and through collaboration achieved the given objective. The Project is now running for last 6 months and no issues have been reported except some replication or non-functioning on app on particular mobile phones during the initial period of implementation.

Technologies

Data Analytics: A number of analytical and graphical reports have been made available in the portal for decision makers. These reports are mostly in PDF format and cover complete coverage as given below:



Portal Statistics upto 03/10/2020

Total Sample Collected	Total Result	Result as Positive	Positive Percentage
37931680	32837956	3206153	10%

Date Wise RT-PCR Test of India

04/10/2020	03/10/2020	02/10/2020	01/10/2020	30/09/2020	Total(Till Date)
243731	463646	382957	501362	581367	38175411

RT-PCR Age Wise Statistics

Below 10 Years	11-20 Years	21-30 Years	31-40 Years	41-50 Years	Above 50 Years
4.56%	10.95%	28.13%	22.18%	15.33%	18.85%

Total Samples	Male	Female	Others
37931680	23691813 (62%)	14222512 (37%)	17355 (0%)

RT-PCR Statistics

Total Collection Centres	Govt. Collection Centres	Pvt.Collection Centres	Total Active Sample Collectors	Govt. Active Sample Collectors	Pvt. Active Sample Collectors
15610	13160 (84%)	2450 (16%)	65855	57901 (88%)	7954 (12%)

Total Verified Mobiles	Total Distinct Mobiles	Mobile of Self	Mobile of Family
5708472 (15%)	23463297 (62%)	29706004 (78%)	8225676 (22%)

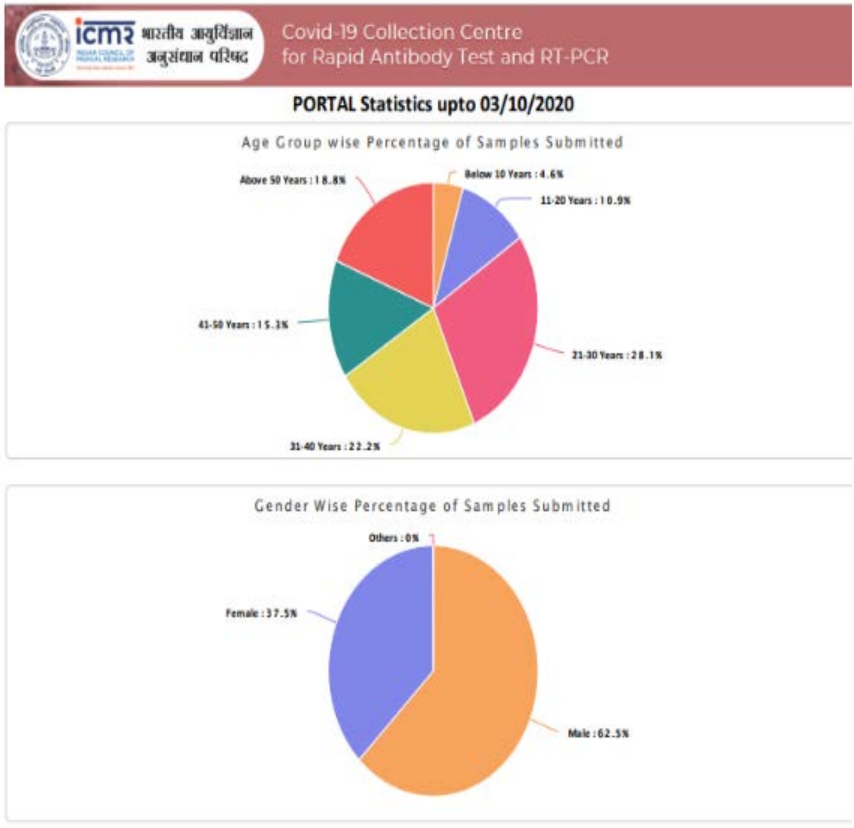
Sample in Govt. Collection Centre	Patient Mobile Verified	Sample in Pvt. Collection Centre	Patient Mobile Verified	Percentage of Total Verified Mobiles
34224546 (90%)	4942231 (14%)	3707134 (10%)	766241 (20%)	15%

RT-PCR Result Statistics

Total Sample (IN)	Total Sample (OUT)	Total Sample Pending	% age (Sample Tested)
37931680	32837956	5093724	86%

RT-PCR Labs

Total Labs	Govt.Labs	Pvt.Labs	Samples to Govt. Labs	Samples to Pvt. Labs	First Sample	Repeated Sample
6949	6027 (87%)	922 (13%)	32510512 (86%)	5178607 (14%)	37381722 (99%)	549958 (1%)



Male	Female	Others
23691813	14222512	17355

Social Media: The RT-PCR video for use of the App was made available on You Tube, Covid19cc portal and NIC Video Gallery so that sample collectors could readily access and use it for their training / sharing/ resolution of doubts. The links are given below:

- https://www.nic.in/videos-gallery/
- https://www.youtube.com/watch?v=9BDsq5kn5Zc
- https://www.youtube.com/watch?v=CXTmT6JIXlI&t=3s(Version 1.2)
- https://www.youtube.com/watch?v=pE4l176xFDI (Version 1.1)
- https://www.youtube.com/watch?v=5ZKQHnXXDFQ&t=23s (Version 1.0)

MobileApp: Innovative solution to use mobile app helped in addressing requirement of solution at lowest level of sample collection. This could also be utilized in a more effective manner as mobile devices are hand held devices which provides more ease of use. The objective of capturing Geo location of sample collection could also be used more efficiently.

People

Leadership support has been provided directly from the Hon'ble Prime Minister's office, who has been monitoring the situation and reviewing progress from time to time.

Secretary (Information Technology) MeitY,GoI, who is heading the EG9 group

has been taking weekly meetings in the initial period of development and implementation for smooth roll-out in the country.

Director General, ICMR, has issued clear instructions to all State Governments to use RT-PCR and RATI mobile apps and to ensure that data is sent to ICMR in standard format of SRF versions, as revised from time to time. ICMR also provided the Samples's SRF data to their authorized laboratories for entry of RT-PCR test results for further processing.

Dr. Neeta Verma,Director General, NIC, National Informatics Centre is the officer who gathered the best resources from NIC in the form of a small team and guided this team to come up with a software / mobile solution to handle futuristic scenarios of every increasing Covid19 cases/ tests in the country. She insisted on having robust cloud infrastructure, which was performance tested twice, for concurrent loads which were un-imaginable in April 2020. Different NIC teams for performance testing, cloud infrastructure, platform setup, software and mobile app teams worked with their respective leaders to come up with this unique solution in short time.

Change management was not a big issue in the project except in the case of some States like Andhra Pradesh, Bihar and UP, who insisted on developing their own solution but were later found to be short in conducting the tests per lakh of population as compared to the rest of the country who readily adopted the Covid19cc.nic.in and RT-PCR/ RATI solution pack. Of course, there was requirement of additional MIS, data download, fields, revision of SRF form, patient categories, symptom categories from different quarters, but these were provided in the Apps and portal simultaneously, mostly within 24 hours itself.

During Covid19 pandemic, capacity building was the real challenge as the geographical area was the entire country and people of different customs, languages, work-background are onboarded in this portal. Their training, awareness posed challenges. The first issue was how to create users for the large number of sample collectors who will be using the RT-PCR and RATI mobile apps. The 2nd issue was how to identify the official users of the portal from among State Government departments/ offices. The 3rdpoint of contention was whether to develop a separate complete portal for MIS requirements or just use the mobile app for data collection and transfer all Samples/ Patients data to ICMR directly.

Creation of users for Mobile Apps: The sample collectors are attached to the Collection Centres or Laboratories and ICMR authorized laboratories. Registering the State/District/Collection Centre/ Sample collectors was achieved through the portal. The mobile number of all these types of users for RT-PCR and RATI mobile apps was made the user ID and OTP based authentication was done for login into the Apps. Later the same concept was extended to ICMR authorized laboratories. The security was achieved because this entry of mobile number by being done in the portal through Government functionaries all over the country.

For imparting training to these sample collectors in the use of mobile apps, a short movie was prepared and put on Social media so that they may know how to use the App. The video is in English and hosted at https://www.nic.in, https://himachal.nic.in, YouTube, https://covid19cc.nic.in etc. Required User manuals and FAQs have been hosted on the portal so that the user can access these on their own.

*Creation of Government Users of Portal***:** It was decided to use existing Emails of DM/DC/CMO/ State Health officials/SIO/DIOs on the Government Email

server so that the issue of User ID/Password is handled without any further issue. The DIOs/SIOs of NIC could view the data and monitor progress of entry of data and bring any issues to the notice of Health/ District Administrators.

The capacity building of country wide officers for white-listing of Sample collectors was planned through Email communications sent to all District Magistrates/ Chief Medical Officers, SIOs/DIOs of NIC. Two set of training were conducted through VC and PPT was shared with the officers. User manual of the portal was prepared and put on the website along with a comprehensive set of Frequently Asked Questions, categories as user-type wise. This facilitated the second step in white-listing of sample collectors and entry of collections centres to whom these sample collectors are reporting.

Development of Comprehensive MIS Portal: While a mobile app could be developed quickly, the development of portal was a challenge as it would require proper hosting platform, security audit and multiple concurrent users would access it all the time. Whereas time for roll-out was short. Therefore, at first, a portal was planned to be developed just to facilitate white listing of sample collectors using location codes of LG Directory. Since, all existing resources like official email/password, mobile of user and LG directing were used, the portal was launched quickly because it became a pre-condition for using the RT-PCR and RATI mobile apps.

Capacity building

Under the project, was achieved through simple App and Portal interface. Training was imparted in first instance to the Government officials at District/ State level who used the portal to white-list mobile app users. 2ndly, lots of training material was prepared in the shape of manuals, PPTs, online training through VC, movie, frequency asked questions bank (FAQs). These have been made available on the portal and sample collectors could view these to get idea of the mobile app. Later, SMS based messages were sent to Sample collectors, Collection Centre and Laboratory in-charges to login into the portal and download their requisite reports, SRF forms. This facilitated them as no duplicate work was required to be done and they could use all content from the portal for their internal use. In addition to this, the DIOs of NIC were imparted knowledge of the project though VC and local sample collectors were encouraged to get their doubts cleared at local level (district level). The patients simply got an SMS about their Test Sample details in the forms of SRF PDF file. This also met their information requirements. Hence, with such capacity building across the Nation, the Project was rolled out.

VALUE INDICATORS

Learnings for sharing

The RT-PCR and Rati mobile apps with https://covid19cc.nic.in portal have been developed in a very short time between 1-April-2020 to 20-April-2020, with collaboration among different teams of NIC at Shimla and New Delhi under the leadership of Dr. Neeta Verma, Director General NIC. She personally monitored the progress daily, round the clock and ensured that requisite expertise is made available for the project. The infrastructure was set up by NIC PFMS team who have also set up infra for eWayBillproject of NIC. The coordination with ICMR was done by Ms Rachna Srivastava DDG at New Delhi. The Mobile Apps and Portal was developed by NIC Shimla. About 15 officials of NIC HP, including outsourced developers working with NIC HP, worked almost 20 hours a day to deliver the working Apps on both Android and iOS

(Apple) platforms with the covid19cc.nic.in portal by 20th April 2020. So the first learning is that with dedicated teams, you can achieve big results quickly. And delivering quickly was the challenge during initial period of Covid19 pandemic in India. The other learning are:

- *Plan big:* In early April 2020, number of tests across the country were just 10,000 per day. So we were expecting the maximum to be in the range of 1 lakh tests per day. But DG NIC insisted that you must plan for more than 5 lakh tests a day. In 5 months, this figure is coming daily and country wide tests have crossed more than 11 lakh per day. Therefore, in a project of this kind with greater uncertainty on usage, planning must be for the maximum usage possible.
- *Mobile FIRST:* Capturing such large scale RT-PCR, Antigen and Antibody tests data through traditional desktop based systems would have meant, huge data entry effort and duplicator of work. Every one has a smart phone these days and they are using various Apps. So it is better to provide a mobile based solution which can be used by large number of people/users without any special effort in training or software updation.
- *Robust ICT Infrastructure:* Service continuity in all scenarios is a very important factor and must be backed by a robust ICT infrastructure with proper DR site from the beginning. The current project has 3 sets of similar set-ups, one at Staging, 2nd at Production and 3rd at DR site. There must be multiple web servers with load balancer and DBs must have Always On feature so that if any particular DB VM fails, the other replica VM can take over.
- *Rapid Development and Replication***:** It is important that the first version of the software or app is made available to the user immediately, to enable acceptance and its rapid replication. In this particular case, many agencies were trying to come up with similar solutions.
- *Distribute data entry work among Users***:** It is better to distribute data capturing and entry work at source. It is equally important that the information and data needs of the person capturing/entering data at source are fully met. It serves as an incentive to the person. For example, in RT-PCR tests, sample collectors were filling a paper form to be attached with the Sample vial. RT-PCR being a mobile app could continue as before in the sense that the sample collector would enter the details of patient and sample and fill up the paper form. But the project has not only generated the SRF form through the App, but also provided an option to Sample Collector and Collection Centres, to visit the web portal and generate multiple SRFs in single PDF file. Even the patient is sent an SMS to view their own SRF details entered by the sample collector for authentication and verification. Since data entry into the RT-PCR app meant that sample collectors were saving time in other activities, they were motivated to use the app.
- *Addressing the IPv6 only issue at Hosting platform***:** We are all aware that Internet is shifting to IPv6 addressing schema and all new network equipment support IPv4 and IPv6 both. Normally, the ISPs provide both IPv4 and IPv6 address to their smart phone users for Internet access. However, it was observed during the initial implementation period that some of the ISPs like Airtel and Jio were providing only IPv6 address to their subscribers in some locations. While the site

https://covid19cc.nic.in was working okay with IPv4 only, IPv4 and IPv6, it was not able to communicate with only IPv6 address assigned to the Smart phone users. The ISPs were informed and problem was rectified after short interval when their network equipment started giving both addresses.

- *Use existing facilities/ resources, if feasible, as far as viable***:** This is a trade-off point in favour of using existing resources and facilities against going for an ALL NEW approach. In the current project, no additional hardware has been purchase for any level except sourcing of Cloud resources for hosting of the application/APIs/storage etc. This has resulted in saving of time because any kind of procurement, takes 2 to 6 months, subject financial approvals.
- *Provide MIS and data integration facility for all sets of Users***:** Usually, Government of India ICT initiatives of Ministries focus on capturing data which is required at national level. They develop ICT systems from their own perspective and ignore the information/data collection/compilation requirements of the State or below District level. This means the grass root level officials are forced to rely on their own systems for preparing data for national MIS and are not helped any manner. The Covid19cc portal takes care of MIS requirements of every set of stakeholders without burdening them with complicated user ids/passwords for additional requirements. The same User ID /Password as given to them for mobile Apps is usable on the portal for downloading every kind data in Excel/ PDF for further use in their own systems. Even the ICMR authorized laboratories, which are not using the mobile app directly, have been provided their ICMR registered mobile ID as User ID and they may download all data. This has been done because most of the Laboratories and Hospitals (Collection Centres) were already having some kind of internal MIS system. However, they are using ICMR interface for entry of results against RT-PCR data. They needed all this data and this has been provided to them. The District and State Health Authorities get all data as per there area of administration, irrespective of collection centres/laboratories. So every set of stakeholder is happy with the exhaustive MIS available to them.
- *Process Change-data capturing at source, instead of direct entry***:** The process change has been achieved by enabling correct data capturing at source instead of complete entry at ICRM laboratory interface while entering the result by the Laboratories. Now Sample collectors of various authorized Collection Centres across India do the SRF entry by verifying the patient's mobile number and storing GPS coordinates where sample is taken.

Digital Empowerment

The RT-PCR and RATI mobile apps have been developed for country wide usage by sample collectors (more than 80,000), who may not be highly qualified or knowing many languages. The data collected by them is processed by ICMR, Laboratories, State/District Administration/Health officials. Therefore, the common language available on smart phones, viz English, has been used as the primary interface of Mobile Apps and Portal. However, to address the issue of language in imparting training to sample collectors, all 746 District Informatics Officers and 37 State Informatics Officers have been provided User Credentials to operate the Portal, enable Sample collectors and onboard

Collection centres.

*NIC officers at State/ District level to provide better and local language technical support at grass root levels:*These 750+ officers provided the local language based technical support locally at below District level all over the country. The collections centres and sample collectors could get in touch with them, get acquainted with the portal and app functionalities and troubleshoot other issues.

Stakeholders: The direct users of the mobile Apps are the sample collectors but almost the 80 crore population of India (31 States/ UTs out of 37) is part of this initiatives. All tests in these 31 States/UTs are being done through the RT-PCR and RATI apps. The immediate implementation of the Apps is an indicator on how all stakeholders have been taken care of. The number and type of direct stakeholders is given below:

- 2,800 + Government officials at ICMR, MoHF, State, District level
- 6,000+ ICMR authorized laboratories
- 15,000+ Collection Centre officials
- 80,000+ Sample collectors
- 3.80 Crore + direct patients whose samples have been taken for Covid19 testing

Government Email based login for State/District Administrators/ Health officials: In order to simplify the login into portal for Government officials so that they may while-list the collection centres and phlebotomists (sample collectors), the official Email based login into the Covid19cc portal has been enabled. All State Chief Secretaries, Health Secretaries, Deputy Commissioners, SIOs, CMOs, DIOs have been given login rights based on their role. This has empowered them in the sense that no additional ID or password was required for them.

OTP based login for sample collectors, collections centres and ICMR authorized Laboratories: As done for Government officials the sample collectors and collection centres were enabled login into the RT-PCR and RATI mobile apps through their existing smart phone mobile numbers. If the mobile number was white listed by Government officials, they could just login and start using the Mobile App. The concept was further extended for while listed Mobile Number and OTP to enable login into the Covid19cc portal for various MIS purposes. Since empowerment meant that this set of users could use their mobile number to login both into the Mobile Apps (subject to being white-listed for it) and also in the https://covid19cc.nic.in portal. All MIS and other requirements are met in the portal. Even the ICMR authorized laboratories have been allowed to download their own data based on similar concept. Only difference is that the mobile of In-charge as entered by ICMR in their database is used for login based on OTP for various MIS reports.

Green e-Governance

The entire concept of RT-PCR/Rati Mobile Apps and https://Covid19cc.nic.in portal is based on paperless data collection and transfer of data to ICMR (and other associated portals/ mobile apps, like NHM, ICMR Laboratory Interface, Covid19 Dashboard, Arogyasetu etc.). Many features are in-built in the App and Portal to enable Green Governance, as given below:

- SRF form is generated in PDF format and can be stored by the Sample Collector, Patient, Laboratory without need for printed. Only the Laboratory report need to be printed, saving lots of papers (3.8crore tests multiplied by 2 pages each of every SRF=10.6 Crore pages)

- No additional Hardware at User level: The existing smart phone of sample collectors is the equipment required to capture SRF details of RT-PCR tests. All major smart phone platforms namely Android, iOS and Windows are covered.This means no additional equipment needs to be purchased by end users. The other available ICT infrastructure at ICMR, Labs, State Admins has been used for MIS purposes. The hosting platform is on NIC Cloud, scalable on demand. Hence, no additional eWaste is to be generated through this initiative.
- RT-PCR and Rati apps enable local saving of data in mobile app of the sample collector. The incomplete/ draft/ not submitted forms are shown in the App itself so that no printing at any stage is required.
- The completehelp/ guidelines for using RT-PCR, Rati and Covid19cc.nic.in portal are in electronic format, saving Lakhs of pages, as given below:
  i. RT-PCR movie to help sample collectors in understanding the mobile App. The short video movie has more than 17,000 views in NIC and NIC HP You-tube channels. The movie has been updated as per App enhancements from time to time.
  ii. The User Manual is available in PDF format
  iii. The Presentation is available in PDF format
  iv. There is an extensive FAQ section for different set of users to assist them in resolving their queries
  v. A marque runs on the Home page of https://covid19cc.nic.in portal to inform users of any particular issues, app updations, connectivity problems etc.
  vi. A GIMS (Government Instant Messaging Group) based group for Covid19cc portal is available
  vii. An email based help is provided on 24x7 basis to sample collectors, labs other users to resolve their queries timely.
- The onboarding process of Collection Centres and Sample Collectors was done through the District Authorities by using their existing Government Email with authentication mechanism. No additional User ID or passwords were required. The users were enabled from day-one to start using RT-PCR and Rati mobile apps.
- The training was imparted using web-tools for Video conference, savings crores of Rupees, if class-room based training was arranged.
- In order to smoothly integrate data of RT-PCR tests with Laboratory and Collection Centre interfaces, software interface was provided so that the users may download their own data and use in their local systems without any need to print anything from Covid19cc.nic.in portal.

Dr. Neeta Verma, *Director General, National Informatics Centre, MeitY, GoI, dg@nic.in.*

Shri. Ajay Singh Chahal, *DDG and State Informatics Officer, National Informatics Centre (Himachal Pradesh), sio-hp@nic.in*

e-Recording & Service-Delivery System
Land & Land Reforms and Refugee Relief and Rehabilitation Department

Manoj Pant and Manas Kumar Bhattacharya

PROJECT OVERVIEW

Vision & Objective

Driven by the growing expectations of the citizen, a complete centrally managed system was launched to extend land records services in real time to common people and commercial houses at their doorstep through online portals. A centralized secured system was built located at West Bengal State Data Center .The system was integrated with registration offices for auto-initiation of mutation process at first. The system was further extended so that any citizen can access different land records related services through any internet enabled location and device to avoid multiple visits to the local offices. Any people can view their real time land records in the departmental website banglarbhumi.gov.in. Further, the service was extended and electronic delivery service system was introduced for online application for digitally signed certified copies of R.O.R and plot information through the departmental portal. Government Payments Gateway (GRIPS) was embedded into the system, so that the common people can pay the requisite system generated process fees through online banking system. Once the copy was digitally signed, applicant is notified through system generated SMS and e-mail and hence the applicant can download their copy of R.O.R or P.I through their respective login in departmental website. At the same time common citizen can avail opportunity of filing online Mutation and Conversion (change of classification of land for changed mode of use of land) applications through the portal without visiting any office physically.

In February 2019, initiatives were taken by the Government to introduce an automated mutation process and automatic land records updation. Land record rules were amended suitably and land records were started updating automatically whenever a property was registered in registry office and the seller information matched with the existing digital land records. The buyer was intimated through SMS and e-mail about their mutation process. Also, the status of mutation with respect to the registered instrument was made available in the departmental website banglarbhumi.gov.in.

During the time registration, real time land records are being fetched through web service at the registration offices. Based on this information, the seller and buyer information are being captured at the time of registration. On completion of registration process, the mutation fees are calculated automatically and the buyer pays the mutation fees at the time of registration. All the relevant information are transmitted automatically to the Land Records Server and after proper synchronization with the digital Land Records the Land Records data gets automatically updated. Each and every step of the process is intimated to the buyer through SMS and e-mail, which they had provided during the time of registration. Once, the entire process is completed, the buyer is intimated about his/her new Record Number and he/she can obtain the new record again through online portal without visiting any office.

After this process is introduced, if the seller of any property is the recorded tenant in land records, then the new buyer does not need to visit to any office

to mutate his name in land records and obtain a copy of digitally signed copy of new record. Introduction of Automated Mutation created a huge positive impact on the common citizens, ensuring transparency & comprehensive land titling by diminishing the gap between Property Registration & Land Records Updation as mandated by DILRMP.

Software/Hardware

Software Environment

- Java is used as open source developmental platform
- Sturts 2.0 used for API
- Jquery
- Hibernate for application-database connectivity

Hardware Environment

- HP DL560 Gen8 Server (Type-A), 768 GB RAM (8 Nos.)
- HP MSL 6480 Tape Library
- EMC VNX 8000 Datacentre Class Storage

Networking Environment

- FCoE Switches-DLink Datacentre (Ruijie RG-S6220) (2 Nos.)
- Array Networks APV 2600 S1 Load Balancer (2 Nos.)
- Firewall-Checkpoint CPAP-SG12400-NGFW (2 Nos.)

Database Engine

- Microsoft SQL server 2014 in cluster configuration.

Certification(certifying Agency)

Security audit is performed by STQC at regular intervals.
Details of Certifying Agency :

- Standardisation Testing and Quality Certification (STQC).
- Directorate, Ministry of Electronics and Information Technology(MeitY), Government of India.
- Electronics Regional Test Laboratory (East), Kolkata.

Disaster Recovery/Service Continuity

The database of the Land Records is situated at West Bengal State Data Centre, which is supervised and maintained by IT Department of GoWB. Suitable policy for Disaster Recovery Management has already been taken up by the Department. Infrastructure setup for Disaster Recovery Centre at New Delhi has already been initiated by chalking up all the necessary technical specifications in consultation with the IT Department of GoWB.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018 -19	2019-20	2020-21
Certified copy of Mouza Map (Online)	Delivery of Map in respect of the whole mouza.		18,900	317,107
Certified copy of Plot Information (Online)	Citizen can get the eDelivery of real time information of a particular plot without visiting any physical touch point.		35,08,033	40,45,080

Certified copy of Plot Map (Online)	Citizen can get the eDelivery of map of a particular plot without visiting any physical touch point		39,299	39,299
Certified Copy of Registered Deed	Citizen can get the transactional details of registered deed	94736	1,41,439	1,20,368
Certified Copy of RoR (Online)	Citizen can get the eDelivery of Khatian or RoR on real time without visiting any physical touch point.		89,13,759	1,09,45,858
Conversion Application (Online)	Citizen can file application for change of use of land online.		45,998	66,139
Khatian (RoR) view	Citizen can view the real time status of any RoR	1,85,29,563	7,17,38,479	865,69,964
Mutation Application (Online)	Citizen can file online application for recording of his name against his land		35,50,852	50,83,954
Plot Information	Citizen can view the real time information of any plot under any mouza	4,86,24,921	15,11,89,428	16,64,89,033
Plot Map view	Citizen can view plot map	61,48,819	79,31,947	3,38,09,982
RS-LR Information	Citizen can view information plot number of any RS to LR plot and vice-versa	69,98,406	67,23,282	56,58,551

Implementation

All the 341 Community Development Blocks covering 349 service locations and any web enabled locations can access the services.

Improvements / Enhancements

Improvements and enhancements in the last year :

- Integration and sharing land records with Municipalities holding number.
- Integration of Revenue Court Cases and Civil Court Cases pending at different level has been done so that the common people can know the present litigation status of a piece of land before any transaction.
- A separate Public Grievance Portal has been rolled out to facilitate any type of grievance related to record correction.

Enhancement for the next year :

- Integration and sharing land records with Banks for property mortgage.
- e- Payment of Land Revenue.
- Land Excavation charges will be calculated and deposited through banglarbhumi portal.

ENABLER

Processes Re-engineered

- Manual service of notice has been replaced by electronic notice
- People need not visit land offices any more for getting services of mutations, conversions, certified copies etc
- Previous system of mandatory hearing has been done away with.
- For any grievance there is no need to visit Block /District office.

- Online grievance application through banglarbhumi portal helps to resolve their issue.
- Automation of case generation received from Registration Department
- Automated Mutation if seller is Recorded owner.
- Automated case generation for online application through banglarbhumi portal which simplifies application process.
- Queue management of cases has been implemented for disposal of Mutation Cases which standardize the Mutation Process.
- Process automation for conversion of Plots integrated with EoDB.
- Process standardization for payment through GRIPS.
- Role based application for simplification of process.
- 3 level authentication required for accessing eBhuchitra (User id / password, Location & Biometric) , which standardize secured login.

Technologies

- MVC Architecture : We use Model View Controller Architecture due to this we can create multiple views for a model, Code duplication is very limited because it separates data and business logic from the display, it supports an asynchronous technique, which helps us to develop an application that loads very fast.
- Rest Based Web Services: All 65 web services are developed and hosted in our application Server for internal & external use for dissemination of information between modules as well other departments .

People

- Capacity Building of Departmental officers are performed multiple times in a year in the dedicated Training facilities of Land & Land Reforms Department to cope up with the transition from manual/semi digital to complete automated solutions.
- With the aid and assistance of one NGO, LANDESSA, multiple sensitization programme for SHG groups were organized at the departmental training centers about various e-Services.
- Presently, online workshop is being held to sensitise the Panchayat functionaries about accessing the e-Services and how the common people can benefit from these e-Services.
- Dedicated team of officials are identified and engaged to act as a link to bridge between the technical team and Departmental Authorities.
- Trained Software Support Personnel are engaged by the department at district Level so that district authorities can get immediate assistance.
- Regular Monthly monitoring by the highest level of L&LR officials to monitor the progress.
- Apart from Officials from National Informatics Centre, WBSC, department has engaged Software Developers and Senior Software Developers for smooth functioning of the system.

VALUE INDICATORS

Learnings for sharing

- Modification of Government Rules to accommodate automatic mutation process under e-Record-Correction.
- Integration of multiple departments by the promulgation of new rule by the government.

- Then streamlining the system integration of multiple backend with different architectures. Departmental application to provide necessary service in the form of e-Mutation.
- Building of awareness to the citizen and transmission of electronically generated information to the targeted citizen staying at the remotest corner or internet shadow region of the state.

Digital Empowerment

Getting delivery of services electronically requires a basic level of education and awareness among the people and then knowledge towards handling and operation of gadgets.

Wide publication of e-delivery service system has already played role to a great extent regarding the provision of getting service without visiting any physical touch-point.

For the later online workshop is being conducted to the public representatives at the Panchayat level regarding accessing of electronically delivered information and services from the departmental portal who in turn can extend or transfer the knowledge to the target citizen in future to access the services rendered by the department.

Land database is basically in bengali language (Unicode compliant) . But for Darjeeling district, Devnagari language has been incorporated so that people of hilly area (Darjeeling) can operate with their own language.

Green e-Governance

The department has taken necessary initiatives in consultation with National Informatics Centre, WBSC regarding application of Green-Computing. The Hardwires and other peripheral devices used in the project is aimed to sustain for a much longer time to minimize recycling of ICT infrastructure, minimize e-Waste and enhance the productivity. Effective awareness in various ways is being taken up accordingly.

eOffice has been introduced in Land & land Reforms department for Green Governance which tends to be a paperless office.

Dr. Manoj Pant, *Principal Secretary & Land Reforms Commissioner & Land Reforms and Refugee Relief and Rehabilitation Department (West Bengal), manojpant@yahoo.com.*

Sri. Manas Kumar Bhattacharya, *Scientist-E, National Informatics Centre ,manas.bhattacharya@nic.in*

Maharashtra State TRAVEL e-PASS System

Raigad Police, Maharashtra

Anil S. Paraskar and Kovid Sawla

PROJECT OVERVIEW

During a single-day pilot, Raigad Police with the IT Team formalized, centralized and digitized this 'Travel e-pass' system into a URL-based online application portal. People who work to provide essential services (medical supplies, journalism, food supply chain, etc.) or in kind of any emergency can submit their details (name, vehicle no., contact details, dates for which pass is required, details of service provided, company ID, medical certificates [having no Covid19 symptom], etc.) at the link and receive a token, which, if their application is approved, generates their e-pass (with a scannable QR code)

The web portal launched by Raigad superintendent of Police to issue travel passes has subsequently been adopted across the state after it proved to be a huge success who had launched it for his district on March 24. Impressed by the effectiveness and transparency of the portal, Konkan range special inspector general of police Niket Kaushik implemented it. It later gets approval from Milind Bharambe, IG (law and order), who issued directives for its use across the state. A simple dashboard has been provided to senior police personnel to monitor and approve/reject applications.

The whole rollout process took less than five days thanks to the effective administration of Raigad IT team and agile development methods followed by the Tech company. The team quickly ramp up capacity and upgrade the system to keep up with rising demand.

The objective of Travel e-Pass System is to ensure essential and authorized services to move and work smoothly during the lockdown period, provides restricted emergency permissions for citizens and provide a simple and sophisticated mechanism for getting Vehicle mobility permission digitally and rapidly from Police or other authorities.

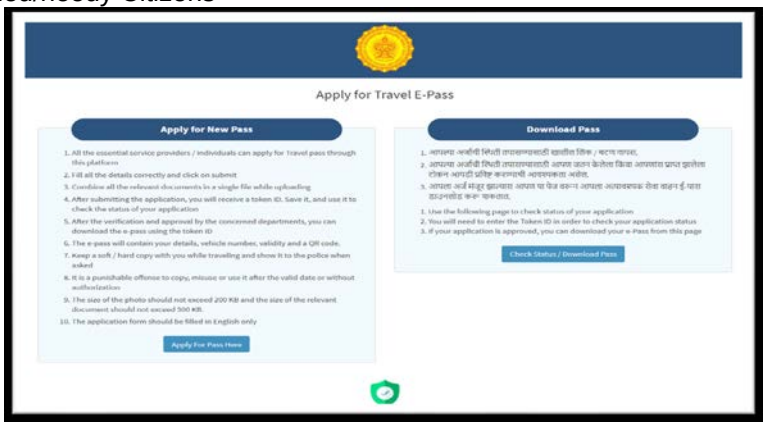
Brief of the project:

Users

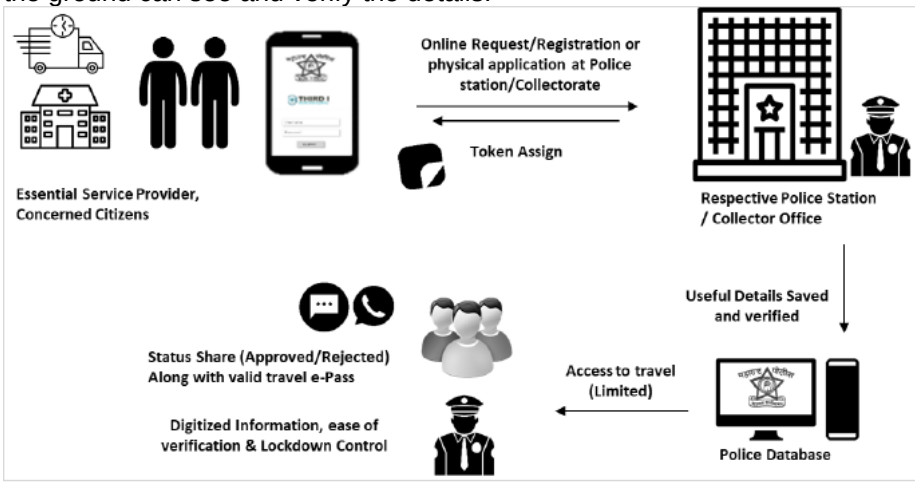
Police Administration, District Collectorate Office, Police Control Room, Zonal DCPs

Beneficiary

Covid19 Control Room, Traffic Police, All Essential Services providers & Stranded/needy Citizens

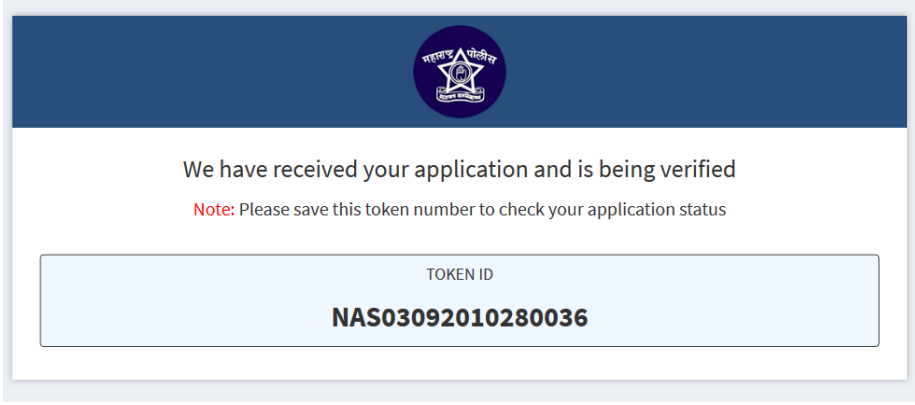


All essential services organizations or people in emergencies can apply for pass through a public URL filling all required information and respective police department/Collector office can then verify and approve e-Pass. It eliminates the need to physically visit the Police Station or traffic branch physically. On approval, Services organizations can download the e-Pass from the same link and keep it with them while traveling. It consists of Name, Vehicle number, Validity date, and a QR Code. On scanning QR code, the police personals on the ground can see and verify the details.

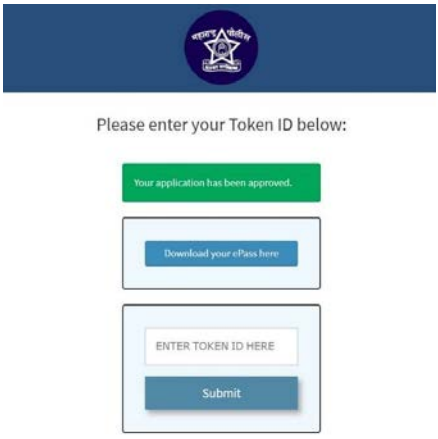


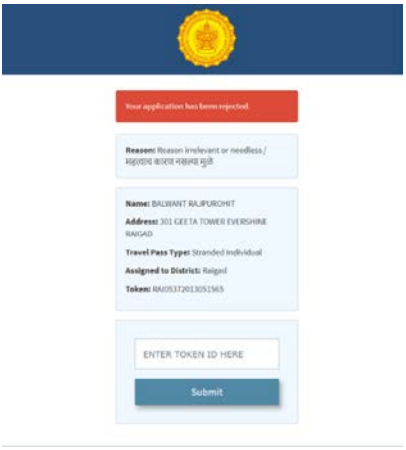
Process Flow:

- All essential services organizations like medical, food supply chain, etc. can apply for e-pass through a public URL filling all required information such as follows:
  i. Name of Organization, Type of essential service, Reason for applying
  ii. Contact Number, E mail ID, Vehicle Number (which will be used in Transportation)
  iii. Permit from-date and to-date
  iv. Address & photo of applicant
- Attachment of document of Relevance like company ID, medical report etc. On submission the applicant will be given a Token ID through which they can check the application status.



- The details will securely be saved in a cloud-based server and will be visible to a separate Police Admin Dashboard where all the information will be visible
- The respective police department can then verify and approve e-Pass. It eliminates the need to physically visit the Police Station or traffic branch physically.
- Police can give and alter validity of the pass (both dates and timings). And can also reject the application if deemed not necessary
- On approval, Services organizations can download the e-Pass from the same link and keep it with them
- While traveling. The e-Pass will consist of Name, photo, Vehicle number, Validity date, and a QR Code on it.
- On scanning QR code, the police personals on the ground can see and verify the details.
- In case, poor or unaware people visit police stations for the transportation request. Then, the Police can generate e-Pass from the Police Dashboard itself thus making it applicable for all. A basic Data Analytics will be added for enabling administration take intelligent and informed decisions





Over 44 lakhs travel passes have been issued by police and district administrations across the state through the portal https://covid19.mhpolice.in since March 24. The police however used this system to issue passes only as an exception and not as a rule. This resulted in the rejection over 44 lakhs passes out of the 92 lacs applications received through this portal so far.

Over 100 updates were made in the portal based on guidelines and suggestions, the application has not crashed despite heavy traffic. “The changes were made based on suggestions and inputs from various quarters.” As per the statistics, 2+ Crore ‘unique visitors’ visited the portal till date. On an Averages, 3-5 lacs people visited the portal daily. Considering the heavy flow of unique visitors and several lakh people uploading the applications comprising photos and other relevant details, a team of 10 experts was deployed around the clock to ensure that the portal does no crash. Moreover, to ensure that the data is uploaded and stored in a secured manner, the police purchased very high cloud data space for the purpose after receiving clearance from IGP Bharambe.

In addition to this, more than 4 lacs one-side travel passes have been issued during the 1st three lockdowns, indicating that people intended to return to their destinations. It served thousands of labors to migrate to their home state.

Software

Following are the technical details associated with Travel e-Pass Project

Software

OS: Ubuntu 16.04 ; Server: Apache 2.4 ; Service: Google Maps, Google earth

Language:

- Server Side: PHP 7, Laravel
- Client Side: JAVA, Kotlin, HTML, Bootstrap (For UI), JQuery (For various scripts)

Database: MySql 7.2

Hardware

The current system is running on a Google Cloud based Server with following resources allocated:

Server

CPU: Quad Core
RAM: 8 GB
Storage: 5 TB SSD for storing

Database

CPU: 64 Core
RAM: 128 GB

Support for QR Code Scanning by field police:

Any smartphone which can run QR Code reader applications can verify the details

Authentication: OTP based security A unique token is assigned to each unique device ID after login. This token is verified each time the app sends/requests data.

Blocking: Each IP is recorded and can be blocked if any suspicious activity is detected

Cyber Security

The Application has been internally scanned & Audited by DIT, Government of Maharashtra under the supervision of Mr. Alok Mishra and IT Director Mr. Ranjit Kumar (IAS). Head of Maharashtra State Innovation Society Mr. Deependra Kushwaha (IAS) also reviewed and gave valuable tips, and helped Mantralaya to be up to date with Data and on the ground situation the and the results of four rounds of audit were shared sequentially and were worked upon

Apart from that following security features has been provided

- Portal is SSL Certified
- Data encryption was provided
- Notifications & Monitoring of any unusual activity & Capturing of IP on every request
- Notification on each user login via email/SMS
- Cloudflare was used for managing traffic and block any kind of DOS attacks/malicious bots or other attempts
- Other provided security features are OTP based Verification, Manual Verification, Verification of User profiles by Raigad Cyber/IT Cell on monthly basis
- IP blocking
- Account Block & disabling etc.

Disaster Recovery and service continuity

- A Backup server was provided in case of server down
- Both Servers has Auto Data backup facility
- Backup of Data was done on a weekly basis

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Citizen Application	Online Web portal for citizens to Automated Reports, Crime Data Analytics, Auto Alerts & Recommendations,	-	-	All essential service providers and citizens who needs to travel within and outside Maharashtra
Admin Dashboard	Admin Dashboard allows district/city authority to visualize all the pending lists with facility to easily verify, approve & reject, one can see Real-Time Analytics of their own districts/cities and incoming and outgoing people list for quick decision making	-	-	All the District collector Offices, SP Offices, DCP & Commissioner office in cities (80+ offices overall including District Collector Office, SP Office, Commissioner office)
Super Admin Dashboard	Centralized Dashboard to see and activate all the Admin Users and see overall statistics of Maharashtra	-	-	Managed by raigad Police, DG Office, Mantralaya (Covid19 Command center)

Implementation

Implementation Coverage achieved in comparison to the plan / target

All the District collector Offices, SP Offices were covered in Maharashtra (except Mumbai, Nashik and 1-2 districts which used their own pass system), DCP & Commissioner office in cities (80+ offices).

Implementation can be understood by following charts

Statistics till Date	Total
Applications received in the system	9241355
Approved applications	4412835
Rejected application	4414885
Pending application	413634
Passengers given travel passes (including no. of co-passengers/labours)	13968613
Inter State Application	1086647
Intra State Application	8154708
Labour migration Applications	5581
Approved labour migration passes	620
QR Scanned (by field authorities)	1746251
Unique QR Scanned	677005

Improvements/ enhancements specifically planned out during next one Year

Currently we're reviewing all of the information and learning through this system and finding out more use cases and replicability for this kind of system in future. It has saved lots of repetitive work, enhanced surveillance and resulted in huge impact.

ENABLER

Processes Re-engineered

- Due to TRAVEL EPASS SYSTEM, the accessibility and retrievability of data has become very robust and easy compared to any other means used by other known systems thus it has highly enhance the existing process
- Due to visibility of all the Data, the decision making is now based on lots of Data and Analytics thus technology combined with human intelligence

Technologies

With TRAVEL EPASS SYSTEM, Authorities used Data Analytics, Data Visualization in regular meetings & decision making, it has components of lots of Automation & AI for helping the whole system work in a much better & robust manner

People

The TRAVEL EPASS SYSTEM is being used by everyone from essential service providers, Government & private employees, stranded students, labors, people in emergencies etc. to conduct their duties or reaching their loved ones, it has created a centralized system as well as redefined team work to create a positive change

VALUE INDICATORS

Learnings for sharing

The Project was conceptualized and planned by Mr. Anil S. Paraskar & supported by IG Konkan region In-charges, Shri Milind Bharambe (IG, Law & Order) and numerous field personnel, step by step multiple pilots were tried, tested and modified before full-fledge launching. The Technical improvements, modifications went on many times and still has huge scope in future

The biggest learning from this initiative is that, the transformation is only possible when there's strong coordination & participation from each and every ranked personnel like constables to Officer and to end user that is citizens depicting huge importance of team work.

Digital Empowerment

The TRAVEL EPASS SYSTEM Initiative has been started as a unique agile experiment in e-Governance which is a way forward to complete digital and smart transformation. We're also aiming to make Raigad Police and subsequently Government as Innovative, Paperless, Citizen friendly as well as most tech savvy department with our numerous initiatives in last 3 years

Green e-Governance

- Paperless operation of the TRAVEL E-PASS SYSTEM modules fully fulfilled the objective to make government proceeding completely paperless
- Saving of paper in quantity of more than 10 lakh of A4 sheets due to procedural transformation
- Minimum Infrastructure requirement (only smartphone & desktop)

Shri. Anil S. Paraskar, *Superintendent of Police, Raigad Police (Maharashtra), Cybercell.raigad@mahapolice.gov.in*

Shri. Kovid Sawla, *CEO, Adivid Technologies Pvt Ltd, Nasik (Maharashtra), info@adivid.com.*

Pradhan Mantri Adarsh Gram Yojana – MIS

Department of Social Justice and Empowerment, M/o Social Justice and Empowerment, New Delhi

Kalyani Chadha and Anand Kumar Verma

PROJECT OVERVIEW

The objective of the web application PMAGY MIS is to empower the stake holders to monitor the scheme implementation on all aspects i.e. infrastructure assessment, households survey and financial estimation of assessed works. The scheme is being implemented in 24 States, 528 districts and 13,181 villages. Currently the scheme has been implemented in 8297 villages out of 13,181 villages selected in financial year 2018-19 to 2020-21. The online MIS also provides the total funds estimated in Village Development Plan including the convergence of other central Govt. and State Govt. schemes. The main key stake holders are Ministry, State and district officials involved in the implementation of scheme. The major intended benefit of this scheme is the all dimensional development of SC majority villages and govt. schemes benefits to identified beneficiaries. The current status of scheme implementation from online web application reflects that 1,00,432 works and 56,97,047 beneficiaries are identified in 8297 villages.

Software

The pmagy.gov.in is a web application developed with open source technologies for the development.

The web application architecture includes 3 Virtual Machines with one web server, one DB server and one report DB/mirror DB server.

Infrastructure: NIC Cloud infrastructure
Servers: Linux RHEL 7.9
Server side language: PHP
Database: MariaDB 10.2
Report DB: MariaDB 10.4
Library: MPDF (To generate Village Development plan from survey data)

Cyber Security

The web application is certified with security audit compliance. The security audit was carried out by Recon Buisness Advisory Pvt, CERT-In Empanelled Company. The security audit certificate was issued on 20.04.2020 by the Recon Business Adviosory Pvt. Ltd with the remark 'The site is free from OWASP Top 10 Web vulnerability and is safe for deployment.'

Disaster Recovery and service continuity

The web application is hosted at NIC Cloud data centre, Delhi. The web application is fully configured with regular backup of web contents and database. The implementation of disaster recovery is under progress to continue the web application in the tough time of disaster. The dedicated backup team of data center also monitors the daily backup of web and DB server.

RESULTS INDICATOR

Information

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
An electronic Village Development Plan	A system generated Village Development Plan is provided to stakeholders in a generic format across PAN India.	0	977	4044

Implementation

Implementation Coverage achieved

The scheme is to be implemented in 13,181 villages selected from financial year 2018-19 to 2020-21. Till now 457 districts have started implementing the scheme in 8,295 villages and out of these villages 5017 villages have generated the online VDP in 22 states. The system generated VDPs is the key feature of web application having details of all works to be executed in the villages along with financial details. The delivery of the benefit to individuals is to be provided through the parent scheme only.

Improvements / Enhancements

An authenticated dashboard with various reports developed for convergence ministries. The detailed analytical reports developed for inter-ministerial stake holders to get the real time information of respective monitorable indicators. PMAGY MIS is integrated with DISHA dashboard of M/o Rural Development to share the data of 26 KPIs. The MIS is also integrated with PMO dashboard (PRAYAS) to share the information of 6 KPIs. Due to corona pandemic and difficulties to do the households survey, an interim village development plan (iVDP) is allowed to be generated by the district stakeholders.

In the next one year the following enhancements are planned:

- The construction progress of infrastructure works
- Know the status of individual beneficiaries using registered mobile number of households
- SSL implementation to the web application
- Upgradation of database and PHP versions
- Implementation of load balancer
- Launch of mobile app for the household survey

ENABLER

Processes Re-engineered

The scheme was launched in 2009 and since then the village development plans are created manually without any predefined indicator. No standard formats existed to record the requirements in village for the village development plan. The scheme guidelines were modified in October 2018 to re-engineer the scheme implementation in the villages. The infrastructure requirements and individual beneficiaries are assessed under predefined 50 Monitorable Indicators spread in Format-2 and 3A.

The online MIS also supported the re-engineering of scheme implementation. The infrastructure assessment of work is captured in Format-2.

The online MIS automates the transfer of all works to Format-4 for the financial estimation requirement.

The identified beneficiaries are submitted in Format-3A under household survey.

The online MIS aggregate all the beneficiaries in the group of monitorable

indicators in Format-3B. The Format-3B is automation of beneficiaries grouping as per pre-defined monitorable indicators.
The online MIS generates the Village Score in Format-6 on a single click as per the status of requirements in monitorable indicators.
Transfer of beneficiaries data from Format-3A to 3B and then to Format-5 is automated. Beneficiary progress is captured in Format-5.

Technologies

The Enterprise Architecture includes the strategy Level officer of Ministry i.e. Minister, Secretary, Joint Secretary, Director and other officers. Operational level officers of Ministry and NIC to devise the modules for the development of online MIS for monitoring. State level, district and village level officers to implement the scheme in selected villages. The video tutorial provided for the user to submit the survey data in formats. The training to village and district officials was provided physically till the enforcement of lockdown. After the lockdown, the trainings for capacity building were organized to up-skill the district level officers to implement the scheme. Trainings for knowledge sharing were organized through Video conferences and through virtual meeting applications. The knowledge management has enabled the district users to achieve the desired outcome as desired in the scheme guidelines. Knowledge sharing has been supported through WhatsApp group of National, state and district officials.

People

The capacity building programs were organized at the national, state and district level for the officials responsible for the implementation of scheme.

VALUE INDICATORS

Learnings for sharing

The scheme was launched in 2009 with the vision for the development of SC majority villages of INDIA. Till the revision of guidelines, the monitoring of scheme implementation was difficult as to receive updated information from states and districts. The challenges for the implementation and monitoring of scheme were conceptualized at Ministry level to redesign the scheme and survey formats. Trainings were imparted to all stake holders at state and districts. Best practice was adopted to train the state and districts officials to describe the objective of formats and flow of information from format-1 to format-5. The system generated VDP was the challenge as it covers survey data of format-1, 2, 3A and 4.

Digital Empowerment

There is no constraint to do the village development due to language or demographic or cultural differences. Implementation of scheme with infrastructural works and beneficiaries is uniform across the nation.

Green e-Governance

Not applicable for the project. This project does not require any additional ICT infrastructure and disposal of e-Waste concerning the Green e-Governance practices.

Ms. Kalyani Chadha, *Joint Secretary, Department of Social Justice and Empowerment, M/o Social Justice and Empowerment (New Delhi), kalyani.chadha@nic.in*
Shri Anand Kumar Verma, *Scientist – B, National Informatics Center (New Delhi), anand.verma21@nic.in*

ePetty Case App - An Evidence Based Enforcement Tool

Telangana State Police

M. Mahendar Reddy and K. Srinath Reddy

PROJECT OVERVIEW

Vision & Objective

When petty crimes are checked promptly, serious crimes are prevented with certainty. (Zero tolerance against crimes/Broken Windows Theory: New York City). The pilot version of the e-Petty Case App implemented in Hyderabad City Police has led to 35%-40% reduction in serious crimes. This system helps in tracking the transformative process of petty offender into a Professional offender. With this objective in view, "e-Petty case app" is implemented State Wide.

The e-Petty case App will facilitate Police Officers to register cases immediately on the spot, through a tab on online platform. It will help capture the photographs of the suspects/accused record crime scene, geo tag the location of crime scene, digitally collect other evidence available then and there. It generates an automatic charge sheet based on the available evidence which is filed in the court during the trial. The entire evidence collected is presented to the II Class Magistrate to bring credence to the entire investigation process. The System generates a respondent slip which is handed over to the respondent on the spot who is asked to come to the Court directly on the following day without coming to the Police Station. All the details of respondent including name, address, phone number, ID proof etc are captured in the electronic form for further tracking and follow-up.

The features of e-petty Case:

- Petty cases can be booked in real time under sections relating to IPC/ City Police Act/ Gaming Act/COTPA Act-2003/MV Act/Town nuisance Act, etc.
- Electronic Recording of offender information like Name, phone number, address, Identity proof, photograph, latitude, longitude etc.
- Provision to capture the images of offender, evidence and seized objects.
- Information relating to multiple Respondents/ Witnesses/Seized items can be added.
- Cases can be registered against individuals/establishments etc.
- Helps to run analytics on the state-wide date to find crime trends, offender span across district, region and state, etc.
- The system pops up the history of previous violations whenever respondent name is entered.

The important aspect of e-Petty case system is to show up the data of repeat/frequent violators at the time of charge sheet so as to enable the Judicial Magistrate to impose enhanced punishment to the respondent.

The e-Petty case App, an evidence based enforcement tool is very useful to register cases with complete evidence in petty minor violations relating to several types of public nuisance including street fighting, drinking in public places, drunk and brawls, road rage, dangerous driving, pollution, gambling, littering, traffic obstruction, noise, etc.

e-Petty cases App, will bring in transparency and accountability in police work across the state. Hitherto, petty cases have been registered manually in a

register and a manually prepared charge sheet has been filed along with the respondents in II Class Magistrate Court for summary trial. Since the entire process was manual there was no way to check whether the respondents named in the charge sheet and the person who appears in the court are one and the same. It was also not possible to bring to the notice of the Court about the details of repeat violations by the same respondents for giving enhanced punishments.

The advantages of e-petty case app:

- It brings Transparency and Accountability in booking Petty cases by Police.
- It helps in identification of hotspots of public nuisance through geographic analysis.
- Helps in Identifying root causes of Petty issues and addressing root causes will lead to prevention of petty issues turning into major crimes.
- Complete evidence based enforcement will enhance credibility of Law Enforcement
- Certainty of punishment for violators and enhanced punishments to repeat violators.
- In the long run, helps to reduce in Major/Serious Crimes (Broken windows theory).

Hardware/Software

Web Portal : JAVA J2EE, Struts, JSON, Web Services, Oracle 11g
Mobile App: Android 1.4, iOS 1.06

Certification (Certifying Agency)

Security audit is done by AKS GROUP of Companies.

Disaster Recovery and Service Continuity

Disaster recovery is available for service continuity at State Data Center

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
ePetty Case	Booking of evidence based ePetty case enforcement	219543	318990	542732

Implementation

Implemented in all 9 Commissionerate's and 28 Police Units (Districts)

Usage Report.

Year	TOTAL_CASES_BOOKED	CHARGESHEET_CASES	PENDING_TRIAL	UNDER_INVESTIGATION	ONLY_FINE_CASE_CNT	ACQUITTAL_CASE_CNT	RAISING_OF_COURT_CNT	IMP_FINE_CASE_C	ONLY_IMP_CASE_CNT	TOTAL_DISPOSED
2018	219543	212768	50783	6490	156340	189	149	4249	1062	161989
2019	318990	305730	97626	13034	202944	499	400	2418	1844	208105
2020	542732	426767	389164	115801	36922	50	55	157	420	37604
Total	1081265	945265	537573	135325	396206	738	604	6824	3326	407698

Improvements / Enhancements

State wide implementation done and we are in the process of integration with courts for speedy disposal of ePetty cases by end of the Year.

ENABLER

Processes Re-engineered

Hitherto, petty cases have been registered manually in a register and a manually prepared charge sheet has been filed along with the respondents in II Class Magistrate Court for summary trial. Since the entire process was manual there was no way to check whether the respondents named in the charge sheet and the person who appears in the court are one and the same. It also helps in evidence based enforcement by tagging the violation photographs with Date, Time and geotagging. It was also not possible to bring to the notice of the Court about the details of repeat violations by the same respondents for giving enhanced punishments.

Technologies

- *Mobile Apps are faster*- Applications are usually 1.5 times faster than mobile websites and they perform actions much faster too.
- *Personalized content*- Users love highly tailored content according to their preferences. It's like offering them a tailored communication in the language they speak and understand
- *Instant Online and Offline access*- Mobile apps offer seamless experiences with their ability to work Offline and Online.
- *Using device features*- Mobile apps have an added advantage where you can code an app into utilizing various features of a native device. So, once downloaded they can use features like Camera that can scan PFDs, QR and Bar codes and NFC to use for payments, GPS to connect with maps and other services and accelerometer, gyro meter and compass that can be utilized for thousands of different purposes.
- *Push Notifications and instant updates*- The ability to send instant and non-intrusive notifications to app users is a major reason to develop ePetty case in Mobile App

Journey form e- Governance to m-Governance, Deliver Services from Anywhere and Anytime.

People

- Description
  i. Leadership support for capacity building, visibility of actions with current status
     a. Project envisaged by Telangana State Police
     b. Around 3000 Police Personnel have been trained on this initiative including all SHO's, Supporting Staff of all Police Stations, ACP, DCP offices, SHE Teams, Patrol Mobile Staff and other direct / indirect staff involved in operation
     c. In addition to the above, Hyderabad City Police have organized and organizing various Awareness training programs on using this App at various police stations.
  i. Change management and Capacity building strategy defined and status thereof
     a. Regular Training to staff and conducting Awareness Campaigns on changes and modifications of this initiative.
  ii. Project management & Monitoring adopted [whether full or part-time program management teams in place, roles and responsibilities of department officials/consultants etc]
     a. A Team of 5 personnel deployed to work on full to monitor the complete work flow

   b. Periodical review on the outcome and performance evaluation by higher officials
   c. Response / Request Model analysis with respect to the efficiency and transparency

- Financial model adopted [Source of funds, description of PPP if any, Total cost of ownership etc]
  i. In-house, Department funds
- Special efforts to ensure sustainability of the e-Governance initiative[s] [including but not limited to carrying out of third-party assessment[s] and implementation of their recommendations where feasible etc].
  i. Monitoring of Citizen Feedback
  ii. High level analysis by Higher Officials in taking up some good initiatives mentioned by Citizens.
  iii. Regular feedback sessions and quality control checks
- Challenges faced in Change Management and Capacity building
  i. Initial resistance from the staff in adoption of the technology
  ii. Technology Fear factor was an impediment
- The Lessons learnt from Change Management and Capacity building exercise[s]
  i. Any initiative should have 100% commitment from the Top Executive as Project Sponsor to drive further down in the organization
  ii. Tracking and Monitoring the project by the Top Executive and Operational Management would help minimize the delays
  iii. Identifying the risks and mitigation plan under the guidance of the Project Sponsor and track them.
  iv. Define and measure Accountability at all levels in the organization for its success.

VALUE INDICATORS

Digital Empowerment

The App is in English and most of the users comfortable in using this app. No cultural or language differences have been raised by any of the user till date.

Green e-Governance

Green e-Governance is about application of Green computing practices to the domain of e-Governance. It involves adoption of environmentally friendly practices with respect to creation, use, and disposal of ICT facilities. There are several dimensions to green e-Governance and prominent among these relate to Power and Paper consumption, and disposal of e-Waste.

- Taking into account Green e-Government as described above, the specific steps have been taken to address the factor.

The objective is to achieve paperless office by minimizing the paper consumption without making an entry. The adoption of ICT equipment that preserves eco-friendly environment and reviews the power consumption.

Shri. M. Mahendar Reddy, IPS, *Director General of Police, Telangana State Police, Telangana, dgp@tspolice.gov.in*

Sri. K. Srinath Reddy, *DSP IT, Telangana State Police (Telangana), sreenath@tspolice.gov.in*

NCLT Online Tribunal System
National Informatics Centre, New Delhi

SB Singh and Manoj Tuli

PROJECT OVERVIEW
Vision & Objective
The Central Government has constituted National Company Law Tribunal (NCLT) under section 408 of the Companies Act, 2013 (18 of 2013) w.e.f. 1st June 2016. The Ministry of Corporate Affairs (MCA) has set up eleven Benches, one Principal Bench at New Delhi and one each Regional Benches at New Delhi, Ahmedabad, Allahabad, Bengaluru, Chandigarh, Chennai, Cuttack, Guwahati, Jaipur, Hyderabad, Kolkata and Mumbai. These Benches are headed by the President (former Chief Justice of High Tribunal), Judicial and Technical Members at different locations.

The Companies Act 2013 is an Act of the Parliament of India on Indian company law which regulates incorporation of a company, responsibilities of a company, directors, dissolution of a company. In 2016, the Insolvency and Bankruptcy Code, 2016 was officially added to the Companies Act. The purpose of this act can be divided into the following two goals:

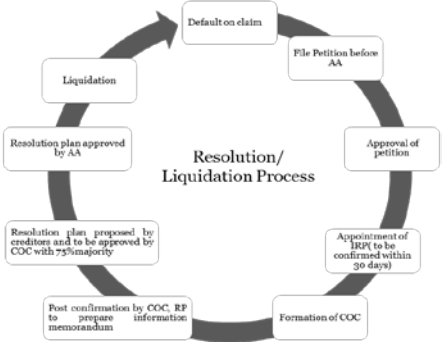
- Making sure that the insolvency proceedings can be completed within a minimum amount of time.
- Making sure that the financial risks to the foreign investors is decreased.

The Tribunal is tasked with providing effective remedy in petitions relating to Companies Act 1956 and 2013 and Insolvency and Bankruptcy Code (IBC) 2016.

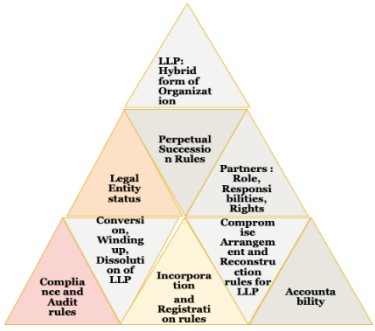
In this direction, NCLT with the help of NIC has initiated Online portal for filing petitions/applications/documents and to facilitate IT based effective and less-paper Grievance Redress System through digitization of various processes.

Companies Act 2013

IBC 2016



LLP Act 2008:



Project Objectives

- Digital transformation of tribal
- Automation of judicial functions
- Digitalization and preservation of records
- Provide time bound, citizen centric services
- Bring about transparency and efficiency in judicial system
- Encourage egovernance and paperless judiciary processes

Functional Scope

The National Informatics Centre was entrusted with the development of web-based online tribunal System for NCLT. Developing, customizing and implementing the generic modules for e-Filing to be used by general public/legal representatives/ for the following:

- Flexibility to file petitions/documents 24*7 in NCLT through e-filing module(G2C) for both petitioner and respondent through authorized access.
- Implementation of Digital India key objectives
- Single window solution for stake holders
- Data Sharing through API integration with related Govt. agencies (G2G).
- Contactless filing facility to litigants
- Personalized dashboard for litigants to track the progress of a petition.
- Provision for uploading petition documents in pdf format in multiple volumes (up to 100 MB per volume) in secured open Sources DMS.
- Online payment of court-fee through integrated payment gateway which is calculated automatically by the e-filing system
- Facilitates conducting e-hearing using electronic means in tribunal rooms and easy access to digitized petitions, replies, rejoinders, comments, objections and written submissions filed by contesting parties in customized view.
- Provision for creating judges' specific own notes/observations on smart screens during e-hearing in the Tribunal Room/ their Chambers by accessing digitized petitions through Interactive Pen Display and Touch Screen in non-sharing mode
- Role based application for NCLT officials and judiciary members
- Complete tracking of activities performed by different registry officials
- Role-based dashboards for ministry officials to track registry pendency, tribunal pendency and overall functioning of NCLT

Geographical Scope

- NCLT has 16 benches pan India, pilot project was successfully implemented in NCLT Delhi & the Principal bench in 2019. Since Jan 2020NCLT online tribunal system has been rolled out in Mumbai, Chandigarh, Jaipur, Cuttack, Allahabad, Hyderabad, Amravati, Kolkata benches.
- Rollout in remaining 6 benches (Chennai, Bengaluru, Ahmedabad, Indore, Guwahati, Kochi) is already going on and will be completed by December 2020.

Key Stakeholders

Stakeholder	Intended Benefits and Current Status
Ministry of Corporate Affairs (MCA) NCLT Online Tribunal System is a mission mode project under the	• Bring about transparency and efficiency in judicial processes

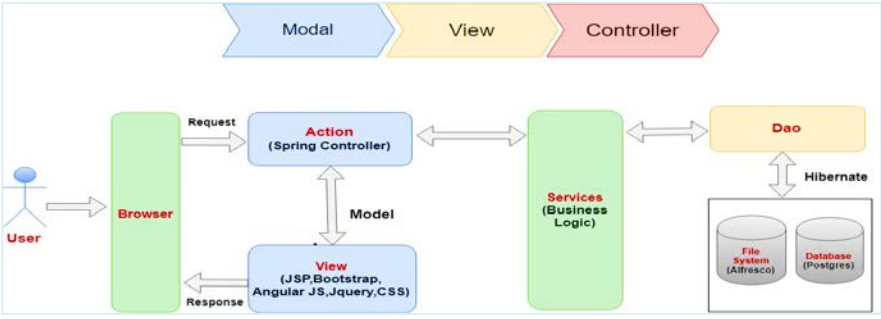
direct supervision of Secretary, MCA.	• Provide more efficient G2C, G2G services • Data sharing with Govt. agencies through API integration. • Easier management of NCLTs pan India through dashboards and reporting • Encourage e-Governance and Green Governance through paperless tribunals. • Monitoring of case hearing status in various benches Pan India through online Display Board System
National Company Law Tribunal President and Registrar are overseeing the execution of the project. All officials in NCLT, including the President, judicial members, technical members, registry officials, directly use the application.	• More efficient registry, tribunals • Better tracking and accountability of registry, tribunal officials • All tribunal documents are digitized and stored in secured repository (Document Management System) allowing confidentiality and zero tampering • Eliminate any biases in listing of petitions for hearing through implementation of automatic registration of petitions • Random allocation of petitions before various benches of tribunal • Automatic Cause list generation.
General Public, Advocates, Chartered Accountants, Central and State Govt Agencies They are using the application for filing petitions in NCLT and provide critical feedback necessary for enhancements.	• 24x7 online filing of petitions/documents by litigants in a hassle-free manner through online court fee payment facility • Immediate processing of filed petitions • Provide information about ongoing petition to litigants • Easy online submission of documents • Tracking of petition progress through personalized dash boards.

Hardware/ Software

Model Name	Technology Components	Version
e-Filing & CIS Modules	JSP/Angular Java/JAVA PHP	11.x 7.3.x
	Spring Hibernate	4.0.x 4.3.x
	Webserver: Tomcat Apache	9.37 2.4.41
DMS	Alfresco	Community version 2019 released
Database	RDBMS – PostgreSQL	12.3
Operating System	RedHat Linux (RHEL)	7.8

- Open source technologies used i.e. JDK/JSP, PHP, Spring-Hibernate, Tomcat/Apache, Alfresco, RDBMS – PostgreSQL, RedHat Linux (RHEL)
- Master-Slave configuration managing PG Pool for replication
- Use of latest spring MVC framework 4.0
- The application is hosted on Megh Raj cloud through containerization managing through Docker implementation at NDC Delhi.
- Capacity to scale virtual machines horizontally and vertically.
- DR Set up on geographically different location at NDC Pune.
- Load Balancing techniques implementation for peak load by concurrency control methods.

Architecture:



Certification(Certifying Agency)

Certifying Agency: AKS Information Technology Services Pvt Ltd.	Web application was certified free from OWASP vulnerabilities and safe for hosting

Disaster Recovery and Service Continuity

- Dedicated disaster recovery system has been set up at NDC Pune to handle any untoward situation with centralized cloud computing team.
- Application replica have been created in Pune data center (while DC at NIC, Delhi) as online backup systems.
- Sufficient Application servers are out under load banker, replication of Data Base with online streaming of DC NAS to DR NAS for backup of DMS is established.
- Impact assessment carried out to identify critical data and its recovery in case of security breach or natural disaster.
- Application is hosted on NIC MeghRaj Cloud.
- Penetration Security Testing by NIC Application Security Team is done at regular interval.
- Query execution time is optimized through APM.

RESULTS INDICATORS

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21

e-filing facility to litigants	• Filing facility to litigants. • They can file/track petition progress anytime from anywhere using the e-filing application through secured login. • Queuing up at registry counters by litigants has been eliminated and eased the functioning of registry and day to day dealing of the litigants • Only e-filed petitions/applications are being accepted by registry during COVID 19 pandemic situation	42,361 e-filed petitions (all three year)
Digital Payments	line submission of tribunal fees using payment gateway. • Integration of Digital payments in e-tribunals solution has led to instant processing of filed petitions • Fees are automatically calculated by the e-filing application; this instils transparency and provides a standard charging mechanism in all NCLTs Pan India.	6651 Online transactions processed
Online submission of petition documents	line submission of petition documents through litigant's e-filing accounts in pdf format • Centralized secured document repository for all petition documents accessible by litigants, registry, judges through different views through secured login. • All tribunal documents are digitized and stored in repository (open-sourced Document Management System) allowing confidentiality and zero tampering	1,66,245 Petition Documents submitted online
e-Hearings	The e-filing application and online submission of documents facilitated VC hearing of matters during lockdown • NCLT tribunal proceedings smoothly transitioned to online medium due to e-filing application during COVID lockdown since April 2020. • NCLT judicial, technical members access petition documents using their accounts and did not have to use physical files.	600+Virtual Conferencing Hearings during Covid 19 period
SMS and email alerts	Alerts and communications regarding petition status, petition listing, defect notification to litigants through SMS and emails to respective parties: • Litigants do not have to contact registry for petition status and updates • Litigants are updated at every step staring from petition submission to petition listing and its disposal.	1,10,822SMS 1,38,175Emails

e-Causelist creation, order creation and upload	Creation of causelists, orders (daily and final orders) using Petition information system (application used by registry officials, tribunal officials) • eCauselist and automatic registration of petitions eliminates bias in listing and hence timely trial of petitions.	Daily e-Causelist prepared since 01 Jan 2019 in New Delhi bench. Subsequent benches started since Jan 2020 upon went live & started creating e-Causelist. E-hearing is going on through e-Causelist only since April 2020.

Implementation

- NCLT has 16 benches pan India, pilot project was successfully implemented in NCLT Delhi, Principal Bench in 2019. NCLT online Smart Tribunal application has been rolled out in Mumbai, Chandigarh, Jaipur, Cuttack, Allahabad, Hyderabad, Amravati, Kolkata benches since Jan 2020.
- The application is planned to roll out at remaining 6 benches (Chennai, Bengaluru, Ahmedabad, Indore, Guwahati, Kochi) will be completed by December 2020.
- Training Sessions more than 40training sessions held for NCLT officials and representatives/litigants across benches, around 1500 users were trained and sensitized in all benches through VC and Physical Interactive sessions.

Improvements / Enhancements

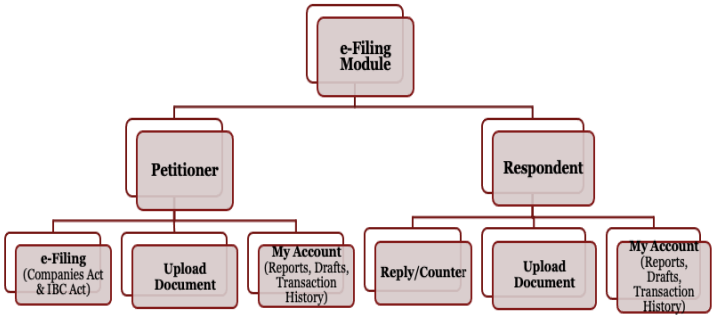
Activities Undertaken (last one year)	Planned Activities (next one year)
• Procurement & Configuration Cloud computing for infrastructure setup is completed for NIC MeghRaj Cloud at NDC, Delhi • Regular performance tuning, resource management by NIC Clous maintenance team on Cloud infrastructure through upgradation of Application and database server OS, RDBMS for optimal performance and safe guards against security threats. • Enhancements and Maintenance – e-Filing, CIS and DMS software updates being done as per user requirements. • Go Live – Completed for 10 locations Pan India. • Backlog entry–Under progress for pending petitions at NCLT Chandigarh, Jaipur, Kolkata, Bangalore, Cuttack, Kochi, Chennai, Ahmedabad, Indore, Allahabad, Hyderabad, Amravati, Guwahati • Integration of NCLT e-filing application with NeSL (National e-Governance Services Limited (govt. of India) • Dashboards for NCLT senior officials	• Availability of digitally signed order copies on website through CIS • Continue solutions enhancements and upgradation as per requirements • Maintenance of E-filing application • Integration of NCLT with other govt. departments for information exchange • Customized Dashboard for MCA officials • Implementation of AI in Petition Management.

ENABLER

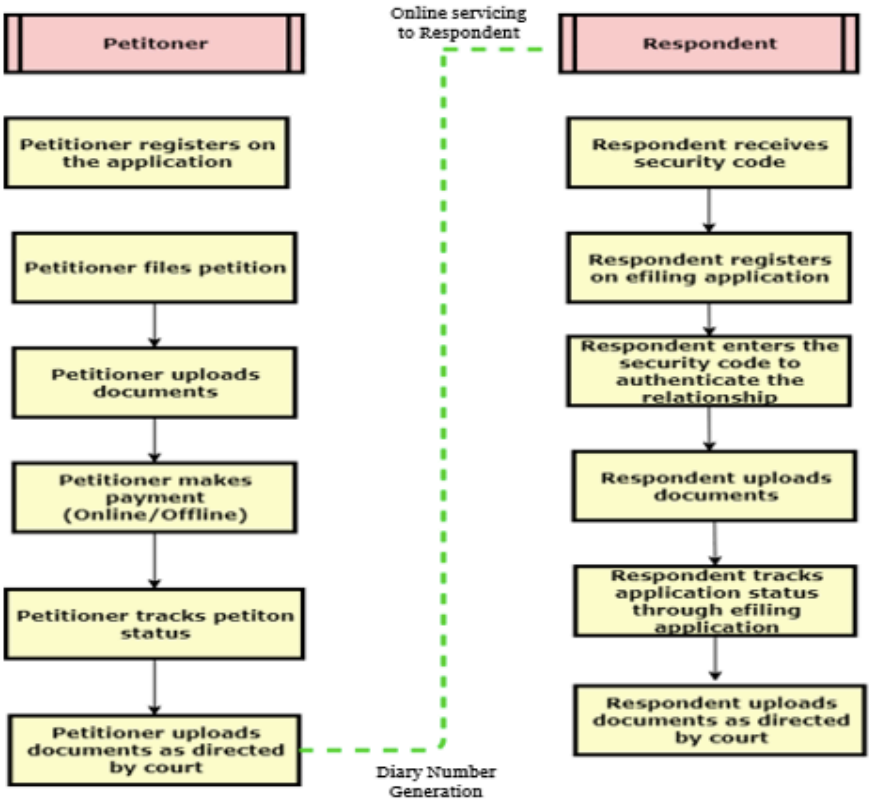
Processes Re-engineered

Automation of critical filing, scrutiny and tribunal activities

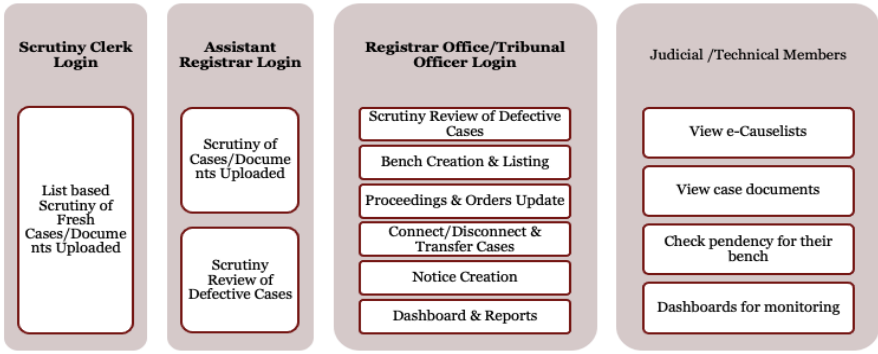
Manual filing activities were automated through e-filing module of the application. This module is used by litigants to file in NCLT 24*7. Following functionalities have been provided to litigants.



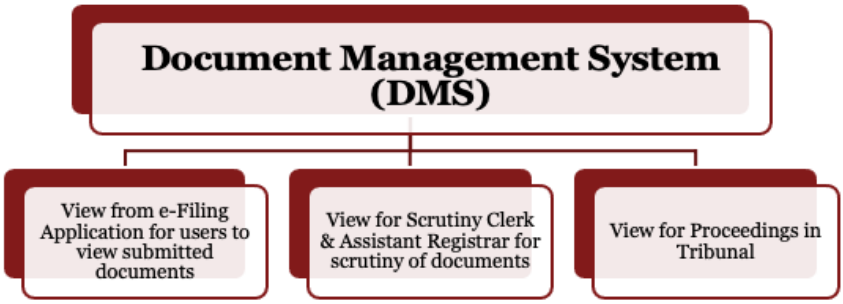
- The following workflow automates the manual activity of filing in NCLT.



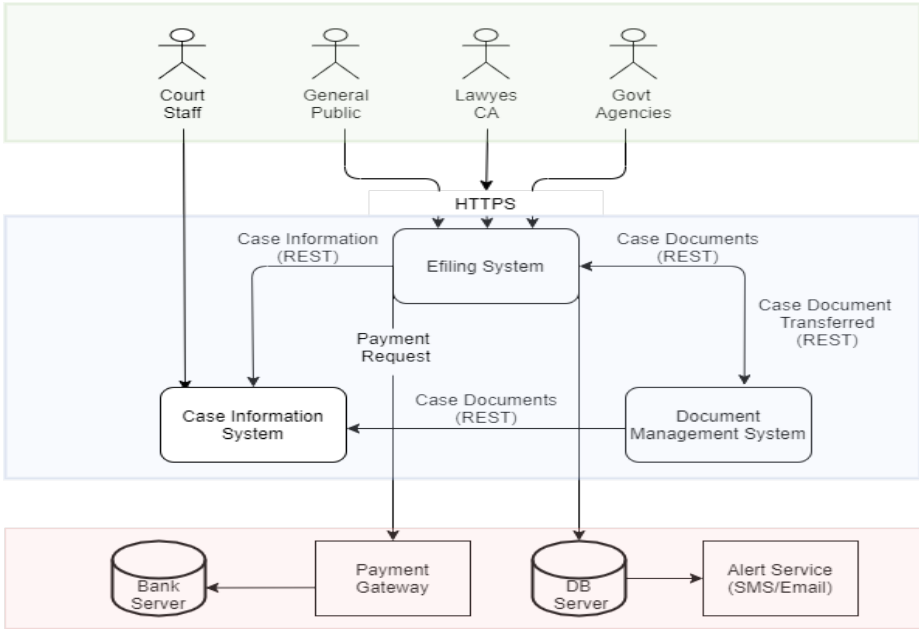
- Manual processes were substituted by role based access mechanism in Case information System (CIS). This resulted in better tracking of registry ctivities and greater accountability of registry staff.
- Dashboards allowed better monitoring of pendency by higher officials.
- Case Information System (CIS): Internal registry application for all registry and tribunal activities as per shown in above diagram



- Petition documents have always been collected as physical files in NCLT, to overcome the challeges of storing physical files safely, an online document repository was conceptualised and implemented for NCLT. It is a centralized document repository for all petition documents, accessible by litigants, registry staff, judges.



- **Technologies**



People

- User Trainings Stake holders training sessions which includes registry officials, litigants/advocates/C.A. were imparted by PMU team. The training program organized on various modules on NCLT online tribunal system was conducted on regular intervals to get all staked holders feel comfortable while using the system.
- Adoption drive the project team has been instrumental in driving adoption of software solution by NCLT officials by conducting multiple sensitization sessions online and upon visit to NCLT locations.
- Trainings for Judges on how to use WACOM screens to access documents and make notes during e-hearing.
- Helpdesk/Facilitation Center was setup in NCLT in each location to help users in e-filing and related services.

VALUE INDICATORS

Learnings for sharing

- Data digitization was a big challenge and critical for successful implementation of online tribunal system hence metadata creation activity was initiated Pan India in all NCLTs. Trainings were imparted through VC sessions/personal training to staff regarding the same.
- NCLT has seen increase in filing since introduction of e-filing module for litigants, the increasing pendency required quick registration of petitions after scrutiny. Keeping this in mind automatic petition registration functionality was introduced in CIS application.
- Petition hearings in NCLT required litigants to report to NCLT on time and wait for their turn; this often resulted in crowding in NCLT. To solve this, display board system was placed in NCLT benches which can be accessed on smartphones/other devices as well, these helped litigants to keep a track of live NCLT hearings daily.
- Orders are uploaded daily on NCLT website so that it can be accessed by general public. This activity will be integrated with CIS module to avoid duplicate activities being done by tribunal staff.

Digital Empowerment

- *User Manuals and Help Videos* were created and posted on the e-filing website and available to all users. These could be used by users for self-training and could be shared with others they would like to pass it on to.
- *FAQs* were posted on e-filing website to answer frequent and common queries.
- *Localized helpdesks* have been setup to assist staff and general public in adopting the e-filing system

Green e-Governance

- Digitization of NCLT is a step in the direction of paperless tribunals and reduction in the use of paper
- Online tribunal system eliminates need of any paper trail in registry or tribunals.
- No physical storage space required as all data resides in secure NIC Data Centers, this is an energy efficient way of storage.
- Virtualization of servers has reduced power consumption which otherwise would have been needed for running multiple machines.

- Environmentally conscious, cloud-based IT infrastructure has resulted in huge reduction in carbon emissions.

Direct and Indirect Cost Control

- Eliminated the need for physical storage of records for huge casefiles leading to reduction in power consumption and costs.
- Postal charges, paper and printing charges savings by sending notifications through emails and SMS, which is now the preferred medium of communication to respondents for serving Tribunal notices.

Shri. SB Singh, *Deputy Director General, National Informatics Centre (New Delhi), sbsingh@nic.in.*

Sri. Manoj Tuli, *Sr. Technical Director, National Informatics Centre (New Delhi), mtuli@nic.in.*

Tele-Law for Rural India

CSC eGovernance Services India Limited

Rishikesh Patankar and Lay Smrity

PROJECT OVERVIEW

Vision & Objective

Tele-Law scheme is an effort to make legal aid accessible to the marginalized communities and citizens residing in rural areas. The scheme envisages the use of communications and information technology for the delivery of legal information and advice. This is a medium of e-interaction between lawyers and citizens through video- conferencing or telephone/phone mode. The service seeks to provide legal assistance to citizens at their doorsteps through the infrastructure of Common Services Centres (CSC) present at rural locations.

The concept of Tele-Law is to facilitate the delivery of pre-litigation advice through panel of lawyers stationed across India at CSC SPV office and at State Legal Services Authorities (SLSA).

To avail the service under Tele-law the rural citizens have to pay ₹30/-. However, if the citizen is from a marginalized category (falling under Section 12 of LSA Act, 1987) free legal consultancy is provided. Details of the marginalized category are:

Sl.No	Categories of Marginalized persons (Section 12 of the Legal Services Authorities Act 1987)	Fees for Tele Law Service	Documents to be brought to CSC for Registration
1.	Women	NIL	NIL
2.	Children(Below 18 years of age)	NIL	NIL
3.	SC / ST	NIL	Caste Certificate
4.	Victims of Trafficking	NIL	Self- Declaration /Copy of Police FIR/ Affidavit
5.	Mentally Ill and Differently abled	NIL	Disability Certificate
6.	Victims of Natural Disaster/Ethnic Violence	NIL	District
7.	Workers in the unorganized sector	NIL	Job Card/ MGNREGA card
8.	People with low-income groups (Income as specified by State)	NIL	BPL Card/ Income Certificate
9.	Under trials /In custody	NIL	Any relevant Case Document
10.	Persons other than those mentioned above	NIL	Aadhar Card/ Any ID Proof

The objective of the model is to provide Per litigation legal advice to and assistance to rural citizens through the medium of ITC.

Functional Scope

Para Legal Volunteers (PLV) are the first point of contact for any citizens/applicant who requires legal advice/consultancy. They are associated with CSCs of the locality and help CSC, Village level entrepreneur (VLEs) in identifying citizens who require assistance.

- Under this, the identification of citizens who require legal help is carried out through the PLVs who are associated with CSCs at the GP level. The PLVs are the first point of contact for every citizen. These PLVs visit

the communities and create awareness about the initiative and identify citizens who require legal aid.

- After discussing and identifying the citizens they help them get an appointment with a lawyer through a nearby CSC. In turn, they also help them in understanding the advice given by the lawyers and assist in further action, if required.
- To receive consultation the applicant has to visit the Tele-law CSC centre, where the consultation is provided. Depending on the choice of the applicant the consultation is either conducted via video conferencing or phone call. The consultation provided is for 20 minutes per appointment.
- Once the consultation is completed the applicant has to provide feedback on the consultation received from the lawyer.
- The selected CSC's (VLE who runs the CSC) are trained on the process of registration. Each VLE[1] is provided with a dashboard, where he/she registers the case, give appointment date and time, schedule consultation and check the status. Once the applicant visits the CSC, his detailed information is filled by the VLE and on mutual consultation, an appointment is provided.

Implementation

- *Department of Justice (DoJ), Ministry of Law and Justice, Government of India (GoI)*: is the funding agency for the initiative taken.
- *CSC e-Governance Services India Limited (CSC SPV):* referred to as CSC SPV is the implementing agency for this initiative.
- *National Legal Services Authority (NALSA):* for the state of Bihar and Uttar Pradesh the Para Legal Volunteers (PLVs) and Panel Lawyers are provided by NALSA.
- *VLEs (Village Level Entrepreneurs):* who run the CSCs and register the cases on behalf of citizens.
- *PLVs:* are associated with CSCs who identify the cases from the villages. *Applicant citizens:* who register the cases to received pre-litigation advice.

Overall 29860 CSCs are allocated to work under Tele-Law project across 28 States and 2 UTs.

ICT Infrastructure

A centralized portal for "Tele-Law" is developed preferably using Open Source Technologies. The hosting system of the portal is configured in true auto-scaling mode and on a cloud platform. The portal is developed to track and maintain database of citizens who intend to take legal advice from virtual lawyers stationed at various locations. The portal ensures high user concurrency and seamless access between mobile and web platform. This is made available to the people in rural areas who are using tablets/mobiles/handhelds for various operations on the portal.

Technology Platform

Tele-Law Portal is developed using Yii framework, which is an open-source web framework. It follows the model view controller (MVC) approach and is written in PHP. It is modelled after the concepts of Ruby on Rails, distributed under the MIT License. It is one of the fastest, most secure and efficient PHP framework. Thus, being one of the most secure PHP frameworks, it safeguards websites from hackers. Various security mechanisms available prevent major attacks on the web application such as XSS, SQL injection, CSRF, tampering

with cookies, etc.
On the other hand the back end is developed in .Net Core programming language, with MS-SQL Standard Edition 14.0 as Database.
The platform is also integrated with the gateway of third party for SMS and on-boarding of VLEs through CSC SPV portal known as Digital Seva Portal.

Certification (Certifying Agency)

Presently code auditing is ongoing under CERTinan approved Agency. Once the auditing is completed certificate will be issued by CERTin.
For disaster recovery and service delivery Data base incremental back up is in place. Through relational Data base management system (RDMS) backup for previous 7 days is taken every day. DR is in place as per standard norms of Cloud Service provider.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Tele-Law Service	1. The service evangelizes to provide pre-litigation advice/consultancy to rural citizens through video conferencing/ telephone call through the channels of Common Services Center (CSCs)present at gram panchayat level. 2. If the citizen is from a marginalized category (falling under Section 12 of LSA Act, 1987) free legal consultancy is provided. Categories are: Women, Childers, SC/ST, Victims of trafficking, Mentally Ill and Differently abled Victims of Natural Disaster/Ethnic Violence, Workers in the unorganized sector, People with low-income groups (Income as specified by State), Under trials /In custody Apart from this citizens other than the above are required to pay a minimum amount of Rs.30/-	Cases registered: 62,065 Advice given/enabled : 61,365	Cases registered: 1,23,063 Advice given/enabled: 1,20,210	Cases registered: 95,674 Advice given/enabled: 92,566

Implementation

The project initially started as a pilot project covering states of North East, UT of Jammu & Kashmir, Bihar and Uttar Pradesh during 2017. Later on depending on the success of the service, it was extended to 115 Aspirational Districts nominated by NITI Ayog.
In total presently 29,860 CSCs are presently working under the service.

Presently a total of 3,00,945 cases are registered through VLE/PLV and 2,92,373 cases are received per-litigation advice i.e. till 08.09.2020.

Improvements / Enhancements

- During the initial phase of the project, it was really difficult for the VLEs and PLVs to convince rural citizens to come forward and talk about their problem in front of the camera. But gradually when the citizens became satisfied with the advice received from the lawyers, they began to share the information with others.
- Initially few panel lawyers were engaged with the project. Later panel lawyers with regional languages were on boarded. Which resulted in more number of case registrations.
- Women lawyers were engaged, because women beneficiaries were more comfortable in discussing their problem with female lawyers.
- The PLVs are the first contact point for the citizens. As the PLVs visit door to door for mobilization activity. A mobile application is provided, this helps them to partially register the details of the citizens who receive advice and remaining allocation is given by the VLE.

ENABLER

Technologies

ICT Infrastructure: A centralized portal for „Tele-Law" is developed preferably using Open Source Technologies. The hosting system of the portal is configured in true auto-scaling mode and on a cloud platform. The portal is developed to track and maintain database of citizens who intend to take legal advice from virtual lawyers stationed at various locations.

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PHP framework. Thus, being one of the most secure PHP frameworks, it safeguards websites from hackers. Various security mechanisms available prevent major attacks on the web application such as XSS, SQL injection, CSRF, tampering with cookies.

Dashboard/Analytics:

Each stakeholder except citizens are provided with a dashboard. Where in they can login and get relevant information.

- *PLVs:*The dashboard enables the PLVs to register the details of the citizens who are need to advice. They are able to view the details of citizens who are registered and who have received advice.
- *VLEs*:Through VLE dashboard, VLEs can register cases on behalf of citizens depending on the availability of lawyers. Allocate time and date for cases which are registered through PLVs.
- *CSC SPV and DoJ:* Has rights to view over all data from State, district till panchayat. With respect to types of cases registered, frequency of cases etc.

Stake holders like CSC SPV/DoJ/SLSA/DALSA : can view drilled down

information of cases registered and advice enabled

People

Capacity Building

To reach out to masses and share the information with below activities were carried out:

- Training of Trainers were organized in phase manner, further the trainers provided training to their respective VLEs and PLVs. The trainings were organized in regular frequency.
- EIC materials such as
  i. Small video bites on step-wise case registration process was made available for all VLEs and PLVs.
  ii. Banners, handouts, flyers in regional languages
  iii. Tele-Law song cum film
  iv. Radio jingle broadcasting
- Competitions were organized to encourage VLEs/PLVs for participation in the programs and awards are given for good work.
- The best performing VLEs/PLVs are featured in respective state social media page.

Leadership Support

- Continuous engagement of political and administrative leadership at all levels ensured timely implementation and wide coverage of this project.
- On any major event or achievement, Sh Ravi Shankar Prashad, IT Minister and Law Minister also congratulated the teams for good work via social media.
- Times to time workshops were organized were in the best performing VLE/CSC and the PLVs were awarded through top management /top government officials.

Government Orders

Officials letter were circulated to District Collectors, District Ministers, State IT Department and State Legal Service Authority to impart support at ground level and provide necessary support.

VALUE INDICATORS

Learnings for sharing

Key learning's

- Initially during the roll out of project, the PLVs visited the community and identified the cases, and brought them to CSC center.It was observed that the process is time taking for the citizen to visit the CSC get the case registered and visit again for consultation.
  i. To reduce the time mobile app for case registration was developed, which helped the PLV to register the case partially and reduce the visiting time of the citizen.
- Initially the panel of lawyers had only men lawyers, gradually with them and feedback form the citizens it was observed that women beneficiaries were not open to discuss their problem with male panel lawyers. Considering the fact female lawyers were added which resulted in more number of cases registration from women.
- Initially when the project was initiated, citizens were reluctant to talk through VC or phone call with a panel lawyer because the technology was new.But gradually citizens started trusting technology and accepted it.

Best practices :

- To create awareness about the service VLEs and PLVs organized camps at village level to reach out to maximum citizens.
- Every state initiated “Login day” for the service. In which on the specific day, maximum citizens were reached out for case registration and advice enablement.

Digital Empowerment

- During the initial phase on the project , there were only limited number of lawyers with Hindi and English dialect. Gradually when the project was extended, panel lawyers with local dialect were added. Which resulted in adding more number of cases registered. Adding of female lawyers in the panel, resulted in more female citizens coming forward for consultation.
- Information Education and Communication materials such as flyers, banners, posters, informative video bites were developed in regional languages and circulated in within the community.
- To reach out to larger audience in small span of time, radio jingles are also broadcasted.
- CSC, VLEs and PLVs are connected on regular basis via department officials.

Green e-Governance

The ICT infrastructure already exists at the CSC"s and the same was leveraged for this project, hence primarily no additional ICT gadgets were procured. During delivery of service, almost negligible use of paper is made in this project.

Shri. Rishikesh Patankar, *Chief Operating Officer-Education,, CSC eGovernance Services India Limited, rishikesh@csc.gov.in*

Ms. Lay Smrity, *National PMU Head, CSC eGovernance Services India Limited,* smriti.lay@csc.gov.in

Audit Online

Ministry of Panchayati Raj, New Delhi

Khushwant Singh Sethi, Deepak Chandra Mishra, Manie Khaneja, Adesh Chand Gupta, Sanjay Joshi, Ankit Panday, M. Venkateshwar Rao and D.Srinivasa Rao

PROJECT OVERVIEW

Objectives

Audit Online is one of the generic and open-source applications developed as a part of Panchayat Enterprise Suite (PES) under e-panchayat Mission Mode Project (MMP) initiated by the Ministry of Panchayati Raj (MoPR). Audit Online facilitates the financial audit of accounts at all the three levels of Panchayats viz District, Block and Village Panchayats and Line department by Auditors (State AG/LFA). Audit Online facilitates recording details for both Internal and External Audit as per the defined process. The software not only facilitates the online and offline audit of accounts but also serves the purpose of maintaining the past audit records of the auditee with associated list of the auditors and audit team involved in the audit and acts as a good financial audit tool and improves transparency & accountability.

- Facilitates internal & external audit of PRIs.
- Creates a platform for online recording of observation.
- Recording responses against the observations.
- Streamline the audit process so that Audit Enquiry, Local Audit Report, Draft Note, Draft Para etc., can be replied online for better management.
- Monitor the closure of audit observations.
- Generating various reports and graphs for analysis & decision support.

This application also ensures proper maintenance of accounts by Panchayats and work as a good financial audit tool and improve transparency and accountability. The AuditOnline application is also envisaged to streamline the process for audit inquiries, draft local audit reports, draft audit Paras etc. It shall be used, essentially, to audit the vouchers viz. receipts and expenditures of the GPs generated in eGramSWARAJ erstwhile PRIASoft.

Scope

Derived from a generic and configurable framework, Audit Online is a platform where configuring Internal and External Audit can be tailored to suite the requirement of states.

Short-term goal: To bring all the Audit schemes on-board and conduct Risk Based Audits for all GPs across the country using Audit Online.

Long-term goal: To make the portal much robust by using the latest technologies such as Data Analytics, Artificial Intelligence and Block Chain, etc. Audit Online has now reached the lengths of onboarding 90% of the states and still going strong.

Currently the Statistics tell us the data otherwise-

No. of GPs with yearbook closed	211314
No. of GPs with Audit Plans	6299
No. of Observations Recorded	89386
No. of Audit reports generated	4845

No. of registered auditors	2265
No. of registered Auditees	24553

(Note: above figures are as on 06 Oct 2020 and are changing on real time)

Geographical Reach:

National level – No of State(s) covered: 27
State/UT level- No of District(s) covered: 85+
District level- No of Blocks covered: 300+

Key Stakeholders

- State Administrator (PR Department)
- State Audit Department/ Local Fund Audit Department
- District local fund audit/ District Audit Office
- Auditor
- Gram Panchayat (Auditee)

Software

Integration with Accounting module of eGramSwaraj (erstwhile PRIASoft)

- District Local Fund Auditor will have access to PRIASoft data and Local Government Directory for handling actual department hierarchy within the state.
- Visualization Dashboards for selection of GPs for Audit
- Few of the Visualization Dashboards have been prepared (others need to be configured after having discussion with DLFA)

Cyber Security

By Cyber Security Group, Application Security Division, National Informatics Center

Disaster Recovery and service continuity

There are multiple production servers for backup which are hosted at National Data Center and 24x7 Support is also available from Data Center support.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Audit Plan	Configuration and planning audit at the GP level			6299
Number of Observations recorded	GP wise Observation recorded			89836
Generated Audit Report	GP wise audit report			4845

Implementation

Implementation Coverage achieved in comparison to the plan / target

Audit Online application is implemented across the country in all the States to carry out the Audit at the Gram Panchayat level. For this financial year (2019-20), on a pilot basis minimum 20% of the GPs will be audited for 14th Finance Commission scheme. Gradually, it will be used for other schemes as well covering 100% GPs.

Stakeholders:

- Ministry of Panchayati Raj, Government of India
- State Panchayati Raj Department
- State Audit Departments/ Local Fund Audit Department
- District local fund audit/ District Audit Office
- Auditor
- Panchayati Raj Institution (Auditees)

Improvements/ enhancements specifically planned out during next one Year

Improvements in the current year

- A Dashboard has been developed to monitor continuous progress on audit process.
- Integration with accounting modules

Improvements planned in the next year

- Configuration as per various other schemes

ENABLER

Processes Re-engineered

Parameter	Before Audit Online	After Audit Online
Number of online forms and number of offline forms	The entire process of Auditing was manual.	There are no offline processing and of information now. Everything is online as per the process flow.
Reforms • Process • Business model	Entire process was manual and Time consuming.	*Process:* The process of Auditing has been re-engineered. The repetitive and unnecessary tasks of manual process have been removed from the workflow.
Whether paper-based activity or decision is available	All the activities include paper-based decision making.	This system is a transition from Paper Based to web based online system. However, system is also configurable to facilitate generation of final report on paper for ease of understanding and proper action taking, if required.
Whether all processes including decision making is online	The entire process of Audit from formation of audit plan, entry and exit conferences with the Auditee, preparation of audit report and intimation to the Auditee, Auditee Response and eventually follow-up of audit observations was manual, and paper based.	Now, the entire process of Audit Planning, Formation of Audit team, Allocation of auditee, Process Task/workflow, approval process and Report generation is automated i.e. All transactions are moved electronically from one level/actor to another level/actor as per configurations. Decision making since planning to follow up, Monitoring and Evaluation are online.

Services Provided	G2G services were paper based and time taking.	Entire process of Audit in G2G has been made online

Technologies

As the audit process flow varies for each State, we have configured the application as per the architecture of each State. It is fully configurable right from team formation for Audit schedule to Audit process steps to recording of observations against state specific categories/Sub- Categories & fact sheets to final Audit report generation.

People

The basic level of training has been imparted to the officials of the Department of respective States. Besides this, several online training sessions have also been conducted at regular intervals. In addition to this, training video tutorials have been prepared both in Hindi and English languages and have been shared with the States. A Standard Operating Procedure (SOP) for AuditOnline is also prepared and can be accessed online.

VALUE INDICATORS

Learnings for sharing

Number of online forms and number of offline forms

Earlier, the entire process of Auditing was manual. After implementation of Audit Online, there are no offline processing & dissemination of information now. Everything is online as per the process flow.

Reforms Process and Business model

The entire process of Audit has been re-engineered. The repetitive and unnecessary tasks of manual process have been removed from the workflow.

Paper based activity or decision

Earlier, all the activities included paper-based decision making. But now, this system is a transition from Paper Based to web based online system. However, system is also configurable to facilitate to generate final report on paper for ease of understanding and proper action taking.

Online processes including decision making

Before AuditOnline, the entire process of Audit from formation of audit plan, entry and exit conferences with the Auditee, preparation of audit report and intimation to the Auditee, Auditee Response and eventually follow-up of audit observations was manual, and paper based. After the implementation of AuditOnline, the entire process of Audit Planning, Formation of Audit team, Allocation of auditee, Process Task/workflow, approval process and Report generation is automated i.e. All transactions are moved electronically from one level/actor to another level/actor as per configurations.

Digital Empowerment

- Panchayati Raj Institutions, Rural Local Bodies (RLB),
- Programme Implementation Units, State Audit Departments in India.
- National level – No of State(s) covered: 27
- State/UT level- No of District(s) covered: 85+
- District level- No of Blocks covered: 300+
- Demographic spread (% of population covered): More than 64% of the States have been covered and remaining others is likely to be covered in a year.

Green e-Governance

- To address the problems plaguing the existing system, a decision was taken to migrate the audit process from the existing "manual paper-based system" to an "Online ICT based System". It was decided to roll out AuditOnline. AuditOnline not only facilitates the auditing of accounts but also provisions for maintaining audit records that have been carried out.
- 'AuditOnline' is an open-source application developed to facilitate internal and external Audit of the 14 FC scheme of MoPR. It is scalable to cover all the schemes of the Ministry of Panchayati Raj and other Ministries as well.
- AuditOnline has been developed by NIC team of Ministry of Panchayati Raj as per the requirements and inputs provided by the State Audit Departments, State AG, State Local Fund Audit Offices.
- AuditOnline also has a provision for maintaining the past audit records of the Auditee along with associated list of the Auditors and audit team involved in the audit. It acts as an excellent tool to enhance the effectiveness and performance of the audited agency and optimize resources.
- The Audit Para are drafted, posted, edited and approved on the portal itself. Once approved, various audit reports are generated automatically and electronically sent to the auditees and other stakeholders. Risk based analytical reports are also generated by the system and sent electronically. The dashboard of the Audit Online Portal provides online status of Auditors, Auditees, generated audit report, recorded audit observation.
- Provides dashboards based on the Key Performance Indicators (KPIs) viz. registered auditors & auditees, audit plans, observations recorded, audit report generated etc.

Shri. Khushwant Singh Sethi, *Joint Secretary, Ministry of Panchayati Raj (New Delhi), jscb-mopr@gov.in*

Shri. Deepak Chandra Mishra, *Scientist G / Deputy Director General, National Informatics Center (New Delhi), dcmisra@gov.in*

Smt. Manie Khaneja, *Scientist G / Deputy Director General, National Informatics Center (New Delhi), manie@nic.in*

Shri. Adesh Chand Gupta, *Scientist F / Senior Technical Director, National Informatics Center (New Delhi), ac.gupta@nic.in*

Shri. Sanjay Joshi, *Scientist E / Technical Director, National Informatics Center (New Delhi), Joshi.sk@nic.in*

Shri. Ankit Panday, *Scientist B, National Informatics Center (New Delhi), ankit.pandey94@nic.in*

Shri. M. Venkateshwar Rao, *Director, State Audit Department (Telangana)*

Shri. D.Srinivasa Rao, *Director, State Audit Department (Andhra Pradesh), srinivasa.dharmagadi@ap.gov.in*

B-PoST – Blockchain- Protection of Streenidhi Transactions

Information Technology, Electronics & Communications (ITE&C) Department, Telangana

Jayesh Ranjan, Rama Devi Lanka and Murali Duvvuru

PROJECT OVERVIEW

To empower the poor, especially the unbanked and underbanked populations, the Indian State government of Telangana has joined hands with Cognitochain Technologies to implement blockchain solution for Streenidhi. Telanaga Govt's flagship initiative currently supporting 2 million poor women with affordable credit.

Right now, in case of microfinance, borrowers lack a credible way to establish their credit worthiness while MFI Institutions lack ability to access borrowers risk profile.

Goal of the project is to build a blockchain consortium where multiple microfinance institutions across the state/country can join the network and share information in a highly secure way while preserving data privacy.

By recording loan disbursement and repayments on the Blockchain we are able to

- Generate monthly demand and other MIS reports
- Reduce reconciliation and improve
- Simplify loan approval and loan management process

Also Credit rating for SHG members derived from the transactions recorded on the block chain can be used to define loan eligibility by Stree Nidhi. These ratings can also be shared with other financial institutions, which in turn improves the access of SHG members to lending from formal financial institutions.

Software

Ethereum Enterprise Blockchain with Proof of Authority consensus, Solidity Smart contracts for creating loan agreements on blockchain

Amazon Web Services, Serverless framework, Amazon DynamoDB, ReactJS

Disaster Recovery and service continuity

Entire solution is built using cutting edge cloud computing technology leveraging serverless architecture. The system is designed to-be self-healing and covered by AWS SLA for 99.95% uptime for Lambda functions.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
B-PoST for Streenidhi	As mentioned above	-	-	1,50,000 Members loan records were processed using blockchain platform

Implementation

Implementation Coverage achieved in comparison to the plan / target

Planned to implement for SHG groups in Rajanna Siricilla District in Telangana state and target is fully met with recording 1 Lakh 50 thousand borrowers loan disbursements and repayments information.

Improvements/ enhancements specifically planned out during next one Year

Rolled out this year:

- Tamperproof transactional data: Data streamlining & alignment
- Reduction of reconciliation and simplification of accounting processes
- Member level credit scoring enables automated loan decisioning

Planned for next year:

Complete digitisation of loan management process leveraging

- UPI based Digital payments: Friction less disbursements and repayments recored on the blockchain
- Blockchain based Digital Identity: Comply to Privacy regulations by design
- Smartcontract based digital loan agreements: Paperless loan agreements leveraging (esign / authentication)
- Realtime reporting & Alerts
- Security, interoperability, blockchain benefits

ENABLER

Processes Re-engineered

- Reduces operation costs for microfinance institutions
- Automated decision-making using credit scores helps in quick turn around on loan application and reduce institution risk of bad loans (potential non-performing assets)
- All this can inturn benefit borrowers by reducing their interest rates (by offsetting the institution expenses for managing the loan process and business risk)
- Borrowers can use their credit score for accessing various other financial services and also can be incentivised for good economic behaviour by reducing their interest rates

Technologies

We built an Enterprise blockchain consortium. When a new loan is created, we deploy a smart contract with loan terms (principal, tenure and interest rate) on to the blockchain. The deployed smart contract will act as a source of truth for the loan. When a repayment is made, a blockchain transaction will be triggered which will update the state of the contract to reflect the loan status.

We built a dashboard to access the loan smart contracts and generate monthly demand and other MIS reports, VO performance, Non-Performing Assets, and Potential Non-Performing assets. Also, a member ledger to display member information and their credit scores.

People

Collaboration between IT&EC department, Stree Nidhi management and Cognitochain team to successfully rolling out the project from inception through Proof of concept and Pilot.

VALUE INDICATORS

Learnings for sharing

Utilizing Blockchain technology for Microfinance institutions enables reduction

in operating expenses, reduce reconciliation and provide digital assets like credit score and digital identity to borrowers which can be used as collateral for accessing various financial services. Also use cutting edge cloud computing technologies helped reduce operation cost for running the IT infrastructure.

Digital Empowerment

We worked with Streenidhi which is helping 20 Lakh poor women with affordable access to credit enabling financial inclusion

Green e-Governance

Blockchain based member identities can enable Paperless loan agreements thereby simplifying loan management process. This also reducing manual book keeping by completely digitizing loan process.

Shri. Jayesh Ranjan, IAS, *Principal Secretary, Information Technology, Electronics & Communications (ITE&C) Department (Telangana), secy_itc@telangana.gov.in.*

Ms. Rama Devi Lanka, *Director Emerging Technologies, ITE & C Department (Telangana), osd_itc@telangana.gov.in*

Shri. Murali Duvvuru, *CEO, Cognitochain, murali.duvvuru@cognitochain.io*

Chief Minister Information System (CMIS)
Project Monitoring System
Chief Minister Office, Uttar Pradesh

S P Goyal, Vishak G and Hemant Arora

PROJECT OVERVIEW

Objectives

To provide effective monitoring tool for projects of various departments, a single window system – Chief Minister Information System (CMIS) has been initiated by Government of Uttar Pradesh. With the help of CMIS portal, physical and financial progress of projects is being monitored at district level to CM office. This e-governance initiative was taken up to address vide range of objectives:

- Highlighting the major achievements of all projects across all departments of Government of Uttar Pradesh
- Reporting, measuring and tracking of physical activities and financial outlays of all projects across all departments and CM office
- Analyzing and improving performance and effectiveness of all projects at various level
- Enabling effectiveness governance
- Becoming result oriented

Functional and Geographical Scope

- CM office
- NIC
- Planning department
- All offices of departments including unit offices at division and district level in Uttar Pradesh
- All offices of executing agencies including project sites

Key Stakeholders

- CM office
- NIC office
- Planning department
- All departments holding ownership of projects of Government of Uttar Pradesh
- Project executing agencies
- Citizen

Intended benefits

The project monitoring initiative taken up by Government of Uttar Pradesh has several benefits such as:

- Financial and physical progress of all the projects across all departments is being monitored by project monitoring authorities at district level to CM office level. Physical progress is being monitored against the set targets by the department and financial progress is measured by the percentage utilization of the budget outlay allocated to the project. Project progress can be easily viewed on Samiksha Dashboard with snapshot of overall progress in various charts and tabular reports.
- The status of project activities/sub-activities is being monitored on pre-scheduled timeline. Using CMIS portal, project activities can be easily identified whether these are leading, lagging or aligned as per pre-

scheduled timeline. Timely decisions and corrective actions are being taken up by the monitoring and implementing authorities.

- Geographical coverage of a project can be obtained at click of the button on CMIS portal. All the districts covered under the project can be viewed at a glance.
- Variations in actual project cost (revised budget) and planned project cost (original budget) can be viewed at a glance on CMIS.
- Active, delayed and In-active projects can be identified easily and quick decisions and actions on these projects can be taken up by project monitoring and implementing authorities at district level to CM office.
- CMIS portal serves as virtual communication and coordination tool for all project monitoring and implementing authorities. Instructions given by monitoring authorities during Monthly Samiksha Meeting at CM office level can be tagged along with project on CMIS portal. The instructions given by monitoring authorities and issues raised by field officers in monthly meetings can be percolated easily to all districts across all departments of Government of Uttar Pradesh.

Current Status

The CMIS initiative was started in 2017 with monitoring of important schemes in two districts - Varanasi and Gorakhpur covering all schemes at DM level. After that all activities related to" Kumbh Mela 2017" held at Prayagraj were also monitored through the portal. CMIS was further extended covering all projects of all departments with investments of Rs.100 Cr as pilot project for monitoring at various levels from district to CM office. After successful implementation of pilot run, the system was further extended to all departments& directorates covering all projects with investment of Rs.50 Lacs or above.

At present, all projects covering several activities of all departments are being monitored by monitoring authorities at district level to CM office level using CMIS portal. Monthly physical and financial progress of all projects is being uploaded on regular basis by the field officers on CMIS portal.

- Recently, during Divisional Samiksha Meeting chaired by Honorable Chief Minister, Uttar Pradesh, new proposals and revised proposals for various schemes were submitted by public representatives. In the meeting, sanctions for these projects were made by departments. Then, funds were released in time-bound manner and revised budget outlays got approved speedily.
- Details of several important schemes and their progress during 2019-20 and 2020-21 were uploaded on CMIS portal.
- Employment data of regular and outsourcing employees related to posts sanctioned, already filled and vacant Posts in different departments was collected and uploaded on the portal.
- Monitoring of high valued projects (59 projects) with investments of Rs.500Cr or above were monitored through CMIS portal.
- Cabinet decisions are getting uploaded on CMIS portal and are easily available across all departments. Monitoring of action taken on decisions by departments are also getting uploaded on portal.
- Instructions given by Honourable Chief Minister during meetings & visits and their follow up by departments are getting uploaded on CMIS portal.
- Option to upload "Janhit Guarantee" checklist on portal by the departments is also available for quarter meetings at CM office level.

- Android based mobile app facilitates uploading of photos of physical work progress in order to verify the authenticity of progress reported by executing agencies. Validation images along with geo reference and timestamp are getting uploaded easily from projects sites by executing agencies while submitting the monthly physical and financial progress report.

Software

- .Net framework 4.5 with c# as scripting language
- Visual Studio-2012
- Microsoft SQLServer 2012
- AM Chart (third-party JS library)
- JQuery v3.00
- Android based mobile app developed on API level 19 supporting android OS KITKAT to ANDROID 10
- HW environment cloud resource at MeghRaj

Cyber Security

Security audit done by third party cert-in empanelled agency under the guidance of NIC CMIS Team and by cyber security cell NIC.

Disaster Recovery and service continuity

- Data is maintained at Government of India's cloud server 'MEGHRAJ' with DR facilities.
- Frequent backup using cloud backup service and replication on local system. Moreover, the State Data Centre has its own Disaster Recovery (DR) Site.
- Daily backup through scheduling process

Hence it is well protected from all emergency situations.

RESULTS INDICATOR

Information

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Total Projects	MONITORING OF PHYSICAL PROGRESS	507	654	1636
Total Activities				5263
Completed Projects		122	142	1095
Completed Activities				2870
In-Progress Projects		139	220	238
In-Progress Activities				2254
Delayed Projects		246	292	303
Delayed Activities				139
Estimated Cost (in Rs.Cr)	MONITORING OF FINANCIAL PROGRESS	193514.56	111092.32	282423.80
Released Funds(in Rs.Cr)		110552.52	111092.32	123739.87
Expenditure (in Rs.Cr)		106976.31	107341.09	118352.50

Percentage of Utilization of the budget outlay		96.76%	96.62%	95.64%

Implementation

Implementation Coverage achieved

Initially, important schemes (817 schemes) at district level for Varanasi and Gorakhpur districts were monitored through a web based system during 2017. Then, all activities related to "Kumbh Mela 2017" at Prayagraj were successfully monitored. Then, all projects of all departments with investments of Rs.100 Cr were taken for monitoring at various levels from district to CM office. After successful implementation of pilot run, the system was further extended to all departments and directorates covering all projects with investment of Rs.50 Lacs or above.

At present, CMIS portal is fully functional covering all projects covering several activities across all departments of Government of Uttar Pradesh. Monthly progress of all projects is updated by executing agencies from project sites on regular basis. Thereafter, the physical and financial progress is monitored at district level to CM office.

Financial approval of project is allowed only when the project get allocated on CMIS portal

Improvements / Enhancements

While implementing CMIS project regular feedback was taken up from all stake holders. The suggestions and change requests received from the departments were incorporated into the system in a time-bound manner.

Initially, only project details were collected from departments on the CMIS portal. Then, provision to collect activity wise details was also added along with project details. A few projects such as Lucknow Metro have sub-activities along with activity and project details in its performance monitoring tools. Therefore, provisions to define sub-activities were also made in the system.

Each activity and sub-activity has certain weightage in terms of time of completion in the entire project life cycle. A few departments faced difficulties in measuring performance of their projects due to several weather conditions as in rainy season, considering these difficulties, one major change was introduced in the system related to assignment of weightage of activity/ sub-activity. Provisions were made to define the weightage of activity/sub-activity on monthly basis.

Due to ease and flexible monitoring of all the projects across all departments on a single platform, the delayed and in-active projects were identified and strict actions were taken up at State and district level. Approvals of project sanctions and funds releases got speed up after implementation of CMIS. With the result, the efficiency of project implementation got improved significantly and most of the delayed projects got aligned with the pre-scheduled timeline.

Future Plan

- Preparation of Electronic Measurement Book (E-MB)and e-Billing through CMIS portal
- Contract Management and works monitoring of project activities
- Integration with Drawing and Disbursing Officers (DDO) portal

ENABLER

Processes Re-engineered

Before implementation of CMIS, each department has its own format for

monitoring the progress of its projects. The reporting formats may vary from one department to another department. Even these formats may also vary from one project site to another project site within same department. Therefore, it was very difficult and time consuming to compile the monitoring reports at head office level.

Moreover, the reports were compiled separately for CM office, planning office and for department's own purpose in different formats which was very tedious and time-consuming.

All these limitations affected timely decisions by project monitoring and implementing authorities which resulted delay in project execution.

After implementation of CMIS portal all reporting formats got standardized and the uniform formats got available to all monitoring and implementing authorities across all departments at various level ranging from district level to CM office. The field officers of executing agency can easily upload monthly progress through their mobile app and web portal.. The monitoring authorities at department level and CM office need not to wait for information related to any project. They can obtain the desired information on click of the button from the CMIS portal which resulted significant improvement in project execution.

All concerned stakeholders (Officials and Applicants) were consulted and accordingly the project was developed. The web based project monitoring system was designed after these consultations so as to meet requirements of all departments. A very systematic plan was made to train the vast work force which was supposed to work on this new system.

While implementation phase of CMIS, multiple round discussion with departments was held. After rigorous analysis of the system, CMIS portal was initially designed and developed on pilot run covering projects with investment upto100 Cr. across all departments. To improve the system, regular feedback from different stake holders was also taken up and corrective measures were incorporated in the system. After rigorous testing of the system, the portal was hosted on MeghRaj Cloud.

Multiple round training on portal was imparted to project monitoring/implementing authorities of departments at district level and State level through Video Conferencing. Hands on how to fill up project details, how to define activities and sub-activities of projects and how to assign weightage of activities/sub-activities, how to generate various reports and charts through the portal – all these activities were the important aspects of the training on CMIS.

Change management at department level and agency level was also taken up due to assignment of new roles and responsibilities pertaining to CMIS portal.

Being nimble and agile is the mode of operandi for Government Departments today as they need to react quickly to challenges posed by various factors besides their declared Vision. Progress of government departments towards their vision is often thwarted by manual and time-consuming processes and lack of data-driven insights.

The CMIS initiative for project monitoring tries to bridge the gap between the departments/ directorates, executing agencies and CM Office & to achieve the intended goals of completing the projects in pre scheduled timelines.

Technologies

System Architecture:

CMIS is developed on Microsoft technology - .NET Framework 4.5. The two major components of .NET Framework are used in the application:

- The Common Language Runtime (CLR)
- The .NET Framework Class Library (CL).

Stored procedures and functions of MS SQL Server are used in the application for business logic. SOAP (Simple Object Access Protocol) services are used for exchanging web service data with Android App.

CMIS application is written in the C# Language and deployed on IIS 10.0 application server on one node and Database Microsoft SQL Server 2012 on another node on MeghRaj Cloud. JQuery 3.0 is used for validation of front-end form and data retrieval from server end using Asynchronous JavaScript and XML (AJAX) techniques. Android based Mobile App:

- The mobile app is also being used by field officers of executing agency through which they can upload the imagesof project site along with geo references and time stamping (upto 4 number of photos) along with monthly physical and financial progress of the project.
- The mobile app communicates with CMIS portal using SOAP Services deployed at server end.

Charts using AM chart library (Third Party JS Library):

Following charts can be generated from Samiksha Dashboard on CMIS portal

- Status of number of completed, In-process and delayed projects
- Status of number of completed and delayed activities
- Status of fund (total cost, total expenditure and total release)
- Project wise physical progress: estimated vs actual
- Project wise financial progress: estimated cost vs released funds vs actual expenditure
- Project wise activity progress chart

People

Uttar Pradesh being the largest state in terms of number of districts in India, it was a very challenging task to roll out project monitoring initiative in entire State in a single stroke. Therefore, CMIS was rolled out in following stages:

- The project monitoring was originally initiated with a pilot project covering all departments across all districts. Initially, only projects with investment of Rs. 100 Cr or above were taken up for pilot run on CMIS portal.
- After successful implementation of pilot run, the system was further extended to all departments covering all projects with investment of Rs.50 Lacs or above.
- Observing the benefits of this single window platform, the project monitoring system is expected to get extended to all projects across all departments in Uttar Pradesh in near future.
- Meetings with all departments' representatives, principal secretaries for implementation of CMIS.
- Workshops in all 75 districts were conducted by CMIS team on the portal through Video Conferencing.
- The state government also set up a monitoring mechanism where the project status and departments' performance is reviewed at district level, at departmental level, Planning commission department, Chief Secretary and Chief Minister's office.
- Training sessions were organized in all 75 districts over sensitization on

working on CMIS Portal. A complete technical & functional training was conducted by CMIS team through Video Conferencing.

- Chief Minister directly monitors the performance of projects through dashboard & reports available on portal.

VALUE INDICATORS

Learnings for sharing

- Challenges faced while entering project details and monthly progress reports by field officers
- Minimizing Administrative Intervention in enhancing Citizen Centric Services, by capturing all possible case scenarios and addressing it through technology.
- Being Agile, not only in development but also in methodology and process.

Digital Empowerment

- Bilingual online platform: Project Details and performance can be uploaded in Hindi as well as English language.
- No Location Barrier: Details related to schemes and projects can be entered and updated through remote locations.
- Paperless project monitoring system: No paper work is required to prepare performance reports for field officers as well as monitoring authorities. Provisions for entering online notes and minutes of meeting are also incorporated into CMIS.
- The platform promotes a transparent and corruption free ecosystem.

Green e-Governance

CMIS portal is paperless end to end e-Governance initiative on which the field officers of project implementing agency do not require hard-copy to submit monthly progress reports. They can simply send the progress report of the projects through web portal and mobile app. The monitoring authorities also do not need to generate reports on paper. All the relevant information about projects is readily available on Samiksha Dashboard in form of various charts and tabular reports.

Shri S P Goyal, *Addl. Chief Secretary to Chief Minister, Chief Minister Office, Uttar Pradesh (Uttar Pradesh), spgoyal@nic.in*

Shri Vishak G, IAS, *Special Secretary to Chief Minister, Chief Minister Office, Uttar Pradesh (Uttar Pradesh), vishakiyerias@gmail.com*

Shri Hemant Arora, *Technical Director, National Informatics Center (Uttar Pradesh), jansunwai-up@gov.in, hemant.arora@nic.in*

Digidhan Dashboard for monitoring Digital Transactions

Ministry of Electronics and Information Technology, Delhi

Archana Dureja, Om Pradyumana Gupta and Inder Pal Singh Sethi

PROJECT OVERVIEW

Objectives

The Digidhan dashboard was launched to help government in monitoring the total digital transactions across various modes on a single platform and to promote digital payments and digital infrastructure for development of a cashless economy. A Central platform was needed for effective monitoring of these digital payments generated through various modes

Functional Scope

Digidhan Dashboard seamlessly captures the data related with 16 digital payment modes like UPI, USSD, IMPS, Debit Card, Credit Card, Internet Banking etc. from various channels like Reserve Bank of India (RBI), National Payments Corporation of India (NPCI), and 110 public sector bank, private sector bank, payments bank, regional rural bank and foreign banks, 100 Smart Cities, State and Ministries. The dashboard records transactions done at following delivery centres:

- At merchant outlets using POS device/QR code
- At home, offices using personal laptops to book movie tickets, etc.
- At doorsteps through banking correspondents
- At various bank branches while filling certain form, etc.

The Dashboard collects and analyses digital payment transactions happening all over the country at over 1.2 lakh bank branches, 36 lakh POS devices through 16 key digital payment modes.

Geographical Scope

- National Level – All 36 States/UT are covered
- State/UT level – All Districts are covered
- District Level – All blocks are covered

Key Stakeholders

Digidhan dashboard serves many government organizations including

- Prime Minister's Office (PMO)
- MeitY
- Reserve Bank of India (RBI)
- National Payments Corporation of India (NPCI),
- 110 banks (public sector banks, private sector banks, payments banks, regional rural banks and foreign banks),
- Ministries
  i. Ministry of Railways,
  ii. Ministry of Civil Aviation,
  iii. Ministry of Road and Transport,
  iv. Ministry of Petroleum and Natural Gas,
  v. Ministry of Power,
  vi. Ministry of Housing and Urban Affairs (MoHUA)
- Department
  i. Department of Posts
  ii. Department of Telecom
  iii. Department of Power

iv. Department of Financial Services

- Smart City Corporations

Intended Benefits

- The dashboard has been a success since its launch and has helped the organization to build expertise in related areas
- The dashboard monitors digital transactions across 16 digital payment modes such as Unified Payment Interface (UPI), Immediate Payment Service (IMPS), Debit Card, Credit Card etc. from RBI, National Payment Corporation of India (NPCI) and 110 banks, City Corporations of 100 Smart Cities, ministries, states and closed loop agencies
- The implementation of Digidhan Dashboard helped government to monitor all the digital transactions on a single platform and take timely data driven decisions to enable improvement in digital infrastructure and digital economy
- Stakeholders can view the status of POS Deployment and Aadhaar Seeding on Digidhan Dashboard
- Digidhan Dashboard has separate exclusive Dashboards for Smart Cities, Ministries & Departments & State
- Local language support is enabled on the dashboard with the help of Google transliterate
- The dashboard consolidates digital transaction data from multiple agencies and banks through SFTP
- Digidhan dashboard was integrated with Smart city portal in July'18 resulting in increased operations of the entire system
- Citizens can view status of deployment of POS (Point-of-Sale) devices, Mobile/Aadhaar seeding in the country.
- The dashboard has been appreciated by all stakeholders and is being widely used today by PMO, Finance Ministry, Niti Aayog and other Ministries/Departments to track growth of digital payment transactions and monitor the performance of banks
- The dashboard can be accessed from personal/public devices at home, office, etc.
- The dashboard is up and running 24X7. All reports provide latest data with time delay of 1 day
- The dashboard has multitude of reports that can be downloaded for specific use by banks and other agencies
- The dashboard provides digital payments data to the user. Any notification regarding data being pulled from agencies is sent through email/SMS. There is no other service provided by the dashboard for which status tracking is required on the dashboard
- Data is received from banks directly which is the single source of truth. Therefore, high accuracy can be expected from the application

Current Status

- The Total Digital Transactions reported in last Financial Year FY 19-20 is 4,572 Crores.
- The target for FY 20-21 is 4,661.92 Crores and the total digital payments transactions reported on Digidhan Dashboard is 2,008 Crores (Source: RBI, NPCI, Banks) (as on 30/09/2020)
- Total 57,87,878 Physical & Mobile POS deployed till 26/06/2020 and Total in 112.51 Crores Aadhaar seeding accounts till 26/06/2020

- 86.68% of CASA accounts have been seeded with Aadhaar number and around 79.12% of CASA accounts are seeded with mobile number till February,2020
- Digital transaction data has an exponential growth. Per day growth of data is around 9GB

Challenges faced during implementation

- In absence of a single secondary source of digital transactions data that could be relied upon for completeness and accuracy, data had to be pulled from multiple agencies like RBI, NPCI, Banks, Closed Loop Wallets to ensure quality and correctness of data. Today, the dashboard is integrated with 24 public sector banks, 23 private sector banks, 4 payments banks, 56 regional rural banks and 3 foreign banks.
- The dashboard was planned to consolidate data from various agencies through APIs. It was found that the data to be shared by these agencies was huge in volume. Therefore, a protocol was devised using the Secure File Transfer Mechanism (SFTP) technology for pulling large data from banks and other agencies through automated means. SFTP has been used for both pulling and pushing files between bank's SFTP servers and dashboard SFTP servers.
- The BHIM app which uses UPI platform was launched on 30th Dec 2017 in New Delhi. The app did not get immediate popularity after launch due to its high transaction failure rate. These transactions were studied and categorize into Business Decline (BD) and Technical Decline (TD). Digidhan dashboard helped in tracking these transactions which resulted the app to pick up the volume of successful transactions again. TD and BD transactions were monitored to remain below the threshold of 1%.
- A digital transaction may involve different legs for creditor and debtor. This may often result in double counting when aggregating digital payments data from different agencies. A principle was devised called Issuer principle to identify which transactions to be shared by banks. This principle states that banks will share data for all transactions where they act as Issuer Banks (irrespective of whether transaction is on-us or off-us). Any other digital transactions occurring within the Bank may also be shared. Banks may specify the means by which these transactions occur. Detailed note on which transaction data to be shared by other sources like RBI, NPCI, etc. was provided to avoid any ambiguity in data sharing and aggregation.

Software

- Database - SQL Server 2012
- C# programming language
- Microsoft .NET Framework 4.5
- Power BI for BI Reports
- Processor: AMD Opteron (TM)
- Processor 6272 with 2.10 GHz (8 processor)
- RAM: 32.0 GB
- System type: 64-bit OS
- The dashboard is hosted on cloud of National Data Center

Cyber Security

The Project has successfully cleared Security Audit requirements of NIC.

Disaster Recovery and service continuity

- The application is hosted on cloud of National Data Centre (NDC), Shastri Park, and New Delhi.
- The state-of-the-art ICT Infrastructure of NDC includes High end Blade & Rack Servers, Enterprise level Storage Systems and Automated Tape Library Systems for data back up and Network & Information Security.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Total Digital Payment Transactions Reported on Digidhan Dashboard	Total Digital Payments across all 16 Payment Modes reported on Digidhan Dashboard	3,134.35 Crores	4,572 Crores	2,070 Crores

Implementation

Implementation Coverage achieved in comparison to the plan / target

- Digidhan dashboard was launched by Shri Ravi Shankar Prasad, Hon'ble Minister of Electronics & Information Technology and Law & Justice in presence of eight State IT Ministers and 30 State Secretaries during National Conference of State IT Ministers and IT Secretaries in Vigyaan Bhawan. It is the only portal that consolidates data of 16 digital payment modes like UPI, USSD, IMPS, Debit Card, Credit Card, Internet Banking etc. from RBI, NPCI, 110 banks and presents it in form of Business Intelligence (BI) reports and compelling visuals
- During budget speech of FY 2017-18, Hon'ble Finance Minister announced a target of 2,500 crore digital payment transactions through various mode of payments. Digidhan dashboard was conceived to track growth of these digital transactions
- The target of 2,500 crore was found to be around 9 times higher than the target set during previous financial years. This target was achieved with rigorous monitoring of the digital payment transactions, proper planning and analytics
- Digidhan dashboard is first of its kind and is a monitoring tool to access big data through various channels like Reserve Bank of India (RBI), National Payments Corporation of India (NPCI), public sector, private sector, payments banks, regional rural and foreign banks. Currently, it is integrated with 110 public sector, private sector, payments, regional rural and foreign banks. It is the only portal which segregates digital payments volume and value based on 16 different digital payments modes i.e. UPI, USSD, IMPS, Debit Card, Credit Card, Internet Banking etc.
- Total 16 Payment Modes have been integrated
- Total 4,572 Crores of Digital Payments Reported on Digidhan Dashboard in FY 2019-20 as compared to the Target of 4,019 Crores
- Total 112.51 Cr accounts Aadhaar Seeded till 26/06/2020

Improvements/ enhancements specifically planned out during next one Year

- Digidhan Chatbot launched in year 2018, which helps user to ask query regarding Digital Payments in multiple languages such as English, Hindi
- Google Transliteration
- BI Report Analysis
- Data Quality Improvement
- Bank Reports Improvement
- Performance Score Card Summary for Banks
- Continuous improvements in App scalability to support increased number of visitors, stakeholders and data on dashboard

ENABLER

Processes Re-engineered

- Initially, transaction data was received from RBI through email (manual process) in every 45 days. Basic excel reports were generated using this transaction data which were exchanged through email with concerned stakeholders. The growth of digital transaction data has been exponential. The manual process of data reporting was replaced with SFTP technology which helps in pulling large data from banks and multiple agencies including RBI.
- The excel reports were made more visually appealing and power BI driven analytical dashboards were introduced. These dashboards represent data analysis in pictorial form and allows user to drill down to next granular level for deeper insights.
- Geographical identification metadata like pin code was added to the digital transactions to calculate Digital Payment transactions on per capita basis and represent a state wise distribution of the same with the help of a heat map. Geotagging helped to identify the location where the digital transaction was conducted. This information was used to display count of digital transaction in different geographies and States on an India map.
- Typically, a user would need to login and browse through the dashboard to find desired information for a particular time period. Since the dashboard gives vast information to the user for multitude of parameters, the information retrieval process was simplified for the user through development of a chat bot. The chat bot is built using NLP and functions on the concept of self-learning. It is built with voice recognition feature. The Chat Bot can be used to save time in browsing during meetings and in situations when the user has a particular query in mind. Moreover, it adds an aesthetic aspect to the very simple process of query handling and answering.
- The digital transaction data can be filtered on a number of parameters like the number of accounts in a particular bank. These parameters were studied and correlated with infrastructure which was not existing before. User could now see information such as Top/Bottom banks in terms of highest/lowest digital transactions, Target Vs Achievement monitoring for banks, etc. For large banks with high CASA accounts, average digital transactions per account was identified
- To standardize the process of digital payments data sharing over SFTP, a specification file was developed and shared with the agencies for sharing of the data. Data formats and nomenclature have been clearly

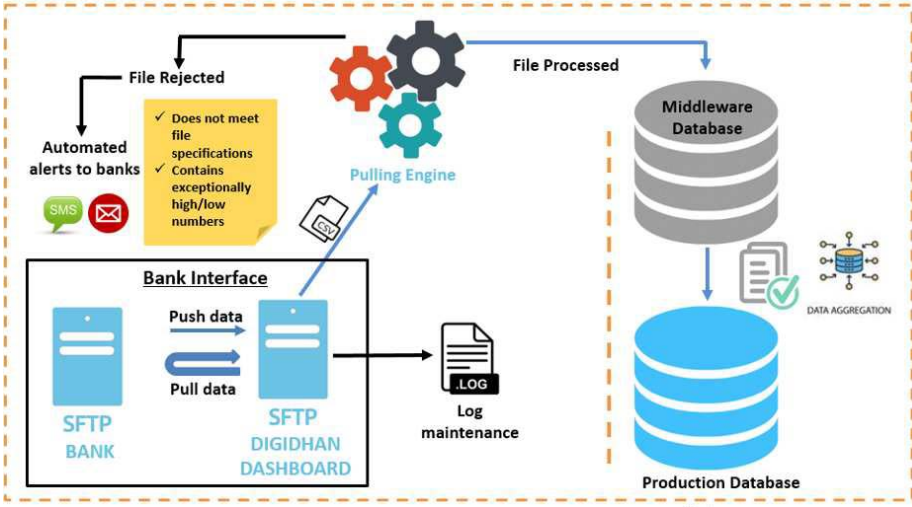
mentioned to standardize and simplify the process of sharing data by banks and other agencies

- Various Data Sources provide data for Digital Payments such as RBI, DFS, NPCI, Banks, Closed Loop Wallets like Paytm, Metro Corporations, etc.
- API/SFTP based integration with banks in an automated fashion on a predefined frequency
- API Integration of Digital Payments from 110 Banks, RBI, NPCI, Smart Cities, Ministries, States
- Integration of 100 Smart Cities on a common Smart City Digital Payment Dashboard
- Integration of Ministries on a common Ministry Digital Payment Dashboard
- Integration of States on a common State Digital Payment Dashboard
- Implementation of Digidhan Mitra (Chatbot) for handling user queries faster
- Advanced excel reports with data analysis on correlated parameters such as:
  i. Bank Scorecard to rank banks on basis of KPIs like compliance, digitization index, etc.
  ii. Analysis of 16 digital payment transaction modes
  iii. State wise distribution of digital payment transactions
  iv. Analysis of transactions on Bharat Bill Pay System
  v. Analysis of transactions done through BHIM app with additional analysis on the basis of Technical Decline (TD) & Business Decline (BD)
  vi. Status of POS deployment, etc.
- Analytical dashboards and compelling data visualization
- Automation of Manual Reports such as Value Volume Report which captures the total Value and Volume of Digital Transactions across all payment modes
- Data Sharing monitoring through Automated alerts to banks through SMS and email, dedicated WhatsApp groups
- The dashboard produces reports with a time delay of 24 hours/1 day ensuring complete previous day data is collected till 12 am in midnight

Technologies

- Data Analytics is accomplished using Power BI which helped in preparation of various Dashboard Reports as part of the Digidhan Dashboard. Power BI tool is integrated with the dashboard for showcasing in-depth analysis of digital transactions through data visualization. Following Reports are prepared using Power BI:
  i. Mode wise Analysis
  ii. Bank wise Analysis
  iii. POS Deployment and Correlation Analysis
  iv. Seeding Analysis
  v. BHIM Transaction and Decline Analysis
  vi. BBPS Transaction Analysis
  vii. Ministry
  viii. Aadhaar and Mobile Seeding Analysis
  ix. Closed loop transaction analysis
  x. Digital transaction analysis for different banks

- Data Sharing Model deployed for Digidhan Dashboard. The dashboard pulls data from the following public/private sources in an automated fashion:
  i. RBI
  ii. NPCI
  iii. 110 Banks (public sector banks, private sector banks, payments banks, regional rural banks and foreign banks)
  iv. 100 Smart Cities
  v. Closed Loop Wallets like Metro corporations, Paytm, etc.



Digidhan Dashboard is developed using Microsoft technologies stack. It is a web application written in C# language, uses SQL Server 2012 database and works on Microsoft .NET Framework 4.5. Windows Communication Foundation (WCF) is used as middleware. The database size is 4.3 TB and is expected to expand to 6TB for near future developments. Daily growth of data is around 9GB.

8 no. of Virtual Machines (VMs) have been deployed with following specifications –

- Processor: AMD Opteron (TM) Processor 6272 with 2.10 GHz (8 processor)
- RAM: 32.0 GB
- System type: 64-bit Operating System

The application is hosted on cloud of National Data Centre (NDC), Shastri Park, and New Delhi. NDC has been designed to provide full stream of hosting services ranging from physical to shared hosting, dedicated servers with managed hosting solutions to infrastructure services such as Collocation & Bandwidth, Disaster Recovery etc. The state-of-the-art ICT Infrastructure of NDC includes High end Blade & Rack Servers, Enterprise level Storage Systems and Automated Tape Library Systems for data back up and Network & Information Security.

Digidhan Dashboard offers an interoperable interface allowing diverse systems and organizations to inter-operate. All client connectors can communicate and exchange data in specified data formats and communication protocols. A common exchange reference model is devised, and a guideline is framed with the content of the information exchange requests. Agencies like DFS require

digital transaction data for some purpose. Data is shared to such agencies through APIs thereby reflecting interoperability with other organizations.

VALUE INDICATORS

Learnings for sharing

- Integration of Digital Payments from multiple modes on a single platform
- Coordination with multiple Stakeholders such as 110 banks, RBI, NPSI, DFS, 100 Smart Cities, States, Ministries & Departments
- Incorporation of Digidhan Chatbot that can be used for other projects
- Incorporation of feature in Digidhan Chatbot to respond to user queries in graphical as well as Tabular formats
- Digital payments data is growing exponentially. Database Archival is implemented to optimize storage and manage data growth. In near future, the application is being planned to be shifted to Hadoop platform as the digital transaction data is expected to scale up even further. Since OLTP is found to be not supporting for bulk data, a shift to big data technologies is in process

Digital Empowerment

- Reporting of Digital Payments across 16 Payment Modes
- Reporting of POS Deployment across States
- Reporting of Aadhaar Seeded Accounts

Ms. Archana Dureja, *Scientist-G, Ministry of Electronics and Information Technology (Delhi), archana@mit.gov.in*

Shri. Om Pradyumana Gupta, *Scientist-D, National Informatics Centre (Delhi), op.gutpa@nic.in*

Shri. Inder Pal Singh Sethi, *DDG, National Informatics Center (Delhi), sethi@nic.in*

eAudit (Online Audit Management System)

Finance Department, Uttarakhand

Amit Negi, N S Negi and Rajat Mehra

PROJECT OVERVIEW

Objective

On Line Audit Management System is web-based portal. This can be run in any browser and its used to create entry conference, work distribution, exit meeting, New Half Margin etc. online for different departments according to audit plan year and respected quarters this project concept note document is prepared to give an insight to the salient features and requirements of proposed system.

- To monitor and manage audit reports of all departments.
- Real-time data sharing.
- Easy management and real-time scheduling assignments to various audit teams.
- Easy compilation of reports by fiscal year.
- Error free calculation.
- Monitoring the progress of various audit teams in different departments.
- Financial year wise easy analysis of number of audits conducted in various departments.

Scope

The Government of Uttarakhand has decided to implement On Line Audit Management System for auditing all Government Offices / Institutes to the directorate of Audit / Government Departments for transparency and accountability.

Overview

eAudit (On Line Audit Management System) portal module is a comprehensive audit system, which provides end-to-end functionality and security to manage audit-related activities, data and process audit management systems.

In the year 2018-2019, a total of 5 teams completed the audit work of 45 departments through On-Line Audit Management System. Under which work of three phases was completed through this portal. In addition, the message, email and eSign facility is also integrated in this portal.

Key Stake holders

- Audit directorate
- Secretary
- Head of the Department (HoD)
- Auditee
- Audit Officer

Current Status

- Total Margin - 7198
- Total Para - 4996
- Total Draft Report – 869
- Numbers of SMS - 29500

Software

- *OS platform:* Windows Server 2012
- *Database:* SQL Server 2017
- *Web Server:* Internet Information Services (IIS)10.0

- *Front End Framework:* Bootstrap 3
- *.NET framework:* 4.5
- *Third Party Tools:* MS Captcha, Ajax Control Kit

Cyber Security

- iSec Services Pvt. Ltd.
  Add: 607 - 608 Reliable Business Center, Anand Nagar,
  Near Om Heera Panna Mall, Jogeshwari (W)
  Mumbai – 400102
  Email: isecaudit@gmail.com
- Website: www.isec.co.in www.ichek.info

Disaster Recovery and service continuity

NIC Uttarakhand State Data Center has its own policy of Disaster Recovery (DR) and this project comes under the ambit of that. As of now DR services are not activated.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Volume (Nos) of Services year wise		
	2018-19	2019-20	2020-21
Half Memo Margin Created	NA	4829	1901
Half Memo Margin Dropped	NA	1157	348
Half Memo Margin Answered	NA	2365	782
Draft Para Created	NA	6508	
Government Departments	NA	333	1267
Urban Local Bodies	NA	52	325
Rural	NA	1294	58
Autonomous	NA	56	1

Implementation

Implementation Coverage achieved in comparison to the plan / target

- 100% coverage to all stakeholders' government departments, ULBs, Autonomous bodies.
- Finance Department of Uttarkahand Government is the nodal agency for the implementation including training and promotion.
- State Government, Urban Local Bodies, Rural, Autonomous

Improvements/ enhancements specifically planned out during next one Year

Phase-2 Computerization of the eAudit System has acknowledged the following modules

- eCertification
- Compliance Module
- eNiyaas
- Integration with Accountant General and Treasury Office.

ENABLER

Processes Re-engineered

As of now there was no system exists at government level to provide the Audit processing and monitoring activities in the government departments.

The Government of Uttarakhand has decided to implement Online System of Audit Monitoring for auditing all Government Offices / Institutes to the directorate of Audit / Government Departments

Technologies

The basic architecture of the On-Line Audit Management portal consists of Web Server, Database Server, Load balancer and Web service APIs. The data

analytics is presented in the application through dashboards and charts for the various stakeholders. Various reports allow all stake holders to select, filter and analyzed data as per their requirements.

People

Secretary, Finance has played the leadership role in conceptualization, review and in regular monitoring of the portal.

Nodal officer, OAMS is responsible for the implementation, capacity building and collect feedback from field offices, general public, analyze new requirements and interact with other government departments, industries etc.

NIC has vital role in software development, hosting and providing continuous technical support in implementation, integrating new requirements etc.

Chief Secretary (CS) has reviewed the portal and provided guidance for the better effective implementation of the portal.

VALUE INDICATORS

Learnings for sharing

- System provides the error free calculation
- Identification of the Units not audited
- Identification of higher amount object Para in single click.
- Real Time data sharing make the efficient system usability
- Online provision for creation of Audit schedule and audit team.
- Provide various reports for HOD, JS and Director level

Best practices

- KPI based Dashboards for monitoring and decision making.
- Training cum Workshop for Auditor and Auditee
- Real time monitoring of the Audit by HOD, JS and Director.

Digital Empowerment

The web-application has provision for the login-based accessibility of the stakeholders with the bilingual (Hindi/English) interface features. Easy accessibility of the various required software utilities also provided over the portal.

Green e-Governance

Paperless Activities in web application

- Online facility to creating Audit Schedules
- SMS/Email based alert messaging system.
- eSign facility to digitally signed the documents.
- key document attachment facility at the time of audit for preventing papers

Green initiative at State Data Center:

This application is hosted at NIC Uttarakhand State Data Center (NICUK-SDC) which has envisaged promoting green computing technology in infrastructure, energy efficient computer hardware and powering system.

Shri. Amit Negi, *Secretary, Finance Department (Uttarakhand), amitnegi.gov@gmail.com*

Shri. N. S. Negi, *Technical Director, National Informatics Centre (Uttarakhand), ns.negi@nic.in*

Shri. Rajat Mehra, *Nodal Officer (UOAMS), Finance Department (Uttarakhand), aoaudit-finance-uk@gov.in*

e-PAUTI

Revenue and Disaster Management, Odisha

Bishnupada Sethi, Usharani Sahoo and Pabitrananda Patnaik

PROJECT OVERVIEW

Objective

Payment of Land Revenue by Citizens having land in Odisha, from anywhere in the world.

Scope

It is a comprehensive workflow-based solution for transparent and error free land revenue collection from tenants. The Demand for Rent, Cess, Water Tax, etc. are automatically calculated by the system for a Financial year from its previous year's data. Duplicate and multiple payment against a land schedule is prohibited by the system. The Authenticity of the Receipt may be verified from the system by anyone.

The 2279 Revenue Inspectors have login ids to update the data and generating reports. The Administration at Sub-Division, District and State level can know all the information pertaining to various aspects of Land Revenue through a discernible dashboard. Citizens can access the system from anywhere in the globe. As this system is open to everyone, even Civil Society and other organizations working for welfare of Citizens are functional stakeholders of the System thereby inducing a virtuous cycle of transparency, accountability and systemic trust in Governance which reinforces trust in Government.

Current Status

There are numerous benefits to various stakeholders as delineated below.

- Citizens need not visit Revenue Inspector's office for payment of their Land Revenue which saves them from unnecessary cost and time.
- Transparency of the system is maintained.
- Maintenance of Electronic Ledger and removal/merging of Registers is seamless, paperless and saves the Revenue Inspector from drudgery.
- No need to print and store the rent receipts as they are available to Citizens in a click or a swipe.
- Data driven policy making instead of policies based on instinct.

Software

Back end: MS SQL Server
Front End: ASP.Net (C#)

Cyber Security

Emergency certification done for public hosting.

Disaster Recovery and service continuity

The application has been hosted in National Data Center (NDC), Bhubaneswar with Disaster Recovery Plan in other NDCs.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Total Number of Land	Total number of land revenue	NA	2,82,955transactions made in	1,16,701 upto 6th

Revenue Payment transactions	payments facilitated through odishalandrevenue .nic.in		2019.	Oct. 2020
Digitized Tenant Ledger of the entire State	Electronic tenant ledger Facilitated	NA	Tenant Ledger of 5,37,40,365 many plots updated	Tenant Ledger of 5,68,71,319 Plots
Tenants Benefitted	Total Number of Citizens Benefitted	NA	3,40,84,638 Tenants Benefitted	3,55,25,133 Tenants

Implementation

Implementation Coverage achieved in comparison to the plan / target

As this solution is web based, it can be accessed anywhere, anytime. Tenants residing in any part of the world can pay their land revenue seamlessly and without any hassle.

Improvements/ enhancements specifically planned out during next one Year

Way Ahead:

- A mobile application called PAUTI has been developed for payment of Land Revenue by tenants.
- The land revenue is being standardized to remove the anachronism from land revenue system.

ENABLER

Processes Re-engineered

- Standardized the decimal portion of the land revenue. Revision of land Revenue.
- Accounting procedure in Arrear land revenue has been simplified to make a win-win situation for both revenue field functionaries and the citizens.
- One can obtain the receipt of land revenue payment instantly.
- Statutory provisions were modified to facilitate such online payment.

Technologies

- Block Chain is planned for Record of Rights updation and Tenant Ledger maintenance.
- System is planned for inclusion in Revenue Enterprise Architecture model.
- Data Analytics and Online Analytical Processing (OLAP) for G2G and G2C decisions.
- Cashless transaction is implemented integrating with iFMS 2.0.

People

- Capacity building programs for field functionaries such as Revenue Inspectors and others have been conducted. Video Conferences are being organized for review and monitoring by Revenue Administration.
- Wide publicity by Revenue Department at State, RDC, District, Sub-Division,Tehsil, RI and Village level for awareness of people.
- Regular Monitoring by Revenue Department to review the progress.
- Feedback from end users through Help Desk, e-mail, PMU and Social media and value addition to the system**.**

VALUE INDICATORS

Learnings for sharing

Major challenge is to make the payments by the tenants where internet connectivity or electric connectivity is a matter of concern. Keeping that in mind, Mobile App "PAUTI" has been developed and implemented for its use. Further, the Revenue Inspectors or anybody can deposit the land revenue on their behalf.

The e-Pauti provides lot of opportunities to both Government and Citizens. The complete Tenant Ledger database is available for financial and other analysis. The receipt is generated in Odia language, so which is comprehensible by one and all.

It is flexible and scalable, so value adding functionalities can be incorporated easily. Other states may use this application. Even within Odisha other departments having such activities may directly use it or use with little customization.

Digital Empowerment

- Senior Citizens, women, persons with disability and other vulnerable population can pay land revenue through this portal without visiting the Office of the Revenue Inspector.
- The physical interface with Govt. Offices have been weaned away.
- People do not have to maintain the hard copy of the rent receipt as it can be downloaded anytime from this portal.

Green e-Governance

This entire payment process is eco-friendly considering that it is entirely paperless and digital. Since the citizens don't have to travel to the Office of the Revenue Inspector to deposit their land revenue, their valuable time and money is saved along with contributing to a clean environment (saving fuel). This has saved 12,500 trees and contributing to INDC of Paris Climate Accord and also to Sustainable Development Goal 13.

Shri. Bishnupada Sethi, IAS, *Principal Secretary, Revenue and Disaster Management Department (Odisha), revsec.od@nic.in, imu-rev-od@nic.in*

Dr. Usharani Sahoo, *Joint Secretary, Revenue and Disaster Management Department (Odisha), usharani.sahoo@odisha.gov.in*

Dr. Pabitrananda Patnaik, *Senior Technical Director, National Informatics Centre (Odisha), p.patnaik@nic.in*

iORA (Integrated Online Revenue Applications)

Revenue Department, Gujarat

Pankaj Kumar, Rinkesh Patel and Amit Shah

PROJECT OVERVIEW

Objectives

To have an online platform for providing Revenue Services in a citizen centric manner by enhancing the transparency and reducing the interface between occupant of the land and Revenue Authorities, resulting in quicker and seamless resolution of applications.

Scope

To provide a hassle-free processing of land related approval benefits to various sectors of the society across Gujarat.

Key Stakeholders

Swifter processing of applications has also boosted the morale of citizens, industrialists, investors, farmers, real estate and common citizen at large. As on date more than 2,00,000 various types of applications have been received and approved on iORA.

Software

Web Server (Cloud):
OS: Windows Server 2016 Standard (64-bit)
Web Application Development Environment: MS ASP.Net Framework 4.5
DB Server:
OS: Windows Server 2012 Standard (64-bit)
DBMS: MS SQL Server 2012

Cyber Security

Software Security Audited
Xiarch Solutions Pvt. Ltd. (Cert-in empaneled agency hired by Govt. Of Gujarat)

Disaster Recovery and service continuity

- Backup plans for daily, weekly and policy implemented
- Internal replication of important data
- Webservers are on cloud and as on today running with 4 servers under load balancer
- DB servers are clustered with other system DB servers

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Non-Agriculture – Section 65	Non-Agriculture (Change of Land Use). If any occupant wishes to use his land for any other purpose other than Agriculture, an approval is required	1677	31609	11593
Change of NA Purpose – Section 65A		16	2097	863
Industrial Purpose – Section 65B		38	1745	744

Permission under - Section 66	from the Revenue authorities. Earlier such process was prolonged & tedious, with iORA such process has become swifter and simpler.	30	532	121
Tenancy Act – Section 63AA	Permission for sale of land for bonafied industrial purpose. It has provided an impetus to Industrial and Economical Progress.	3	871	344
Saurashtra Gharkhed, Tenancy Settlement and Agriculture Lands Act Section – 55		Application introduced in 2019-20	257	293
Bombay Tenancy and Agriculture Lands Act Section - 89A		Application introduced in 2019-20	29	39
Premium – Bombay Tenancy and Agricultural Lands Act 1958 - Section 43 & 57	Premium to convert new/restricted Land to old tenure land. With iORA the system has become faster and more convenient.	623	4267	648
New and Restricted Tenure – Agri. & Non-Agri. Premium		Application introduced in 2019-20	816	891
Application for Inheritance	This service relates to records of right. This has helped to convert all the handwritten data into digital library, so that all the data can be easily searched and accessed.	642	47726	79592
Correction in Form No. 7		Application introduced in 2019-20	3473	4686
Tenancy Act Section 63	Permission for Purchase of land for bonafied industrial purpose. It has provided an impetus to Industrial and Economical Progress.	Application introduced in 2019-20	438	258
Saurashtra Gharkhed Tenancy Settlement and Agriculture Lands Act - Section 54		Application introduced in 2019-20	412	144
Bombay Tenancy and Agriculture		Application introduced	301	215

Lands Act – Section 89		in 2019-20		
Agriculturist Certificate		Application introduced in 2019-20	Application introduced in 2020-21	1623
NA + Premium – Bombay Tenancy and Agricultural Lands Act, 1958 – Section 43 & 57	It's a combination of 2 application for payment of premium and change in land use. Multiple approval from a single application can be taken with saves lot time and accelerate the pace in development process of the state.	Application introduced in 2019-20	1266	1871
New and Restricted Tenure – Agri & Non-Agri. (NA + Premium)		429	2866	482

Implementation

Implementation Coverage achieved in comparison to the plan / target

Pilot Project for Online NA application launched on 25 July 2018 in 2 districts of Gujarat (Ahmedabad and Gandhinagar), in December 2018 was launched across the state of Gujarat.

- Faster industrialization is both desirable and inevitable; so is faster urbanization. Land is an essential requirement for these structural changes to proceed unimpeded. Due to these revolutionary reforms undertaken by Government of Gujarat and providing Land related approvals within stipulated time-limit, more than 2,00,000 various types of applications have been received and approved on iORA.
- The number of applications through iORA is almost three times the number of manual applications during the previous year.
- As on August 2019, approx. 25% of applications were in Green channel. After deploying PSOs at state level and upgrading portal to iORA 2.0, the applications in Green channel increased to 52% i.e. 109% rise from the district level process in January 2020. Red channel and Yellow channel have been also decreased from 51% to 42% and 23% to 6% respectively during the same period.

Improvements/ enhancements specifically planned out during next one Year

After the astounding success of iORA and accolades, the Revenue Department has launched iORA 2.0, a faceless governance system to further enhance the transparency and swiftness in processing of Revenue related online applications. The following are the salient features of iORA 2.0:

- Before accepting the online application for further process, they were verified by the respective officials of the same districts, in which the land parcel was located. A dedicated Pre-Scrutiny Cell consisting of 8 Deputy Collectors is now centrally set up at Gandhinagar to perform this verification.
- All the applications are scrutinized centrally at Revenue Department, Gandhinagar with random and equal allotment of applications to the Pre-Scrutiny Officers (PSOs).

- PSOs are not given the rights to view applicant contact details viz. Phone Number or email-id, resulting in a faceless scrutiny system.
- PSOs verify the application along with affidavit and allocate channel (for processing of application within timeline) based on the type of applications and land records. Which is then sent to the respective Districts for further processing.
- This initiative results in further enhancing the transparency of the system

Following are the application plan to be rolled out during next one year.

- Land allotment
- Land Measurement/demarcation of land,
- Copy of index 2.

ENABLER

Processes Re-engineered

- No need to take any approval from other department prior to submission of the application online. No other document is required along with the online application other than scanned copy of affidavit.
- Earlier, 17 different opinions/approvals were required from various authorities/departments, with the help of online interface/integrated database, it has now been streamlined to only 3.
- A site inspection at village level was done earlier, now a trust-based system of affidavit has been introduced. Site visit is exempted and done only if specifically required.
- For Online payment of processing fees and conversion charges/premium on land, iORA has been integrated with Cyber Treasury Portal & SBI ePay. Online payment can be made using Credit Card, Debit Card, Net Banking, UPI, BHIM etc.
- Earlier manual process required a separate application for mutation in land records. In the new process, once the final approval order is generated, automated Mutation Entry in land records is done through integrated databases. The applicant is not required to do any separate application for Mutation.
- Email and SMS notification sent to the applicants at each stage of the application.
- Three channels (Green, Red & Yellow) have been decided for dispensation of applications within timelines.
  i. Green – 15 days
  ii. Yellow – 45 days
  iii. Red – 90 days
  iv. Aadhaar base bio-metric authentication in application disposal workflow for each approving authority.
- Once the application is approved and dues are paid, a final order will be autogenerated and sent to the applicant via E-mail.
- Multipurpose NA permission instead of specified use is provided to applicants.

Technologies

- NET Framework 4.5
- MS SQL Server 2012
- SS Reporting Service (Reporting tool)
- CouchDB for NoSQL data (PDFs)

- Integrated with CM Dashboard (Data Analysis)

People

Capacity building

Training of Precsrutiny officer (PSO), Chitnis, mamlatdars, DY.Collectors, Collectors and other field functionaries

Leadership support

Continual monitoring of Hon'ble CM through CM Dashboard and ACS, Revenue has resulted in a robust system and unlocked the true economic potential of land. Initiating and successfully led several transforming measures for providing Ease of Revenue Services to the citizens of the State. As the leadership navigates its path to a higher growth trajectory, such initiatives of Revenue Department, Government of Gujarat will be a guiding light for others to succeed.

Management of change

Encouraging field staff as well as applicants to embrace technological changes. Mandatory processing of application online with the help of technology.

VALUE INDICATORS

Learnings for sharing

Key challenges faced during the implementation of the projects:

- Digitization of 8 crore land records.
- Digitization of 2.43 crore mutation entries.

Digitization has helped to convert revenue data into digital library which can be easily accessed and searched.

Digital Empowerment

The iORA Portal is developed in Gujarati language as the applications are majorly used by the people of Gujarat, who are well acquainted of the language.

Green e-Governance

Earlier any application made has to pass through various stages for approval process, which leads to submission of hard copy of multiple documents like Land Records, Annual Statement of Rates and revenue cases details etc. With the implementation of iORA all the applications are made and approved online, and no hard copies of the documents mentioned above are required.

Shri. Pankaj Kumar, IAS, *Additional Chief Secretary, Revenue Department, (Gujarat), secrev@gujarat.gov.in*

Shri. Rinkesh Patel, *Additional Collector, Project Officer, Revenue Department, (Gujarat), projectofficer-rev@gujarat.gov.in*

Shri. Amit Shah, *Scientist F, National Informatics Centre (Gujarat), amit.shah@nic.in*

PRERNA - Property Evaluation and Registration Application

Stamps & Registration Department, Government of Uttar pradesh

Rakesh Shrivastav, R.H. Khan and Vinay Kumar Singh

PROJECT OVERVIEW

Vision & Objective

The Government of Uttar Pradesh (GoUP) envisions a citizen centric, transparent, efficient and self-sustaining Registration system in the state. The Government of Uttar Pradesh plans to realize this vision through the effective and optimal use of ICT, change management techniques, training, citizen education, process reengineering and project management. The Program for "Automation & Online working of Stamps & Registration Department Offices in Uttar Pradesh" has been conceived and developed to achieve the following objectives:

- Develop a citizen centric, simple and speedy, user friendly & reliable registration process.
- Build consistency in the process.
- Provide transparency and objectivity in the valuation of the properties.
- Automate all the back office functions pertaining to the registration services provided to the citizens.
- Demystify the registration process
- Bring speed, efficiency, consistency and reliability
- Substantially improve the citizen interface.

Functional Scope

Stamps & Registration Department, GoUP has decided to automate the working of all offices under the IGRS, Uttar Pradesh. This project thus aims at automation and online working of 364 Sub-Registrar offices, 75 District Registrar Offices, 04 Additional IG offices, 23 DIG offices, 90 AIG offices, head office in Allahabad and camp office in Lucknow.

The project aims to automate the current workflow in the Registration offices with the usage of application software.

Entire project can be divided in 2 major components;

- Design, development, implementation and maintenance of web-based application for IGRS-UP.
- Hardware/Software Specifications, Costing, Procurement, Installation and maintenance at NIC, Meghraj Cloud and at Disaster Recovery Site.

Key Stake holders

The PRERNA has the following stakeholders:

- Stamps & Registration Department. (The department is the Primary Stakeholder (State/Division/Distt. /Tehsil level User)).
- NIC, Meghraj Cloud (NIC, Meghraj Cloud, where the application is hosted.)
- Property Registrant and Common Citizen.
- Nivesh Mitra for Industrial Properties (https://niveshmitra.up.nic.in)
- Land Records- Records of Reights (Bhulekh) (http://upbhulekh.gov.in)
- E-District (http://edistrict.up.nic.in)
- DARPAN (CM/DM Dash board) (https://up.cmdashboard.nic.in), (https://up.dmdashboard.nic.in)

- Revenue Court Cases (http://vaad.up.nic.in)
- Property Tax dues (Nagar Nigam)
- Government of UP
- Income Tax Department
- Government Bodies – Development Authorities, AwasVikasParishad etc.

Various vendors, real estate agents, lawyers, notaries etc. who are a part of the sale and registration of properties.

Hardware/Software

Hosting platform, Technology, H/W, S/W of PRERNA

- *Technology used*: Open-Source Technology (LINUX, JAVA, HTML Reports), JavaScript
- *Application Server*: TOMCAT
- *Database Server*: PostgreSQL
- *Web Services*: SOAP and Restful

The Application is hosted in 5 Application Servers (VMs) on Load Balancer and 5 Database Servers (VMs)

For integration with other Departments of GoUP (BOR, Nagar Nigam, CM, DM Dashboard, Niveshmitra, Revenue Court) and other stakeholders, Restful API's have been developed.

Hosting location of PRERNA

NIC, Meghraj Cloud, New Delhi.

Infrastructure details at Meghraj Cloud:

- *Web/App Servers*: 5 Nos. (On Hardware Load Balancer)
- *Database Servers*: 5 Nos.
- *NAS*: 45 TB
- *SAN*: 2 TB

Certification (Certifying Agency)

Website Security Audit (https://igrsup.gov.in)
Certificate No: AAA/WAC/20200063
Dated: April 15, 2020
IG Stamp & Registration / PRERNA
AAA Technologies P. Ltd
278-280, F Wing, Solaris-1,
Saki Vihar Road, Opp. L & T Gate No. 6,
Powai, Andheri (East),
Mumbai 400 072, INDIA
Tel: + 91 22 28573815 / 16
Fax: + 91 22 40152501
info@aaatechnologies.co.in
www.aaatechnologies.co.in

Disaster Recovery and Service Continuity

The safety of most valuable Registration data and documents is necessary. A DR/Near DR is necessary along with Data Centre. The up time should be maintained at 99%, hence the DR site needs to be in active-active mode.

A proposal has been submitted to setup DR/Near DR Centre along with suitable Hardware/Software specification, costing etc. to Stamp & Registration Department and is in process.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Property Registration (PRERNA ver. 3.0)	PRERNA v3.0 software has been designed and developed on Open platform i.e. Java, PostgreSQL are being used to maintain the database, The Application and Database are hosted on NIC Meghraj Cloud. To achieve a high degree of modularity, scalability and maintainability, n-tier architecture has been adopted while designing PRERNA v3.0 software solution. Accordingly, the entire application development logic, the database logic and presentation logic has been segregated.	3725556	3558217	2228391

Implementation

The Digital India Land Records Modernization Programme (DILRMP) of Government of India on e-Governance in IGRS envisages covering all SROs (Sub Registrar Offices) in all districts of the state.

100% Coverage and Implementation in terms of target/plan:

S. No.	At a Glance	Approximate Nos.
1.	No. of Districts	75
2.	No. of Tehsils	350
3.	No. of Sub Registrar Offices	364
4.	No. of SRO Offices Computerized	364
5.	No. of Deeds Registered Annually	35 Lakhs
6.	Annual Throughput of Citizens	40 Million
7.	Types of Deeds Registered	60

To achieve a high degree of modularity, scalability and maintainability, n-tier architecture has been adopted while designing PRERNA v3.0 software solution. Accordingly, the entire application development logic, the database logic and presentation logic has been segregated. PRERNA 3.0 features:

Features:

- Online filing of Registration Application
- On Line generation of deeds
- On Line capturing of photographs & Thumb Impression
- Market Value Assistance
- Computation of stamp duty, registration fee/fines etc.
- Endorsement & Printing of photograph & Thumb Impression
- Issuance of check-slip cum cash receipt
- Generation of Encumbrance Certificate

- Scanning of registered document
- Electronic recording of scanned document
- On Line Query on registered deeds.
- Monitoring of revenue
- Generation of Index registers
- Connectivity with Land Record System (Bhu-lekh)- Online mutation

Improvements / Enhancements

Following improvements are made in the modules in the last 1 year:

- Issuance of encumbrance/non-encumbrance certificate
- Document / information Search
- E-Payment of Stamp Duty & Registration Fee
- MIS Reporting
- Integration with Land Record System for auto Mutation of Properties
- Integration of Registration System with Nivesh Mitra, E-District

Future Development Points:

- Integration with Civil Court Cases
- GIS Mapping
- Integration with Bank for Registration of Agriculture Bank Mortgage
- Establishment of Disaster Recovery Centre

ENABLER

Processes Re-engineered

Important points of BPR are:

In view of the computerization and use of modern technologies there is need for re-engineering the existing registration procedure. General public are unaware of requirements to be fulfilled before going to Sub-Registrar. Therefore, it is suggested that there should be a help counter (evaluation counter) at each Sub Registrar office, which will enable even a computer illiterate person to know the requirements for document registration like required market value, stamp duty, registration fee, list of support document proofs to be furnished etc.

- The endorsement which was earlier written manually and by putting stamps on the backside of document will be replaced by printing the endorsement using laser printer.
- The use of web camera will help the department officials to take photograph of executants on the spot which will remove impersonation problems. Use of web camera will cut general public's expense on bringing photographs to the Sub Registrar office.
- The use of Bio-Metric device which can capture finger print will be a best suitable alternative to manual process of taking thumb impression using ink pad. The bio-metric device doesn't require any ink, which blackens the fingers of executing party, document and in turn office walls and corners portions of office premises. The thumb impression can be used for verification at any stage.
- Use of scanner for scanning originals is best alternative to manually storing photocopied documents in the office and to write down whole documents in volumes. The photocopied documents take large space and in turn disturb neatness of office infrastructure. Every registered document will be scanned using Auto Document Feeder scanner with legal sized bed. Again, the scanned image will be stored on CDs,

portable hard disks to reduce storage space and to form the central record room.

- Use of electronic token display system will enhance the work flow of the system. The general public will be able to attend at prescribed time instead of waiting for hours long. The token sheet will be generated by computer using computerized token system.

Technologies

All the technical initiatives were taken to fully automate the Registration Process in Stamps & Registration Department, GoUP. The following initiatives are taken:

- Introduction of E-payment system towards the digital payment of Stamps Duty & Registration Fee and other Fee.
- Provision of login ids to infuse accountability in operations
- Provision of SMS & E-mail Alerts
- Provision of Web Camera
- Provision of Bio-Metric Devices,
- Provision of Scanners
- Provision of Digital Display Boards
- Reduction of manual records with computerized standardized documents
- Centralized deployment of database and applications at Meghraj Cloud Server to remove unnecessary duplication and simplify preparation of "disaster" copies of registers
- Inbuilt mechanism of security and quality control for crucial registration data
- Easy web access to citizens for their records
- Easy retrieval of records and reduction in manual efforts of the registration staff in the day to day working

Exchange of information pertaining Online Payment System, Linkage of Property Registration System with:

- Land Record
- E-district
- CM/DM Dashboard
- Nivesh Mitra System
- Nagar Nigam etc.

Technology Standards: Linux, Postgres, Java, HTML, JAVA Script, XML DATA/Message Exchange Standards.

Generic approach was adopted to make the system scalable in the Sub Registrar Offices of Stamps & Registration Department thus resulting a customized framework for property registration system.

People

Capacity Building

Capacity building/Training has been provided to department personals on different modules of PRERNA Software such as Preparation of Master Databases, Property Valuation, Registration of different types of deeds (Data Entry, Modification, reports etc.), Scanning & Archival, Database Backup, Preparation of Index Registers and Uploading of data from the districts on NIC Meghraj Cloud Server

- E-payment System
- different modules of Management Information System

- Indexing & Digitization Software

VALUE INDICATORS

Learnings for sharing

- Defining roles and responsibilities of the officers/staff.
- Process reengineering for better service delivery
  i. Simplification of Registration Process
  ii. use of modern technologies, web camera, Bio-Metric device and the use of scanner for scanning etc.
  iii. Establishment of hep counters
- Study of departmental activities
- Deciding suitable software architecture for the department
- Procurement of suitable hardware/software
- Software design, development & testing
  i. portal solution framework,
  ii. application software solution,
  iii. security architecture,
  iv. network architecture,
  v. data flow requirements,
  vi. data storage requirements,
  vii. Encryption at various levels of the solution etc.
  viii. The solution design is based on system standards to enable the interoperability and integration of solution with external solutions.
  ix. Support Hindi and English and UNICODE compliant.

Improving the quality of services to the citizens- This improvement of quality will be in terms of

- Easy availability of information
- Increase in number of channels for providing services / information to the citizens
- Reduced cycle time for application processing by automating the backend processes
- Greater transparency and accountability during the process
- Reduction in number of visits to the IGRS offices
- Citizen friendly office environment
- Visible improvement in the quality and level of G2C services provided to the citizens in the state
  i. Increase in transparency
  ii. Ease of administration and effective monitoring of work
  iii. Leveraging the benefits of ICT in new system

Green e-Governance

- Removal of manual records with auto generation of computerized standardized documents
- Easy access to citizens for their records

- Easy retrieval of records and reduction in manual efforts of the registration staff in the day to day working.
- Electronic Archival of Documents
- Auto generation of Endorsement, Index and other back office Reports
- Availability of Online Physical & Financial Progress.

Shri Rakesh Shrivastav, Assistant *Inspector General, Stamps & Registration Department, Government of Uttar pradesh, Aig2.camp@nic.in*

Shri R.H. Khan, *DDG & State Informatics Office, State Election Commission (Lucknow), Sio-up@nic.in*

Shri Vinay Kumar Singh, *Scientist F, National Informatics Centre (Lucknow),* Vinay.singh@nic.in

ReLIS (Revenue Land Information System) and Revenue ePayments

Land Revenue Department, Government of Kerala

K. Biju, Sreelatha. L and T. Mohana Dhas

PROJECT OVERVIEW

Vision & Objective

ReLIS is the complete Land Records Management System implemented in Kerala integrating Applications for Land management, Revenue ePyaments and Resurvey Records management. This project is conceived as per the Digital India Land Records Modernization Programme (DILRMP) and has achieved the DILRMP (Digital India Land Records Modernization Programme) objectives by bringing transparency in the Land Records Management, Online citizen Services and upkeep of Land Records to reflect the current status. The project is implemented in all Revenue Divisional Offices, Taluks and Villages in the State. Integrated with eTreasury and all Villages enabled for Digital Payments through ePOS and UPI.

ReLIS is Integrated with

- Property Registration Application PEARL for online Transfer of Revenue Registry
- eTreasury financial services
- Revenue ePayment portal for ePayment of Land Tax, TR Fee and other land related
- payments.
- Bhunaksha for Map Services.
- Revenue Recovery for Marking of Land Notifications
- Revenue Recovery for Revenue Recovery Collections
- Financial Accounting System of Villages for DCB
- Resurvey Records Management Application.
- KSWIFT to provide Land Ownership, Tax Payment, Land details verification.
- Agricultural Portal for verification of Land details and ownership
- CM Portal Unnathi for Project Monitoring.
- Ente Jilla for Information Service to Public.

Major Citizen Services

- Responsive site to enable mobile friendly services to Citizen
- Online Mutation (Transfer of Registry) after Property Registration
- Online payment of Land Tax
- Online payment of TR Fee of new Mutations
- Online payment of Kerala Agriculture Workers Welfare Fund (KAWWF)
- Online Services. (Application submission and Service delivery)
- Classification Change
- Pending Mutation
- Land Records Maintenance Activities(Resurvey Corrections)
- Location Map
- ROR (Thandapper Extract)
- Thandapper Pakarppu (Certificate)
- Tax Receipt over SMS

- Information Services
- Tax Receipt Verification / Search
- Ownership / Tax dues Verification
- Mutation Status / New Land Parcel details
- FAQ on all online Services.
- Status of processing over SMS

Other Services

- Dashboards
- Decision Support System for Government
- Data sharing for Audit & Accounting
- Data sharing with Treasury Department
- Data shared to Economics and Statistics Department
- SMS services
- ePOS Facility
- Unicode based localization support

Stakeholders

- General Public
- Revenue Department
- Registration Department
- Agriculture Department
- Department of Survey and Land Records
- Coffee Board
- Kerala Agriculture Welfare Board.

Outcome

- Mutation with Map Updation effected immediately after Registration
- Cashless Village Office with 52 Types of Payments over ePOS and UPI.
- Immediate Credit to Government Treasury on Collections
- Records, Registers and DCB Online
- Online delivery of ROR, TP Pakarappu, Location Map, Tax Receipt
- Verification of Tax Receipt
- Tracking of TR Application
- Services from CSC and portal user
- Search on land for checking encumbrances on land like Loan, Recovery, Lease, Court attachment etc.
- Intimation over SMS for all approvals of ROR, Mutation, Tax Payment and Tax receipt over SMS to registered mobile of the Land owner

Hardware/ Software

Site hosted in Kerala State Data Centre Cloud6 VMs in SDC Cloud –3 Application Servers in load balancing mode; One Data base server, one replication & reporting server, one document server. LAPP (Linux, Apache, PHP, PgSQL) stack. Responsive site, SSL enabled

- Technologies : Open Source with APACHE, PHP, Java Script, HTML , XML, JSON, AJAX , Packages : CURL, PEAR , MDB
- Web service :REST
- Database : PostgreSQL
- Hardware: Application Servers, Database Servers, SAN Storage etc
- Utility : SMS, e-payment, e-POS, eTreasury Payment Gateway

Certification (Certifying Agency)

- Cert-K certification

- Regular internal Security audit using AppScan and Source code Analysis Tools
- Penetration test by NIC Cyber Security Division

Disaster Recovery/ Service Continuity

Primary Database is synchronously replicated to another database-backed up by a tertiary database.(This facilitates Near DR)

- Application Servers are load balanced.
- Near and Far DR facility is being processed by GOK

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Record of Rights	Document on ownership of Land for the citizen	8,13,234	7,27,529	1,98,746
Transfer of Registry	Mutations through the System	59,75,679	60,74,005	11,72,236
Classification Change	Change in Land Classification –Online Service			1167
Land Records Maintenance	Resurvey Correction Service Online			1052
Online Land Tax Collection	Revenue for the Government from citizen as direct online payment	17.03 Crores	19.44,Crores	32.48,Crores
Tax/Fees Collected through Front Office	Collection through Front office	182.45 Crores	302.30 Crores	87,89,Crores

Implementation

- Implementation Coverage achieved in comparison to the plan / target
  The project is implemented in all Taluks and all villages across the State. Integrated with APIs to Departments like Agriculture, Registration, DLRMP MIS,CM Portal, Industries, Treasury etc
- Indicate improvements/ enhancements specifically rolled out during the last one Year and those which are planned to be rolled out during next one year.
- Integration with E-Payment System(eTreasury)
- Integration with Revenue Recovery system
- Digital Signer integration, Dash Boards
- Responsive redesign for all Citizen Services.
- Web services to other State and Central portals for Information dissemination
- Bhunaksha Integration

Planned for next one Year

- Unique Land Parcel implementation
- Aadhar based Services.

- Resurvey Records Publishing in eGazette with integration to eGazette
- Appeal and LC online

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Processes Re-engineered

The Land records were maintained based on different practices being followed in different geographical location across the state of Kerala. It was highly essential and challenging requirement to bring uniformity in the practices and data. The basic records available in half of the Villages were 85 years old and bringing records to the current position required standardization and simplification of the processes. The process re-engineering was done within provisions of the Transfer of Registry rules to frame suitable solutions to the challenges. The standardized procedure was rolled out in Wayanad district and replicated in other northern districts where re- survey is not yet completed.
Integration with Registration and Survey
Integration with eTreasury for ePayments
API based data sharing to other Departments
Re-engineered procedures towards integrating Bhunaksha for MAP based services.

Technologies

- Data Analytics as Dash Board
- Enterprise Architecture as Revenue Portal in progress
- Mobile Technologies and Responsive web-Applications
- Restful web-services
- Parichay and Jan-Parichay integration for single sign-on in progress

People

- Departmental IT Cell has been set up to support implementation at state level.
- WhatsApp support group with identified district level master trainer is established.
- Software changes are managed through change management procedure

VALUE INDICATORS

Learnings for sharing

- E-payment and online services has been a game changer and enables faceless services
- Integration of Registration Portal with ReLIS Portal using restful API enabled sharing of registered documents for mutation and ownership updation.
- Bhunaksha Integration for Map Services

Digital Empowerment

Responsive site design to citizen over mobile. .

- Digital Payment facility (ePOS/UPI payments
- Software supports Local language.
- All payments are electronic
- Paperless, cashless, Faceless Village/Taluk Offices enabled in Kerala
- Integration with Registration enables to maintain land records up-to-date
- Integration with Resurvey enables to maintain data integrity across departments.

- Updated FMB ensures transparency in land records

Green e-Governance

- Electronic delivery of certificates with online verification enables reduction in paper use
- Tax receipt over SMS reduces printing of the receipts unnecessary
- SMS integration ensures green governance
- E-payment eliminates need for citizen to go to bank, fill in challan etc
- E-payment ensures automatic re-conciliation across departments without resource intensive reporting and accounting
- Information readily available for decision making in required formats and logic
- ePOS integration at Villages facilitates Digital Payments

Shri. K. Biju IAS, *Commissioner Land Revenue, Land Revenue (Kerala), lrcommissioner@gmail.com.*

Smt. Sreelatha. L, *Senior Technical Director, National Informatics Centre (MeitY), kerpkd@nic.in*

Shri. T. Mohana Dhas, *Deputy Director General & State Informatics Officer, National Informatics Centre (MeitY), sio-ker@nic.in*

SPARK (Service and Payroll Administrative Repository for Kerala)

Finance Department, Kerala

Rajesh Kumar Singh and Girish Parakkat

PROJECT OVERVIEW

Objectives

- Online processing of HR related matters & Salary matters of all Govt. employees
- Digitization of Service Book of Govt. Employees
- A centralized database retrieving HR and salary matters of Govt. employees
- An integrated employee data sharing system for all other e-Governance initiatives of Kerala
- HR related details of all the employees in State government service can be extracted from SPARK system
- Service book of all employees has been digitalized.
- Salary processing of all state government employees is presently only processed through SPARK.
- Government employees increment sanctioning is now done through SPARK system.
- The SPARK system also ensures the rules and regulations are uniformly applied to all employees thereby avoiding complaints and achieving better employee -employer relations.
- Online Transfer Processing of SPARK hastens the transfer procedures of employees.
- HR claims of employees are now activated through SPARK
- SPARK provides provision for filing annual property returns of Government officials including AIS Officers
- SPARK has modules for Income tax calculations and modules for filing Income Tax.
- All arrear calculations both Salary and DA Arrear can be calculated through SPARK.

Scope

- Automatic PEN (Permanent Employee Number) Generation
- Salary/Arrear/leave surrender / Excess pay processing of All employees, (All India service/ UGC/AICTE/Gazetted/non-gazetted and temporary employees)
- Increment Sanction/Transfer/promotion/Deputation/ working arrangement
- Retirement management module
- Online leave management
- AEBAS enabled attendance management system
- Automated salary and claim deduction based on leave.
- New Pension Scheme Module
- Annual Property Returns module
- Prepares Due drawn statement
- Online provident fund application

- Individual access to all Spark employees
- Mobile Application SPARK On Mobile on Android platform
- Automatic updation of encashment details in SPARK as and when a bill is encashed in Treasury
- Form 16 and Form 24 generation – Printable and electronic format
- Paperless e – submission of Salary Bills for 57 departments has been enabled in SPARK
- Online HR claim Processing
- E-submission of salary bills
- Automatic updation of encashment details in SPARK as and when a bill is encashed in Treasury.
- Bill entry, bill passing and payment through DBT
- Generation of sanction orders, TDS and periodical reports
- Online appropriation checking for claims
- AAdhar seeding for regular employees
- Aadhar Seeding for verifying Temporary Employees

Stake Holders

General provident Fund for all employees

All the GPF events like Admission. Temporary Advance, Non Refundable Advance, Closure with seam less integration with AG s office is done through SPARK.

- Online Application for GPF through Accountant General. For regular employee GPF account, transaction (NRA, Temporary Advance, conversion are sanctioned and approved by Account general. GPF Admission /Non Refundable Advance and Conversion application by individual employee with the proper recommendation and sanction from the Department officers concerned and this is to be pushed as online to AG‘s system. For each and every online application there is a status retained in the individual users or DDO level to know the progress of application. Corresponding sanction order details will be available in the DDO users and can be forwarded to AG for processing. Once the application processed or sanctioned from AG subsequent intimation will be available in the DDO interface.
- Government Aided Institutions' PF System (GAINPF): The PF accounts of employees working under Aided institutions are managed by Government Aided Institutions' PF System (GAINPF). The system takes care of the entire life-cycle of PF management such as PF subscription, monthly entry, advance & withdrawal, refund, interest calculation, issuance of credit cards, annual statements etc.. through integration of GAIN PF with SPARK the system shares data with SPARK for processing the PF related claims of employees in aided institutions

Gazetted Employees Management System

As part of Data integration with Accountant General office SPARK PMU has facilitated the provision for updating online slips from Accountant General Office by integrating the SPARK system with the Accountant General Data management system. State gazetted officers’ pay, allowance, leave and pension details are being managed by the office of the Accountant General. The entitlements of gazetted officers can process only after the updation of corresponding slip from Accounts general office. Accountant General Office manages such processes through a web based program, called (Gazetted

Entitlement Management System GEMS). GEMS is developed and owned by the office of the Accountant General. AG's office processes slips for Salary, Leave salary, Promotion, Increment, Subsistence allowance, Reversion, Transfer, Leave surrender, Terminal Surrender and PF related claim bills. These Data of gazette Employee are shared to SPARK for processing salary, leave surrender, promotion, increment etc. for employee working departments which is Enrolled under SPARK.

Integration Of State Life Insurance and Group Insurance scheme Policy

The State Life Insurance (SLI) and Group Insurance Scheme (GIS) policy and premium amount details, monthly deductions etc are updated in SPARK by the DDO during monthly process of the salary. State Life Insurance (SLI) and Group Insurance Scheme (GIS) details all state government employees are managed by Kerala State Insurance Department through Viswas portal. State Life Insurance (SLI) and Group Insurance Scheme (GIS) details all state government employees are managed through this online system. Thus Viswas ensures speedy processing and settlement of SLI and GIS claims.

Mandatory DSC For Drawing And Disbursing Officer DDOs for online submissions

As part of the IFMS system, all bills are supposed to be online. Security of bills submitted online will become a problem. This requires electronic signature to be submitted electronically So KELTRON (Kerala State Electronics Development Corporation) has been assigned the responsibility of giving Digital Signature Certificate (DSC) FREE OF COST. Hence all DDOs are requested to take Digital signature certificates (DSC) from KELTRON and to Contact District wise KELTRON office. DDOs should ensure that the name in Digital Signature is same as that in SPARK.

Infrastructural support from KSITM (Kerala State IT Mission)

Kerala State IT Mission (KSITM) is a government organization under Department of Electronics & Information Technology. KSITM is also the nodal agency of IT Department for E-Governance, IT infrastructure development and IT enabled services. Infrastructural supports for smooth running of SPARK are provided by KSITM.

- State Date Centre : Hosting of Servers and Near DR site
- Kerala State Wide Area Network(KSWAN): Network Support

Integration of Govt and Aided educational Institutions

The Education Department of Government of Kerala have details of over 15,000 schools in the state. Sampoorna is a school management system project implemented by the Education Department of Government of Kerala to automate the system and process of over 15,000 schools in the state. As part of Data sharing SPARK have being cordially working with Sampoorna efficiently in these years for processing pay and allowance of teachers in these School.

Software

System Infrastructure

Co-located servers at State Data Centre having Load balanced multiple Application servers and Dedicated Replicated DB servers with SAN incorporation.

Platform/Technology used

Database: PostgreSQL 9.6
Web Application: ASP .NET 10.0
Operating system: Microsoft Windows Server

Servers in Use:

Database servers: 2 (Master slave replication configured)

- Server 1: For OLTP and processing
- Server 2: Reporting and E-submission
- Operating system: Microsoft Windows Server 2008 R2 Enterprise 64 Edition

Application servers: 5 - VMs

- Four servers to public
- One for Spark PMU Help desk
- Operating system: Microsoft Windows Server 2016 Standard

Infrastructural support are provided by

- State Date Centre : Hosting of Servers and Near DR site
- Kerala State Wide Area Network(KSWAN): Network Support
- National Informatics Centre(NIC) : Development and Technical Support
- Aadhar Seeding for Temporary Employees
- KELTRON : Hardware Support and Training
- e-Kuber (RBI)

Cyber Security

Formal Security audit certification have been obtained with respect to cyber security from CERT-K

Disaster Recovery and service continuity

The backup, disaster back up policy and mechanisms in place are:

- Replicated Data base
- Daily full backup.
- Daily backup copy at different locations.
- Tape drive backup copy.

RESULTS INDICATOR

Information

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Allotted Permanent Employee Numbers (PEN)	Total number of regular employee having PEN 537761	10234	26412	4872
Bills of salary and Claims Processed	• Salary Bills • Arrear Bills (salary, DA, PR Arrear) • Online claim Bills	• 951821 • 358354 • 453355	• 935729 • 442721 • 489071	• 969711 • 367534 • 598265
Online Application For GPF	• GPF Admission Application • GPF Temporary Advance Application • GPF Closure Application • GPF NRA Withdrawal Application		• 11307 • 778 • 2289 • 25726 • 10288	• 25673 • 95353 • 14065 • 71001 • 24105

	• GPF Conversion Application			
Temporary employee registration		47536	60741	21426
Leave surrender bills for temporary employee			143	290
Aadhar Seeding of regular employee		40465	48320	59393
Aadhar seeding pf temporary employee		48743	54093	38039
Online Transfer application		12960	15610	14309

Implementation

Implementation Coverage achieved

While implementing this project, the management team, formulates its organization strategy by implementing the technologies available at that time and ventures the project based on the circumstances of that time. Data is soul to an e-governance system. Inputting initial data into the system, verify it, and lock the data from further manual editing etc are vital basic steps to build and nourish that soul. Data comes to SPARK through three sources. In the first place, it is through bulk data entry by the departments when they become part of SPARK. Second major source is the data being generated by SPARK when the users run processes available in the system. Third is manual updating of data by authorized users in areas where automated processes are yet to come. Since payroll activities were commissioned first in SPARK, with speedy implementation in mind, user departments verified the data that are vital for payroll processing and started to use SPARK. It will make HR procedures more effective, efficient and transparent. But now a lot of human resource management related modules have been added to SPARK and the system is taking the shape of a comprehensive and single Employee Management Information System for the state government as envisaged originally.

The SPARK Data integration with other e-governance project bridges the gaps between government and its stakeholders and also helps to strengthen Government to Citizen (G2C), Government to Employees (G2E), Government to Government (G2G) and Government to Business (G2B) transactions. Implementing this Data Integration with Other e-Governance project was a crucial step. As SPARK being the single and comprehensive employee management information system for the state government with the HR and pay roll details of all the government employees, it also acts as the mainstay of state financial disbursement system. At the time of joining in service, the employee details get registered in SPARK database. Subsequently entire data in respect of service and salary related matters of the employee are captured in the system. As a result, HR and pay roll related information of any employee can be retrieved from the system in no time. SPARK shares HR related data with other ICT systems like VISWAS, AMS- Attendance Management System, e-office, GPF system etc. In addition to that, the SPARK software is integrated with treasury and Accountant General Office General Office to facilitate financial transactions through SPARK. This Interoperability of the systems will help to standardize the data and will ensure better performance results. Recently attendance punching data integration has been carried out in SPARK

for Secretariat employees. Moreover the digitization of employee data in SPARK enables the decision makers in formulating various policies relating to human resource management in government Sector. The prime example of utilizing SPARK data for decision making was seen during finalization and approval of 2014 Pay Revision Order. The financial implication of PR 2014 was calculated based on the SPARK data.

SPARK Data integration with other e governance projects has done in such a manner that specific data from SPARK in approved format flow into the connected application through secured web services and in return processed and authenticated data from each connected e-governance project sthat are relevant to SPARK, are fed back automatically in SPARK system. As data checking being done at each level the data stored and updated in SPARK and connected systems will be highly accurate.

Improvements / Enhancements

SPARK PMU is continuously updating the system, based on new Govt policies and also by considering the needs of employees, as they are the main stake holders of the system. . The below mentioned changes have been made in SPARK during the period 2019- 2020.

- Attendance Management Module: In Attendance Management system SPARK can receive and process the data from biometric attendance marking system. Based on the punching data recorded in the SPARK Data base attendance details can be verified and monitored. Now it is available in General Administration, Finance Department, Law department.
- DSC Mandatory for e -submission: SPARK PMU has already enabled DSC registration/renewal facility for DSC implemented departments. Now SPARK has also facilitated the e-submission of Salary Bills and claim bills with Digital signature by the DDO /The head of the institution concerned. E-submission of Salary bills with DSC facility was already there for Finance Department and Treasury Department now this facility has been extended to all the DSC implemented departments and in addition to the salary bills, now claim bills can also be e-submitted with DSC.
- Salary challenge to CMDRF and its related updations: SPARK PMU has updated the CMDRF (Flood 2018) Contribution details option for donating govt employee's one month's gross salary (amount equivalent to 9/2018 gross salary) to CMDRF fund as per G.O. (P) No.144/2018/Fin dated 11/09/2018. Using this option the concerned DDO/Head of the Department/Establishment user can facilitate employee contribution equivalent to one month gross salary of September 2018 to CMDRF, and this contribution amount can be recovered from employee’s salary, Leave account, Pay Revision arrear, PF account. Employees’ CMDFRF contribution can be updated through; Salary matters --->CMDRF (Flood 2018) contribution details. Payment options facilitated under “CMDRF (Flood 2018) contribution details” option are as follows; Salary deduction, 30 days Leave surrender, PR arrear 4th Installment, NRA withdrawal from PF
- Online Application for GPF modules: SPARK PMU has updated a new module for General Provident fund for submitting online application as per the G.O (P) No 9/2019/Fin, dated 12/02/2019 to Accountant General. GPF Admission /Non Refundable Advance and Conversion application

by individual employee with the proper recommendation and sanction from the Department officers concerned and this is to be pushed as online to AG's system. For each and every online application there is a status retained in the individual users or DDO level to know the progress of application. Corresponding sanction order details will be available in the DDO users and can be forwarded to AG for processing. Once the application processed or sanctioned from AG subsequent intimation will be available in the DDO interface. As per the G.O(P) No 37/2019/Fin, dated 30/03/2019 Government has revised the existing Upper Monetary Limit to various categories of Sanctioning Authorities for sanctioning NRA/Conversion of Temporary Advance to NRA subject to a maximum of 75% of the eligible balance at credit of the subscriber, as booked by the Accountant General. All NRA/Conversion of Temporary Advance to NRA will take in effect only after getting online authorization of the Principal Accountant General in SPARK and all the bills of the GPF NRA will be generated and encashed by the DDO's through SPARK only based on this online authorization issued by the Principal Accountant General.

- Individual login for all employees: SPARK PMU has enabled login facility for all employees in SPARK to view their e-Service Book and pay and allowance details in SPARK. All regular employees are informed that those who don't have any user credentials in SPARK can register online by themselves to get individual login in SPARK. The individual login facility is available at the login page of Spark. For new registration, a individual can visit the login page of SPARK through the link www.spark.gov.in/webspark by using any browser. This option is only for creating Individual user in SPARK and not for creating official users for establishment purposes
- Enable e TSB account: The Government of Kerala initiated to introduce Treasury Savings Bank account namely, TSB for the disbursement of pay and allowances of all Government employees with internet banking facility. This system has already been implemented in Finance Department, General Administration Department and Treasury Department. As the next phase, the employees of all other remaining Departments (mentioned in ANNEXURE TO G.O (P)No 67/2019/Fin dated 13/06/2019) would be covered before the salary of 07/2019. To update the TSB account in Present salary details of an employee follow the procedure in SPARK website through the URL, https://www.info.spark.gov.in/
- Online Transfer Module: In accordance with the orders issued vide G.O. (P)No.3/2017/P&AR Dated 25/02/2017,G.O(MS)No.18/2017/ 2017/P&ARD dated 29/08/2017 and G.O (MS) No.10/2018/P&ARD dated 05/04/2018, SPARK PMU, incorporated online general transfer processing modules in SPARK, for confining all the transfer processing through the system. After initializing the start date and end date for submitting applications by SPARK PMU, the employees in the respective department can submit online applications for general transfer through this online transfer module. Applicant can view the status of submitted application through this option, and can able to check whether it is being processed under District Level officer (DLO) or State Level Officer (SLO), accepted or rejected by the approving authority

- Re-employment employees salary processing Earlier SPARK system had issues in handling the salary processing of reemployed employees. SPARK PMU has rectified this issue and now users can update reemployed details and can process their salary without back end editing through SPARK PMU office.
- Paperless E-submission of salary Bills: Considering the present scenario of spreading of pandemic COVID 19 Govt. introduced paperless bill system, duly authenticated with Digital signature of DDOs for the salary bills for 3/2020 onwards on pilot basis. Government have examined the matter in detail and are pleased to accord permission to the DDOs of all Government Departments, including Aided institutions, only to e-submit the digitally signed SPARK bills for the salary claim from 3/2020 alone, without submission of any signed hard copy of the outer/inner/schedules of the same to treasuries. Countersignature of bills for 3/2020 in the case of aided institutions is also not required. In continuation of the same, now Government are pleased to extend the paperless bill system for monthly salary bills of the 57 departments for the salary bills of 7/2020 onwards

Future Plan

Based on the changes in Govt policies and automated smooth running of the System SPARK software is undergoing many updation. Now we are working on some features/ updations by considering the need of the employee and we are planning to rolled out below mentioned during next one year.

- Paperless bill submission for all bills and claims
- Online TA bill module
- Online Leave surrender module
- Seamless integration with AG s office for CTC processing of gazetted employees

ENABLER

Processes Re-engineered

In E-governance projects, timely process re-engineering plays an inevitable role in the success of the project. Process re- engineering involves a series of processes, starting from understanding the current system, and proceeds through identifying the existing system's draw backs and gaps, comparing the existing system with related projects, and then developing process reengineering techniques and implementing those new ideas and policies to make the system more efficient and sustainable one. As part of process reengineering, SPARK PMU enforced some major changes in the system and also issued many Government orders for ensuring the sustainability of the system. Some of the major process reengineering strategies implemented by SPARK PMU are as follows:

- One DDO System: One DDO system has implemented in SPARK with the aim to bring down the total number of account generating points to bare minimum for effective compilation of accounts, also to reduce the number of treasury bills for efficient management of treasury transactions. Through this one DDO system, the drawal and disbursement of salary and other entitlements of all staff members, including gazetted officers in an office has entrusted with the respective DDO of that office.
- E submission of Bills: For automating the procedure of bill submission to treasuries, SPARK PMU has enabled e-submission module in SPARK

as per circular 70/13/Fin. In the initial phase, the facility for online submission was enabled only for SPARK generated salary bills, and later on this facility has extended to non-salary claims also. In addition to that a common format TR 59 (c) was introduced for claiming non salary related claims such as PF withdrawals, medical reimbursement claims, closure claims of FBS and GIS, IFMA drawl, loan and advances, LTC, TA etc., based on G.O. (P) No 149/2014/Fin dated 26/04/2014 and G.O. (P) No. 306/2014/Fin dated 23/07/2014. The DDO can submit the bills thus generated from SPARK to the concerned treasury through online.

- Electronic pay slip updation from Accountant General Office: As per G.O (P) No.77/2017/Fin dated 16/06/2017, SPARK PMU has facilitated the provision for updating online slips from Accountant General Office by integrating the SPARK system with the Accountant General data management system.
- Attendance Management system in SPARK : SPARK PMU has devised the attendance management module, through this option SPARK can receive and process data from biometric attendance marking system, Now it is being piloted in Government Secretariat under the direct supervision of Principal Secretary
- Annual Property Returns Filing module: The annual property returns filing module in SPARK is complete and is used by many departments. From, the next year onwards, employees of all departments have to be brought under the system
- Effective Grievance redressal mechanism: SPARK PMU has efficient SPARK-office help desks to address the grievances of users, also recruited efficient DMU's (Department Management User), and their services are made available under all Government Departments. System maintains very responsive Chat, Phone and email facility to assist the SPARK users. Recently, SPARK has opened a new wing in Kannur, in order to manage the northern regions of Kerala. In addition to that exclusive SPARK helpdesks are now functioning in all District treasuries across the state to resolve the user queries
- Temporary Employee module enabled in SPARK: SPARK PMU has activated the temporary employee module for registering the employee details, disbursing the salary, wages etc of daily wages/contact/temporary employees through the SPARK system as per GO (P) NO 109/2016/Fin dated 29/07/2016. After passing the bill, the salary/allowance is directly credited to the bank/treasury account of the employees concerned.
- Digital signature: DDOs in charge of main offices/ sub offices are provided with a digital signature. This enables the DDOs to view, manage, process, verify and approve the service and salary matters regarding the employees in the respective offices

Technologies

QUEST; an in-house helpdesk software

An in-house software 'QUEST' has been developed by SPARK PMU to monitor the number of emails, guests, phone calls, chats, Tapals and the type of queries received at SPARK Helpdesk. With the help of 'Quest' software, SPARK PMU can identify the frequent queries from the stakeholders and it helps in locating the SPARK modules which need modification. On examining the frequent queries, necessary changes or additions can be made in those

modules to make it more users friendly.

Online Learning environment in SPARK

SPARK is the Employee Management Information System of Kerala Government for managing its human resource. Lifelong learning happens when formal and informal, traditional and online leaning methods are blended systematically into a single learning life-cycle. In the formal side SPARK PMU arranges formal training programmes on demand from field departments. SPARK PMU has also created a dynamic learning environment through Department Master Trainers. Department Master Trainers are, in fact, training volunteers who have substantial experience in using SPARK and got further intensive training. In a lifelong learning environment, presence of an online learning platform to bridge the time gap between different formal training batches is quite essential. With this objective in mind we have designed a new info website for SPARK and that will be launched soon. The new info site will have a very easily usable and regularly updated online manual and FAQ

Online video tutorial

SPARK PMU is continuously updating the system, based on new Govt policies and also by considering the needs of employees. Tutorial video of new and latest update / module will be uploaded in website www.info.spark.gov.in

People

SPARK maintains a sedulous and responsive helpdesk system, which is destined to resolve the queries related to service and payroll activities through SPARK. As part of confining all service and payroll activities through one point and to automate the government procedures, all state government employees' service and salary related procedures are now being processed through SPARK During the project implementation period, SPARK PMU has developed a customized helpdesk management software, 'Quest' to manage the helpdesk procedures, and now as part of process reengineering, SPARK PMU redesigned Quest software to make this meet all the necessities of an help desk unit. Well organized systems are in place for facilitating SPARK implementation, providing runtime support, obtaining user feedbacks, develop and update the software. Finance Department implements SPARK through the SPARK Project Management Unit (PMU) functioning under it.

Organisation Structure Of SPARK PMU

We have a dedicated team of experienced 41 Master Trainers stationed at SPARK Project Management Unit. Out of it 35 Master Trainers are stationed in SPARK PMU, Thiruvananthapuram, 3 Master Trainers in SPARK, with district level regional help desks across the state.

SPARK PMU has two frontend help desks system functioning at Thiruvananthapuram and Kannur districts, to deliver support services to its stake holders. SPARK helpdesk unit working under SPARK PMU unit Thiruvananthapuram and its regional unit at Kannur offer services through emails, chats, phone calls, tapal and assist officials who approach PMU as guests. SPARK PMU redesigned the 'Quest' to equip the software manage all helpdesk procedures effectively and promptly. Quest enables the SPARK authorities to monitor the calls and the type of queries received at the Help Desk. With the help of 'Quest', SPARK PMU can identify from which module the most number of queries are asked and the changes to be made in the module. It also helps to record and quantify the number of queries answered

by mail, chat and phone at the Help Desk by each person.

VALUE INDICATORS

Learnings for sharing

As part of confining all service and payroll activities through one point and to automate the government procedures, all state government employees' service and salary related procedures are now being processed through SPARK. With respect to payroll and other benefits, an average of 21,06,213 bills are processed yearly through the SPARK system. Data to be handled is also very huge as system has to manage the data of 5,42,220 regular and 1,60,279 temporary employees from 33199 offices under 119 departments, so obviously, the queries approaching SPARK helpdesk unit would also be very huge. During the project implementation period, SPARK PMU has developed a customized helpdesk management software, 'Quest' to manage the helpdesk procedures, and now as part of process reengineering, SPARK PMU redesigned Quest software to make this meet all the necessities of a help desk unit

Help desk functions operating through 'Quest'

- Email Handling: SPARK PMU has been receiving more than 600 emails each day. Forwarding these emails to helpdesk personals, who have been assigned email duty is done through this 'Quest' software. Also the SPARK administer can know the number of emails pending with each helpdesk personnel's and status of the email query sent by to SPARK's email id, using this application.
- Duty Assigning: SPARK authorities can assign duties to help desk personals using this helpdesk software. Also this 'Quest' software is helpful in identifying the areas of expertise of each helpdesk personals and assign duties based on their expertise, which is helpful in handling the queries approaching SPARK PMU very efficaciously. This application is worthwhile in managing the helpdesk duties and also expedient to utilise the human resource at SPARK helpdesk
- Tracking the query status: This facility is very useful in tracking the status of a query once attended by the SPARK helpdesk unit. The helpdesk personals has to log into the 'Query' system using their individual User id and password and on attending each issue the helpdesk person enters the details of attended issue into 'Quest' query details page. The details to be updated in the 'Quest' query page is PEN of the employee who is having this issue, user code (DDO's PEN), Email, Contact number, Query type (Salary, promotion, DA arrear, Salary arrears, transfer, part salary….), Communication type, this option is to mark the query is discussed through email, phone, chat, tapal, or as discussed in person when guest visited SPARK PMU)
- Forwarding the complaints to software section and communicating with software section: This facility included in the 'Query' system to report the issues which need software assistance to software section. Software section has also given separate login and provided user id and password to log in to the 'Quest' system for viewing the forwarded query details from SPARK help desk, also the software section can communicate with SPARK helpdesk using this option
- Chat activities: SPARK PMU will soon enable the option for incorporating Chat facility to the 'Quest' system. This will be useful for managing the chat activities and also to record the chat details and solutions discussed

through the chat session. New chat module of the 'Quest' will be having default messages saved as canned messages for common queries, so that the chat operators can select such messages from the canned message list and can reply the queries through chat conversation. These canned messages save the typing time and thereby enabling the chat operators to answer more queries coming to their chat box

- Sending SMS to employees: Helpdesk persons update the query details into 'Quest' software after attending the query and the 'Quest system generates the 'Query ID' for the updated query. The 'Quest' system will be soon modified in such a way that the Query ID generated on query updation will be sent to the concerned employees/user's contact number updated through Quest, so that they can approach SPARK PMU with this Query ID for knowing the status of the issue in detail, also if their issue forwarded to software section, the solution will be sent as sms through the proposed sms sending option.

Digital Empowerment

As part of e-governance move in the state, all the major projects of the state have been brought under digitalized work flow. Sharing of these digitalized data to other projects, which need this information for their processing procedures will help those projects to save lot of time, effort and manpower. Integration with treasury is a part of Integrated Financial management System (IFMS) implementation. Before Treasury integration, salary bills, processed through SPARK need to be re-entered manually in Treasury offices for encashment. Manual re-entering of data in salary bills may end up with data redundancy and affect the integrity of data. But, after Treasury integration, the data processed in SPARK system automatically gets updated in Treasury offices, so manual re entering of data is not required in Treasury Offices. This reduces the time and efforts of financial transactions.

SPARK data's Government to Government (G2G) level relevance also extends to areas like providing employee data for conduction of elections, generating data reports for specific requirements of individual departments etc. In the integrated environment data flow and mapping procedures are done in automatic manner, so that, much time and effort can be saved in data capturing. It helps to ensure uniform application of rules and regulations to all employees, thereby avoiding complaints and achieving better employee - employer relations. Being a well-integrated system therein, the changes made through one system reflect in all related systems, hence the procedures being followed will be always up to date.

As a part of digital empowerment All employees were given login facility in SPARK to view their e-Service Book and pay and allowance details during 10th to 20th of every month in SPARK. The DDO wise, credit information on all bills credited into the bank/treasury account is available in the SPARK application. SPARK PMU has enabled login facility for all employees in SPARK to view their e-Service Book and pay and allowance details in SPARK. All regular employees are informed that those who don't have any user credentials in SPARK can register online by themselves to get individual login in SPARK. The individual login facility is available at the login page of Spark. For new registration, a individual can visit the login page of SPARK through the link www.spark.gov.in/webspark by using any browser. This option is only for creating Individual user in SPARK and not for creating official users for establishment purposes

SPARK OnMoblie App

An Android Mobile App of SPARK application named 'SPARK OnMobile' is available in Google Play Store. SPARK OnMobile App provides the facility to view employee details and Monthly salary details. Now they can submit leave application to higher approving authority through SPARK OnMobile App. The employees who have Individual access in SPARK can use SPARK OnMobile App.

Green e-Governance

Going paperless have a huge impact on the environment through reducing paper consumption, by turning paper documents into electronic ones. A tree can only produce, on average, 17 reams of paper, and takes about 100 years to grow. By reducing paper usage, companies can have a direct impact on reducing their carbon footprint. After all, more than 50% of paper comes from virgin forests. Going paperless helps to reduce C02 (carbon dioxide) emissions. Turning a single tree into 17 reams of paper results in around 110 lbs of C02 being released into the atmosphere. Additionally, trees are also ‘carbon sinks’ and every tree that is not cut down for paper usage is able to absorb C02 gasses. The average tree can absorb around a ton- 2,000 lbs- of C02 in its lifetime. Considering this scenario the idea of paperless salary bill submission was introduced, Government have examined the matter in detail and are pleased to accord permission to the DDOs of all Government Departments, including Aided institutions, only to e-submit the digitally signed SPARK bills for the salary claim from 3/2020 alone, without submission of any signed hard copy of the outer/inner/schedules of the same to treasuries.

While for 15 departments it was a successful experience, Government now extended the paperless bil1 system for monthly salary bill s of 8/2020 onwards for the 57 department

The Implementation of paperless salary bill submission was successfully accomplished with all the necessary amendments were made and implemented within the given time period. Now we are planning to implement paperless salary bill submission in all departments (115) in next year. By going paperless we can not only save the environment but it also saves companies a lot of money. By automating all E-governance project processes and transitioning to more eco-friendly workflow solutions, each project can saves tens, hundreds, and millions of dollars this year, and every year

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Shri Rajesh Kumar Singh, IAS, *Additional Chief Secretary Finance, Finance Department (Kerala), acs.finance@kerala.gov.in*

Shri Girish Parakkat, *Deputy Secretary To Govt, Finance Department And Manager Spark, Finance Department (Kerala), girishp@kerala.gov.in*

Integrated Business Solution for Shri Ramraja Temple Orchha

Shri Ramraja Temple Orchha, Madhya Pradesh

Ashish Bhargav and Avinash Pathak

PROJECT OVERVIEW

Online Public Interface

- To provide online Booking of Various Services like Pooja / Offerings, Accommodation, Darshan Booking etc through website and Mobile App.
- Transaction Analytics Dashboard for building confidence among public and public representatives.
- Registration module for devotees for getting updates about the various temple events.
- Feedback Module for Public to provide inputs through various channels to improve Satisfaction Index.

Business Automation for Temple Administration

- To Provide HR/Account and Vendor Management and payment Module for efficient monitoring of the Temple management activities.
- To develop REST APIs for the integration of 4G and WIFI enabled handheld billing devices which have smart card, magnetic swipe card and NFC payment facility to replace all type of paper based receipt books with e books.
- To provide regular updates through sms and email to registered devotees about various events.
- To Provide Analytics and Report Module for temple administration for getting the business insights for better decision making and improving the service delivery channel.

Enhance Digital Coverage of Ochha

- Target is to attract more tourists.
- Website contains Videos and photos on public pages to Explore Orchha and its heritage.
- It also have a discover orchha module to provide brief description about the grandeur architecture of Orchha.

Integrate all the above modules in a single application and implement it to fulfill all the above mentioned objectives.

Software

- Designed and Developed the application on ASP.Net MVC 5.0 framework for achieving the micro services architecture and also developed the Web APIs for integration with all third parties HW/SW in case of future needs.
- Used SQL Server 2012 R2 for Database and Entity Framework 6 as middleware.
- Designed and Developed the Android App for the 4G and WiFi Enabled handheld Billing Device Telpo TPS 900 and integrate it with the solution through APIs.
- Used Hybrid Framework react native for the development of Mobile App for Public.

Cyber Security

Certifying Agency: MAPIT (Madhya Pradesh Agency for Promotion of

Information Technology)

Disaster Recovery and service continuity

Hosted the application on MP State Data Centre which has its own disaster recovery procedure and auto sync of DB with DB Replica in case of any failure.

RESULTS INDICATOR

Information

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Mahaprasad	Booking of Mahaprasad it includes three variants of Mahaprasad	-	-	90764
Pooja/Offerings	Various Services have been provided under this Category like Rajbhog, Balbhog, Vyari etc.	-	-	5876
Accomodation	Online Booking of different Rooms of Dharmshala	-	-	803
Darshan	Darshan Booking	-	-	2500

Implementation

Implementation Coverage achieved

We have implemented the solution in a phased manner. In first phase we have launched the website for public. In second phase we have launched the online booking of services and its configuration module for temple Administration. In third phase we have automated all the activities of Temple and replace the receipts book by e books using TELPO TPS 900 and in subsequent releases try to implement all those changes which were requested by Temple administration and enhances the service delivery through various channels as per the feedbacks we have received from public representatives and devotees.

Improvements / Enhancements

We have integrated the Business Analytics Dashboard for Temple Administration and New Darshan Booking module for public after COVID-19 Unlock. Also added the Notification Module for sending the notification to devotees through SMS and email for sending Covid -19 and event updates. Recently launched Mobile app for devotees and tourists.

Features to be Incorporated in New Releases

- Integration of Kentico 9.0 for Integrated Campaign Management and Email marketing.
- Use of TwiML for sms based feedback of services to increase CSI

ENABLER

Processes Re-engineered

- We have studied and analyze the as-is processes of temple for providing different services to devotees and simplified them into to-be processes then automate them with the help of this processes are standardized.

- Booking of Services inside temple premises done through API based 4G and WIFI enabled handheld billing devices which are also integrated with smart card, magnetic swipe card and NFC payment facility for digital payments.
- Enhances the service delivery channel as per the feedback provided by devotees and different officials.
- Analyze the scenarios in which the temple administration will get benefitted in better decision making with the help of the data set available and generated those reports.
- Automate various temple activities by breaking tasks in order to figure out where are the gaps and advantages.
- Tendering process become fast and transparent with the help of newly designed tendering module.

Technologies

- API driven architecture to support extendibility and decouple UI component from middleware.
- Digital Coverage of the Orchha's rich heritage and architecture is very less and scattered over the net so this solution provide an integrated platform to provide all the information at one place with the help of interactive videos and images which in turn helps in boosting the tourism and hospitality industry of the city. Integration of this website with different social media platforms further increased its reach.
- With the help of leads and feedback forms Temple Administration have been able to improve the public services.
- Different Business Analytic reports helped the Temple administration in better decision making for optimal resource utilization and crowd management especially in the time of heavy rush.
- Using Google Analytics we will be able to provide the requirements of tourists to local shopkeepers and restaurants in order to improve their services and satisfy the needs of tourists as we have integrated the application with Google Business

People

- Improvement is always an ongoing process to make a system more acceptable and useable we have always taken the help of our feedback mechanism through SMS and website to create change requirements and to improve the different modules.\
- For the capacity building of Temple Employees we have arranged various workshops, seminars and webinars to make them aware about the change in processes and new releases with the help of NIC.
- Also arranged doubt clearing sessions to bridge the gap between development, implementation and execution team.

VALUE INDICATORS

Learnings for sharing

For task management and CRM we have used Trello in which all stakeholders are there as Team Members for efficient sharing of Information, action points and to-do listing. This helped a lot in achieving our targets and time lines with clarity of requirements.

Design and development of the application done in a modular approach so for version controlling we have used github as code repository.

Digital Empowerment

Inside temple there are various sign boards both digital and printed to guide the devotees about the online booking procedure and our temple staff also provided the guidance to devotees for online booking and digital payment.

There is a Technical Helpdesk where devotees and tourists get the info about the usage of the application and ask their queries also.

In future we have planned to integrate our services with CSC to increase the digital outreach especially in rural areas with the help of CSC kiosk centers..

Green e-Governance

For e-Waste Disposal we have planned to use the following strategies

- Sell back to manufacturer for those items we have the buyback clause with Seller/Manufacturer.
- Other than the above items we have planned to give to certified e waste recycler.
- If there is any item which can be used by any NGO then give it to them.

Shri Ashish Bhargav, *DM/Temple Administrator, Shri Ramraja Temple Orchha (Madhya Pradesh), dmniwari-mp@mp.gov.in*

Shri Avinash Pathak, *ADIO NIC, National Informatics Center Tikamgarh, pathak.avinash@nic.in*

Portal for Online Booking of Tickets for Helicopter Services to Kedarnath Dham Uttarakhand

Tourism Department, Uttarakhand

Dilip Jawalkar, Sanjay Gupta and Shivani Gothi

PROJECT OVERVIEW

In view of suspecting news of black marketing of Helicopter tickets by touts and service operators during the peak season of char dham yatra in Uttarakhand, the Tourism Department of Uttarakhand asked NIC Uttarakhand to design and develop the online portal for booking of tickets for Helicopter services. Accordingly NIC UK did system study, design and developed an online portal for the same.

The portal was formally launched on 27th May 2019. With the implementation of these portal, pilgrims can online book seats for Helicopter in this sector upto maximum of six passengers per trip. The tickets are booked as per fares prescribed by Tourism Department Government of Uttarakhand. After successful booking of ticket, pilgrims can download e-Tickets & Boarding passes from the portal, which is required to produce at boarding location on travel date, to board the Helicopter. The portal has mobile & e-mail based authentication and is integrated with payment gateway, offering all modes of payments, to book the ticket. The portal is designed in such a manner that user with “administrator” role can configure following parameters as per the requirements:

- No. of seats for passengers per Helicopter
- No. of trips a helicopter can fly in an hour
- Setting up of dates for which bookings are opened by Government.
- Percentage of seats allotted for online booking and on-spot counter booking
- Addition of any no. of operators providing Helicopter service
- Activation and de-activation of Helicopter service operator
- Setting up of fare for different sectors.
- Addition of source and destination locations etc.

As per Tourism Department’s prescribed norms only seventy percentage of tickets can be booked online while remaining thirty percent tickets are booked on the spot at boarding locations by booking windows set up by Garhwal Mandal Vikas Nigam.

The portal also has option for bulk booking of tickets (Max 20) by registered tour operators. The registration of tour operators is also done through the portal

Scope

Functional:

Citizens, Registered Tour operators, Helicopter service providers, Tourism Department Uttarakhand, policy makers

Geographical:

The project is web-based and therefore, can be accessed from anywhere in the world.

The project is proposed to be replicated in all other locations in Uttarakhand offering Helicopter services.

Software

SW – ASP.net

Database – SQL Server
HW- Hosted on Two Virtual Servers in State Data Centre (SDC) Uttarakhand
SSL configured

Cyber Security

Portal has been security audited regularly by CERT-IN empanelled vendors whenever new module is added to the portal

Disaster Recovery and service continuity

As the application and databases both are deployed on virtual servers in state data centre Uttarakhand, database and application backup plan is followed as per data center policy.

RESULTS INDICATOR

Information

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
e-Ticket	Pilgrims can book helicopter tickets online, by providing some basic details like name, age, mobile number, identification number etc. It is an OTP based service and the payment is done online using net banking/UPI/credit/debit cards. 70% of the total seats are made available for online booking.	-	No. of Tickets – 38698 (Rs 25.09 Crores)	No. of Tickets – 7543 (Only during period 1-20 Oct) Rs 4.5 Crores)
e-Registration of Tour operator	Tours and travel operators which are registered with the government of Uttarakhand can register themselves on this portal and can avail the facility of bulk tickets booking through their login credentials provided after online registration on the portal.	-	60	14
On-spot Window Booking	With the online booking services, counters were setup at the places from where the yatra starts to kedarnath ji dham, so that the pilgrims who have not booked the tickets online and want to avail the helicopter services can get the tickets booked from the counters. 30% of the total seats are made available for on-the-spot booking at window at helipads.	-	9439	1545
eBoarding Pass	All the pilgrims have to carry the boarding passes with them which can be printed from the portal or can be obtained from	-	38698	7543

	the counters, or can be shown digitally on mobile phones. These boarding passes are issued with an encrypted QR code on them.			
eVerification of booked Ticket	At the helipads the boarding passes are verified using a mobile application through which the deployed government official at helipads scan QR code on the boarding pass or e-ticket before boarding the helicopter. The mobile app is integrated with online web portal through web services. The boarding details of passengers are updated on web portal on real time basis.	-	4759	0
eRefund	The tickets which are cancelled due to non-flying of helicopter because of bad weather, technical problem or tickets cancelled by individual are refunded online as per cancellation policy.	-	4484	121
MIS for Heli Service Provider	All Helicopter service providers have been provided user credentials on the portal, through which they are able to generate various reports like date & slot wise passengers list, day-wise booking of tickets, total amount collected towards booked ticket and other analytical reports.	-	-	-
MIS for Government official	Through this type of user, the government official can generate different kinds of analytical reports from the booked tickets data.	-	-	-

Implementation

Implementation Coverage achieved

Initially, Tourism Department Uttarakhand planned to start window based booking from the web-portal by authorized officials only. For this ticket windows were established at three helipads for booking of helicopter service tickets through centralized web portal.

Later on, after observing successful implementation of window based computerized ticket booking, the government decided to start online booking of tickets for citizens. 70% of the total tickets were opened for online booking while 30% were allowed to be booked through window booking. This was done in a very short time period in 15 days.

Improvements / Enhancements

Initially the concept of e-ticket was there, which was found little hard to track each individual, due to which e-boarding pass system was introduced in that very season of the first year. After that the mobile app was developed in the

second season of that same year to get the boarding pass verification done at the helipads. Due to which the fraud tickets were noticed and the necessary action were taken by the Government.

ENABLER

Processes Re-engineered

Government Process re-engineering

Booking of Tickets for Helicopter Service by Citizens

Pre-Computerization:

Manual System	Time and Cost implications
Many of the pilgrims visiting or planning for visiting Kedarnath were not aware about availability of Helicopter services at Kedarnath.	• Pilgrims willing to avail Helicopter service in place of 14 Km track were bound to pay heavily during peak season of the Yatra. • It was very difficult and time consuming for local administration to manage on-spot booking due to heavy rush of pilgrims. • The accounting of no. of pilgrims availing helicopter service was not possible. • The royalty for flying helicopter service in Uttarakhand, to be paid by helicopter service operator to Government was not transparent.
Tickets were booked either manually by tour operators or through individual websites of helicopter service operators.	
Manual booking of tickets was leading to black marketing of tickets during the peak season of char dham yatra.	
• There was no single repository of total seats available in a single day. • The touts and some tour operators were able to create false demand of ticket or hold large no. of tickets thereby opening doors for black marketing of tickets.	

Post-Computerization:

Online System	Time and cost Implications
• Citizens willing to visit Kedarnath can plan their visit by booking of online ticket for Helicopter service. • The helicopter service operators can not charge more than the prescribed rates of availing the service by Government. • The ticket generated through online portal is sent to registered mobile no of the applicant. • The availability of no. of seats on a particular day is available on portal dashboard on real time basis. • Any citizen can book online ticket to a maximum of 6 passengers. • The mobile no. given at the time of booking of ticket can not be used twice in one season of Yatra. • The authenticity of booking of ticket is verified by sending OTP to the booking person.	• The application software is developed in-house by team of NIC Uttarakhand at no cost. • The tourism department has hired only one technical manpower (One Programmer) for day-to-day hand holding of technical issues.

• The QR code based boarding pass of individual passenger is generated through the portal.	

Challenges

- Since the online system was implemented for the first time in the State in char dham yatra season in 2019, a lot of opposition of new system was experienced from helicopter service operators as well as by tour operators.
- Internet connectivity at remote helipad locations was a bottleneck initially for 100 % percent verification of boarding passes.
- As per the norms, a fix no. of tickets is booked for a particular slot of 3 hours of flying time. Sometimes passengers get accumulated at boarding location when helicopters are not able to fly in a particular slot due to bad weather conditions.

Outcome and Key achievements

- A completely transparent and automated system has been implemented for online booking of tickets.
- This ensures hassle free booking of ticket by an individual at government prescribed rates of flying.
- Tour operators are allowed to book group booking of max. 20 passengers using their user credentials.
- Proper checks and validations are implemented in the system to stop blocking of tickets etc to the best possible extent.
- The portal may be used for automation of other transport services in the State.
- Government is able to generate more revenue in the form of royalty deposited by helicopter service providers by knowing exact figures of passengers flown by helicopters.
- The implementation of such hassle free online and transparent system in the State for helicopter services to Kedarnath Dham helps in promotion of tourism in the State.

Technologies

- NIC SMS service has been integrated in the portal and used for sending OTP before after booking of ticket.
- e-Ticket can be generated any time by providing registered mobile no. and after verification of sent OTP.
- Only one ticket of max. 6 passengers can be booked by one mobile no.
- A Mobile App is developed for verification of boarding pass by officials at the helicopter boarding location.
- Tour operators can do group booking of maximum 20 passengers using their user credentials.

People

Capacity Building:

- Regular training programs are conducted for Tourism officials and tour operators to use the system.
- The department officials are now able to work on this web portal after providing basic operational training on computers and internet.

Change Management Process:

Garhwal Mandal Vikas Nigam (GMVN) and Uttarakhand Civil Aviation Development Authority (UCADA) officials, who are nodal agencies for helicopter operations in the State are able to use online portal for generation of different kinds of reports using their user credentials.

VALUE INDICATORS

Learnings for sharing

The portal for online booking of tickets is in public domain and any citizen can book the ticket through the portal. But for ensuring 100 % verification of boarding passes department should ensure following:

- Internet connectivity at all helipads
- Appropriate no. of officials for verification on lines of airports.

ICT infrastructure for hosting the web portal was a big issue initially while conceptualizing the project. Later on it was decided to host on Virtual Servers at State Data Centre.

Digital Empowerment

- Accessibility of online system at remotest of the location.
- Availability of nearby places around Kedarnath dham and other key details which a visitor may be interested in, are available at single point through portal.

Green e-Governance

- Implementation of online ticket booking system and making it available on individual mobile phones saves large amount of papers in printing of ticket.
- Limited use of gadgets. Cloud based hosting of Portal.
- Online receiving of feedback about portal from citizens and other stake holders.
- The maintenance of hardware systems are in place for enhanced efficiency of hardware and therefore minimizes generation of e-Waste.
- Awareness programs to create environment friendly working
- Restrict transportation/ travelling as all information is readily available and accessible through portal.

Shri Dilip Jawalkar, **IAS**, *Secretary, Tourism Department Uttarakhand (Uttarakhand), dilipjawalkar@gmail.com*

Shri Sanjay Gupta, *Senior Technical Director, National Informatics Center (Uttarakhand), sanjaygupta@nic.in*

Ms Shivani Gothi, *Senior Systems Analyst, National Informatics Center (Uttarakhand), shivani.gothi@nic.in*

Sikkim Tourism Portal for Tourists and Stake Holders' Services with Health and Safety Compliant features

Department of Tourism and Civil Aviation, Sikkim

K. Jayakumar

PROJECT OVERVIEW

The primary objective was of creating an Eco-Systems for digitized/computerized management of operations and activities for promotion of tourism, in keeping with the interests of tourists and stakeholders and providing augmented valued added services maintaining standards of services and ensuring compliance with policies of the state especially with regard to safety and health, encompassing thereunder several aspects such as those detailed below;

- Presenting profiles of tour & travel packages, accommodation units including hotels, home stays/ farm stays, guest houses, B&B establishments, service apartments with their features and facilities pictures, along with the profile of services offered, location, sightseeing places around, exciting experiences for the tourist and travellers and logistic details of reaching the accommodation units and associated tour packages that can be availed.
- Issue of Permits like Restricted Area Permit, Protected Area Permit, mountaineering/ climbing of peaks, trekking, camping and for visiting tourist destinations in Sikkim.
- Registration of Tour and Travel Operators and Renewal of such Licenses with associated mechanisms for inspections to monitor quality of services provided, institution of regulatory & compliance mechanisms as part of the decision associated with such registration/ renewals.
- Display of information related to tourist circuits, tourist packages, travel destinations, facilities, accommodation including home stays, logistic services that can be availed from registered operators.
- Support services for disaster/ accident relief, comprehensive insurance, evacuation and medical aid to travellers and tourists.
- Leasing of Tourism Assets through eAuction, payment of lease and associated monitoring for management of assets and augmenting revenues commensurate with services offered.
- Training and Capacity building for travel and tour guides, ensuring competency standards, certifications, licensing and renewal of licenses.
- eMarket place for soveneirs, ethnic products, garments, artefacts and packaged local produce.
- Tracking the no of tourists and places visited with geo-tags and location aware software modules and reporting mechanisms to align the services adapted to the movement and requirements for support services

A dedicated back office core team and digital operations task force (DOTF) monitors transactions, activities taking place on the portal and facilitates various operations which includes

- handholding for upload and management of contents in the portal by engaging the home stay owners and managers of facilities.
- sending communications either by triggering autonomous capabilities of the system to send SMS/ emails intimating, acknowledging,

communicating status, confirming or otherwise notifying them of actions to be taken at their end or composing custom communications addressing unique needs/ requirements of tourists.

Key Stakeholders

- Simple to use interactive self-service environment for availing services adapted to their needs
- Information, Pictorial representations, thematic maps, navigation aids with links to guide maps, brochures, Dos and Donts, policies and travel tips
- Submission of Travel plans and information disclosure to enable backend team and help desk provide tour guidance
- Information on Events of Interest, Places of interest around the destinations being visited, travel, entertainment, recreation recommendations
- Promotions, concessions, attractions and offers posted by stakeholders
- Alerts, context helps, location-based services on portal
- Backend help line/ call centre assistance and back end task force for monitoring transactions on the portal
- autonomous functions of the system to acknowledge, respond, escalate and notify tourists/ travellers

Self Help Services for Tourists & Travellers

- Profile related & travel information submission for entry formalities, permits, accommodation, availing services for travel, trekking, adventure, homestays etc
- Making self-declarations of personal, family and accompanying persons
- Declaring of travel history/ health certification
- Travel preferences – premium, luxury, choice of value-added services
- Viewing and downloading maps, brochures, navigation travel tips
- Requesting special services for aged persons, differently abled

Back End Operations with Help Line

- Entry formalities / Reporting requirements
- Emergency and Rescue
- Assistance for destination planning and tour itineraries
- Facilitation and guidance for compliance with procedures
- Incident Reporting & Customer Care
- Profiling of Stakeholders, tourists/ travellers
- Training for Proficiency/ Competency and Quality of Services as also Compliance
- Crowd Sourcing & Validation of Data for currency and Updated data
- Operations permissible only if the user is a compliant user (enforcing discipline)

Envisaged Outcomes

- Enhanced Quality of Services - Booking packages, travel services, accomodation, complaints/ grievance redress, facilitation support from Back End
- More Opportunities to all Stakeholders & employment / engagement
- Better tracking, value addition, changes adapted to demands/ Profiles, Rescue and Relief
- Improved Revenues

- Back Office Operations for complaints handling/ Better marketing, Image building & Promotional efforts

Focus on MICE/ brand building

Software

- *Technology Stack:* Microsoft .NET Framework 4.5, MVC 5, Razor view Engine
- *Programming Language:* C#
- *Backend Database:* Microsoft SQL Server 2012
- *Frontend Tools:* HTML5, Javascript, JQuery, Cascading Style Sheet (CSS3), Bootstrap 4.2.3 IndexDB (Local Storage Database)
- *Hardware Data Server;* Application Server; Exchange Server. System maintains Security and confidentiality standards. Security requirements has four primary components namely authentication, confidentiality, integrity, and availability.

Cyber Security

The Portal Software has been tested and certified for Security and Audited by AAA Security Consultants empanelled by NICSI.

Disaster Recovery and service continuity

The Portal has been deployed on NIC Cloud Infrastructure under Secure Environment with failsafe provisions, disaster recovery and reliable, manageable, highly available managed ICT infrastructure.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Crowdsourcing of service provider contents/details	Consolidation, business data verification and registration of service providers (hotels, travel agents, tour operators etc.) enabling authenticity of information for efficient service delivery of tourism related services.	-	-	1620
Business data profiling of service providers	Enable secure access into the web portal for individual business entities (with secure login credentials) within various business verticals for endorsement and promotion of business, authenticity of business data and eradicate fraudulent practices of rendering services by non-recognized establishments.	-	-	1242
Certification of service providers for Health & Safety /COVID readiness	Empanelment/recognition of service providers during the pandemic by means of providing digital evidences in the form of profile completion (with appropriate indicators suggesting % of completion), uploading	-	-	874

	COVID preparedness photographs, training details and online submission of declaration on adherence of SOPs issued by State Government. This reinforces the safety aspect in terms of reassuring tourist planning to visit Sikkim as a safe destination during the pandemic.			
Tourism Content Management System	Integration of a dynamic content management system to progressively manage content to highlight information such as various tourism circuits, destinations, places of interest and ability to store numerous other data for information relevancy and variety of choice for travelers.	-	-	Over 1263 Destinations
Travel card	A unique online feature for tourists to apply for a travel card providing essential tourist related information such as personal details, tour information and health declaration. This facilitates digital identification of individual or group tourist with a unique 12 digit code with downloadable PDF format and QR scan facility. Benefits include: i) Pre-determine expected volume of tourist visits in coming months ii) Hassel free documentation for travelers iii) Effective & efficient tourist tracking and footfall count. iv) Easy contact tracing during pandemic with features like capturing daily tour itinerary & log destination visits by accommodation units. v) High quality of service delivery for tourists by empanelled/registered service providers.	-	-	874

Implementation

Implementation Coverage achieved in comparison to the plan / target

The idea behind digital Operation is also to bring all hotels, homestays, B&B establishments, guest houses, Service apartments, farm stays, travel operators, trekking/ mountaineering/ camping service providers etc under the ambit of regulated business and quality assurance framework, improved tax compliance, improved standards of services. The Sikkim Registration of Tourist Trade Act is being amended to accomplish this vision. Presently Trade Licensing is done be agencies like Gangtok Municipal Corporation, Urban Development Department and Rural Development Department in their respective jurisdictions. For entities/ firms and businesses involved in tourism

trade this task will be undertaken by Tourism and Civil Aviation Deptt in a Digital Ease of Business Environment.

Improvements/ enhancements specifically planned out during next one Year

The concept of a Travel Card is unique. It helps track the no of tourists, their profiles, the destinations being visited and their duration of stay at various places. This data will help plan improvements and also facilitate the rolling out of value-added services adapted to their requirements. The information captured also helps tracing and tracking in case of an emergency situation and to render speedy help – rescue and relief. Over time it is proposed to roll out location-based services and provide information and updates on neighbourhood attractions, suggest exploration and availing of services by local communities and local attractions and experiences.

ENABLER

Processes Re-engineered

One of the Predominant goals of the Transformative exercise undertaken for improved and augmented quality of tourism services delivery was to automate, improve and streamline processes, which typically required reengineering of current manual processes. A publication “Sikkim Tourism – A vision for transformative change” was released on Aug 15, 2020, highlighting the salient aspects of the strategic approach underlying the changes that are being ushered in. The Sikkim tourism portal implements automated processes and serves as a platform for collaboration to connect, to engage and involve stakeholders in the processes they require to participate in, to accomplish the envisaged outcomes. In re-engineering processes for automation, it has been ensured that the stages/levels and process steps for relevant transactions and for processing digital records and e-documents for decisions has been ascertained and reduced wherever possible on the basis of BPR. Information is maintained online in real time and is available for evidence-based reporting / record keeping. Rigorous efforts were also required to integrate the business rules relating to variants, visualize alternative flows, and validation checks. Analytics and Decision support including reporting formats were elaborated with the availability of realtime/ online information. It was necessary to visualize and integrate new processes and repertoire of new activities for proactive engagement of tourists and stakeholders, involving them in the cycle of conceptualizing interventions, mechanisms, models, policies etc relying on their inputs/ feedback. The initiative embraces and ushers in a ‘performance culture leveraging automation of processes, re-design of user interfaces, enriched cognitive human centric interfaces, automation of administrative and business procedures, enhanced collaboration/networking, team performances, changes in workplaces accompanied by learning, business insights, continuous improvements on the basis of feedback, peer mentoring, knowledge/experience sharing and capacity building, and transparent mechanisms for evidence based decision support/enhanced efficiency at all levels. The design of a systems and cloud-based solution serves as a black board architecture, an evidence-based decision support system and an automated service delivery mechanism with an additional option to post and update information relating to operations for availing services and completing processes in an offline mode for rural tourism destinations at various Tourism information Centres or at Hotels or at Tour Operators Offices having internet connectivity. The design of process automation involved user friendly forms

with online help, need to know information, tool tips, customized menu with appropriate control features to facilitate date entry, validation, authentication, integrity and security of data. All data updations take place through the processes designed for updation of relevant databases with inbuilt validation checks. User contexts were created with well-defined use cases, process flows, alternative options, drill down views with relevant cross-references for corroboration and enabled comprehensive understanding of context within which actions were performed and information entries relating to field operations updated. Configuration features enabled roles to be customized for the designated persons/ agencies participating in processes to perform transactions, update information and take decisions relating to the offer of various services in a transactional mode.

Technologies

Approach for Design and Development of Automated Processes. Information Structures and Data Base architecture, Information catered to needs of Stakeholders are to be incorporated with (a) the associated Authoring & Content Upload & Information Management functions. Information is required to be displayed on web pages with interactive links for generation of realtime, online information on tourists, places of visit, tourist circuits, destinations, amenities, facilities, accommodation and other conveniences, knowledge resources and reference materials for policy dissemination, guidelines for compliance, learning, training and competency development of (i) Tour and Travel Operators (ii) Hoteliers and Home Stay Operators (iii) Lease owners of Tourist Assets, Facilities and way side amenities will be uploaded and presented to the users browsing the portal. Simplified two-step process flows are adopted for online transactions related to requests for issue of permits, booking of accommodation, tourist packages, availing tour and travel operator services, availing insurance etc. The software will have texts, navigation assistance, context-based tools for data capture, user profiling, input validation, content management and drill down traceability, tool tips, navigation aids, bread crumbs etc. A communication module would also be made functional and embedded in the software for automated standardized messaging for informing or engaging the stakeholders comprising travel & tour operators, asset owners and managers, tourist and travellers, hoteliers and home stay owners with features such as those under mentioned; Embedded triggers get invoked upon the occurrence of events, requests made by the users, to notify the persons required to take appropriate necessary action and also to update status dashboards for monitoring and review of progression of processes. Messages would also be used optionally with user permission for notifying them and drawing attention to responses against requests made by them for information, booking of accommodation, issue of permits etc. The system would also send emails / messages drawing attention to updates, action to be taken, escalate events in the absence of action within prescribed timeframes or alerts signifying need for compliance, notifying actions follow up required for improvement in services on the basis of inspections guidelines, dos & donts would be appropriately displayed on screen and for interactive display when invoked by the user to inform them. Immediately after registration and login, a more adaptively customized myhome page to appear for the three classes of users (i) Tourist and Travellers (ii) Tour and Travel Operators (iii) Tourist Asset Lease Owners and Managers (iv) Hotelliers and Home Stay Owners. Crowd sourcing model is employed for upload, review and validation of information

and content, relating to tourist circuits, accommodation, facilities, amenities, services offered to tourists and travellers. Services Offered would also get monitored for quality assurance with embedded features to elicit feedback on quality to enable improvements and employing closed loop methods for review of operations.

People

Institutional Mechanisms for Project oversight and Monitoring. The system would be developed with components which can be individually driven by appropriately constituted empowered teams with each of such teams entrusted with tasks to be monitored and managed, commensurate with results and outcomes envisaged. Constitution of teams would be notified specifying their responsibility for various tasks, specifying milestones/ specifics of the accountability required of them and defining tangible outcomes. Mechanisms for reviewing, evidence of accomplishing outcomes, monitoring impact would be built in with relevant reporting, dashboards etc. Measuring success in terms of quantum and quality of content, number of users, profile categories, outreach/results will be backed by evidences and embedded analytics – showing tables with graphical depiction of trends, patterns etc.

VALUE INDICATORS

Learnings for sharing

Category	Challenges Faced in Change Management and Capacity Building exercise[s]	Lessons Learnt
Non-Clarity/ Ambiguity at Early Stages of Project Planning and Implementa-tion	Clarity of deliverables usually evolves over a period of time during roll out with progression in the project lifecycle. Hence, at the stage of process redesign and requirement analysis, the details of implementation are less clear. The terms used for deliverables are usually interpreted differently by the different groups of stakeholders. These differences in perspectives often causes difficulties in firming up user acceptance criteria, handholding requirements, delays in the project execution and rework. However, iterative approaches for validation and user acceptance were adopted. Exit criteria for above mentioned milestones were not clearly defined in	More diligence was required for enhanced levels of clarity to emerge with iterative and progressive implementation of the software. Hence provisions for user acceptance and validation prior to go live and associated deliverables are required to be articulated taking into consideration the iterative development model and compliance with functional and non-functional requirements. Extensive efforts are required to intensify the interactions among all participating individuals and teams to ensure that project Teams and stakeholders are in alignment on the details relating to description of services, deliverables acceptance criteria in the contract. It is desirable to have a measurable exit criterion defined corresponding to every milestone. Preliminary efforts to document all the ambiguous points /risk and issues at the time of proposal and focus thereafter on these areas to describe and elaborate such aspects would be useful.

	the contract.	
Frequent changes in Requirement	There were frequent changes in the requirement and requirements were communicated through various modes like telephone, e-mail, discussion etc, which resulted in: 1) Difficulty in gathering and freezing the requirements in a structured method. 2) Deviation on the project milestones	• It is recommended to adopt agile/iterative methodologies • It is recommended that participation of technical analysts may be involved in requirement gathering on need basis so that the iterations among these teams are minimized. • Frequent demos with the users/ stakeholders to ensure agreement on the functional flow & implementation. • Requirements gathered from the customer require to be documented in the form of story points by business analysts for quick release. • Sufficient buffer must be accounted for at the start of the project to cater to frequently changing requirements from the customer and resulting rework. • Project team must be very much flexible, volatile and adaptive to handle frequent requirement changes. • The estimation technique of rigorous Planning at each stage has been found to be useful in tracking plans with execution and progress.
Interoperability and integration of Modules	The software had to be integrated and modules had to interface and exchange information	Interoperability requirements had to be envisaged in advance with considerable foresight. Aspects such as database design and interface development will have to keep such requirements in mind.
Role Centric WorkDesks and Simulated Electronic Workoplaces	In transitioning to an electronic workculture, it is often difficult to wean away the employees from paper based conventional work culture. It may be necessary to align the software features to facilitate the transition.	The software developed had integrated inbox, outbox, role centric work desk GUI with relevant links to emulate an electronic workplace. This has made it easier for users and stakeholders to relate to their work items and embrace electronic work culture
Configuration Management, Alerts, Talk back features and Evolved Maturity of Software Design	Government Organisations are often complex and adopt processes and practices that are difficult to address in an automated environment. For example, transfers, delegation of work, allocation of tasks, performance management, office practices etc require to catered to in the software, Also employees require to	The software solution requires to be advanced to enable configure the behavior of the software to meet different conditions and align the behavior with work practices. Data validation would require to be performed alongside entry of information in the fields. Alerts, talk back features, appropriate control features, cross reference links, pre-population of entries in drop down menus are all subtle but important aspects that require to be addressed.

	be alerted and their actions validated even as they perform various tasks. The relevant policy references, business rules require to be referenced and invoked.	

Digital Empowerment

Technology is an equalizer and provides opportunities to inclusively deal with all categories of persons availing or offering tourist services - ranging across young persons, women, differently abled, tribals, disadvantaged, rural communities and vulnerable sections of the society.

In order to further enhance inclusiveness, access is being provided through a network of 29 Tourist Information and facilitation centres, in areas where internet connectivity and wifi cannot be deployed.

The Department of Tourism is also facilitating the deployment of wifi and hotspots in various hotels providing them with solutions and empaneled vendors under rate contract.

The tourists have the option of updating their travel cards by themselves, or at tourist information and facilitation centres or at hotels/ homestays or at travel operators' offices which are wifi enabled. Alternatively, they may WhatsApp or fax tour details to the backoffice Digital Operations Task Force team for backend data entry/upload.

Additionally, extensive provisions have been made to ensure SMS communications, in addition to email and web-based status updates are provided, to enable tourists and stake holders view and update the profile of tourist service providers, and offer value added services on the basis of location enabled/ tracking services and other built-in features embedded in the processes for transactional service delivery.

Stakeholders have been extensively trained on the portal operations and digital processes. A dashboard is also available on the portal providing the trends relating to registered stakholders, their profiles and the travel cards/ no of tourists arriving and staying at various places.

Green e-Governance

Sikkim is an environment friendly state with green & clean processes having been adopted in all community initiatives.

Less papers are used, plastics are banned, the entire state is organic adopting vermi composing and recycling methods extensively.

The State IT Deptt has implemented an eWaste initiative to optimize use of electronic gadgets and implement measures for the safe disposal of waste after recovery of recyclable materials.

Dr K. Jayakumar, *Additional Chief Secretary, Deptartment of Tourism and Civil Aviation (Sikkim), jaykay87@nic.in*

APSBCL – Retail Outlet Monitoring System

Andhra Pradesh State Beverages Corporation Limited

D Vasudeva Reddy and Bodgari Balakishore

PROJECT OVERVIEW

Objectives

The objective of the department is to make the overall functioning of liquor manufacturing, storing and distribution more responsive, transparent, agile and tracked on real time basis to the extent possible.

Though department has an online system which covers the overall functioning, it was out in place around 5 years back and over the period there are technical advances which department want to leverage. One of the main objectives is to bring the manufacturing of liquor at distilleries into 'real time tracking mode' which currently functions in offline mode which is causing many bottlenecks for department.

Another objective of department is to bring down the number of retail outlets and run them on its own. Further it want to implement a system at these retail shops for effective monitoring of sales which shall provide an insight into the trends and based on analytics, govt can prepare a suitable course of action.

In this context, department wants to overhaul the existing system which shall help in eliminating the existing bottlenecks and allows it to leverage the latest technology in streamlining the day to day operations and provide a better and effective visibility in its revenue generation.

Scope

Geographical: Andhra Pradesh

Functional:

Admin Module – This module consists of the following

Material Management Section:

- APSBCL Outlet
  i. Create new outlet
  ii. Activation & Deactivation
  iii. Modification
- Mapping/Approval of New Item
- Liquor pack - type mapping
- Strength Mapping
- Monitoring of payments of Customs Duty and Duty Free products
- Indent Mapping at Depot

Depot Module:

- Monitoring of stock sent to Outlet
- Cash remittance
- Sales management
- Reconciliation
- Transportation
- Theft /misappropriation
- Physical verification

Retailer Module:

- Authentication to collect the goods from the Depot
- Transport & Tracking trough GPS
- Receiving of Goods/products & reconciliation

- Sale to the Costumers
- Depositing the cash with department
- Bill generation
- Sale proceedings
- Reports
- Development of Mobile Apps with all above features

Finance Module:

- Reconciliation of all sales and cash deposits at BCL Outlets
- Monitoring Issue Price:
  i. Supplier Cost
  ii. Excise Duty
  iii. Addl. Payment on Excise duty
  iv. VAT
  v. Remuneration to the Corporation
  vi. VAT on Remuneration to the Corporation
- Payment to the supplier in real time basis
- Regular payments (full payment) for every 45 days from the date of sale
- Cash discount payment
  i. Daily
  ii. Weekly
- Calculation of penalties on non-moving stocks
- Calculation of Breakage charges (form 3, 4 and shortage)
- Handling of CC/DC payments @Retail outlets

MIS & Analytics:

- MIS reports - Daily, Weekly, Monthly, yearly reports for various activities at all levels.
- Any other additional MIS reports as per department requirements
- Circle wise reports
- Zone wise reports
- Data Analytics
- Dynamic Reports generation with pre-defined parameters
- Role based dashboard
- Cash discount payment
  i. Daily
  ii. Weekly
- Calculation of penalties on non-moving stocks

Vigilance & Monitoring:

- Development of mobile apps for effective monitoring
  i. Checking of heals and QR codes
  ii. Retrieving the required information from central server
  iii. Registration of complaint & forwarding to appropriate authorities
- Web based solution with above features

Issue Tracking System

- Web based solution for stakeholders to log their issues
- Forwarding to maintenance team & closure of the issue

User/ Device Management

- Creation/ Deletion of Users and their respective mapping
- Creation/ Deletion of BCL outlets, jurisdiction mapping, mapping with Depot
- Registering the devices and their respective mapping

Integration with CFMS

- Cash Management @Retail Outlets
  i. Generation of challan for transfer of deposited cash to various head of accounts including APSBCL operational charges of finance/revenue department directly
  ii. Success/ failure confirmation from CFMS to department server
  iii. Processing of this information and updation in department server
- Web based solution with above features

Issue Tracking System

- Web based solution for stakeholders to log their issues
- Forwarding to maintenance team & closure of the issue

User/ Device Management

- Creation/ Deletion of Users and their respective mapping
- Creation/ Deletion of BCL outlets, jurisdiction mapping, mapping with Depot
- Registering the devices and their respective mapping

Stake Holders:

- Citizens
- Andhra Pradesh State Beverage Corporation Ltd.,
- Commissioner of Prohibition and Excise
- State Finance Department
- Suppliers of Liquor

Software

Software Environment: C#, asp.net & , Microsoft SQL Server Database
Tools: Microsoft Visual studio
Application Server: IIS
Hardware: VM Hosting

Cyber Security

Security certificate from APTS (AP Govt. nodal agency of cyber security for all the govt. department's IT applications).

- APSBCL Department _Login: Unique Ref No: APTS/APCSP/Assurance/167/2020
- APSBCL: Unique Ref No: APTS/APCSP/Assurance/97/2020
- APSBCL Retail Application: Unique Ref No: APTS/APCSP/Assurance/96/2020

Disaster Recovery and service continuity

- This ICT solution is hosted at AP State Datacenter. Since this data centre hosts almost all the flagship IT applications of AP govt, it is fairly safe and the agency maintaining this data center follows all the best practices and laid out procedures. However, as AP was bifurcated recently and hence is in process of establishing its own infrastructure, it is yet to set up a DR site.
- As part of DR & Business Continuity, there has been proper backup policy in place which is tested frequently for its effectiveness and the servers are configured in High Availability mode. All the Application servers and database servers are configured in Virtual Environment with redundancy.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Scanning of bottles for sale @ BCL Outlets – both Online & Offline	*Description:* This service includes sale of each liquor bottle by scanning the Heal attached to it for tracking purpose. *Benefits:* • Exact record of sale leading to Plugging in the Revenue leakages • Reduction in duplicate/ illegal liquor circulation • Real time availability of stock status which leads to improved revenue & minimizes inventory obsolescence • Timely closure of day end Sale	NA	18,40,76,168 bottles sold	35,22,47,293 bottles sold
Mobile apps for physical verification, sales & enforcement	*Description:* This service helps in physical verification of sale, stocks, genuine bottles etc at the retail outlet. Department officials can verify the actual data at retail outlet against the data in system. *Benefits:* • Helps stopping of availability of duplicate liquor • Reduces misappropriation • Stopping revenue leakage • Better & effective enforcement of government policies	NA		
Treasury Integration	*Description:* Through this service the department finance has been integrated with state government treasury. *Benefits:* • Allows the collected amount to be deposited in treasury directly thus giving a better insight to government in its revenue. • Reduced work load on reconciliation of funds	NA		Transaction Count: 1,32,122 Amount: Rs. 2,483.7 crores

Implementation

Implementation Coverage achieved in comparison to the plan / target

- When the department started this IT initiative (August, 2019), it has a target of setting up 3500 retail outlets across the state. Against this target, it has successfully set up 2934 retails outlets which are fully functional (84% Target achieved). As AP Govt. has a stated policy of complete prohibition over 5 years, it is reconsidering whether to go ahead with opening the remaining retail outlets and with this background it can be assumed that 100% of target has been achieved.

- In terms of functionality, following modules were envisioned at the start of this IT initiative
  i. Indent Management
  ii. Scanning of bottles
  iii. Supplier Payment
  iv. Stock Reconciliation
  v. Revenue reconciliation
- All the above modules/ functionalities have been developed and are LIVE thus achieving 100% target. This IT initiative is already serving all its intended stakeholders (Suppliers, APSBCL, Citizens, Treasury) thus achieving 100% target.
- Apart from the above functionalities, many other important functionalities like integrating with state treasury for daily sales deposits and physical inspection etc ideas were brought up during the course of project and all these functionalities have been built in the system over a period of time and successfully implemented.

Improvements/ enhancements specifically planned out during next one Year

Some of the improvements/ enhancements rolled out during last year are mentioned below:

- Mobile Apps for physical verification & enforcement – This has dramatically improved the compliance of sales recording and stock updation
- Offline scanning – This is important as many outlets are located in remote areas where due to connectivity issue, real time (online) scanning was proving challenging.
- Role based Dashboards – Dashboards have been implemented for higher officials providing them real time insight into sale, stock availability, revenue generation etc which helps them in taking informed decisions
- Integration with Treasury – This has reduced the time taken to deposit the collected amount into treasury

Improvements/ Enhancements Planned for next year:

- Replacement of Payment Gateway – Replacement of payment gateway with an Integrated Payment will allow quicker revenue deposit (T+1 instead of T+3).
- Cash Collection at retail outlets – Currently, most of the retail outlets are depositing the collected cash as per their convenience – varying from next day to within a week. A process supported by a suitable mobile apps is being devised which will allow the collected cash to be deposited into department nodal account the very next day.
- Seamless Integration with depot module – Currently, depot module is not completely integrated with retails outlet module but plan is to do a seamless integration which will be of great help to all the stakeholders.

ENABLER

Processes Re-engineered

Sale of liquor – As the very first step of retail outlet process reengineering, the recording of sale of liquor bottles was automated through implementation of an IT application for Heal scanning. This automatic scanning through the implemented IT application resulted in automating the process of stock updation and end of the day sale closure. It also automated the calculation of

amount to be deposited to treasury.
End of day sale closure - This also helped in standardizing the end of the day sale closure across the state as the system is designed in a way not to allow any sale after the pre determined time of sale closure.
Physical Verification - The process of physical verification was much simplified through the use of mobile apps as it can be done in real time. Similarly it allows immediate determination whether the given bottle is genuine or duplicate as scanning of attached heal will provide all the relevant information.
Amount Transfer & Reconciliation - The process of transfer of collected amount to treasury is now standardized and simplified by completing the integration of department finance department with treasury. At the same time the process of fund reconciliation was simplified.
Indent Management – Most of the steps involved in Indent management is automated which helps in better stock management and ensuring the availability of specific brand of liquor in general thus improving the revenue.
Supplier Payment – This process has been automated through the use of implemented ICT solution as the status of indent from a particular supplier is available and hence based on department policies payment can be made directly to supplier bank account

Technologies

Use of data Analytics – As the data related to consumptions during various months, specific durations and type of liquor, specific brand etc is available from the geography across the state; it has helped in drawing up supply pattern of liquor accordingly. This has greatly improved the revenue realization, forecasting and effective stock management.
Social Media – Sale and consumption of Liquor being a sensitive issue from societal point of view, use of social media and its regular monitoring has greatly helped the department in achieving its objective.

People

- Given the extent of coverage of this IT initiative, effective training of concerned resources is very important and a comprehensive capacity building program is in place for this. All the manpower across the 2934 retail outlets were given extensive training on use of scanning application, closure of end of day sale application and all other related applications.
- Resources are deployed at every depot to handle the related functionalities and were given training on how to use the IT application. These resources were involved in regular training to the mapped retail outlets.
- Department officials were provided know how on using the mobile apps for physical verification and checking stocks etc.
- Most of these trainings were conducted in face to face and follow ups were done through use of remote meeting tools. These remote meeting tools were widely used during the lockdown to keep the related resources updated.
- The leadership support from department which includes Managing Director APSBCL, Commissioner Excise was very important and they were very supportive throughout the implementation of ICT solution. They regularly encouraged the whole team (service provider & department both) which kept the morale high and helped in achieving the objective.

VALUE INDICATORS

Learnings for sharing

Challenges & Learning –

- As the project conceptualized the scanning of each bottle before sale, the availability of connectivity was very important. However, given the geography of AP, at many a places it was very difficult to get the connectivity required for execution of this service. To overcome this challenge, APOnline technical team adopted the offline mode of scanning which helped achieving the objective.
- Another challenge was handling the sale using scanning during the peak hours – As there are big crowd and very high volume of sale is expected during peak hours, online scanning (even at places having good connectivity) was becoming an issue. To overcome this challenge, APOnline team deployed a local set up where all the sale related scanned data was stored instead of directly coming to main servers and this data was reconciled after peak hours to main servers.

Process Change –

Earlier the collected amount was first deposited in department's bank account and then was transferred to treasury which used to take 3-4 days and double reconciliation was needed. A process change was implemented where the collected amount was transferred directly to treasury under its different related head of accounts. This helps in avoiding the double reconciliation and delay of amount deposition under relevant head of accounts in treasury.

Digital Empowerment

Department has plan to introduce the digital payment modes across all the retail outlets. This includes introduction of UPI payments and Credit and Debit Card payments. The development is under progress and it its expected to be launch soon.

Green e-Governance

- As most of the processes involved has been automated resulting in shift from manual processes which used to consume lots of paper. Now the use of paper has been minimum, a big step towards green e-Governance.
- Also, department has been using the related IT Infrastructure (servers, network equipments etc used in hosting) along with in house IT equipments at its offices, depot in a very judicious manner helping in extending their life. So, through the efficient use of IT equipments, department is achieving green e-Governance.

Shri. D Vasudeva Reddy, *Commissioner of Distilleries & Breweries & Managing Director, State Beverages Corporation Limited (Andhra Pradesh), mdapsbcl2019@gmail.com*

Shri. Bodgari Balakishore, *Head Technology, APTOnline Ltd (Andhra Pradesh), bala@aptonline.in*

Contractors' Labour Information and Management System (CLIMS)

NTPC Limited

Akhil Raizada and Saurabh Banaudha

PROJECT OVERVIEW

Objective

NTPC indirectly employs thousands of contractors' workers in its power-plants across India and also assumes moral responsibility of this large workforce in ensuring proper wages, healthy life and social security. However, erstwhile practices of managing contractors' labour were non-standardized series of activities operating in silos. Most of the activities targeted towards welfare of contractors' workers, largely relied on manual-records maintained by contractors leading to huge amount of paper-work and at times gross miscalculations. Statutory compliances were difficult to achieve and IR clearance for contractors' bill payments were slow and tedious. Other issues included multiple data formats, manual attendance and problem of proxy workers, tedious process of maintaining gate passes, delay in payment & validation of payment to workers, time consuming MIS and statutory reports etc. It has been successfully running in 45 locations of NTPC. All the processes of labour management have become online and are performed using CLIMS web application.

CLIMS is designed to automate several time-consuming processes in a contract involving labour force, including wage sheet processing for contractor's labour and statutory reporting and archival. The application covers the management of information of contractors and their work contracts including management and control of contractor's labour force; their work timings, wages, welfare, safety and health concerns. While the contractor retains ownership of labour data and enjoys full control over labour attendance, work timing, wages etc., system provides necessary information windows to Engineer-in-charge, HR and safety department etc. For ensuring compliance of labour laws and labour welfare. Pre-set Workflows have been incorporated in CLIMS wherein labour can enter the plant only after the requisite safety training and medical clearance and EIC checks.

It is not only a labour information and attendance system but a system spanning bigger objectives of economic development, social justice and safety & welfare of labour. CLIMS received Mid-Day Infrastructure award in Aug 2018. It has been successfully running in 45 locations of NTPC.

CLIMS application embraces following tasks : **-**

- Digitalization of all the processes of Labour Management system of NC.
- Repository of Contracts' data, Work' data and Workers' data.
- Authentication of workers' attendance using Face Recognition or Finger print provides better security and automatic access control.
- Real time data is available online in Dashboards and in various reports on workmen deployed by contractors, their attendance and presence in plant.
- Auto generation of Wage Sheets & Pay Roll for validation which helps in ensuring payment to workers on the last day of the month.
- One-time Data Entry for one type of data in online Repository. Same data may be used in various different forms and reports.

- Customized Analytical / Statistical Reports and Charts for Management and CLIMS users.
- Automation of Forms & Reports including Statutory Reports.
- All the processes of labour management have become online and are performed using CLIMS web application and hence there is significant reduction in paper consumption.
- Automatic and Online remote Activation/Deactivation/Deletion/Transfer of workers in CLIMS portal and biometric machines.

Hardware / Software

CLIMS has been developed on .Net platform using MVC architecture. SQL server is being used as backend database and user interface is developed using Telerik and Syncfusion UI components.

Certification (Certifying Agency)

Security audit of CLIMS has been completed by M/s ISEC Services during 2020

Disaster Recovery and Service Continuity

Near site disaster recovery is implemented by incorporating near real time system back up at the data centre of Mumbai Office. Full-fledged DR is being implemented at NTPC data centre Noida. High bandwidth MPLS network connects the current DC with DR.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Number of Projects		38	43	45
Number of Users		35867	63000	68000
Number of contractor's labourers		<50000	105000	132975

Implementation

All targets envisioned and planned at the time of launch achieved successfully. The planned coverage of locations and employee base has been met 100%. System is now fully accepted both by internal as well as external and institutionalized

Improvements / Enhancements

- Customized wage sheets for various projects based on their wage agreements.
- Revamped HR and Medical Clearance modules with worker data return option.
- Attendance Upload (through excel) module during non-punching due to COVID-19.
- Digital Access Dates Extension Module with complete workflow based approvals.
- Shifting from finger biometric attendance to non-touch face based attendance of workers.

- Various customized reports to enhance user experience and ease of working.
- EIC Overview Module which helps in tracking of workers in the work flow on CLIMS online
- Main Contractor module for tracking his subcontractor's workers , attendance and wage details
- Module for Skill training of laborers & safety training

Planned

- Archiving option for works, workman and contractors' details
- Revamped Wage Sheet Generation Module
- Tracking module for Contractors
- Main Contractors module in work flow of access dates extension

ENABLER

Processes Re-engineered

Contractors' Labour Information Management System (CLIMS) is a corporate web application which is designed and developed in-house by IT and HR departments of NTPC. It is a 'captive private cloud' based solution which streamlines and simplifies contractors' labour management tasks and also enhances safety, medical and statutory compliances. The application covers the management and control of contractors' labour force; their personal and demographic data, medical check-up and health status, safety training and security clearances, work timings, wages, PF , insurance and other welfare measures. While the contractor retains ownership of labour data and enjoys full control over labour attendance, work timing, wages etc., system provides necessary work flows and information windows to Engineer-in-charge, HR , Medical and safety department etc. For ensuring compliance of labour laws and labour welfare. Pre-set Workflows have been incorporated in CLIMS wherein labour can enter the plant only after the requisite safety training and medical clearance. It is not only a labour information and attendance system but a system spanning bigger objectives of economic development, social justice and safety & welfare of labour. CLIMS received Mid-Day Infrastructure award in Aug 2018. It has been successfully running in 45 locations of NTPC. All the processes of labour management have become online and are performed using CLIMS web application.

Technologies

- Internal communication mobile app SAMVAAD decided to be used for circulation and correspondence
- Social media platforms of the company updated with the development and design changes
- Circulation of attractive information leaflets (animated as well graphics)

People

- Promotion at all levels – project/ regional offices and the corporate center
- Standard communication to all employees keeping them updated

VALUE INDICATORS

Learnings for sharing

CLIMS makes it possible to have a centralized control over contractors' labour of all the locations of the organization. The system APIs make it possible for all type of biometric labour attendance machines, spread throughout the countrywide locations, to be connected to the central server and the server can

control entry/exit of each individual worker depending upon his/her medical clearance, safety clearance, labour license and other conditions. This gives NTPC strict control over ensuring security of plants as only approved, active and cleared workers enter the plant premise.

Digital Empowerment

The CLIMS dashboard can inform about the exact workers employed on any day at any time at any given work location. It allows one-click statutory report generation and helps in time and cost estimation for future contracts based on historical data. The most important and significant achievement we have achieved is fair wage payment of workers on or before the last day of the month with CLIMS generated wage sheets. NTPC could achieve this because CLIMS wage sheet is fast to generate, is accurate and statutorily correct and can be viewed by IR/HR officers immediately online. As the wage sheet is generated using government specified wage rates and is based on actual number of days a worker has attended the work, it ensures worker rights to wages and social security. PF & ESIC deductions are also automatically calculated in wage sheets (based on actual attendance) and hence are accurate. CLIMS has brought transparency in terms of wage payment and has ensured payment of proper wages, PF & ESIC, insurance and social-security to the workers of contractors of the company. Other stakeholders like Contractors themselves and NTPC have also benefited from CLIMS in various ways. Contractors now do not have to keep manual records of worker data. The details are available to them online in CLIMS application along with all uploaded documents. They have been trained to generate wage sheets from CLIMS which is faster, accurate and paperless. Contractors can request for extension of exit/entry authorization of their workers online which is hassle free and goes through the requisite workflow in a fast manner. Safety, Social Security and welfare of workers are the highest priority of NTPC and CLIMS makes it possible to implement them in a smooth manner. With CLIMS, NTPC has completely ensured that a contractors' worker is paid his actual and fair wages and can enter the plant only after getting all the clearances (safety, medical and HR) and requisite trainings. As everything Is available online on screens of CLIMS application, the labour management processes are faster and more effective. As we have all the historical data stored in our servers, CLIMS provides on-click generation of statutory reports and faster IR clearance for contractors' payment. CLIMS provides various reports and real–time management dashboards to track overall labour deployment and other important details.

- Tighter security control and safety enhancement.
- Automated Wage Processing with PF ESIC etc. using CLIMS Time sheets
- Timely & lawful payments to labourers and safeguard their well-being by monitoring ESI and PF payments as warranted by the labour laws of India
- Unique labour identification Cards based upon type/area of work.
- Track of labours qualification, training, safety trainings, skill enhancement training and health status throughout his work life.

The digital transformation achieved through CLIMS in management of contractors' workers has benefitted all of its stakeholders tremendously.

Green e-Governance

The CLIMS dashboard can inform about the exact workers employed on any

day at any time at any given work location. It allows one-click statutory report generation and helps in time and cost estimation for future contracts based on historical data.
Automated Wage Processing with PF ESIC etc. using CLIMS Time sheets

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Shri Akhil Raizada, *GM (HR-Tech), NTPC Limited, akhilraizada@ntpc.co.in*

Shri. Saurabh Banaudha, *DGM(HR-Tech), NTPC Limited, saurabhbanaudha@ntpc.co.in*

Odisha Human Resources for Health (OHRH)

National Health Mission, Department of Health & Family Welfare, Odisha

Shalini Pandit, Guru Prasad Rath and Nirupama Mohapatra

PROJECT OVERVIEW

As per the suggestion of MoHFW, GoI, a comprehensive Human Resources Management System in health sector for both regular and contractual staff has been developed, which includes Doctors, Para-Medics and Programme Management Staff for better monitoring of HR activities and their performances recorded in HMIS (Health Information Management System) facility wise.

Modules of the system:

- Profile Entry/ Edit/Update: Profile of each employee is recorded and updated on continuous basis.
- Transfer Management: The transfers from one location to another are being reflected in the system.
- Leave Management: The Apply and sanction of leaves were automated through web and mobile app.
- Renewal Management (For Contractual Staff): The periodical renewals of contractual employees were recorded.
- Payroll Management: The pay slip for all employees was generated from the system on monthly basis.
- Training Management: The system displays the training profile of each employee, extracted from the TMIS (Training Management Information System)
- Performance Management: The quantitative performance of each employee is adjudged through their monthly HMIS institutional data.
- Integration with HMIS (Entry of Monthly data from HMIS and Comparison Reports)
- Mobile App for Workforce, where an employee can update his/her basic profile status, Performances based on training, Self Appraisal Report Upload, Leave Apply and Receive of Alerts/ Approval/ SMS etc.

Key Stakeholders

Employees of Health and Family Welfare Department, Govt. of Odisha

Intended benefits and current status

- All Covid warriors of H & FW Departments were in a single framework.
- Facilitation to employees in getting e-Pay Slip, Leave Apply and Profile updation.
- Processing of In-time renewal of Contractual Employees.

No. of Employees entered/updated: 54,744
No. of Doctors Registered: 6850 (Including 1994 Specialists)
No. of Para Medics Registered: 30562
No. of ASHA Workers Profile Updated: 46616

Software

Server: My SQL
Front End: PHP 7

Cyber Security

Security Audit done by the empanelled CERT-In third party followed by NIC Audit

AAA technologies Pvt. Ltd. had been assigned to do audit.

Disaster Recovery and service continuity

Application is hosted in National Data Centre, Bhubaneswar. DR and BCP have been taken care of by NDC

RESULTS INDICATOR

Information

Description of various e-Services, benefits and their Volumes

Name of Planned e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Employee Registration	Profile Entry of Employees	11290	46,450	51,600
e-Pay Slip Generation	Generation of pay slip through the Application	-	35,160	40,310

Implementation

Implementation Coverage achieved

- The application has been developed to cover entire state of Odisha in respect of health sector resources.
- Stakeholders are MOHFW, Health Department, NHM, Districts and Citizen.

Improvements / Enhancements

- Plan to rollout in State of Andaman & Nicober as requested by the State.
- This application will be further enhanced with development of
    1. Employee GIS for MAP based Report of Institutional HR strength and Performances recorded in HMIS.
    2. Representation based auto-relocation (transfer) module will be implemented.
    3. Feedback system will be incorporated to get feedback from employees

ENABLER

Processes Re-engineered

- All Employees of Health and Family Welfare Department, Govt. of Odisha, whose information was earlier kept in a scattered way, are integrated in to a single database.
- Contractual Employees, who were no part of any database of H & FW Department, are included.
- The time consuming process of salary processing are re-engineered with online salary sheet and pay slip generation.

Technologies

- Information Disseminated through NHM Social Media to publicize the Application.
- Connect to Server through VPN for updation of files and Database.
- Android based Platform used to develop the Mobile APP and Google Play Store is used to host the App.

People

Trainings and demos have been conducted for district. block level officers who are facilitating to the Drawing and Disbursing Officers in health sector and knowledge sharing is enabled through all possible ways of communication.

VALUE INDICATORS

Learnings for sharing

Registration of Doctors/ Specialists and para-medics working at private clinical establishments to deal with COVID-19 Pandamic have been collected through Collector/DMs of the districts and entered into the system.

Digital Empowerment

- Access has been provided in the website and Mobile App to get the District/ Block/Institution wise employees as per their category of designation.
- Display of Pay and Leave records

Green e-Governance

A paperless service through Mobile App and application for Leave Apply and e-Pay Slip has been incorporated.

Ms. Shalini Pandit, I.A.S, *Mission Director, National Health Mission, Department of Health & Family Welfare (Odisha), missiondirector@nic.in*

Shri Guru Prasad Rath, *Consultant-IT, National Health Mission, Department of Health & Family Welfare (Odisha), nhm.itconsultant-od@nic.in*

Ms. Nirupama Mohapatra, *HOD & Senior Technical Director, National Informatics Center (Odisha), n.mohapatra@nic.in*

Online Event Management Portal

Department of Information Technology & Electronics, West Bengal

Sanjay Kumar Das

PROJECT OVERVIEW

Objectives

The Online Event Management (OEM) System promotes automation and emerging technologies across West Bengal and aims to make the state a hub of innovation and to provide various services to the citizens of the state through e-governance. It provides an interactive platform for scheduling events, hosting webinars/ online knowledge workshops as well capturing feedback of participants with a provision for downloading certificates for event participation. The Online Event Management (OEM) portal has been designed for conducting knowledge workshops/online capacity building sessions at national and international levels where eminent speakers can share their knowledge on cutting edge technologies, thereby supporting the ecosystem for adoption of these technologies in the state.

Functional Scope

The Event Management portal is interactive and has three functional components. All the programs organized by the Department of IT&E, Govt. of West Bengal were managed through these components. These are as follows:

- Event registration portal (For registration, publication of names of successful invitees, issuance of electronic invitation card.)
- Event feedback portal (To receive feedback, to publish the feedback analytics, press release and gallery, certificate download.)
- Events attendance monitoring app for android (EAMA)

Geographical Scope

- National Level – No of State(s) covered: 1
- State/UT level – No of District(s) covered: 23
- District Level – No of Blocks covered: 341

Key Stakeholders

The beneficiaries of the Online Event Management Portal include the targeted audience of all the events conducted by DoIT&E including: -

- Academicians / faculty
- Technology enthusiasts
- Working Professionals
- Entrepreneurs
- Students
- Any other individuals

The Online Event Management Portal was conceptualized as an automated solution for DoIT&E to better handle the registration process and data management of all the events conducted by DoIT&E.

However, the success of the efficient data management of the Online Event Management System has called for upgrading the system as a product for all other state government departments to handle their events efficiently as well. In this regard, the SNLTR team is working relentlessly on the new module of the Online Event Management System which would be rolled out across other state departments for their use.

Intended Benefits

Some of the key benefits delivered to the beneficiary include the following:

- *To organization:* Discontinuation of physical registers for registration of applicants/ participants, doing away with the concept of kiosk for attendance capturing, discontinuation of physically issuing Certificate of Participation.
- *To citizen:* Accessibility and ease of registration during event, marking session attendance, getting updates of specific events during the session, collection of participation certificates in electronic medium.
- *Other stakeholders:* Effective management of MIS and corresponding analysis of interest trend for designing future similar sessions.

Current Status

As of now, 10 (ten) Knowledge sharing programmes were managed using this application with more than 6000 unique participants.

In the ongoing pandemic situation, a series of Webinars are being conducted on different technologies through this event management portal.

Software

- *Technology Platform used:* The backend platform is developed in .PHP, Java and android SDK. MySQL is used as database.
- *Interoperability:* App and web version connected through API so that both the versions directly accessed the central database.
- *Security concerns:* Proper methodology of security aspects was followed. W3C standard for HTML and standard coding structure for PHP were meticulously followed.
- *Any issue with the technology used:* Running seamlessly.
- *Service delivery channels:* Web, Email, SMS
- *Innovation:* Synchronization between QR-code scanning and data update of the server via mobile app. interface

Cyber Security

Name of Certifying Agency: TCG Digital Solutions Private Limited
Certificate Reference No.: TCG/Kol/ Events/ Dept.-IT/ CERT/ 01
Issue Date: 07/05/2020
Key security features are as follows:

- The W3C standard for HTML and standard coding structure for .PHP were meticulously adhered.
- The entire system is OWASP guideline compliant.
- The application is protected from SQL injection technique.
- It is also protected from cross site scripting.
- The Web Server does not disclose its identity.
- The database security structure provides different layers with the overall control of the database available with the security administrator; only the authorized database administration users with assigned privilege can access database.
- The application is safe to host certified

Disaster Recovery and service continuity

The application is hosted in SNLTR self-administered web server.

Though native Disaster Recovery (DR) is not in place, the application is running in single availability zone in said server. The application not being mission-critical, for back-up and continuity plan we are relying on server native capability for snapshot and VM auto-recovery.

Once the application is migrated to WBSDC, a formal risk management and risk mitigation strategy along with applicable policies would be in place for maintaining service continuity along with applicable service levels.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Online Event Management	Attendees can register through the OEMS and attend the sessions seamlessly	No of events: 8 (eight) No. of registration: 9485	No of events: 2 (two) No. of registration: 2317	NA
Ease of registration, certificate generation for the events	Attendees can register through the OEMS and attend the sessions seamlessly and collect certificates online.	No of events: 8 (eight) No. of registration: 9485	No of events: 2 (two) No. of registration: 2317	NA

Implementation

Implementation Coverage achieved in comparison to the plan / target

The Online Event Management System is currently being used for the events of Department of Information Technology and Electronics. More than 10 (ten) events have taken place with attendees count of approximately 12000 and registration of approximately 6500 attendees.

Further, this platform will be rolled out for other departments and government entities, in order to achieve objective. The G2G version of the application is also underway.

Improvements/ enhancements specifically planned out during next one Year

The portal and the app have been conceptualized to provide G2C service as of now. However, rolling out G2G version of the application is also underway.

ENABLER

Processes Re-engineered

Earlier, registration for an event was manually driven and time consuming. However, the Online Event Management portal offers a fully automated process for registration. Participants get themselves registered on their own using web portal

Entry and exit to and from an event is scan based and hence records the full participation of an attendee thereby providing an error free analytics on the event success

Technologies

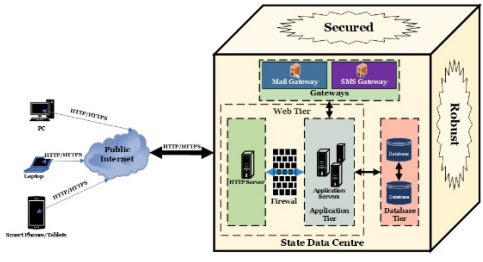
Architecture

The entire application is hosted in West Bengal State Data Centre (WBSDC) and can be divided into the following Three different tiers.

- *Client Tier* – This tier consists of client devices which are used to access the application. These devices include web browsers in any PC/Laptop, Android Phones, Tablets etc. This tier adheres the recommendations

provided in *W3C Standards and Guidelines for Indian Govt. Websites (GIGW)* to make the UI/UX more adaptive and user friendly.

- *Web Tier* – This tier not only hosts the application but also used to provide the web/remote services to the mobile client. The Web Tier can further be broken into the following two different tiers.
  i. *Http Server* – This layer in the first interceptor of the HTTP/HTTPS request coming to the application URL. This server has a public IP mapped with the domain name of the portal. This is configured in a way to redirect the incoming request to dedicated web servers having internal private IP and protected behind a firewall to allow request from permitted hosts only. This also manages the incoming request dispatching load using proper failsafe load balancing technique and has the rules to auto redirect any normal HTTP (port 80) request to HTTPS (port 443) ports for better security purpose to protect sensitive data during the exchange of the same between client and server.
  ii. *Application/Business Tier* – This tier hosts the actual web application and the associated business components. The entire web application is designed & developed using *Model-View-Controller (MVC2)* design patters to segregate the data model, data presentation and application control flow as per business process. For this application, this tier is developed using *PHP* using standard *W3C* recommendations.
  Model – This segment of the application deals with the data models to harness the application data structures as per designs. These models are used to carry data from one state to another during execution of a business process sequence.
  View – This segment of the application deals with the logic and codes to decide the way the underlying data is presented to the end user.
  Controller – This segment of the application manages the flow of control from one state to another during execution of business process sequence. This manages flowing the business/control data from one state to another, executes dedicated business actions and present the final data output into user understandable views through the presentation layer.
  iii. *Database Tier* – This tier hosts the actual application database for storing the actual business data in indexed, normalised Relational Database Management System (RDBMS). For this application, MySQL is used as RDBMS server. This tier is protected with all standard data protection techniques and accessible only from the Web Tier and that through permitted exposed APIs only. The above architectural details are pictorially represented in the following diagram.



Architecture of Event Management Application

People

The Online Event Management (OEM) System is completely automated and does not require any human intervention.

VALUE INDICATORS

Learnings for sharing

There were extensive interactions with the event coordinators and DoIT&E leaderships. Sample feedbacks and inputs from sample participants who had previously registered for such events, were also sought to understand their perspectives. A technical committee was also constituted to discuss, brainstorm and come to a consensus on the Graphic User Interface (GUI), technical architecture and final solution of the applications (both Web and Mobile).

Various identified problems of the conventional way of event management include the following:

- More time & cost involvement
- Manual activities were predominant
- Human touchpoints existed
- Physical infrastructure required
- Manpower deployment required
- Hard-copy MIS is maintained

Once the technical committee arrived at a consensus regarding the solution, functionality document was approved by the DoIT&E after rounds of scrutiny which was used as the reference document for the SRS.

- The SNLTR team first created a prototype of the web application and collected preliminary feedbacks from the DoIT&E for further enhancements, including process flow as well as UI
- Thereafter, User Acceptant Testing (UAT) was conducted, post incorporation of the feedbacks & inputs received from DIT&E. All the software bugs were addressed.
- After UAT, the application was transferred from the staging environment to the production environment for Online Event Management to conduct State Level workshop/training programme.
- The application is now fully operational and has successfully handled a series of state-level, national-level and international-level knowledge workshops.

As of now, 10 (ten) such programmes were managed using this application with more than 6000 unique participants.

Digital Empowerment

The attendees of the events have been seasoned with traditional way of registration, collection of invitation cards and certificates. Initially the transit from manual system to the automated system faced a few challenges due to less awareness.

It provides an electronic platform to the applicants/participants to register and download Electronic Invitation Card in order to avoid the hassles of physically visiting premises and standing in long queues. It streamlines the processes for scrutinizing the physical records of the applicants, maintaining their repository and furnishing approval of selected applicants and captures comprehensive attendance electronically as well as providing event specific updates to the participants.

Green e-Governance

This system is completely automated and does not require any human intervention. Participants get themselves registered on their own using mobile browser as well as web-based applications. It is an interactive platform for scheduling events, hosting webinars/ online knowledge workshops as well capturing feedback of participants with a provision for downloading certificates for event participation.

It provides an electronic platform to the applicants/participants to register and download Electronic Invitation Card in order to avoid the hassles of physically visiting premises and standing in long queues.

Shri. Sanjay Kumar Das, *W.B.C.S (Exe.), Joint Secretary, Department of Information Technology & Electronics (West Bengal), jsit@wb.gov.in*

SECTION - IV
Sustenance Initiatives

Key Performance Indicators for Sustaining eGovernance Projects

Kasturi S Vijaya Sekhar
Head, Statistical Cell, IIIT Hyderabad. email: vijay@iiit.ac.in

Abstract

Governments are using Information and Communications Technologies (ICTs) in their public administration processes. The pace has accelerated in all the government entities that led to design several eGovernment projects day-to-day. As a result, lot of public money is being pumped into these initiatives with an objective to serve better.The study looked at four eGovernance projects in detail based on their secondary data focusing on five broad sustainable indicators that determine the sustenance of projects. The indicators can be seen in majority eGovernment projects: (a) project strategy and policies (b) financial model (c) business model (d) technology deployed and (e) organization resources.Finally, concluded that administering eGovernment projects is inter-disciplinary in theory and inter-dependent in practice.

Keywords– eGovernment, Sustainability, Indicators, ICTs

Introduction

Government's one objective is to administer their services in transparent manner for which technologies were in rigorous use - the transition is known as *electronic governance.* When government aims to achieve specific goals, designing technology-oriented projects is must and it should create an easy, accessible environment after reducing the internal procedures. However, these eGovernment projects are of various kinds viz., stand-alone, government owned, joint venture and public-private-partnerships (PPP) etc. Each model has its own stint hence it is a daunting task to emerge with a common framework for understanding the sustainability in each model. Then the project coverage, whether it is panchayat, district, State or Central level play a vital role. Therefore, drawing up an exhaustive list of indicators that influence the sustainability is quite interesting. Notwithstanding this difficulty or, perhaps because of it, one might look for indicators which can serve as proxy for factors[Roy and Chatterjee, 2009].In addition, the formal structures, functional robustness, and commensurate wherewithal should be looked at since they endorse ab-initio, explicitly or otherwise, the goal of continuity. After examining these, five indicators which can influence on a project's sustainability identified after evaluating the following *four* projects and discussed in detail. These projects have won the excellence award in the year 2015.

1. Mobile based Digital State Asset Register, Govt. of Bihar

The "Mobile based Digital State Asset Register" is a joint initiative of Govt. of Bihar and National Informatics Centre, Bihar. This project has been conceived to establish mobile and GIS based framework for monitoring of the State Government assets such as building projects, road projects, plantations, nurseries, health facilities, electricity network, transport network, education assets and waterbodies to strengthen the asset management, project management and other related functions for improved planning, decision-making and execution mechanism. State government has initiated mobile based survey of all 5.6Cr plots of the state with a purpose of making water for irrigation. It was envisaged to deploy a software solution using mobile and handheld devices such that requisite information / photos / videos and physical

progress from work site can be captured to create a centralized repository of state assets and provide data to the existing MIS System. The solution is an integration of Mobile based Software with State Spatial Data Infrastructure using Service Oriented Architecture (SOA). The MIS reporting solution facilitates monitoring and control to ensure collection of various data from field units either using web application or handheld devices such as smartphones/tablets. The application generates the compiled MIS reports with detailed analytics and provides GIS based data visualization such as proximity analysis and geo-tagging of specific assets. It provides analytical dashboards with various types of graphs, charts & diagrams from the real time data, display of vital information in the form of tickers on the portal for top management. Senior officers can view summary daily/ weekly/ monthly reports, state-wise/project-wise/location-wise reports on their desktop or mobile phone. The application also provides protection mechanism for preventing unauthorized use in cases of phone theft/loss. The solution also facilitates mass SMS broadcasting, citizen query response system etc. The role-based system integrates web, GIS and mobile technology to deliver location specific decision making so that dynamic decision making at different level of governance can be supported. In the present era of mobile governance, the system is being used at different levels of governance and it is catching up very fast. SMS is most widely used for status, alerts, and notifications. This service has been developed as the core infrastructure for enabling the availability of public services through handheld devices. NIC has created a centre of excellence i.e., mobile competency centre at Patna to extend integrated service platform for mobile and GIS applications. Currently, every department and their services for location specific decision making has been brought to this framework, which resulted into sustain the project goals.

2. eDistrict Kerala

eDistrict is a mission mode project under National e-Governance Plan (NeGP), with DeitY, Government of India as the nodal department at the centre (currently MeitY, GoI). Kerala State IT Mission is the implementing agency and National Informatics Centre (NIC) is the solution provider in Kerala. The objective is to make available the government services to the citizen nearer to their home. Common Service Centers (CSCs) and online portal are the point of contact for the citizen to avail different department services. Nearly, 45 services of different departments are implemented under the project. The services include 25 certificate services of the Revenue Department, Right to Information (RTI) services, end to end Grievance redressal, Forest Department Services, Payment services like electricity bill, water bill, BSNL phone bills, University payments etc. The project has been rolled out in all the districts of Kerala. Village Offices (1600+), Taluk Offices (77), RDO Offices, Collectorates, Forest Offices and other offices on board are connected. More than 2800+ Akshaya centers (CSCs) delivering the services. As of September 2020, more than 5.57 crore applications for certificates are processed online and approved service requests through online. Around 2.9 crore unique user registrations are done. The software is integrated with NDML payment gateway for online payments and SBI site to site integration is also done. eDistrict Kerala is integrated with Digital Locker. Portal is integrated with Aadhar (UID) database for authentication purpose. It is also integrated with SSDG.

eDistrict-Kerala is one of the largest open source eGovernance implementations and Web technologies are used for solutions. The citizen can

apply for the services from any CSC / online portal and need not go to the government offices. Approachability of the citizen increases as more CSCs are in place than the number of offices. This resulted to reduce the distance, or no travel required for availing the services. Applications can be filed in any CSC irrespective of the geographical location of the government office, thus saving the cost and time. As the CSCs run by entrepreneurs work beyond office hours, people can avail the service without losing wages for the day. Improvement in overall transparency leads to reduction in opportunities for corruption. The workflow defined in eDistrict provides the facility to forward the applications from one office to another for inputs required for processing. Statistical reports are available for review and dashboard introduced for better monitoring. Administrative modules are available for assigning charges / privileges. Supervisory roles can monitor the office wise performance thus improving the performance of the offices. SLA is built into the system to monitor and comply with the citizen charter and ensures timely delivery of services. Online database verifications support fool proof decision process. Inter-operability across departmental databases is achieved by integrating databases of SSLC, ration card, driving license and election ID card through web services. Authentic verification from above databases is done by verifying officers and thereby saving time, paper, and postage. *All these factors contributed to the sustenance of the project.*

3. Aadhaar enabled PDS through ePOS

AePDS is a unique attempt piloted in Krishna district in 2014 and, the system has helped in improving the quality of services under the public distribution system subsequently, it got replicated in all 13 districts across the Andhra Pradesh in October 2015. All the 28,642 fair price shops (FPS) in Andhra Pradesh, delivered ration through online aadhaar biometric authentication. This has provided a great impetus to effective delivery of services under PDS. The state government saved approx. Rs.1200crore worth subsidy between 2014 and 2016. 3.8 crore PDS beneficiaries in Andhra Pradesh receive their food entitlements in a hassle-free and comfortable way, importantly, in-time from any fair price shop outlet of the state of their choice, every month. Introduced an integrated with NPCI and AEPS bridge to implement cashless PDS, during demonetization period 30lakhs beneficiaries per month availed ration using cashless. End-to-end automation of processes, along with digitization of beneficiary data, has made PDS in AP robust and accountable. Real-time information generation provides a clear digital trail for each transaction. The best practices adopted by Andhra Pradesh make it a case worthy of emulation by other states. Prioritizing both transparency and efficiency, these initiatives ensure that the poor households have access to their entitlements, are not inconvenienced, and save the government huge amounts by controlling the diversion of stocks and plugging leakages in the delivery channel. *The main objective of the system which ensured sustainability are*

- Targeting the right beneficiaries through six step validation under NFSA act. This has ensured that needy people are covered under the scheme. Aadhaar seeding of beneficiaries has weeded out fake and duplicate units.
- End to end computerization with less manual intervention and traceability of stock. Tracking has minimized diversions and ensured that stock reach the right mile in time, with message dissemination through SMS to dealers and beneficiaries.

- Beneficiary is assured of his right through Aadhaar authentication as the means of ration delivery. Beneficiaries are now aware of their entitlement and are sure that none other than them can draw their benefits.
- Inclusiveness is the major turnover for the project with features like fusion finger technology to address failures of people with feeble fingerprints, IRIS based authentication for laborers and nominee facility for sick, bed-ridden, old age and people whose authentication fails.

4. ReALCRAft - Registration and Licensing of Fishing Crafts

Demand driven project to enhance coastal security by identifying every fishing vessel with a unique registration number. It is a web enabled workflow based online application system for Vessel Registration under MS Act and License Certificate under MFR act to the fishing vessels operating along the Indian coast. With the total registration, the security agencies, citizens, and other approved government machineries would be able to track the status of any registered vessel at any point of time from anywhere, through internet or via SMS. It is a web-enabled IT solution under Open-Source Technology.

Considering the above information submitted by the project implementing authorities, the following observations were made in evaluating the sustenance based on five indicators.

Key Performance Indicators (KPIs)

a. Project strategy and policies: While designing the projects, the project planners must keep *Sustainability Strategy* as a guiding post with clear set of goals. One such goal can be a project should have a life for a minimum guarantee period with no change in team members. If team changes, the successors may discontinue the existing functions and design a new set over a period. Therefore, the strategy must be identified, evaluated, and incorporated right at the design stage without giving room for larger variations [Khan, 2000]. An additional set of observations have also been asked before designing a project viz., whether the initiative was the result of government orders, the derivative of policy framework or, extension of an old project, depending on the relevance, evaluation criteria. During the evaluation, three strategies must be looked into, which are imperative to project functioning viz.,

- *Government Process Re-engineering* helps in improving the old procedures and transpire simple solutions and to achieve the strategic objectives [Hammer and Champy, 1993].
- *Capacity Building* provides a series of trainings to the stakeholders and project implementers.
- *Change Management* is for *project implementer's* continuity.

These strategies have great value to project continuity which needs to be document in very beginning of a detailed project report or in the policy documents. The policy must be written, in a way that a project performance must be revisited at least once in six months [Kumar, 2007]. It also augurs well for sustainability where stakeholder participation in project policies and decisions are encouraged. Should the project succeed, then the replication can be targeted to other administrative units viz., center, state, district, or panchayat etc if adequate finances are available.

b. Financial model: Financial viability is brainchild of sustainability, budgeting sufficient funds for a project at its initiation and, in-depth monitoring enables the planners to control the project overall finances. In the case of exclusive

government funded projects, budgeting throughout the life cycle is a constraint. Sometimes, multiple owners drive a project. In such case, it becomes everyone's responsibility to see that their contribution for continuing the project is meaningful. In the case of private partnership project, the intension is tending to work for profits. Therefore, significant conflict arose when a particular service does not attract sufficient profits which leads to status on continuity of a project. eGovernment is not only about merely deals with a project implementation it is about shift in the mindsets of various players. Individuals will have different attitudes and, not all are receptive to change in a business organization in overnight. They will visualize the benefits that they derive from a particular change and see how that add-value to their ability while performing their duties and decides business continuity.

c. *Business model:* Someprojects depend on larger government backing therefore, need to structure and buttress projects in such a manner that they sustain themselves irrespective of changes on the political and financial front. Sometimes, projects will evolve and sustain due to the demand from larger population in such cases, taking private partners support is necessary if government resources are not sufficient. But there was very little intervention with the government conventional trends which may lead to resistance among private players [Upadhyaya and Chugan, 2012]. When private interventions emerge with the government, the focus may shift to return on investments thus, the private player continuity matters in the project's continuity. For instance, citizen service centers (CSCs) objective is to deliver public services using technologies that are owned by a private operator. The operators act as bridging point between the government and citizens and their income model is based on increment in number of transactions. The operators are not happy at one point of time with their remuneration because of low volume of transactions and closed many centers in a particular State [Jamwal, 2013]. Therefore, eGovernance can become an important mean for judging whether the projects taken up on course are, have achieved, and to see for which they have taken up. Thus, it is vital whether a CSC operator or, a service provider or, a private player is satisfied - decides the project continuity.

d. *Technology deployed:* Delivering electronic government services in Indian conditions have a few challenges such as poor electricity, low network bandwidth and, cyber-attacks etc. Deployment of latest web browsers, servers, hardware-software infrastructure and, enhancements to mobile governance are other factors that decides a project continuity. Software and, their application updates to be reinforced based on the beneficiary requirements. Standardization testing and quality is another area that ensures a project application adheres to the government guidelines. Subsequently, deployment of the latest security and performance trends will further strengthen the middleware applications and help in longevity. Interface development and re-development is critically essential since many project applications after their initial roll-out, failed to keep pace with the stakeholder expectations. Many a times, the projects supposed to follow a top-down / bottom-up approach appears to be neglected [Glemarec and Oliveira, 2012]. To avoid that, one can also look at successful rollout projects to understand the enhancements implementing at regular intervals to meet with the rapid technological advancements. Inadvertently,

technology is keep changing and updating on its own, with that result, citizens are looking for comfortable services. For instance, providing information via mobile messages and migrating to mobile based solutions are two very recent enhancements that are helping to promote a project's visibility. Due to the Mobile Governance trend, the existing web portals, stand-alone websites, and desktop applications are slowly migrating to mobile based solutions. Thus, advancements in expansion, frequent upgrades of electronic devices and, latest maintaining methods are other merits playing a major role in continuity of the projects.

e. *Organization resources:* Organizations strive to build a successful project with the help off low of a resource pool and neatly maintained internal operations, which is an integral and crucial objective of any organization. A comprehensive plan is to be executed to operate these several applications. Often, a specialized strategy needs to be designed right at the beginning stage to compare a project status before and after executing for a stipulated timeframe [Bagga and Gupta, 2009]. Organization, as being the visible face of the projects must put the most amicable while delivering the services. Whether or not projects involve over several modes of services, it is critical to follow well defined timelines to gain the trust from the beneficiaries. Timelines are often resting on motivation of implementers and teamwork which is a key attribute that shape a project's long-term stability. The motivation, in the form of providing necessary training, incentivizing extra work to produce service-oriented goals often an invitation for success of a project. Other than the implementers, policy makers, project consultants; technology provider role is appropriate to a project's continuity. Often, changes in these players also affect the project continuity and so, on organization stature.

Key findings

eGovernance objective is to *continue* in a long run but often, projects are being implemented and pushed to rollout stage without doing a pilot test. The benefit of pilot test is, it can perform a critical assessment on existing pain areas and identifies a project potential to meet the future requirements. After the successful pilot tests and during the initial rollout, implementers are to validate the progress but many a times, this fact neither interest to them nor overlooked unintentionally. To succeed, there should be a highly reputed activity needs to take place which conform to the yardsticks stated afore. Meanwhile, the projects that are having problems in continuity can be identify, revisited and necessary precautions can be recorded well in advance. It was further surmised that projects are to be independently assessed by a neutral body to know the ground reality and their actual performance [Agarwal and Vaidya, 2011]. In case of any deviations, it will be difficult to assess a project's progress and is hard to bring it back on track. But in majority projects, the impact for the intended users is already known and easy to visualize the acceptance of users - that itself would lead to a successful stand. Therefore, the project planners must do a periodic comprehensive review to assess the user acceptance. If necessary, planners can distinguish short- and long-term goals and these can explicitly identify other set of indicators [MoEF, 2002]. Governments are delivering technology-based services and the trend is increasing which is pushing them to design more projects that led to depend more on technologies. There is no standard framework available to evaluate eGovernment project's overall sustainability considering it is an overwhelming mission [Janowski,

2011].

Conclusion

The indicators chosen for this study have multi-discipline in character - some projects sustain because of reputation, some because of leadership, some because of political will, some because of financial continuity and some because of governance structure and some because of private players etc. Thus, it is difficult to conclude that a project's sustainability depends entirely on the above characteristics since different set of indicators may yield different results. But it is well understood the continuity of eGovernment projects is interdependent because it involves people, processes, technology, and organization resources i.e., one dependent on the other. Therefore, it is safer to look at an indicator which can influence on a project's continuity rather than looking sustenance of a project's entirety. Finally, eGovernment projects continuity is important to reach intended beneficiaries and, it is concluded that applied framework is more suitable for measuring sustainability of a project than a theoretical framework.

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New Era in Digital Governance

Selected eGovernance Initiatives - 2020

Over the decades various government entities have made use of Information and Communication Technologies (ICT) to bring changes in delivery of government services for citizen's benefit. During Covid-19 pandemic, governments made extensive use of technology to aware citizens about the precautionary measures and safeguard their life. Various e-Governance applications such as “Aarogyasetu-contact tracing App, “eSanjeevani” etc. have been designed & developed in emergent situation and were successfully implemented Pan India.

This compendium “New Era in Digital Governance- Selected eGovernance Initiatives from India 2020” presents and captures award worthy initiatives of pan India authorities and institutions of Governments at central, state and local level. This compendium is dedicated to the hard work, determination, experience and knowledge of Government Authorities for making appropriate usage of ICT in eGovernance services.

Each project presents the view of critical success factors, results enablers and indicators, the results, the degree of implementation, the key learning, infrastructure development, training of human resources, process reengineering and other related factors, as articulated by various government authorities, form the core content of this compendium.

The projects are further cumulated in to various categories according to their area of implementation such as- Administration, Agriculture, Citizen services, Ease of doing business, education and training, election, energy food and Civil supplies, e-procurement and e-auction, health, law & judiciary, Finance and audit, Travel and Tourism etc.

For egovernance practioners, industry professionals and researchers, compendium published under the series “ Selected eGovernance Initiatives in India” by Computer Society of India Special Interest Group on eGovernance (CSI SIG eGov) continues to provide a rich source of information for discerned readers.

Rishikul Prakashan
102/42/6, Jawahar Lal Nehru Road
Prayagraj-211002
email : rishikulprakashan@gmail.com
contact : 9450961843

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