



Digital Governance For Digital Society

Selected eGovernance Initiatives-2021

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



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This compendium presents a selection of eGovernance initiatives in India which competed for the coveted Computer Society of India's CSI SIG eGovernance awards for the year 2021 and have either been considered for the awards or have reached up to the finalist stage.

The primary objective of this compendium is to bring to the attention of National and global audience, a small selection of the inspired effort of a number of e-Government functionaries in the Country who strive hard to bring to the common citizens of India, the best that Digital Governance has to offer for Digital Society.

The awards to winners of this year were presented by the Computer Society of India's Special Interest Group on eGovernance (CSI-SIGeGov) during a glittering awards ceremony organised at MNNIT Allahabad, Prayagraj on 23rd April, 2022.

- Editors

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The images e.g. names, logos etc. that appear on the cover page, inside are either for illustration purpose or taken from the nomination documents of the nominees or taken from project URLs provided by them. Errors, omissions, if noticed are unintentional.

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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 around 500 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 33+ years professional experience in Academia & 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 since 1988 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 been Organizing Chair/ Programme Chair of number of National Conferences/ Seminars & Coordinator of 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. CSI Allahabad Chapter bagged Best Regional Chapter Award for so many years due to his active involvement in quality programmes for CSI professional and student members.

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 250+ e-Governance Projects nominated by Central/ State Governments. He is Convener of CSI-SIG eGov Awards (2020-2024)

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 (2020-2024).

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Award of Excellence ***

Award of Appreciation **

Award of Recognition *

Acknowledgements

This book Digital Governance for Digital Society: Selected eGovernance Initiatives 2021 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 2021, accorded consent to include their eGov initiatives in our publication on successful presentations of these initiatives before the experts in Digital Dialogue for Field Validations to reach the finalist stage.

CSI SIG eGov acknowledges their contribution in achieving the goals for entering into a new era of digital governance for digital society. Each of the initiatives presented in this book have their own learnings - at every stage of project life cycle. 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

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.

CSI SIG eGov team also realized the need of process-reengineering in award process life cycle last 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.

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.

We would like to express our gratitude to the Core Committee members: Dr. Ashok K Agarwal, Shri Surendra Kapoor, Sri Prabhu Gollamudi, Dr. K.S. Vijaya Shekhar, Prof. Harish P Iyer, Dr. Piyush Gupta, Dr. C.V. Ramamohan and Ms. Ayaluri Sridevi for reposing the faith in the current team. CSI SIG eGov Core Committee members who nurtured this group at Hyderabad for the last more than 17 years have been so helpful for the smooth transition of the SIG eGov activities from Hyderabad to Allahabad specially when Covid-19 pandemic was at peak.

Assessment of hundreds of nominations received from nominees involves multistage shortlisting process which requires time and dedicated efforts of the

expert team members. We would like to express our gratitude to the following rich experienced team of experts drawn from different sectors viz Government, Industry, Academia, Research Institutions, independent eGov consultants whose voluntary and selfless association have brought a rich perspective to the assessment process.

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

Editors

Message

Current Covid Pandemic with various variants continued to impact the Society through 2021 also globally and literally changed the way of thinking for every person. During these pandemic years, Information Technology continued to evolve exponentially and impacting every corner of our lives. The need arises for the Government processes also to align with these disruptive changes in Technology. Common Citizens need to understand Digital transformations and learn to adopt and use them effectively for their own use. All Government Institutions would need to address the change over from old to New Technologies as fast as possible, we no longer can avoid impact of IOT, AI, BlokChain Technologies and Cyber security issues. Government Institutions have to make the processes simpler and simpler within the reach of a common citizen irrespective of Rural or Urban, make sure the Quality of life improves and basic needs of citizens are addressed with zero corruption.

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 has constituted a Special Interest Group on e-Governance (**CSI-SIGeGov**) and has also been providing recognition of good work done through awards at its annual Award events for the last two decades. I am delighted to know that CSI e-Governance awards will soon be reaching the 19th year in succession. Having been a part of these awards from the inception in the year 2002, I am fascinated to see the responses from Central Government, States, Districts, Municipalities and Panchayats which implies there has been a pronounced drive by the government to move towards digital governance.

I congratulate the CSI-SIGeGov team, specially Prof G P Sahu and Prof D K Dwivedi for taking on the mantle of CSI e-Governance Awards, inspite of severe impact of the Pandemic in the country They have very effectively implemented and stabilized the Portal based evaluation and virtually changed over to Digital processes for these awards. My personal appreciation to them for their extraordinary efforts put in for successful completion of e Gov Awards. 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 responded to the request to participate in large numbers. The immense support has been provided timely by our team of experts spread across the country. My personal congratulations to them for their dedication and passion. Their contributions have been the key driver of success for these Awards.

CSI-SIGeGov will continue to focus on e-Governance space and facilitate sharing of knowledge across the stakeholders through recognizing excellent work done in this area and publishing the case studies on e-Governance projects. I am delighted that CSI-SIGeGov is bringing out another compendium with the title

“Digital Governance for Digital Society - Selected eGovernance Initiatives 2021”. Such compendia have become a good reference and source of knowledge for eGov practitioners and researchers over the years.

With the various initiatives of the governments taking a firm shape, leading the country towards Digital Transformation, I am sure that the CSI SIGeGov team will continue to work and evolve with changing scenario and perspectives of Digital Governance for a Digital Society.

I congratulate the editorial team consisting of Prof G P Sahu and Prof D K Dwivedi for excellent work done and bringing out this compendium well in time.

My personal congratulations to all Award winners for doing great work and motivating others do well in future

Best wishes,

Dr Ashok K Agarwal

Founder CSI SIGeGov and CSI Fellow

Preface

Digital Governance for Digital Society

Selected eGovernance Initiatives 2021

While COVID-19 caused devastating disruption to the global economy more than two years into the pandemic, it also forced remarkable innovation across different sectors. 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. Companies have found new ways to sell, service, and operate during the crisis. Educational institutions migrated to virtual mode within no time.

Government took several steps to face the challenges and threats posed by COVID-19. Regular advisories were issued to the citizens to enable them to take precautions. Self-reliance was the key to cope up with the challenges that is evident in the fact that from zero production of Personal Protection Equipment (PPE) before March 2020, India created a capacity of producing 2 lakh PPE kits daily within no time. India has been recognised as one of the largest producers of Covid vaccines in the world. Various automobile sector industries collaborated in the making of life-saving ventilators. Government ensured that free foodgrains are available to the poor and marginalised section of the society during Covid pandemic and beyond. Systematic steps were taken for administering vaccine doses to the citizens in time bound manner. All this was possible due to proper monitoring tools using technological innovations.

During 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/RAT1 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.

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 social schemes, 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.

Digital 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

Preface

CSI SIG eGov made our sincere effort to validate the information provided through submissions made 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 and Prof. G.P. Sahu
Editors

Section-I
Invited Articles

Inter-Relationship Investigation among Key Factors of Green IS Adoption in Banking and IT Industries

Monika Singh and G. P. Sahu

Abstract

In view of the significance of Green Information Systems (Green IS) adoption in every business of modern era, it is requisite to know and investigate that how Green IS adopted effectively in the organizations and what are the factors need to be considered attentively for behavioral intention to adopt Green IS. This research is an attempt to develop relationships between antecedents of behavioral intention to adopt Green IS such as Hedonic Motivation, Habit, Interoperability, Energy Efficient Technology, Performance Expectancy, Effort Expectancy, Leadership, Employee Stewardship, Expert Appointment, Organizational Policy, Facilitating Conditions, Price Value, Government Regulations, Incentives, Competitive Pressure and Social Influence. Using Interpretive Structural Modeling (ISM) and MICMAC analysis, inter-relationship among all 16 CSFs is developed along with explanation of the driving and dependency power of each CSF. An ISM diagram is developed that provide clearer and complete model of behavioral intention to adopt Green IS in Banking and IT sector in India.

Keywords: ISM, MICMAC analysis, Green IS, Key factors for Green IS adoption

1. Introduction

Since last two decades it has been noticed that Information Technology/Systems (IT/S) is the fastest growing sector in the world (Chan et al., 2019) and the fundamental enabler for swift growth in nations' economies (WEF Report, 2019 and 2018). Organizations, nations and society are copiously dependent on IT/S, to the extent that they cannot survive without it due to its boundless potential (Kurkoon et al., 2018). However, IT/S guzzles resources and origins e-wastes and GHGs emission (Brocke et al., 2013). IT/S contribution is approximately 2% of overall Global GHGs emission (Belkhir & Elmeligi, 2018). It is predicted that by 2040 the total volume of production and uses of IT/S equipment will emit 14% of total carbon emission in the world (WEF Report, 2019; Malmödin & Lundén, 2018). The apprehension of carbon emissions caused by the data servers is catching attention worldwide gradually since it is proportional to the use of energy (Van Heddeghem et al., 2014). According to Yang et al. (2019), the increasing energy ingestion put heavy pressure on energy production at large scale that consequently enforces heavy compression on the atmosphere. This becomes a huge problem in case of cloud data center and required abrupt vigilant action by the researcher, practitioners and users in the IT field since these cloud data centers consumes high level energy due to resource scheduling mechanism to complete the task at high priority causing low server use ratio as well as due to requirement of cooling system that is on the basis of highest significant strategy causing extreme chilling supply, escalations in maneuver cost, and huge energy waste (Yang et al., 2019, WEF, 2019; WEF, 2018).

Banks helps in development of individuals, industries as well as countries. It has a major contribution in country's economy, as now these days banks are growing everyday by upgrading themselves and fulfilling customers need accordingly (Sahu and Singh, 2016; Chiabai et al. 2013). By using the up-graded systems, softwares, applications, internet and networking the banks are now not limited to local banking, conversely, they are providing global banking and achieving competitive advantages through latest technology system like Virtual banking (Lekakos et al., 2014). In the modern era, use of internet and latest IT equipment at high level made customers to rely on internet banking

more in comparison to bank branches and offices (WEF Report, 2018; Ranganathan, 2010; Karin, 2009). Information technology (IT) sector day by day developed as the most robust sector in the world (WEF, 2019 and 2018). IT sector in comparison to other sectors has the increased efficiency in the modern world that makes this sector key driver of global economic growth (Yang et al., 2019). This sector comprises businesses including production and usage electronics, IT equipment like computer and accessories, softwares, internet, networking, and other products and services associated with information technology (Singh and Sahu, 2020; Yang et al., 2019; WEF, 2018). Excessive manufacturing, use and disposal of IT/S lead to GHGs emission at large scale and increase in global warming. Green Information Systems emerged as the solution to this GHGs emission problem due to IT/S equipment production, usage and disposal (Raisinghani & Idemudia, 2019; Bussel et al., 2015; Weiss, 2006).

Brooks et al., (2012) separated Green IS in two broad categories: (a) initiatives that use IT infrastructure to change organizational processes and/or practices to improve energy efficiency and reduce environmental impacts; and (b) the introduction of environmentally healthier IT products and/or services. Green IS focuses on either energy-saving IT equipment and information systems or an energy-efficient society by IT/S application. According to Nau & Marinova (2020), research in the area of Green IT/S has been played a significant role in reducing GHGs emission and improving the resource optimization from ICT usage.

The study is conducted in two IT infrastructures dependent sectors of India i.e., banking sector and Information Technology sector. This study is based on qualitative analysis to achieve the objective. Following the qualitative data analysis, variable identified via literature review and expert's opinion in next section, then using Interpretive Structural Modeling (ISM) an inter-relationship developed among the variables and an ISM model (diagraph) is developed. Thereafter, the extended ISM method is performed i.e., MICMAC analysis and constructs are categorized in four different categories based on their driving power and dependency power in the last section of the study.

2. Literature Review

When IT industry is concerned the compliance to measures is vital element but not the sufficient to gain the ultimate goal of reducing CO2 emission (Nanath & Pillai, 2014). IDC stated in their September 2008 Report "US Green IT Survey," that out of 300 CIOs, 44% of the clients agreed that IT/S plays a crucial role in their companies' struggles to minimize their carbon footprints (ibid). However, in 2008 the publications in this area jumped up to 12 publications and CIOs stated that Green IT is the essential strategic technology in this year (Thibodeau, 2007) with estimates of Green IS Service market reaching \$5 billion by 2013 (Mines, 2008). Consequently year 2007-2008 marked as the instigation of Green IT/S as an emerging discipline in IS Research (Nau & Marinova, 2020; Melville, 2010; Watson et al., 2010).

This paper is an extension of paper published on literature review conducted in the area of Green IS "Singh and Sahu (2020)", where various variables were identified as the Critical success factors for effective adoption of Green IS in various organization especially in Banking and IT industries. According to Singh and Sahu (2020), the CSFs for Green IS effective and efficient adoption generally are categorized under four categories: Organizational factors, Economical Factors, Social-culture factors and Regulatory compliance factors. However, it is found that little literature is available on Government incentives, Technology and Motivational factors to achieve the objective of successful adoption of Green IS (Singh and Sahu, 2020; Sahu and Singh, 2016).

Enterprises that are adopting Green IS may face barriers such as insufficient capital; insufficient expertise to implement the initiatives; blurred purposes or goals; and insufficient arrangement to upkeep the technical requirements (Bose & Luo 2011).

From the accessible literature review, it is explored that numerous models on adoption of Green IS have been developed on the basis of literature review in the field of IT or technology adoption. Green Archiving Model, developed by Bussel et al. (2015) in order to reduce the consumption of power, stored data and records, and cost. Sarkar & Young (2009) developed Tentative Conceptual Framework on the basis of Institutional Theory (INT) developed by Scott in 1995 along with using Theory of Reasoned Action (TRA) given by Ajzen & Fishbein (1973) providing that Green IS policies are stimulated by consumer necessities, subjective norm, government regulations, cost model, and long-term awareness programs. Bokolo & Majid (2017), established a model on Green ICT for sustainable enterprise strategy, aimed at reducing time taken to initiate and diffuse Green strategies for enhancing business value in enterprise. The evaluation of the Green ICT Model is one using Structural Equation Modeling (SEM). Bokolo & Che Pa (2016) developed Case Based Reasoning (CBR) Architecture for Green Information Systems adoption in organizations to train, educate and support practitioner in implementing Green IS as well as developed a Component Based Model to suggesting various driving forces for diffusion of Green IS.

Given that rich qualitative data have been noted as a valuable way to examine construct relationships (Eisenhardt, 1989; Eisenhardt & Graebner, 2007), as well as to conduct exploratory research of contemporary events without the need for strict research controls (Yin, 2017 and 2011). In this study, to analyze the qualitative data Interpretive Structural Modeling (ISM) technique is used. Qualitative study refers to interpretation and analysis of qualitative data like interviews and opinion of expert panel/respondents, documents, and researcher's observation in order to understand and elucidate societal phenomena (Myers, 1999). According to Chua (1986), qualitative method is suitable for exploratory investigations. Interpretive qualitative study is a copious pondered approach but on the other side it is currently an established approach for the exploration of IT/S based research organizations (Klein & Myers, 1999; Myers 1999; Hirschheim & Klein, 1989).

3. Methodology

To conduct qualitative research case study approach has been adopted following the earlier studies (Pare, 2004; Dube & Pare, 2003). According to Yin (2017 and 2011) Case study methodology is preferred when the study emphasizes on contemporary phenomena stirring in realistic settings and in which the investigator has diminutive command. Interpretive Structural Modeling (ISM) was initially developed by Warfield in 1973 (Jayant & Azhar, 2014). This qualitative analysis technique enables a person or a group to develop and draw a relationship map (flowchart) among the constructs involved in a multifarious judgment circumstance (Charan et al, 2008). This technique is often used in complex conditions to offer ultimate understanding and to put together a course of action for solving a problem. The ISM process transforms unclear, poorly articulated mental models of systems into visible, well-defined models useful for many purposes (Ahuja et al, 2009). Interpretive structural modeling (ISM) can rightly be employed under such circumstances because on the basis of relationship between the factors, an overall structure can be extracted for the system under consideration (Salimifard et al., 2010).

3.1 Experts' Selection, Personal and Group Interviews

Qualitative data collection was conducted via semi-structured open-ended interviews of

expertise and decision makers in the field of IT/S. Decision makers and IT experts of banks and IT firms approached to conduct the interviews regarding CSFs for Green IS implementation. However, in order to fill the ISM matrix and rank the CSFs panel of experts from three banks State bank of India (SBI), Punjab National Bank (PNB) and HDFC Bank has been approached. In case of IT industry National information Center and two more software companies (name not disclosed on the request of officials) has been approached.

In order to perform the qualitative data collection and analysis, target respondents were only IT experts (official assigned in the company to look after IT/S equipment's sales/purchase, implementation and usage) or the decision makers such as Chief Manager, Chief Executive Officer, Managers, Executive Directors etc. of the banks and IT companies. In addition to these officials, Professors and post-doctoral students belong to the same field were also pursued and with their valuable expertise used in final decision making and result interpretation. Using semi-structured open-ended interviews in total 31 interviews conducted from March 2019 to August 2019. The interviews were executed by phone (elven interviews) and face to face (nineteen interviews). However, the condition of all the interviewees was not to reveal their details due to no higher authority permission and security concerns. The interviewees' backgrounds are provided in the table: 1.

Table 1: Background of the Respondents

S. N.	Interviewees	Total
1.	Chief Executive Officer	3
2.	Executive Directors	2
3.	Scientists	2
4.	Chief Manager	2
5.	Managers	9
6.	IT-Experts	10
7.	Professors	1
8.	Post-doctoral students	2

The table depicts that the respondents were CEO (three), Chief Managers (two), Executive Director (two), Scientist (two), Managers (nine), IT experts (ten), Professor (one) and Post-doctoral students (two). The total time-duration of each interview was 15 to 40 minutes.

As the Green IS is new in developing countries like India and the employees are very concerned about their job and organizations security, therefore only two interviews were allowed to record and rest interviewees have denied for recording of their interviews. Therefore, every time note was taken carefully. Out of these 31 interviews 28 interviews were personal; however, three interviews were group-interview comprising the above-mentioned interviewees in group. The semi-structured questions offered a frame of reference and allowed researcher to probe deeper into certain critical answers by applying laddering and funneling techniques (Kvale and Brinkmann, 2009; Eisenhardt and Graebner, 2007). Moreover, the ordering of questions was flexible and principally dictated by interviewee's responses. Different ideas and topics were often explored in more detail in each interview depending on the interviewee's environmental and Green IS knowledge. This led to a conversational style of interview appropriate to the study's exploratory nature and suitable for detailed analysis (Flick, 2009).

3.2 Case I: Banks

State Bank of India: State Bank of India (SBI), a well renowned name and leading organization in financial sector, is the primogenital establishments in the country. SBI group is now a multinational finance business. SBI is ranked 216th position on the Fortune Global 500 list of the world's largest organizations as of 2017. SBI is the biggest financial institution country with a 23% market stake in assets, further a share of one-fourth of the total loan and deposits market. SBI was founded in 1806 and basically originated from Bank of Calcutta. Total revenue of SBI in 2020 FY was ₹265,100 crore (US\$37 billion), with an Operating income ₹68,133 crore (US\$ 9.67 billion), and Net income ₹ 45,221 crore (US\$ 6.81 billion) (2020). The total assets worth ₹3,312,461 crore (US\$460 billion) is with the bank and total number of staff is 294,041.

SBI proposes products and services in a liable way that verifies advantageous for the shareholders whilst concurrently taking the Bank's societal and ecological impact into account. It has Sustainability and Business Responsibility Policy in order to maintain and monitor its progress to implement and operate competently in an environment filled with perils and prospects. Its business actions are based on the high level of ethics and work culture and bind this huge institute together. Management of SBI is strong-minded to spread its beliefs and obligation to the public at large. SBI's multi-faceted corporate model is hastily developing to meet numerous desires synchronously, for example improving consumer gratification, increasing emphasis on digitalization backing to national growth goals, mounting communities, educating financial learning amid deprived people, dropping the carbon footprints of its business actions and bring into line its initiatives to the global Sustainable Development Goals (SDGs). The Banks's Policy sketches the tactic taken to achieve SBI's monetary, ecological and social enactment in a cohesive manner and will help ensuring that globally accepted canons and best practices are smeared during ascertaining, measuring and observing ecological, societal and governance threats with respect to the Bank's corporate processes.

The banks policy also covers characteristics enclosed underneath the nine principles as mentioned in National Voluntary Guidelines on Societal, Ecological and Financial Accountabilities of Commercial published by the Ministry of Corporate Affairs (MoCA) Government of India (GOI), in July 2011. However, the bank reviews its policies periodically and the info is restructured as obligatory. In 2020, SBI has elevated US\$ 100 million in green bonds through private placement.

Punjab National Bank: Punjab National Bank (PNB) was founded on 19 May in 1894. PNB is an Indian multinational financial institution. Currently, bank has over 6,968 branches and over 9,656 ATMs through 764 cities. PNB has a banking subsidiary in UK (named PNB International Bank, with seven branches in the UK), in Hong Kong, Kowloon, Dubai and Kabul. It has representative offices in Almaty (Kazakhstan), Dubai (United Arab Emirates), Shanghai (China), Oslo (Norway) and Sydney (Australia). PNB holds 20% of Everest Bank Limited having more than 50 subdivisions in Nepal. In addition to this, PNB have possession of 84% of PNB Bank in Kazakhstan with 4 subdivisions. Along with these trades, bank is also involved in Corporate Social Responsibilities (CSR), and incurred INR 3.24 crores (US\$472 billion) on different CSR events like tree plantations, medicinal campsites, agriculturalist trainings, and blood donation campsites etc. in previous years.

PNB has started its business in 1895, at Lahore and becomes first Swadeshi Bank. The rapidly growing customers, due to customer's faith and institute's goodwill could be seen in rising business graph. The Gross domestic business is above than INR 336 crore

(US\$ 3.36 billion, in FY 2020) and institute will maintain its specialty in low cost CASA securities. The finance institute has attained enhanced consequences in the quarter owed to a scheme MISSION PARIVARTAN: revolutionary course of action started for Corporate Brilliance intended to enhance Competency, Productivity and Cost-effectiveness in order to sustain for long term as well as providing the institute the superiority over its contenders. The 'Mission Parivartan Division' an autonomous "THINK TANK" created to start, adapt and drive revolution through enhancement in Populaces, Products and Procedures, has empowered Bank and it oblige the consumers with improved potency and enthusiasm to live up to its Punch Line "The Name you can Bank Upon".

In the previous financial year 2018-19 the bank has raised net profit of INR 10134 crore (US\$1478 billion) and INT 336 Crore (US\$ 3.36Billion) in FY2020, the net interest income achieved INR.12956 crore (US\$1890 billion representing the year to year development of 9.3%, Domestic Net Interest Margin (NIM) augmented to 2.64% from 2.59% in FY'19. Further, the bank is streamlining its abroad operations resulting in lessening of abroad commerce.

PNB has focused on improvement of its asset value due to which the GNPA and NNPA's declined by INR 8886 crore (US\$1296 billion) and INR 13009 crore (US\$1898 billion) correspondingly. The bank aims to be a reagent for revolution that profits current and forthcoming generations. Therefore, the bank has adopted sustainability as a fundamental part of institute's procedures like in their core business and yonder. In that way, PNB believes in being accountable to their shareholders, humanity and the environs.

Housing Development Finance Corporation Limited (HDFC): The Housing Development Finance Corporation Limited (HDFC) was among the chief to obtain an 'in principle' sanction from the Reserve Bank of India (RBI) to build a finance institute in the private segment, being the share of RBI's liberalization of Indian Banking sector in 1994. HDFC initiated in August 1914, as "HDFC Bank Ltd." in Mumbai, India. However, HDFC Bank started its operations as a Scheduled Commercial Bank in 1995. HDFC is dedicated to preserve the highest level of moral values, proficient veracity, corporate governance and governing acquiescence. The Bank work upon a business philosophy comprising five central values: Operational Brilliance, Consumer Centered, Product Governance, Societies and Sustainability. In the earlier financial year by June 2018 the Bank's total official share capital is INR650 crore, (US\$948 billion) along with the paid-up share capital INR 520,83,15,734 (US\$76 billion) (encompassing 260,41,57,867 equity shares with the face value INR 2 = \$.029 each). In FY 2020 gained net profit of Rs 6,927.69 crore (USD 69.27 billion). The banks' shares are enlisted in Bombay Stock Exchange (BSE) Limited and National Stock Exchange (NSE) of India Limited. HDFC's American Depository Shares (ADS) is enlisted in New York Stock Exchange (NYSE) and the Bank's Global Depository Receipts (GDRs) is enlisted in Luxembourg Stock Exchange (LSE).

The financial institute functions in an extremely computerized environment with internet connectivity with all the other branches, making the bank highly efficient in swift fund transfers for customers. The bank offers multiple-branch access facility to retail consumers via bank's network and Automated Teller Machines (ATMs). The institute has made considerable efforts and investments in procuring and using the best innovative techniques accessible globally to make the bank a world class bank. The bank provides core banking as Corporate Banking operation is reinforced by Flexcube, on the other hand, Retail Banking operation by Finware, both the software applications

provided by i-flex Solutions Ltd. Both the softwares are open, scale-able and web enabled. The Bank has arranged its appointment in techniques and the network as its important objectives and done momentous progress in web enabling its core dealings. In every area of its business operation HDFC has prospered in leveraging its market niche, proficiency and technology to generate an economical advantage and develop market portion.

HDFC has also done tremendous job in CSR as the bank believes that a country grows when its societies find ecological resources of living. HDFC bank runs a scheme named Parivartan, as their CSR inventiveness, to reach out the society and empower them to transform from a rancorous cycle of deficiency to an honorable cycle of evolution. Curtailing from the core value of sustainability, the scheme empowers loads of people to be self-contained and consequently, become associates in the development of the country. The bank controls and monitors its business operation to maintain balance between the natural resources and societies for its' operative. It concerns climate change extenuation and ecological preservation as vital features of an ecological business.

3.3 Case II: Information Technology Companies

National Informatics Centre (NIC) was founded in 1976, and appeared as the leading developer of e-Government/Governance applications bringing to the public. NIC has also leading role in promoting digital opportunities/digitalization of nation to achieve sustainable development. NIC along with its ICT Network NICNET developed the utilitarian connectivity with all the Ministries and Departments of Government of India (GoI) including: Central Government, al the State Governments/Union Territories, as well as 708 District Administrations. NIC is functional in driving e-Government/Governance applications in government ministries/departments, enabling up gradation all government operations, broader transparency, endorsing dispersed planning administration, ensuing in improved proficiency and culpability to the Indian citizens. "Informatics-led-development" government's initiative is commanded by NIC to develop competitive advantage by employing ICT applications in communal & open administration.

NIC delivers countrywide ICT substructure to assists e-Governance programs and numerous ingenuities of Digital India program. NIC is also associated with design and development (D&D) of software for refining distribution government services at State and District level. ICT substructure of NIC namely NICNET, NKN, LAN, Mini Data Centre, Video conference studios, messaging service and Webcast amenities are the crucial elements of NIC services across the nation. In order to reduce its' carbon footprint NIC works on new technology and practices and implement the same in its services. The core activity performed by NIC is endorsement of Digital India and making the e-Government services reachable at doorstep of the clients. On the other hand, it has reduced the transportation cost, fuel consumption etc.

The other IT companies approached are also taking part in CSR activities and reducing their carbon footprints via various technologies. As the companies have not allowed revealing their name and identity, so the names are not mentioned. However, during the interview it was mentioned as well observed that the companies were taking vital step to deal with the issues of GHGs emission by adopting virtual data servers, cloud computing and thin client services. Along with these activities the companies were using solar panels in order to reduce conventional energy resources consumption. The companies have provided written instructions at the staff desk remarking use of sleep mode, shut down the system and other related activities. The companies have

organizational IT policy related to up-gradation of IT/S equipment's and softwares in order to ensure less power consumption technology adoption.

4. Case Analysis and Model Development using ISM Methodology

Following the steps of ISM methodology according to Digalwar et al. (2017), Sahu & Singh (2016), Thakkar et al. (2008) in this study ISM model developed. The processes are described below:

Step-1: Identification of Variables/Constructs

The sixteen (16) constructs identified through in-depth literature review from Singh and Sahu (2020). Additionally, in the interviews of the IT Experts, Scientists, Chief Managers and other decision managers these constructs are confirmed. These constructs are Hedonic Motivation (HM), Habit (HM), Interoperability (IO), Energy Efficient Technology (EET), Performance Expectancy (PE), Effort Expectancy (EE), Leadership (LA), Employee Stewardship (ES), Expert Appointment (EA), Organizational Policy (OP), Facilitating Conditions (FC), Price Value (PV), Government Regulations (GR), Incentives (IC), Competitive Pressure (CP) and Social Influence (SI).

However, experts have provided few more constructs but due to lack of adequate literature support, they have not included in the study. These sixteen constructs have included for the further steps.

Step-2: Development of Adjacent Matrix or Structural Self-interaction matrix (SSIM)

SSIM matrix portrays a preliminary imprint relationship among the construct, that which construct how and in what order (direction) effects other factors. The rules to fill the matrix are:

1. A if construct 1 (i) predicts construct 2 (j);
2. B if construct 1 (i) is predicted by construct 2 (j);
3. C if both the constructs predicts each other; and
4. D if both the constructs are unrelated (Salimifard et al., 2010).

The process followed and SSIM matrix has been developed in the table 2.

Table: 2 represent the Structural Self-interaction matrix (SSIM), where all the factors are correlated by A, B, C, D using the above described interrelation logics. The first half diagonal part is exactly same as the second diagonal part. Therefore, the first half part is shown in the matrix.

Step-3: Development of a Reachability Matrix

On the basis of above created adjacent matrix/SSIM matrix, in the next step reachability matrix has been developed using below rules:

- If the (i, j) entry in SSIM is A, then the (i, j) entry in the reachability matrix will 1 and the (j, i) entry will 0.
- If the (i, j) entry in the SSIM is B, then the (i, j) entry in the reachability matrix will 0 and the (j, i) entry will 1.
- If the (i, j) entry in the SSIM is C, then the (i, j) entry in the reachability matrix will 1 and the (j, i) entry also will 1
- If the (i, j) entry in the SSIM is O, then the (i, j) entry in the reachability matrix will 0 and the (j, i) entry also will 0.

Fundamentally, the reachability matrix retorts the interrogation by yes or no i.e., can we

“reach” to construct 2 by from construct 1, here, “reach” denotes direct or indirect relationship between construct 1 and construct 2 (Singh et al., 2008). Table 3 represents the reachability matrix. In table 3 dependence power and driving power of constructs is also calculated for the further analysis (Micmac analysis).

Table 2: Structural Self-Interaction Matrix (SSIM)

S.N.	Elements	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
1	Hedonic Motivation	A	B	B	B	B	B	B	B	B	B	B	B	B	C	B	A	
2	Habit	A	B	B	B	B	B	B	B	D	B	B	B	B	C	B		
3	Leadership	A	B	B	A	B	B	B	A	B	B	A	C	C	A			
4	Employee Stewardship	A	B	B	B	B	B	B	B	D	B	B	D	B				
5	Expert/Consultant Appointment	A	B	B	A	B	A	A	A	A	A	A	B					
6	Organization Policy	A	B	B	A	B	B	B	A	A	B	A						
7	Facilitating Condition	A	D	D	C	B	C	C	C	D	B							
8	Price Value	A	D	D	A	B	C	C	C	D								
9	Interoperability	A	D	D	D	D	A	A	D									
10	Energy Efficient Technologies	A	D	D	A	B	A	A										
11	Performance Expectancy	A	D	D	A	A	C											
12	Effort Expectancy	A	D	D	A	A												
13	Government Regulations	A	B	D	A													
14	Incentives	A	D	B														
15	Competitive Pressure	A	B															
16	Social Influence	A																
17	Behavioral Intention to Adopt																	

Table 3: Reachability Matrix

S.N	Elements	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Driving Power
1	Hedonic Motivation	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	4
2	Habit	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	3
3	Leadership	1	1	1	1	1	1	1	0	0	1	0	0	0	1	0	0	1	10
4	Employee Stewardship	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	4
5	Expert/Consultant Appointment	1	1	1	1	1	0	1	1	1	1	1	1	0	1	0	0	1	13
6	Organization	1	1	1	0	1	1	1	0	1	1	0	0	0	1	0	0	1	10

	Policy																		
7	Facilitating condition	1	1	0	1	0	0	1	0	0	1	1	1	0	1	0	0	1	9
8	Price Value	1	1	1	1	0	1	1	1	0	1	1	1	0	1	0	0	1	12
9	Interoperability	1	0	1	0	0	0	0	0	1	0	1	1	0	0	0	0	1	6
10	Energy efficient Technologies	1	1	0	1	0	0	1	1	0	1	1	1	0	1	0	0	1	10
11	Performance expectancy	1	1	1	1	0	1	1	1	0	0	1	1	1	1	0	0	1	12
12	Effort Expectancy	1	1	1	1	0	1	1	1	0	0	1	1	1	1	0	0	1	12
13	Government Regulations	1	1	1	1	1	1	1	1	0	1	0	0	1	1	0	0	1	12
14	Incentives	1	1	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	6
15	Competitive Pressure	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0	1	9
16	Social Influence	1	1	1	1	1	1	0	0	0	0	0	0	1	0	1	1	1	10
17	Behavioral Intention to Adopt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Dependence	15	15	10	14	6	8	10	6	3	7	7	7	4	11	2	1	17	

Table 4: Reachability Set, Antecedent Set, Intersection Set and Level

Variable	Reachability Set	Antecedent Set	Intersection Set	Level
1	1, 2, 4	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	1, 4	III
2	2, 4	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16	2, 4	II
3	1, 2, 3, 4, 5, 6, 7, 10, 14	3, 5, 6, 8, 9, 11, 12, 13, 15, 16	3, 5, 6	VI
4	1,2,4	1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 14, 15, 16	1, 2	III
5	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 14	3, 5, 6, 13, 15, 16	3, 5	VII
6	1, 2, 3, 5, 6, 7, 9, 10, 14	3, 6, 8, 11, 12, 13, 15, 16	3, 6	VII
7	1, 2, 4, 7, 10, 11, 12, 14	3, 5, 6, 7, 8, 10, 11, 12, 13, 14	7, 10, 11, 12	V
8	1, 2, 3, 4, 6, 7, 8, 10, 11, 12, 14	5, 8, 10, 11, 12, 13	8, 11, 12	VI
9	1, 3, 9, 11, 12	5, 6, 9	9	VII
10	1, 2, 4, 7, 8, 10, 11, 12, 14	3, 8, 5, 6, 7, 10, 13	7, 10	VI
11	1, 2, 3, 4, 6, 7, 8, 11, 12, 13,14	5, 7, 8, 9, 10, 11, 12	7, 8, 11, 12	VII

12	1, 2, 3, 4, 6, 7, 8, 11, 12, 13, 14	5, 7, 8, 9, 10, 11, 12	7, 8, 11, 12	VII
13	1, 2, 3, 4, 5, 6, 7, 8, 10, 13, 14	11, 12, 13, 16	13	VII
14	1, 2, 4, 5, 7, 14	3, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15	5, 7, 14	IV
15	1, 2, 3, 4, 5, 6, 14, 15	15, 16	15	VII
16	1, 2, 3, 4, 5, 6, 13, 15, 16	16	16	VIII
17	17	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17	17	I

Step-4: Determining Reachability Set, Antecedent Set, and Intersection Set

After developing the reachability matrix, reachability set and antecedent set are determined by the matrix for each construct. In the reachability set, constructs comprise itself and others constructs which it may help to achieve. The antecedent set entails of construct itself and the other constructs which assist in reaching it. Afterwards, the intersection set determined, by determining the intersection of Reachability Set and Antecedent Set.

Table 4 represents the Reachability Set, Antecedent Set and Intersection Set of the constructs. As it is clear that on construct 17 i.e. Behavioral Intention to Adopt Green Information Systems is reaching itself in reachability set and all the constructs are help to achieving it.

Step-5: levels Finding

The intersection set and reachability set is derived for all constructs. The construct for which the reachability and intersection sets are identical will be on first level in the ISM pyramid.

As the construct on first level would not assist achieve other construct above its own level, therefore once the first level construct is identified, that will be eliminated from other constructs to find the next level. This iterative process will be done to find out the all levels of all constructs. Table 4 provides the level of all constructs, where the levels of the constructs is identified and provided in the Level column.

Step-6: ISM model development

In the model development, the first level construct is positioned at the bottom of the digraph and then the second level construct is poisoned on above the first level digraph. Similarly, all the constructs are positioned in the digraph. Figure 1 represents the ISM model. Social influence is at level VIII, Government Regulations, Effort Expectancy, Performance Expectancy, Interoperability, Competitive Pressure, Expert Appointment and Organizational Policy are at level VII, Constructs Energy Efficient Technology, Leadership and Price Value are at V level, Facilitating Conditions is at level IV and Incentives is at level III. Hedonic Motivation and Employee stewardship are at level II and Habit is at Level I.

Step-7: MICMAC Analysis

MICMAC analysis is established by Michel Godet and François Bourse (Chandramowli et al., 2011), to measure the position and value of variables through direct and indirect relationships among the variables. MICMAC analysis is Matrice d'Impacts Croises

Multiplication Applique a un Classement to measure the driving and dependence power of constructs need to study (Faisal et al. 2006; Saxena et al., 1990). This principle is referred as cross-impact matrix exponentiation employed to classification, (Mathiyazhagan et al., 2013; Wu et al., 2012; Thakkar et al, 2008) It measures the scope of the constructs.

The dependence and driving power are calculated by summing up the entry of “1” along the rows and columns respectively in the reachability matrix. Figure 2 represents the MICMAC analysis i.e., driving power-dependence diagram between the constructs. These constructs or enablers will influence the other construct others and get influence by other constructs if changes occurred. The constructs are categories in four quadrants namely: autonomous, dependent factors, linkage factors and independent factors. The quadrant denotes the driving and dependence power of the constructs and their effect on other constructs.

- The first quadrant is “Autonomous factor” comprising the constructs that have weak driver power and weak dependence. As they both the power of these factors are weak, these constructs are comparatively disconnected from the structure. There these constructs have only few links that could be strong.

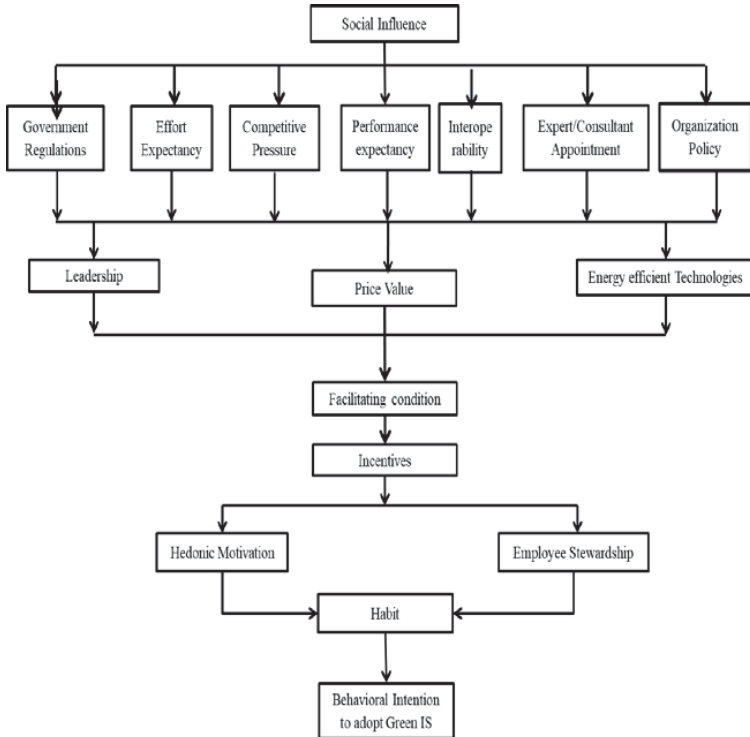


Figure 1: ISM Model for Constructs

- The second quadrant is “dependent factor” comprising the constructs having weak driver power and strong dependence power.
- Third quadrant is “linkage factors” comprises the constructs having strong

driving power as well as strong dependence power. The construct laying in this quadrant are more unstable construct that one action on these constructs will result in influence on others with a response on themselves.

- The fourth quadrant is “independent factors” having the constructs with strong driving power and weak dependence power.

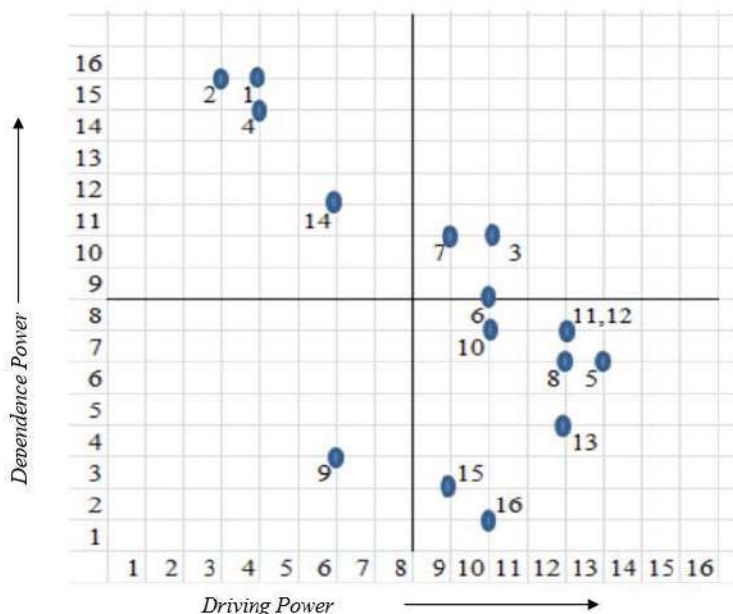


Figure 2: MICMAC Analysis

4.1 Result Analysis and Discussion

In this paper ISM matrix and model have been developed following the ISM methodology procedures for the sixteen constructs of the study. The model provided a hierarchy of the CSFs to be considered for Behavioral Intention to Adopt Green IS in Indian banks or IT companies. The results of ISM modeling and MICMAC analysis is discussed here.

The ISM model shown in Figure 1 explores the hierarchy of the constructs (CSFs) in order to adopt Green IS. The diagram shows the direct and indirect relation among the constructs and level of the constructs. Social influence is on the lowest level VIII which indirectly influence the ‘Behavioral Intention to adopt Green IS’. Government Regulations, Effort Expectancy, Performance Expectancy, Interoperability, Competitive Pressure, Expert Appointment and Organizational Policy are at level VII above the social influence and effects the constructs of level VI directly whereas indirectly effects the ‘Behavioral Intention to adopt Green IS’. Constructs Energy Efficient Technology, Leadership and Price Value are at V level and directly influencing the constructs at level IV. Facilitating Conditions is at level IV and Incentives is at level III. Hedonic Motivation and Employee stewardship are at level II and directly making effect over habit of ‘Behavioral Intention to adopt Green IS’. Habit is at Level I and directly effects

‘Behavioral Intention to adopt Green IS’.

The finding from MICMAC analysis explore that Interoperability construct lays in quadrant I i.e., “autonomous factors” and have weak driver power as well as weak dependence power. Therefore, it is autonomous factors. Since this factor has disconnectivity or the weakened linkage with the rest of the constructs (does not mean that the factor is unimportant), the construct should be handled separately during the adoption process. Construct Hedonic Motivation, Habit, Expert Stewardship and Incentives lies in quadrant II having weak driver power but strong dependence. Therefore, they are dependent factors. Since these factors are dependent on rest of the factors so they are less significant. But it could be improved by handling the driving constructs more attentively. As Hedonic Motivation, Habit, Expert Stewardship and Incentives are the important factor as they create self-motivation and that in turns lead to the development of behavioral intention to adopt Green Information Systems among the employees.

In quadrant III construct Leadership and Facilitating condition are laid with strong driving power as well as strong dependence power. Therefore, these constructs are linkage factors. Rest of the factors Expert Appointment, Organizational Policy, Price Value, Energy Efficient Technology, Performance Expectancy, Effort Expectancy, Government Regulations, Competitive Pressure and Social Influence are lies in quadrant IV. These factors have strong driver power and weak dependence power so they are driving factors. It can be inferred from the result that these strong drivers could be treated as the root cause of remaining constructs. In order to adopt Green IS effectively and develop Behavioral Intention to Adopt Green IS in the organization these factors are required to be considered foremost. If during the adoption process high attention will be given to these driving factors then risk of project failure will be lessen as well as risk of employee’s resistance, productivity decrease or other similar havoc will be avoided. As the adoption process of any new technology requires government and organization’s motivation, encouragement and support so that employees and customers will readily and swiftly. In addition to this energy efficient technologies, easiness to operate, performance increasing technologies, price reduction on total operation and production as well as gaining competitive advantages in the market are lead to effective and efficient adoption of Green IS in the organization.

5. Conclusion, Limitation and Scope of the study

This study has tried to found the inter-relationship among the constructs through Interpretive Structural Modeling (ISM) methodology. In the study all the steps and procedures of ISM methodology are followed, described and executed. Finally, the result interpretation and discussion is provided. Expert Appointment, Organizational Policy, Price Value, Energy Efficient Technology, Performance Expectancy, Effort Expectancy, Government Regulations, Facilitating Condition, Price Value, Competitive Pressure, Competitive Pressure and Social Influence are the key factors in effective and efficient adoption of Green IS in organizations. These constructs will lead to industries to achieve their goal. Using MICMAC analysis, the construct is divided into autonomous, dependent, drivers and linkage factors accordingly.

Similar to other studies, this research has also few limitations like selection of the experts and academicians are based on the availability and approachability. The expert’s opinion could be influenced and prejudiced, as expert opinion varies from person to person as per their experience, resource availability and knowledge. However, the result of the study may be generalized and can be used for further research in the area of Green

IS adoption in future.

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MOOCs Role in Enhancing Financial Literacy: Bank Employees' Perspectives

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Abstract

Since Information Technology (IT) has revolutionised every sector of the economy, its role in education through Massive Open Online Courses (MOOCs) cannot be neglected. MOOCs has revolutionised education with increased democratisation and diversification for systematic change. This study aims to analyse the factors that promote financial literacy through MOOCs as medium of educating people, with reference to bank employee prospective. So, 142 valid questionnaires responses were collected from various public and private sector employees. Confirmatory factor analysis and multiple regression was used as research method to analyse the data. Financial behaviour and financial knowledge both found to have significant impact on the financial literacy if they tend to have educated from MOOCs. MOOCs can one of the methods for enhancing literacy among the people in both urban and rural areas.

1. Introduction

As education is one of the essential basic amenities that every person should get, contrary banking literacy is also crucial at the same pace. But due to a low level of education, lack of documents, accessibility of banks, trust issue and incompatibility in access to technology, banking literacy has become a challenge. Since Information Technology (IT) has revolutionised every sector of the economy, its role in education through Massive Open Online Courses (MOOCs) cannot be neglected (Park et al., 2018) as it is an encouraging form of teaching. Since 2008, especially in North America, various public and elite universities have reached global education through MOOCs (Wakefield et al., 2018). MOOCs has revolutionised education with increased democratisation and diversification for systematic change. MOOCs came into force to provide introductory university-level courses worldwide (Gordon et al., 2015). But MOOCs has proved to be a pyramid in shaping the higher education landscape (Dodson et al., 2015). Massive open online courses are being designed to enable anyone anywhere to study free university courses to pursue their interest by taking taster courses.

After successful implementation of MOOCs in education, MOOCs can also act as a tool for establishing financial literacy, as economic infrastructure cannot be considered the only typical address to achieve financial inclusion (Grohmann et al., 2018, Gordon et al., 2015). Financial literacy will also provide insight into making effective use of financial products and services, planning & controlling one's economic future, and reducing vulnerability to fraudulent schemes. Enlightening through MOOCs will change consumers into responsible customers and empower them to know their rights as a consumer of financial services.

1.1 MOOCs

Learners worldwide have benefitted from MOOCs (Sidek et al., 2020; Gabaree et al., 2020). During the Covid-19 pandemic, learners evaluated their courses at home. Consequently, MOOCs were elevated as a new teaching method that overcame the limits of traditional teaching platforms' limitations by allowing students to learn from any place and at any time (Wang, 2021). Learners invariably benefit from observing videos or by reading lecture notes online. This type of remote learning enables students to learn outside the physical classroom.

1.1.1 MOOCs: The Key Features

MOOCs came to highlight their global reach. MOOCs use online mode to reach a global audience of learners. Learners can be anyone irrespective of age, economy, gender, but they should be motivated to learn with the proper technical connectivity and the right motivation. (Porter, 2015) Various MNCs worldwide use MOOCs in their training models for their employee learnings. MOOCs as business models will also need to excel with the skills to direct an increasingly global market of existing brands of knowledge providers (Porter, 2015). They also require a sustainable business model first to fund activities of the MOOCs platform provider and second to fund the creation of the MOOC and provide support to its consumers.

Various courses provide Professional Development and academic recognition through MOOCs. With that, MOOCs give the certificate of participation, which is sufficient evidence for employers validating MOOC achievement as viable professional development endeavours. (Annabi et al., 2016). MOOCs offer the untold potential for academic Professional Development, mainly if the courses provide academic recognition and PD validation. Most MOOCs courses are structured with professionals worldwide from various reputed institutes. But with lectures, they involved multiple activities that had to be performed in the team, which led to the professional development of individuals.

Learning is almost free in MOOCs, but some charge the amount for the certificate they offer at the end of the learning program. High-profile professionals mainly organise MOOCs and keep in view of learners they are designed as highly cost-effective in both monetary and time (Karnouskos, 2017). As High-profile learners offer MOOCs, MOOCs are convenient because learners can log into the online portal. They are fortunate to learn. This provides greater flexibility to learners to learn from their hectic regular schedules. Like students, MOOCs can also be an effective way to reach existing bank customers, update them with current reforms, and instruct them to apply in their saving and investment plans. For this purpose, the following research objectives are being framed for this study.

1. To study the problems faced by the banking industry in enhancing their customer literacy following traditional methods.
2. To determine the role of MOOCs in enhancing financial literacy.

2. Literature Review

To study the existing problems faced by the banking industry in enhancing their customer literacy following traditional methods.

2.1 Financial Literacy

Financial literacy is defined as the "knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence to apply such knowledge and understanding to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life." (OECD, 2014). Financial literacy as "the knowledge of basic financial concepts and ability to do simple calculations." (Huston, 2010) conceptualised financial literacy as the knowledge of personal finance as well as the application of that knowledge. Financial literacy is the "ability to use knowledge and skills to manage financial resources effectively for lifetime financial security" Jump\$tart Coalition, 2007. Financial literacy and financial capability are used as synonyms (Kempson et al., 2009). Some researchers considered financial literacy synonymous with financial knowledge

(Hilgert et al., 2003; Lusardi et al., 2011; Bucher-Koenen et al., 2016). Lusardi (2007) and Lusardi and Mitchell (2011) conceptualised financial literacy as the knowledge of basic financial concepts and the ability to do simple calculations. Mandell and Klein (2007) defined financial literacy as "the ability to evaluate the new and complex financial instruments and make informed judgments in both choice of instruments and extent of use that would be in their own best long-run interests". Lusardi and Tufano (2009) reported debt literacy as an essential component of financial literacy and hence comprising the ability to take simple decisions regarding debt and apply knowledge about interest compounding to real-life situations. (Mathavathani and Velumani, 2014) undertook a study on financial literacy among rural women in Tamil Nadu. The study focused on only three aspects of financial literacy: financial knowledge, behaviour, and attitude and found that financial literacy among rural women is very low.

2.1.1 Financial Literacy and its Importance

The financial system plays a crucial role in global economic development. Contrary to financial literacy has been a global issue that hinders economic growth. Financial literacy can even improve the participation of less financially informed and aware people in the financial markets.

Financial literacy is a multi-dimensional concept, so we have to measure it separately, considering the various aspect of it. Through several decades government of India has been aggressively working to increase the financial knowledge of different sectors of the country. Various training programmes. Indians are considered less aware about insurance, debt trap, sufficient retirement fund and return on investment due to low financial literacy. Financial knowledge is also influenced by individual preferences, household resources and the cost of acquiring financial knowledge. Financial literacy can also be classified based on gender, and even women are less financially informed than men. But if women are financially knowledgeable and participate in the financial decisions of the family, then they contribute to more significant family income.

2.1.2 MOOCs as Channel for Enhancing Financial Literacy

As with changing the economic objective, there should also be responsibility toward managing own finances and securing proper financial investments. However, there should be effective financial planning to meet the financial objective and here comes financial literacy, which plays a crucial role in an individual's financial planning. Financial planning is defined as "the process of meeting one's life goals through the proper management of personal finances" (National Institute of securities market (NISM)).

Past research has confirmed low financial literacy levels among various socio-demographic groups in India. For certain groups of people, it would be individually rational to have low financial literacy as the cost of acquiring literacy is higher than its benefits as banks play a significant role in enhancing financial inclusion and financial literacy among the country's population. So through various financial literacy programs banks can provide easy and cost effective financial education and training to its customers and promote others to save, invest and secure through MOOCs can be effective and efficient channel, as through MOOCs they can promote financial literacy in a very cost effective manner.

Educating and training through MOOCs to the illiterate rural and low-income audience by involving various entertaining factors such as animated movies and games (Agarwalla et al., 2014) this method of education and training would be more effective than traditional pedagogy based only on lectures in the presence of educated staff.

Through MOOCs, banking experts would convey the importance of savings and influence financial attitude to save (Siddike et al., 2016). MOOCs can also be an effective way to reach existing customers, update them with current reforms, and instruct them to apply them to their investment plans.

2.1.3 Consideration of MOOCs for Banking Literacy

The organisation For Economic Co-operation and Development (OECD) has set goal to help customers "develop the skills and confidence to become more aware of financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being" (OECD, 2005). In 2014, only 53% of the population had bank accounts, but in 2017, four-fifths of Indian adults have bank accounts (economic times). But World bank said: "Globally, 13 per cent of adults, or 20 per cent of account owners, reported having what can be considered an inactive account, with no deposit or withdrawal – in digital form or otherwise – in the past 12 months."

The government is taking various initiatives to spread financial education across the country, yet there are several issues faced by people across the country, especially women; multiple studies have found that the urban population is more financially literate than the rural population. And as India is a male-dominated society, women are less financially literate than men. As the government is already providing various training and awareness to save and invest, MOOCs can be one of the best sources to reach such a section of society. MOOCs is the best measure to provide financial education as people will not have to visit far of places to take such education, they can take such lectures at their nearby bank branch.

But teaching should include the fundamental element of finance such as savings, benefits of saving, investing, insuring, the role of banks, interest on their deposits etc. As banks have reached every corner of India, they are the best medium to provide training. As financial literacy problems are all around, connecting to the mass population, MOOCs can be considered the best alternative. Even mobile technologies have become quite popular, so they can use MOOCs to do function videos in their app and website to efficiently perform their transaction without anybody's help (Baluja, 2016).

2.2 Factors that affect Financial Literacy

Out of the factors extracted from the literature following aspects are being considered for this study

2.2.1 Financial Behaviour

Financial behaviour can be defined "as any human behaviour relevant to money management" (Xiao et al., 2008). Various studies reveal that financial literacy is positively related to financial behaviour. Individuals with effective financial behaviour were more likely to participate in the stock market and formal financial markets, actively save, have a bank account, plan and monitor household budget and personal finance, make timely payment of bills, prefer savings than borrowings at times of crisis, accumulate and manage assets, carefully evaluate financial products, make appropriate financial decisions (Atkinson and Messy, 2012; Klapper et al., 2012; Agarwalla et al., 2014 and Lusardi and Tufano, 2009)

In meta-study of financial research, a significant association has been found between financial literacy and financial behaviour (Agarwalla et al., 2014). (Zait et al., 2014) his study mentioned financial behaviour as one of the variables to measure financial literacy.

Cole et al., 2009) surveyed India and Indonesia and reported less access to bank accounts in both countries, i.e. just 12 per cent for India and 41 per cent for Indonesia, and more access to informal credit – 64 per cent for Indian households and 52 per cent Indonesian households. Various studies concluded that women are discouraged from the family's financial decisions, and hence they have inferior financial behaviour. (Agarwalla et al., 2014). Agarwalla et al. (2014) found that majority of Indian working youth (68 per cent) were exhibiting desirable financial behaviour, i.e. were self-disciplined when dealing with household finance and personal money and were more likely to make timely payment of bills, to assess affordability of products, to set financial goals, to carefully evaluate financial products and to depend on savings or assets instead of borrowings in times of crisis. These results were similar to the findings of the OECD countries survey.

H1- Financial behaviour positively influences the financial literacy of bank customers by using MOOCs as the medium of training.

2.2.2 Financial Knowledge

Financial knowledge is defined "as understanding key financial terms and concepts needed to function daily in American society" (Bowen, 2002). Financial literacy should also include the application of financial knowledge. (Agarwalla et al., 2014). Financial knowledge and the ability to use financial knowledge are essential factors of measuring financial literacy (Mandell et al., 2009). A financially literate person will possess the basic knowledge of some key economic concepts (OECD, 2013). Therefore, financial knowledge is termed as a critical dimension of financial literacy (Huston, 2010) and most of the time; it is considered a synonym of financial literacy. Huang et al. (2013) regarded as financial knowledge as an individual's understanding of financial concepts. Huston (2010) identified four main components of financial knowledge after reviewing 71 studies: basic money concepts, saving or investment, borrowing and protection concepts. Herd et al. (2012) measured financial knowledge as the person's knowledge of his financial situations, instead of basic financial concepts, and treated it as a prerequisite to effectively making financial decisions.

Individuals with high financial knowledge were more likely to better understand basic financial concepts, interest compounding, time value of money, time value of money, impact of inflation on price levels , impact of inflation on investment returns, numeracy , relationship between risk and return, role of diversification in risk reduction, working of credit cards and have high self-perceived financial knowledge (Lusardi and Mitchell, 2006; van Rooij et al., 2009; Atkinson and Messy, 2012; Agarwalla et al., 2013; Yu et al., 2015 and Huang et al., 2020).

H2- Financial knowledge positively influences bank customers' financial literacy by using MOOCs as medium of training

2.3 Research Model

The following research model has been framed based on the factors in figure 1

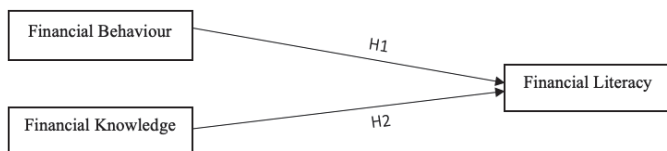


Figure 1: Proposed Research Model

3. Methodology

Data analysis obtains usable and valuable information from the collected data. The primary objective of data analysis is to describe and summarise data, identify relationships between variables, compare variables, and forecast outcomes.

Descriptive research has been conducted, the primary purpose of descriptive research design is to study various factors which influence behavioral intension of Employees for adopting MOOCs in their training and enhancing customer literacy toward financial aspects in banking sector. Primary data was collected from the existing employees of nationalized and private banks of Prayagraj, Auraiya, Jalaun districts. Total of 200 employees were contacted out of them 142 employees responded and give their views on the education of their customers and other people through MOOCs. Under Non-probability sampling purposive -convenience sampling has been adopted for collecting information.

Questionnaire was prepared in two sections and 1 section consist of demographic questions related to employee and their job, whereas section second consist of questions related to factors of the study. In this study 5-point balanced Likert scale has been used with 1be “strongly disagree”, 5 be “strongly agree” and “neutral” as center point. Statistical tools and technique are to be applied to study the response of customers. SPSS 23.0 and Amos 23.0 has been used for data analysis in this study. To validate the questionnaire model fit, convergent and discriminant validity and composite reliability has been done and Cronbach's alpha and regression analysis has been done to test the hypothesis.

4. Results

4.1 Respondents Profile and Characteristics

Out of one hundred and, thirty-four valid questionnaires of Massive open online courses (MOOCs) were completed by bank employees of both nationalised and private banks. As from the table below, 66.4% of the employees were male compared to 33.6% of the female employees. Relating to the employee's age, it is noticed that the age group of 21-30 captured the most significant part of the total valid sample (43.3%) group of age 41-50 and 51-above has 10.4 %and 11.9% respectively of real customers. Concerning the work experience ranging from, most employees had work experience of 5-20 years. There were no employees with work experience of 50 years and above.

4.2 Descriptive Statistics

After analysing the demographic data, confirmatory factor analysis was done with the responses, further data validity and reliability, and later multiple regression was run to test the hypothesis.

4.2.1 Confirmatory Factor Analysis / Model Fit

The Confirmatory Factor Analysis (CFA) is used to investigate the model fit, i.e., how well the proposed model of the factor structure accounts for the correlations between variables in the dataset.

Table 1: Model Fit Values

FIT INDEX	CMIN/DF	GFI	AGFI	TLI	CFI	RMSEA
Experiment Values	1.150	.955	.916	.987	.991	.034

The χ^2 (CMIN) divided by the degrees of freedom (DF) leads to the computation of the relative χ^2 (CMIN/DF), which has a value of 1.150, and indicates a good fit as >2.00

represents an inadequate fit (Byrne et al., 1989). Other indicators of model fit are the Goodness of Fit Index (GFI) and the GFI adjusted for degrees of freedom (AGFI) (Tanka et al., 1985). The calculated GFI is .955, and the AGFI is 0.955. Both values are shown as the excellent fit index.

The Comparative Fit Index (CFI) (Bentler et al., 1990) was calculated for a model which indicates acceptable fit. The Root Mean Square Error of Approximation (RMSEA) that measures the discrepancy between the fitted model and the covariance matrix in the population is calculated at 0.034, which indicates a close fit of the model.

4.2.2 Reliability and Validity

To test the reliability and validity of each construct in model, the Internal Consistency of Reliability (ICR) of each construct was tested with Cronbach's Alpha coefficient. Convergent validity was assessed through composite reliability (CR) and the average variance extracted (AVE). (Bagozzi et al., 2012) proposed the following three measurement criteria: factor loadings for all items should exceed 0.5, the Composite reliability should exceed 0.7, and the AVE of each construct should exceed 0.5.

All constructs in the Research model are in their range. Further, the Cronbach's Alpha values range from 0.80 to 0.89. All the constructs are above 0.70. Consequently, the scales are deemed acceptable to continue. As for discriminant validity, the square roots of average variances extracted by the constructs are more than correlations among variables, as shown in Table 2.

Table 2: Reliability and Validity

	CR	AVE	MSV	CRONBACH'S ALPHA	FK	FB	FL
FK	0.770	0.527	0.483	0.711	0.726		
FB	0.756	0.509	0.545	0.705	0.695	0.713	
FL	0.784	0.549	0.545	0.712	0.646	0.738	0.741

4.2.3 Testing of Hypothesis with Multiple Regression Analysis

Theoretical framework implies testable predictions about various factors involved in the study. Therefore, the projections are being hypothesised, and for their testing, a stepwise regression method is used.

4.2.3.1 Model Summary: The value for R² as depicted in table is 0.587 which means model formed explains 58.7% variance in the model. The adjusted R² value for final model is .581 which indicates that the model 3 explains 58.1% of the variance in the dependent variable as shown in Table 3.

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.695 ^a	.483	.479	.48445	.483	123.080	1	132	.000
2	.766 ^b	.587	.581	.43425	.105	33.285	1	131	.000

a. Predictors: (Constant), FK

b. Predictors: (Constant), FK, FB

4.2.3.2 Anova Table: It is found that the value of F is 93.234 and is significant ($p<0.05$). Since the value of F is much greater than 1, it may be concluded that such a high value cannot happen by chance alone. It can be inferred that financial behaviour financial knowledge influence financial literacy among customers with employee perspective as demonstrated in Table 4.

Table 4: Anova Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	28.886	1	28.886	123.080	.000 ^b
	Residual	30.979	132	.235		
	Total	59.865	133			
2	Regression	35.162	2	17.581	93.234	.000 ^c
	Residual	24.703	131	.189		
	Total	59.865	133			
a. Dependent Variable: FL						
b. Predictors: (Constant), FK						
Predictors: (Constant), FK, FB						

4.2.3.3 Coefficients: The beta value as indicated for the model shows the individual contribution of each predictor to the model. The absolute values of beta are obtained for (.434) for financial knowledge, (.416) for financial behavior, the corresponding t-values for all the predictors are significant at ($p<0.05$) as per the recommendations of (field, 2009) as illustrated in Table 5.

Table 5: Coefficients Value Table

Model		Unstandardized Coefficients		Standard ized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Partial	Tolerance	VIF
1	(Constant)	1.082	.275		3.940	.000					
	FK	.731	.066	.695	11.094	.000	.695	.695	.695	1.000	1.000
2	(Constant)	.287	.282		1.018	.311					
	FK	.456	.076	.434	6.017	.000	.695	.465	.338	.606	1.649
	FB	.473	.082	.416	5.769	.000	.688	.450	.324	.606	1.649
a. Dependent Variable: FL											

4.3 Financial Literacy Model

Based on the statistical analysis, all the two variables have been found to extend financial literacy to the banks' customers and influence others to join banking services in rural areas, as illustrated in the figure 2.

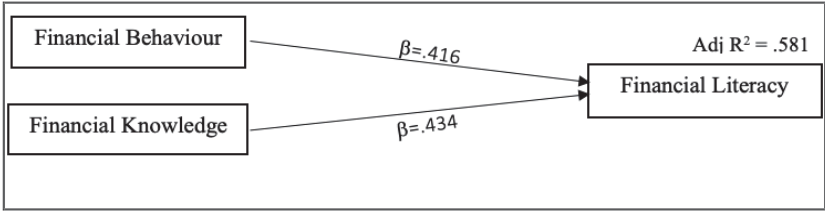


Figure 2: Final Validated Model

Table 6: Final Hypothesis Table

Hypot hesis	Predictor / Independent Variable	Direction Of Relationship	Dependent Variable	Regression Analysis
H1	Financial Knowledge	————→	Financial Literacy	Supported
H2	Financial Behaviour	————→	Financial Literacy	Supported

5. Discussion & Conclusion

As MOOCs have made education and training accessible and cost-effective in higher education and the corporate world. So, the implementation of MOOCs for financial literacy is also necessary, and to an extent, bank employees are quite confident about their customers learning from MOOCs. So, while discussing demographic profile, employees of the bank consist of both younger and older people, so in my experience, while collecting data, it was found that employees within the age range of 25-45 are more in favouring adopting a technology. In contrast, employees above 45 years were not found that compatible with adopting MOOCs for financial literacy.

In the case of the above model, two variables were extracted, i.e., financial knowledge and financial behaviour, and according to the employees' response concerning their customers, financial training through MOOCs, both variables were found significant with the dependent variable, i.e., financial literacy. The foremost model fit was tested by confirmatory factor analysis, and as all the values of CFI, GFI, RMSEA were found moderate and indicated good fit. Each factor of Cronbach's alpha values were more significant than 0.7, which shows that questionnaire has good reliability. The later hypothesis is tested with multiple regression analysis from 2 variables, and both were found effective. The value of R² is .587, which means the model explains 58.7% variance, whereas the value of adjusted R² in the model is .581, so the value of adjusted R² is close to R², indicating the model's fitness.

Many studies have been conducted on the point of view of customers. In this study financial literacy aspect has been considered from the perspective of employees as they deal with customers on a day-to-day basis. Most banks have various educational videos

on their websites to inform customers about the procedures related to multiple banking amenities. In rural and urban areas, customers take more time to perform simple banking tasks due to less awareness of various banking services. So, knowing the aspects of employees on their customer's training, there is a requirement for banks to provide training to their customers. Financial knowledge and financial behaviour seem to impact financial literacy through MOOCs positively.

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Section-II

State Initiatives

State of Odisha

Manoj Kumar Mishra and Kabita Roy Das

STATE SUMMARY

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

Objective

Minimum Government - Maximum Governance" is the objective of Govt. of Odisha for provisioning Services to the citizens at their door step. For this, long term sustainable action plans and road maps have been prepared by Government of Odisha.

- Hon'ble Chief Minister, Odisha has approved implementation of 5T (Transparency, Technology, Team work, Time and Transformation) Mantra for delivering Services to the citizens. Under this system, both quantitative and qualitative measures are taken for delivering in time service to the public. For adherence of 5T charter, a separate Department in Lok Seva Bhavan has been created. Regular Planning, Controlling, Monitoring and Coordinating are being done for uninterrupted service through e-Governance.
- More than 1200 services have been identified for different Departments. The key services coming under Odisha Right to Public Services (ORTPS) Act, 2012 are strictly monitored for delivering the services within stipulated time period mentioned in the Act.
- For ease of availing services, "OdishaOne" portal has been developed, so that the citizen is able to get all services at one platform.
- Mobile App for the services are developed for easy usage by the citizens.
- "Mo Seva Kendras" have been opened for common men who have no access to Mobile and internet.
- Services at Door steps are encouraged through Service Rathis in which the Government machineries move to citizens for providing services.

Examples of State level Institutional partnership plans

Earlier 3T was in use for Transparency, Technology and Team work. From 2019, Transformation and Time Limit also have been added up for betterment of service delivery system. Using technology, transformation is done for qualitative service delivery system. There are plethora of illustrations and achievements in Odisha e-Governance service delivery system. The service delivery systems are developed through Government Agencies like NIC, OCAC or in PPP mode.

One example is furnished here from Revenue & Disaster Management Department in which NIC is the technical partner for the system. The use of Information and Communication Technology (ICT) for transaction based Record of Rights (RoR) updating through e-Mutation process helped a lot for transforming the service delivery mechanism.

Key challenges faced in eGovernance journey

Odisha is a state rich in natural resources, culture, heritage, traditions, tourist places and all other such things. But, implementing an e-Governance application is always a challenge for the State. The major challenges for implementing e-Governance applications and last mile delivery issues are described below.

- **Connectivity:** Internet connectivity in remote areas is a major issue. OSWAN is provided up to Block level. Similarly, MPLS, VPNoBB and other internet connectivity are provided to the end users.
- **Awareness:** Many times, public are not knowing about the new systems. The target group size is very high as the beneficiaries are mostly citizens of Odisha which is 4.19 crore as per 2011 Census data.
- **Mobile Apps:** The internet use in rural part is low. But Mobile is used in many places. Hence, MobileApp are given importance for simple and easy usability by common men.
- **Feedback:** For support to the public, Project Management Units (PMU), Help Desks, Face Book, Twitter and others are being used.

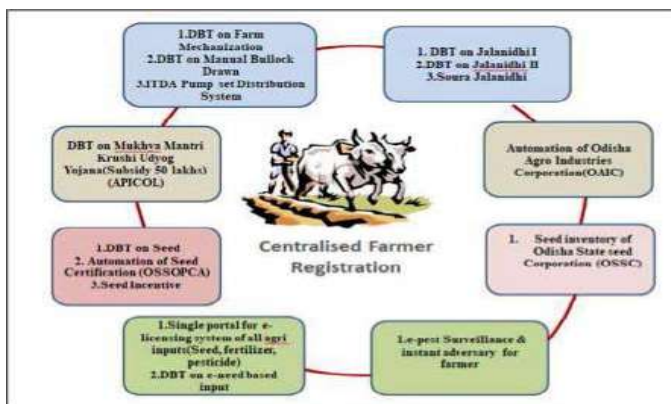
RESULTS INDICATOR

A few Beneficial Outcomes

Govt of Odisha emphasizes e-Governance services through Technology partners like NIC, OCAC and Private agencies in PPP mode. NIC is one of the leading partner provisioning e-Governance in the state and it has presence in almost all the Government departments in Odisha. However, three sectors submitted herewith are Agriculture, Revenue & DM and Transport.

Sector – 1: Agriculture and Farmers' Empowerment:

Agriculture and Farmer Empowerment is one of the core sectors of e-Governance in Odisha. Government emphasizes this sector and with use of ICT the gap between root level and government is abridged. The following diagram depicts some e-Governance areas where ICT has played vital role in bringing transparency, simplifying monitoring and enhancing productivity.



- **Farm Mechanisation:** The Farm Mechanization Project deals with improving farm labour productivity through the use of agricultural machinery, implements, tools and pump set. The DBT system facilitates the transfer of entitlements and benefits directly to the beneficiary's Bank account after purchasing the farm implement from the registered dealers / Manufacturers.
- **DBT on Seed:** Seed is the most critical input for farmers. To maintain

transparency in seed sale, the cycle covers Seed certification, Dealer licensing, Distribution by Seed Corporation as well as Subsidy payment through PFMS to beneficiary's account.

- **Jalanidhi:** JALANIDHI is a PLIP (Private Lift Irrigation Point) project for the farmers of Odisha that facilitates to get 50% subsidy by executing STW and BW. The farmers are encouraged to go for own captive irrigation (Bore Well & Shallow tube well) projects.
- **COVID-19 Special Portal for “Odisha Horticulture Produce Marketing”:** During unprecedented COVID-19, the supply chain of Horticultural produce such as fruits, vegetables, flowers etc. got disrupted. The surplus horticultural products stuck at their harvest point only due to closure of APMC (Agricultural Produce Market Committee). Besides these, many other applications like Farmer Registration, e-Pest Surveillance and Pest Management, Soura Jalanidhi, Mukhya Mantri Krushi Udyog Yojana etc. have been implemented for Govt of Odisha in Agriculture department. Few Statistics in Agriculture are

Subsidy Statistics Scheme wise (Released in DBT scheme)

e-Governance Project Name	No of Beneficiary	Subsidy Amount. Rs in Crore
DBT on Farm Mechanisation	2,79,845	2371, 19,98,603
DBT on Seed	9,81,090	212,23,72,535
Jalanidhi	51,515	251,46,45,325
Soura Jalanidhi	1,544	5,55,84,000
Jalanidhi-II (Cluster based river lift)	15,460	386,50,00,000
MKUY (Mukhya Mantri Krushi Udyog Yojana)	161	15,76,09,260
Total	13,14,155	3242,72,09,723

Sector – 2: Revenue & Disaster Management:

In nineties, computerization of Land Records was started in Odisha. With the development of very huge database of Record of Rights, the e-Governance services G2C and G2G were started. Some of the major applications in Revenue & Disaster Management Department are described below.

- **Land Records Management System (LRMS):** This is also called as “eMutation”. It is a transaction based complete work flow system catering to 16 different types of mutations such as Sale Purchase, Inheritance, Partition, Lease, Relinquishment, Willnama, OPLE, OLR etc. The property registered in Sub-Registrar's office is automatically flown to the Tahasil end and a mutation is initiated by the Tahasildar. The difference between hand written and LRMS Khatiyans are shown in the figure below

Achievements:

- o Working in all 317 Tahasils of Odisha
- o Total Cases instituted: 34,07,446
- o Total Cases Disposed: 30,64,055
- o Total Backlog Cases Executed: 5,08,593

- E-PAUTI (Online Land Revenue Payment): Revenue Payment is a regular activity of the Land owners. They pay Land Revenue every year to the Government. The Demand is maintained by the Revenue Inspectors in Tenant Ledger and collection made against it. Government of Odisha has taken steps to collect the current Rent, Cess and Nistar Cess through this portal. PAUTI Mobile App is also available.

Total Khatiyans: 1,68,78,260

Payment done: Against 20,37,933 Khatiyans amounting Rs. 16,06,75,355

- Bhu-Arjjan (Land Acquisition, Rehabilitation and Resettlement Management System): This application is developed with new Land Acquisition act, 2013. It is operational for 9 departments namely Works, Water Resources, Industry, Transport, WORKS, WATER RESOURCES, INDUSTRY & TRANSPORT. Other departments PanchayatiRaj, Health etc will be on boarded soon. Till to date 50 projects comprising 207 proposals have come to this database. PFMS integration will be done for Award payment.

Status of Estimated Land Area and Amount for the 9 Departments using Bhu-Arjjan

Sl.No	Department Name	Estimated Area of Land Acq. (in Acre)	Estimated Project Cost (in Rupees)
1.	Water Resources	67,182.7040	2101,03,71,039.49
2.	Works	30372.9763	2023,26,10,399.73
3.	Transport	6938.8710	78,74,78,420.70
4.	Steel & Mines	1097.0651	213,77,84,100.00
5.	Rural Development	34.6610	15,92,91,243.38
6.	Industry-IDCO	3429.6500	846,17,46,116.85
7.	Housing & Urban development	0.5030	2,55,00,746.88
8.	Health	4.8160	175,18,94,342.00
9.	Co-Operation	3.1250	7,45,84,437.00
	Grand Total	1,09,064.3714	5464,12,60,846.03

- Disaster Assistance Monitoring & Payment System (DAMPS) of Special Relief Commissioner, Odisha: Orissa is a state, which is worst affected by the severity of natural calamities. Calamities like Floods, Droughts, Cyclones, etc. are well experienced by the people of the state. Flood calamity occurs almost each year where as a portion of the state is suffering from the severity of drought calamity for about last ten years. Similarly, Cyclone, though less frequent, but appears on the coastal belt of Orissa causing huge loss to the people and their lives & properties.
- ‘DAMPS’ aims to ensure that the financial assistance given to the Next of Kins (NOKs)/victims should reach them in timely, hassle free and transparent manner. The assistance to reach his account without any intermediate disbursement authoritarian role. Benefits of DAMPS:
- Ex-gratia Assistance for 7 disasters identified by central govt. and 13 disasters

identified by State Government covering disaster affected victims from 3.5 crore populations of Odisha.

- More than 120 crores rupees has been disbursed to the disaster affected victims and their NOKs towards ex-gratia assistance during last one year
- 2250+ Revenue Inspectors have been trained and provided with android based mobile app to capture any disaster related preliminary information on mobile with snapshot and geo-tagged data.
- Dash board based monitoring and analysis
- Periodic performance rating is being maintained compared to manual control

Sector -3: Transport

In Transport Sector, National and State level projects are successfully running in Odisha. The list of these projects are:

- Vahan: The Web enabled comprehensive system for all activities related to Vehicle Registration at RTO offices as per CMV Acts/Rules and OMV Taxation Rules.

No. of RTOs: 38

Registration: 95.08 Lakhs

Revenue: Rs. 11,444.17

Crores Online: 88% and Offline: 12%

- Sarathi: This is also a web enabled comprehensive system for all activities related to Driving License.

Driving License: 25.56 Lakhs Learner's License: 41.58 Lakhs Revenue: Rs. 271.62 Crores Online: 99% and Offline: 01%

- eChallan Transport: Users-664, 63Lakhs Challans (2019), Fine –Rs.26 Cr (Online),

Rs.43 Cr (Offline)

Police: Users-942, 79Lakhs Challans (2019), Fine-Rs.5Cr (Online),

Rs.9 Cr (Offline)

- eCheckpost

2020: Transaction-8014, Revenue-1.63 Cr Online

2021: Transaction-19810, Revenue-2.64 Cr Online

- Integrated Road Accident Database (IRAD): The different stakeholders of this application are Police, Transport, NH, SH, Health, 108 Ambulance. Total Accidents entered as on date are 257.

In other activities Total No of PUC Users are 3000, No of Dealers – 1500 and Fancy Number Auction/ Booking is Rs. 12.16 Crores.

Achievements:

- Eliminating/ Minimising the visits to RTO offices.
- Cash less transaction using URL based payment/Making Payment Online
- Auto Approval of many processes.
- Prior appointment of the citizens to avail different services etc

Common service delivery

The interoperability of e-Governance applications within and across the departments are considered. The data is shared through APIs and Web Services. In Pradhan Mantri Fasal Bima Yojana (PMFBY), the Land Records data was used through APIs for Crop insurance. During 2020, PMFBY integrated with Bhulekh database which eliminated duplicate land & area registration, resulting a Govt. premium saving of nearly 700 Cr. in comparison to the previous year. Similarly, all applications of Transport and Agriculture are also talking to each other wherever resource sharing is required.

E-Governance best practices of the state

The use of ICT solution in one area helps to implement in other areas. The experience and best practices are used for new, renovation and change management of e-Governance applications. The 5T review of the projects on every 4th Saturday helps to bring such changes into effect. The User requirements as well as Technological changes are discussed and action plans are prepared. The major best practices followed are discussed below:

- **Government Process Reengineering (GPR):** To use the ICT and refining the existing working style, at many places process re-engineering is required. User Departments take necessary steps for making the changes. The seamless use of technology and enhancing efficiency are aimed. The gap analysis is done and abridged.
- **State-of-the-art Technologies:** Always latest and emerging technologies in data visualization, data analytics, computational intelligence, data mining etc. are followed. Cyber Security Audit clearance and Cloud Hosting are also done in time. Less paper usage is tried increasing electronic transactions and resource sharing.
- **Agile and ALM:** User requirements in government sector are mostly not clear. The requirement change is also very frequent. Thus, Agile SDLC is most suitable to government projects. Further, Application Lifecycle Management (ALM) is given emphasis from project initiation to rollout and maintenance.
- **Inclusive and Sustainable e-Governance applications:** The Project Planning is done for long term objectives. Involvement of Users in projects creates a strong ownership of User Department. The continuity of the project on regular basis is also given importance with flexibility of making modifications in requirements.
- **Interoperability:** Data and resource sharing among different applications is taken care of. Standards of applications and portal development are followed as per the government guidelines.

ENABLER INDICATOR

e-Governance enabling processes

Odisha is emphasizing on provisioning good governance to its citizens. With the use of Technologies e-Governance services can be enabled. The e-Governance is an evolving process. When one area is covered, other areas in the departments are explored for inclusion. Then Detailed Proposal is prepared for the application with proper time, cost and other resources estimation. The fund requirement, security, risk management are also estimated and planned in the Project proposal. Accordingly, fund is placed as per the State Government processing rules.

For example, in Land Records project of Revenue & Disaster Management System when Land Records Management System (LRMS) was made completely online, the path for e- PAUTI for online Land Revenue Payment system was initiated. Similarly in Agriculture and Transport projects also new areas are explored and covered in e-Governance. Wherever the areas are coming under ICT, better technological improvements are also taken up.

State level initiatives towards Capacity building for eGovernance

- Capacity Building is planned and User Trainings are conducted before rolling out an e-Governance solution. As NIC has presence in District level with competent professionals of DIOs and ADIOs, so decentralized training programmes are planned for successful implementation of projects. Further, use of Video Conferencing has reduced physical movement and time consuming journey for all the way to State Headquarter at Bhubaneswar and with use of VC, virtual mode trainings are being conducted.
- Revenue & Disaster Management Department has a well-equipped training centre “Revenue Officers’ Training Institute (ROTI)” at Bhubaneswar. The OAS and ORS officers from beginning of their career are getting good trainings and hand holdings from this institute.
- The staging servers are set up with test data and application for good hand holding of the users. The User Manual and other documents are shared within the login of the application for easy referral.
- Feedback obtained from the end users are properly analysed by departmental experts and NIC team and necessary changes are incorporated in the system for its upgradation.
- In the same fashion rigorous trainings are conducted for Transport and Agriculture sectors

Emerging technologies relevant for the State

- Data Visualisation and Data Analytics: Dash Board has become the common part of an application and all Key Performance Indicators are displayed on it. MIS reports and Dynamic queries are integrated within the system for getting different analysis reports.
- Data Ware houses: As multiple applications in different technological platforms are developed in different times, thus one Data ware house is constituted. Through Scheduler Programming, the data are Extracted, Transformed and Loaded (ETL) into the Data ware House in every night.
- In Revenue & Disaster Management Department the Revenue State Dash Board, ORTPS Daily Bulletin are fetching data from the Revenue Data warehouse and provides necessary information to the users.
- Cloud Computing: The Government of India Cloud “Meghraj” and “O-Cloud” of Odisha State Data Centre are used for hosting the applications in Cloud environment. Looking to the sensibility, usability and availability of data mostly Hybrid Cloud Hosting in which database servers are co-located and applications are hosted in VMs for better performance. Disaster Recovery in other Data Centre is adopted for safety of the data.
- Cyber Security: The Centre of Excellence – Application security is present in NIC, Bhubaneswar. With their help strong cyber security guidelines of

Government of India are followed. The regular penetration testing in the applications are done by the security team for the applications hosted in NIC servers and corrective measures are taken up.

- Cashless transactions: With use of IFMS and PFMS, cashless transactions are focused. The DBT system is applied wherever it is useful
- Green Computing: The e-waste management is always targeted. Query evaluation and optimization are given importance for using optimal number of operations in programming. This makes the system for less CO2 emission and reduce environmental effects. Further, less paper usage is encouraged in the system as many communications and service delivery are done electronically.
- Use of emerging technologies: Computational Intelligence, AI/ML and other technologies are used for better performance of the e-Governance applications. In agriculture AI/ML are used for finding ineligible beneficiaries. Similarly, IoT has been used in Transport project.
- Micro Service Architecture, Service oriented Architecture and Enterprise Architecture are initiated for different applications. The Microservice helps in using Containerisation in National Data Centres.

Specific gap areas – policy level, process level, technology level that State plans to pursue and improve

The 5T initiative in Odisha is instrumental in bringing success in the e-Governance projects of Odisha. Action Plan is prepared by the Departments and regular Review is being taken by 5T Secretary. The Gap analysis in all the sectors are accommodated in the Action Plans. All Policy level decision are being taken at higher authority level.

For Process level, necessary Government Process Re-engineering (GPR) is being done by the departments for technological support and reforms in rules and acts. Emerging Technological usage is done for better service to public and right decision making at Government level.

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State of West Bengal

B. P. Gopalika and Abhishek Roy

STATE SUMMARY

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

Dr. Amit Mitra, Hon'ble Minister – in – Charge, Department of Information Technology and Electronics, in his special address delivered at the concluding day of the Global Blockchain Congress – Consensus 2018 on 19th December 2018 at Biswa Bangla Convention Centre, New Town, Kolkata categorically chalked out course of actions to be undertaken by the Department of IT&E for incorporation of Blockchain technology in public service delivery system across the State Government domain. He envisaged a future where public data kept on Blockchain would remain safe, secret, auditable as well as easily accessible only to the owner of the data. Honourable MIC in his discourse named 5 specific domains where Blockchain needed to show impact, in order to achieve greater social good. These domains are: Health, Agriculture, Land, Education AND Traffic Management

Implementation of various additional applications under revamped Ease of Doing Business (EODB) Single Window System On microservices platform and other non-EODB applications on RAD platform and other e-gov applications implementation and migration to SDC and SDC cloud.

The West Bengal State Enterprise Architecture (WBSEA) is envisioned as a platform of transformation by the Government of West Bengal which aims to galvanize the pan-government ecosystem by transcending departmental boundaries & deliver all citizen-centric services through a single portal (e-Bangla) by creating a whole-of-government ecosystem. These Integrated services may enable free flow of information through a common architecture such that citizens are able to experience and leverage benefits of a "One Government of West Bengal" interface. EA enhances effectiveness, efficiency, and agility of the government by Single point of entry to government services and effortless inter departmental communication through sharing from common data lake as presented through the WBSEA Portal.

Covid Vaccine Related (CVR APP): WhatsApp bot that enables citizens to book vaccine slots for them is launched across the state & received 1,50,000 bookings till date. Vaccination with Drive-In facility introduced for elderly and ailing patients so that they can conveniently receive the vaccines and verification chatbot to verify genuine vaccine centers.

ICMS Integrated Covid Management System - Portal, WhatsApp Bot & Mobile APP to enable a citizen search for covid beds availability in both government and private hospital of their selected area along with Safe home, Hearse Van & Ambulance availability.

Examples of state level policy Integration

In view of the larger role of Innovation in new age technology industry and to create jobs, it is proposed to develop a start-up ecosystem in the State of West Bengal. This will be a significant enabler in fostering a conducive environment for the youth in the State, driving West Bengal towards its emergence as the "Innovation Capital and among the top 3 Start Up destinations of the country".

As part of Shilpa Korun Bangla Gorun ('set up industry, develop Bengal'), a key calling of the State, the State Government initiated proactive steps to support innovation and entrepreneurship among the youth. West Bengal Government launched the State Startup Policy 2016-21 to boost the startup ecosystem in the state and encourage the youth to transition aspiration from wage employment to self-employment.

Strategy: Approach, Program structure, Roles & responsibilities

VISION: The State of West Bengal aspires to be the "Innovation Capital and among the top 3 Start Up destination of the country".

Objectives for next three years:

- Operationalize a world class State Incubator in partnership with NASSCOM like entities
- Incubate at least 75 ventures
- Set up Incubation funds to seed at least 25 select start-ups/year
- Promote Private, Academic and District level incubators in partnership with NASSCOM like entities
- Encourage start-ups run by women, minorities and those focused on creating social impact
- Organize yearly Innovation Celebration Festival

Proposed focus key sectors:

- IT/ITeS- IoT (Internet of Things) and Wearables Technologies, Internet & Mobile Technology and Social Media, Mobility Analytics & Cloud (SMAC)
- Design
- Information Security/ Cybersecurity
- Reality experiences
- Safe, sustainable and smart cities/districts/villages
- Rural E-Commerce
- Healthcare, Water and Sanitation
- Housing and Urban/Rural development
- Agriculture and Livelihood
- Finance and Microfinance for financial inclusion

Key challenges faced during e-Governance journey

Expansion of infrastructure and creation of information highway pertaining to Enterprise Architecture.

RESULTS INDICATOR

A few Beneficial Outcomes

- Department of P&AR and eGovernance
- Home and Hill Affairs Department

- Health Department.

Common service delivery

RAPID APPLICATION DEVELOPMENT (RAD) Policy of West Bengal government for common service delivery through resource sharing between departments due to P&AR department intervention states that the state government department will make a request to P&AR department for creation of new online service (s) for shared infrastructure and resources under RAD policy

State e-Governance Mission Team (SeMT) under the P&AR and e-Gov department will conduct an As-Is study of the relevant departmental processes and arrive at a To- Be process map for the service/s to be developed. The requester department is required to sign off the To-Be process in the shortest possible time frame. Post sign off the To-Be process, SeMT will provide a draft effort estimates for development of the requested service.

The requester department will have to bear the manpower costs as per the NICS rate for the effort required for the development as per the actual cost details submitted by SeMT according to the progress of work.

The developed services will be deployed in the centralized server of the RAD Platform. Maintenance & augmentation of the RAD platform & server will be done by P&AR and e-Governance Department as and when required. The developed services cannot be hosted in any other server.

Post completion of the application development, the concerned State department may conduct UAT as early as possible & necessary go for making the services live may also be issued within the shortest possible time.

Any modification, customization & additional changes in the developed application will be treated as a change request & additional manpower costs requested for the change request post go-live of the new service will be funded by the requester department.

E-Governance best practices of the state

- Rapid Application Development (RAD) policy
- Data driven governance, leading to real time governance
- Use of emerging technology in government (Blockchain, AI , etc)
- WhatsApp bot based governance

ENABLER INDICATOR

e-Governance enabling processes

State e-Governance Mission Team (SeMT) has been actively helping various departments such as Home, Health, Housing, Planning etc for development and maintenance of services under the Rapid Application Development (RAD) policy no 40-PAR & eGov/e-Gov/IT-17/2017 dated 6/2/2018 issued by P&AR and eGovernance

Department.

State level initiatives towards Capacity building for eGovernance

State e-Governance Mission Team (SeMT) has been actively helping various departments of The Government of West Bengal with capacity building initiatives.

The Data Science and Artificial Intelligence (AI) is an established proficiency in the domain of Information Technology and eGovernance and is a combination of statistics, mathematics, technologies and business acumen for making sense of large volume of structured and unstructured government data. SeMT, under the aegis of P&AR and eGovernance department, Govt. of West Bengal had organized a 15 day training program on Data Science in 2017-18 for Govt officials and yet again in 2018-19 for 12 days in weekends. The programs were greatly successful and attended by senior IPS and IAS officers of various departments.

one day awareness programme of the master trainers from various stakeholders on cyber security awareness campaign 31-01-2020 at Rabindra Tirtha Auditorium.

Emerging technologies relevant for the State

The Department of P&AR and eGovernance, Government of West Bengal has launched a WhatsApp Bot for booking of vaccination slots in May 2021. This WhatsApp bot enables citizens to book vaccine slots for them. It has the capability of scheduling based on type of vaccine, age range, type of dose, etc. Date wise time slots of half an hour, are allocated to people for vaccination with proper social distancing.

It has been launched across the State with an overwhelming response from the citizens of West Bengal, such that more than 3 crore transactions have been made since initiation. Officials at vaccination centres marks those who received the vaccine and uploads the data in web-based software. This makes vaccination process smooth and hassle-free. The BOT covers more than 250 centers and with it more than 1.5 Lakh Slot Bookings have taken place till date across the state (all districts covered).

Therefore, the vaccination chatbot by the Government of West Bengal has greatly helped smoothen the vaccine appointment booking process and reduced waiting time for citizens at vaccination centers. The bot has zero manual intervention to get a jab slot and stands out as the only one in India with the aforesaid features. No state has been able to replicate such advanced features through the WhatsApp Bot within limited timeframe.

In contrast, Government of India have taken a cue and recently launched a similar WhatsApp bot known as MYGOV. Except it's features are limited to download of vaccination certificates and dissemination of vaccine related information only. Citizens are neither able to register and search for availability or book vaccination slots through the MYGOV WhatsApp bot. Hence, it may be held with confidence that such initiatives piloted by the Government of West Bengal finds universal acceptance across the country in betterment of citizen's lives. The Government of India is walking the path of new digital innovation by West Bengal to extend outreach and thereby make the critical vaccination program achieve improved outcomes. Therefore, it may be concluded that "What Bengal thinks today, India thinks tomorrow".

OTHER RELEVANT INFORMATION

Awards and Recognitions

- Digital India Awards 2020, Silver award for excellence in Digital Governance – State / UT
- National e-Governance Award by DARPG, GoI, for e-Governance 2017- , Silver Award
- National e-Governance Award 2008 by DARPG, GOI, for IT application for education and communication of children affected with Cerebral Palsy
- National e-Governance Award, 2011 by DARPG, GoI, for E-Auction of Tea
- National e-Governance Award, 2015 by DARPG, GoI, for e-Initiative in Commercial Taxes
- Ranked 4th best State in the Country the National e-Governance Service Delivery Assessment (NeSDA) in the Overall Assessment by DARPG, Govt of India
- 1st rank in the SKOCH State of Governance. 2018. Best e-Governance State in the Country award by Skoch in 2018
- Top 5 State in e-Governance award by Skoch in 2020.
- West Bengal e-District 13th SKOCH AWARD in New Delhi 2017
- Ease of Doing Business using RAD platform 13th SKOCH Awards, New Delhi 2017
- West Bengal Accelerated Development of Minor Irrigation Project 13th SKOCH Awards, 2017
- West Bengal e-District Technology Sabha Award at Indore 2018
- Ease of Doing Business Award at Technology Sabha Indore 2018
- RFID based Prepaid Taxi Booking System SKOCH AWARD 2018
- Fair Price Diagnostic Center SKOCH AWARD 2018
- Grievance Redressal System, Clinical Establishment Regulatory Commission SKOCH AWARD 2018
- Award of Excellence by Bidhannagar City Police at Kolkata on 8th October 2018
- Labour Department e-Services SKOCH Awards 2018 and CSI Nihilent Awards
- Utkarsh Bangla UN USIS Awards 2019 and SKOCH Award
- e-Samadhan CMO services SKOCH Award 2020
- e-ABGARI
 - o Digital India Award from President of India, 2020
 - o National e-Governance Award, 2018
 - o Technology Sabha (Indian Express Group) e-Gov Award, 2017
 - o CSI-Nihilent e-Governance Award, 2016

- o Skoch Platinum Award for e-Governance, 2015
- Kanya Shree
 - o UNPSA Award 2017
 - o GEM Tech Awards 2016
 - o UN WSIS Award, 2016
 - o Skoch Award for e-Governance, 2015
- e-BEVC0
 - o Skoch Award for e-Governance, 2020
 - o Technology Sabha (Indian Express Group) e-Gov Award for ERP, 2018
- i-Budget: Integrated State Budget Management System
 - o CSI-Nihilent e-Governance Excellence Award, 2016
 - o Technology Sabha (Indian Express Group) e-Gov Award, 2017
- Comprehensive Public Grievance Redressal Management System for Chief Ministers' Office
 - o Skoch Platinum Award for e-Governance, 2020
 - o Technology Sabha (Indian Express Group) e-Gov Award, 2019
- Workflow based File & Letter Tracking System (WFTS) For WB State Government Offices
 - o CSI-Nihilent e-Governance Excellence Award, 2014
- e-Grievance
 - o Skoch Award for e-Governance, 2015
- CSI SIG AWARD OF EXCELLENCE 2015-16 FOR IBUDGET TO FINANCE
- CSI Sig Award of appreciation 2016-17 for enathikaran to finance department
- CSI SIG AWARD OF APPRECIATION 2016-17 FOR EODB LABOUR
- CSI SIG AWARD OF APPRECIATION 2017-18 FOR SSV LABOUR
- CSI SIG AWARD OF RECOGNITION 2017-18 FOR SVMCM SCHOLARSHIP TO HIGHER EDUCATION
- CSI SIG AWARD OF RECOGNITION 2017-18 FOR EHRMS TO SCHOOL EDUCATION

Specific gap areas –

Policy level, process level, Technology level that State plans to pursue and Improve

- Policy level interventions for implementation on enterprise architecture with participation of all departments to create single source of truth in the form of data hubs. Salient feature of WBSEA is built once and use multiple times leading to modular development and reusable components. This enables optimal development of common applications that are agnostic of the department and relate to horizontal functions of the GoWB, such as performance management, productivity tools, workflow management and core data management, open API, messaging, user management, system administration and security. These common applications are built centrally and used in common by all the line departments, with appropriate configuration required by each department. A

range of centralized Data Hubs such as the Land Hub, People Hub, Entity Hub, GIS Hub and IoT Hub in Data Hub logical architecture may be created to enable prompt, secure and seamless data exchange between data creators and clients (i.e. various government entities and departments).

- Blockchain proof of concept already implemented in budge budge municipality. Data match exercise between databases of stakeholder departments viz. Registration, Land Records & Municipality. 45,468 land records of selected Block in the state have been ported to Blockchain system, making them immutable & tamper-proof. Next, the policy level intervention may be put in place such that banks and CESC are also made part of Blockchain networks. This will lead to reduction in NPA's of banks
- Telecom is the subject matter of GOI's central regulatory authority. Here, the central policy may be formulated such that state specific requirements may also be recognized by telecom operators and they are bound by local needs. For example:
 - Connectivity in remotest corners of rural West Bengal as per Government of West Bengal's directive and not by profitability alone for operator.
 - Identification and display of accurate country codes on CLI system
- GPR recommendations in certain cases may be implemented only when a few old and outmoded rules by the central government may be modified to pave way for quicker government service delivery

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Section-III

eGovernance Projects

1. Administration and eOffice Tools

Central Management Information System (CMIS)

Directorate of MIS, Govt. of Manipur & National Informatics Centre Manipur State Centre

Laishrambadalkumar Singh, Okramshalizachanu and Liaipubam Premchandra Sharma

PROJECT OVERVIEW

CMIS is a centralized web based integrated system of Personnel Information and Payroll. It is the first step in the direction of achieving aim of paperless Electronic Payroll System i.e., pay bill generation, electronic submission and electronic payment to the employees.

Objective

- Electronic transaction of all human resources management activities through CMIS using the internet, so as to provide timely disposal of HR issues of the employees and incentivize them to perform efficiently.
- Provide a scope to the decision-makers for effective planning and utilization of existing manpower.
- Saving of time and energy of government employees both at the managerial and micro-level by the automated CMIS leading to optimum utilization of their services for the purpose of the public.
- Provide up-to-date data on employees, sanctioned posts, scales of pay, emoluments drawn of all State Government employees.
- Provide accurate details of the staffing pattern of the employees across Departments and within units/outposts of a department to facilitate management/policy decisions on deployment /redeployment /transfer/promotion.
- Facilitate accurate projection of liabilities on salary/allowances/pension for budgetary exercise, grant of DA/pay revision, etc.
- Provide an effortless system for salary preparation and quick encashment by integrating with other systems like Treasury NET, BEAMS, eKuber.

Scope

Computerization of Employees' personnel information, sanctioned post-management, and preparation, processing, and payment of salary. The system has modules for New Recruit, Transfer, Transfer with Promotion, Promotion, Time Scale/ACP, Profile Correction, sanctioned post-management, Pay Correction, Bill Process, leave, loans, etc. It is a workflow-based system with various roles like DDO Assistant, DDO, HOD Assistant, HOD, MIS staff, Director MIS, Treasury Officer, Director Treasury, NPS Nodal officer, etc. These roles carry out various transactions by cooperating with one another and following predefined workflows, Salary preparation, processing, and payment constitute a major component of CMIS. The various functionalities supported include updating of the payment details such as the release of regular and other increments, pay revisions, GPF, Accommodation, loans, leaves, GIS details, allowances, and deductions, etc. The system provides Checklist types of reports and onscreen view types of reports for completeness and correctness of the data. The system also generates various reports like TR 22, Schedules & Challans for GPF, NPS, GIS, housing, loans, and recoveries, etc, employee profiles, sanctioned strength, vacancies, etc. The system

also has a comprehensive dashboard that provides consolidated and detailed real-time figures on salary bills.

Hardware/Software

Web Server - Apache 2.4

Application Software - PHP 5.6

Database software - Postgres12.4

Certification (Certifying Agency)

Yes, Security Audit Clearance from certifying agency - AKS IT services

Disaster Recovery and Service Continuity

- The system both the application server and database server are hosted in NDC, Shastri Park, New Delhi.
- A Database replication is set up locally in NIC Manipur 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
Dashboard	Provides consolidated and detailed real-time figures on salary bills which helps in fiscal planning and management.			
New Recruit	Enrolment of new employees and assigning EIN.	1854	3512	896
Transfer	Only after the updating of the transfer of an employee, his or her salary can be processed in the new place of posting.	681	1894	2034
Transfer with Promotion	Only after updating of transfer with the promotion of an employee, his or her salary can be processed in the new place of posting with the new pay structure after pay fixation.	258	607	348
Promotion	Only after updating of promotion of an employee, his or her salary can be processed in the new pay structure after pay fixation.	449	726	972

Central Management Information System (CMIS)

Time Scale/ACP	Upgradation of pay scale of an employee to higher scale due to acquiring of Time scale and ACP.	122	1867	335
Profile Correction	Correction in Name or Date of Birth or Date of joining to government is required if any mismatched found with the details recorded in the service book,	34	516	941
Sanctioned post management	Every newly created sanctioned post details are to be entered. Also, Correction in details of sanctioned posts may come due to wrong entry or change in designation name/head of account/type of post, etc	0	0	2454
Pay Correction	Correction in pay due to wrong entry or wrong fixation or fixation due to new pay commission etc	1892	45765	13823
Bill Process	DDO has to prepare groups of salary bills every month for the regular employees under his /her jurisdiction	2800	35174	76210

Implementation

100 % covered for all the departments of Manipur Government.

Improvements / Enhancements.

Improvements/ Enhancements

Enabled deduction from salary for direct deposit to Chief Minister's COVID Care Fund and online collection of NPS contribution of employees for deposit to their NPS accounts and also provision to check bills having employees whose July increment is due.

Earlier in the manual system of payroll, the DDO had to prepare a separate excel file and submit it to treasuries and then from the treasury to NPS nodal officer for further upload to NSDL to deposit the NPS contribution of the employees to their respective NPS accounts.

Presently there is no feature for access by employees. In the next version employee corner will be added to allow them to view their profiles, payslip, salary statement of a period, transaction histories, etc. Also presently the system is covering only the regular employees, the next rollout will cover the private sectors of the Manipur Government.

ENABLER

Processes Re-engineered

Earlier all the data entry and updating of various transactions related to employees and sanctioned posts like new recruitment, promotion, transfer of posting, etc. were done centrally by the MIS directorate having manpower less than 10 resulting in a delay in data updating and clearance for salary for the employees. The system does not include any module for salary preparation. The DDOs had to prepare salary bills manually for the employees listed in the clearance.

In CMIS which is a web-based application, all the data entries are distributed to DDOs and HODs level and then forward to MIS Directorate for approval. This has lessened the workload in the MIS directorate and quickened the data updating. Also, as the payroll itself is integrated into the system and only the salary bills from CMIS are allowed to receive in treasury, the manual bill preparation is almost nil. The system is integrated with treasury NET and eKuber for the passing of bills and payments. Single point data entry for pay bills makes no need to enter the details of the bills again in the treasury NET. Hence quickening in the passing of bills and deposits to accounts of employee's.

The system facilitates effortless and efficient pay bill preparation and encashment to employees' bank account in almost real-time. The System becomes a major component of IFMS.

Migration of database and operation from CPIS application which is a legacy system to a more complex CMIS system in the given period of time was a big challenge.

Although rounds of training and provision of downloading user manuals were given, making the users familiar with the steps of operation and participation in system operation is a big challenge.

Technologies

Sharing of APIs and database views with treasury net and BEAMS for end-to-end management of salary bills. User role-wise alert feature for time-to-time notifications to help in smooth operation. A dedicated helpline number and email address are used to communicate with the stakeholders to give technical support in system operation and change management. In addition, remote services were also provided to the users for technical support using tools like any desk during the COVID 19 pandemic.

People

Capacity Building

With the commitment of the Finance Department, Government of Manipur to the proposed enhanced system from NIC Manipur State Centre to resolve the delay in data updations of various transaction and in salary encashment of employees and also to get up to date data on pay structures and emoluments drawn of all State Government employees, the CMIS application could come into a reality.

Multiple rounds of operational training were given to DDOs, HODs, staff of the MIS Directorate, and their assistants for the smooth running of the system. All change requests come through the Directorate of MIS. Infrastructure in the NIC Manipur data Centre helped in the fast development, testing, and rollout of the application.

VALUE INDICATORS

Learnings for the sharing

Data migration was a big challenge as the certified data of employees and sanctioned posts are sensitive. The team had to work dedicatedly even in holidays and off-hours in planning, conceptualizing, and executing so that rollout could be accomplished in a given time. The Changes in terms of new features and updating are to be done in a short period of time as salary preparation is real-time and fully depends on the system. New features like deducting a fixed amount or salary of 1 or more days from the employees for direct deposit to CM Covid Care Fund have to be added and applied to salary preparation.

Discovered unforeseen cases like

- Utilization of manpower at inspector/rifleman level from the central force. They enjoy the pay structure of central and their time to time pay fixation is done from their parent department.
- For nurses they will get HRA even though they accommodate Govt quarter.
- There are still employees whose pay is to be calculated in the 5th pay commission due to some reasons like suspension.
- In the expiry of an employee, in some cases the due salary amount if any has to be deposited to the account of the nominee.
- Service link-up due to regularization from Adhoc, contract, etc
- Upgradation to higher scale due to acquiring of Time scale and ACP.
- In charge transfer

Digital Empowerment

CMIS is used by the DDOs, HODs, MIS directorate, and their assistants.

Green e-Governance

The system is totally a web application and it is hosted in Cloud. So, there is no-Waste.

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Integrated e - panchayat

Department of Information Technology & Communication, Govt. of Rajasthan

Alok Gupta and Umesh Chand Joshi

PROJECT OVERVIEW

In compliance to the Budget Announcement Number 210 of FY 2016-17, Department of Information Technology & Communication (DoIT&C) of Government of Rajasthan has envisaged an Integrated Raj e-Panchayat solution as a next generation IT platform to enhance PRI's productivity and streamlining internal process of Rural Development and Panchayati Raj department. The application has been developed to implement and monitor all the Schemes and development activities of Rural Development and Panchayati Raj department.

Objective

- Automation of all functions of PRIs at 33 Zila Parishads, 295 Panchayat Samitis and 9891 Gram Panchayats.
- Single Platform of information for all kind of information's related to PRIs.
- Online payment disbursement to individual's beneficiaries and vendors by leveraging the RPP (Rajasthan Payment Platform).
- Effective Planning & Execution through Work plans, Defined Timelines & Escalation mechanism.
- Comprehensive Gram Panchayat Management including Meeting, Bank, Funds and Work Management.
- Align RDPR function with standard e-Governance initiatives of the State Government.
- Mobile application for GIS based work progress monitoring with geo tag photos.
- Online payment of all expenses made up to GP level through Rajasthan Payment Platform.
- Real time information for complete Gram Panchayat profile i.e., development works, demographic details, schemes and beneficiary details etc.
- Availability of MIS dashboards and accounting reports.

Hardware/Software

- Frontend: .Net with Angular JS
- Backend: Microsoft SQL Server

Certification (Certifying Agency)

- Application hosted in secured environment of Rajasthan State Data Centre (RSDC)
- Safe to Host certification as per RSDC policy

Disaster Recovery and Service Continuity

- As per Disaster Recovery policy of RSDC

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 Payments for works and other expenses	Application has provision to perform online payments	Rs. 184.99 Crores	Rs. 322.10 Crores	Rs. 508.24 Crores
Registration of Works	Development works under different schemes	140964	156187	184986
Financial Sanction Generation (No of Works)	The application has provision to generate different kind of sanctions	118739	218059	147430
Direct Benefit Transfer to SBM Beneficiaries	Block level user (BDO) transfers the benefit directly in the account of beneficiary	Total Payments Made: Rs. 76.94 Crores		

Implementation

A phase-wise development approach has been adopted in implementing the Integrated Raj e-Panchayat Application. The project has been divided into four phases:

Phase wise development of Integrated Raj e-Panchayat application		
S. No.	Module/ Sub-module	Phase
1	Scheme/ Work/ Project Management - Initiation and Planning - Execution - Monitoring and Control - Closure	Phase-1
2	Budget Management - Budget Planning - Budget Approval - Budget Provision - Budget Distribution	
3	Accounting & Taxation	Phase-2
4	Beneficiary Enrolment	Phase-3
5	Common Requirements - Business Analytics/ MIS Reports - E-mail - Committee & Meeting Management - Scheduler - SMS Alerts	Phase-4

Pilot testing of this software was started in selected Panchayat Samitis in January 2017. After this, in the first week of February 2017, seven more Panchayat Samitis were onboarded on pilot basis. This software was released by the hon'ble minister (Panchayati Raj) on 16.2.2017 and in the meeting, a detailed demonstration of the software was also presented by the officers of Department of Information Technology & Communication, to all the officials and the hon'ble minister. From 01-04-2017, the software has been implemented across all ZilaParishads, Panchayat Samitis and one Gram Panchayat of each Panchayat Samiti.

Improvements / Enhancements

- Workflow based application for Planning, Execution, Monitoring, Closure.
- Automatic updation of asset register on work completion.
- Integration with Plan Plus of GoI for 2-way communication.
- Further integration with all other GoI applications related to different processes/schemes.
- Mobile Application is available now for Geotagging of work sites.
- Enhancement of this as an integrated solution for RD&PR department with all possible integrations with different units of department
- Platforms like Mobile app, GIS tools, Data analytics etc. to be included for improving efficiency
- Integration with other departments like Health, Education & Anganwadi for better monitoring

ENABLER

Processes Re-engineered

- In the previously available software, data entries were done after the work completion due to which authentic information was not available in time. Integrated e-Panchayat software is a workflow-based application; hence the information will be generated automatically, and there will be minimum requirement of data entry.
- The amounts spent on the works are being paid directly to the bank account of the supplier through this software by using the RPP (Rajasthan Payment Platform) based on the author. The functionality of e-Sign / OTP verification has been added to remove the required of manual payment process.

Technologies

- The operating model of business process integration and business process standardization for delivering services through Integrated Raj e-Panchayat are clearly identified, prepared and deployed in the web application. The IT team works daily with the department officers and end users for the betterment of the model and process integration.
- Various analytical dashboards have been developed for decision support system and better monitoring of works.

People

- The application has a large user base consisting of users from more than 11,000 Gram Panchayats. Hence the capacity building was a real challenge. To overcome these dedicated sessions were organized at Jaipur for the master trainers from all districts.
- Apart from State level PMU team along with two resources (DPM and Assistant) at district level is also involve in the deployment of the application. This team is working as module champions to assist field level user.
- The application has a dedicated module for help desk, in which all kind of documentation is available and users can raise issues/suggestions by using this module.

VALUE INDICATORS

Learnings for sharing

This software is the country's first of its kind for complete automation of all the functions of PRI's (Panchayati Raj Institutions). The involvement of end users during the development of the project is really a key element for the success of the project. Few efficient Block Development Officers, Gram Development Officers and Public Representatives (i.e., Sarpanch, Pradhan etc.) were continuous in touch during the development of the application, now they have emerged as the best source to promote the implementation of the application throughout the state. The application can be replicated for other States also.

Digital Empowerment

Financial Inclusion is a key enabler to economic, social and transaction security of a country, thereby driving inclusive growth. It is for this reason that financial inclusion has been one of the key priorities for Government of Rajasthan. Rajasthan has always used innovative technology as an effective tool to expand financial inclusion, through various initiatives like Direct benefits Transfer, Mobile banking, Aadhaar enabled banking accounts, e-KYC's and many more. The government always ensure that every single project is bi-lingual in nature. Mandatory guidelines from Hon'ble Chief Minister and Chief Sectary of the state every application platform and front-end portal are in Hindi as well as English. Rajasthan has seven divisions and each division has its specialized portal and sectorial application aligned with the demographic and cultural aspect of that specific area.

Green e-Governance

Rajasthan State Data Centre is a 100% green data centre. The upcoming data centre in the state is going to be a Tier 4 data centre in the state and the only Tier 4 data centre in the country which is owned, operated and controlled by the government. Government of Rajasthan judiciously follows every policy of Green IT, along with this the state also has its own Green IT policy which is followed by all departments and outsourced sectors religiously. All environment friendly practices with respect to creation, use and disposal of ICT gadgets and infrastructures are followed. The Rajasthan Green IT policy has been prevalent since the year 2007 and was revised in the year 2015.

The Integrated e-Panchayat application has resulted in reduction of paper work which in turn has contributed to the environment and saving of trees

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MC Suite of IT Applications for Delhi

South Delhi Municipal Corporation (SDMC) & National Informatics Center, New Delhi

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PROJECT OVERVIEW

Objective

The Objective of the MC Suite of IT Applications is to provide State-of-the-art web and mobile-based workflow systems to the MCD employees to process the applications and deliver the services to the citizens. On the other-hand Citizens can also avail the services online in a faceless manner.

Scope (Functional & Geographical)

- Applications are faceless cashless by design & development, which helped in the seamless delivery of services during the COVID-19 pandemic to a larger extent.
- Citizen-Centric Services: Online delivery of services namely submission for Property Tax Return, Registration of Birth and Death, Community Hall booking services, Licenses applications, Cremation / Burial Ground Slips, Covid-19 helplines to know the availability of beds, cremation/ burial grounds, Test & Vaccination centers, etc.
- Licensing Services: Veterinary Licenses, Pet Dogs Registration, Gen. Trade / Storage Licences, Factory Licenses, Health Trade Licences, HTL Application, Hackney Carriage, Tehbazari, Hawking License.
- Public Utilities: Town Planning approval system, Building Plan Sanction (EODB), Tracking of Garbage Vehicles (eSBM), dashboards, Parking Monthly License Fee System, Cremation / Burial Ground Slot Availability, etc.
- Other Services: Mobile App for Property Tax Return, Attendance App, PRICE, Payment- Gateway, Form-Processing workflow, GePNIC, etc.

The suite of IT applications is presently meant for Delhi people of 3 corporations (SDMC, NDMC & EDMC). They can avail services from any internet point, No geographical boundaries. NRIs can also avail services using Mobile & OTP organizations.

Key Stakeholders

- Citizens of the SDMC, NDMC, and EDMC
- MCD officials
- Government and non-government organizations of SDMC, NDMC & EDMC
- National Informatics Centre.

Benefits:

- Paperless System:
 - o Eliminates manual handling of applications (No paper mode of applications)
 - o Contribution towards the initiative of Green Governance
- Cashless System:

- o Integrated Online Payment Gateway System
- o Promotion of Digital Transactions
- Faceless System:
 - o Online Registration, submission of applications, and getting service online.
 - o Almost No need to visit MCD offices
- Covid-19 complained
 - o Application of Social Distancing thus Saving Lives and slowing in the spread of Covid-19
 - o In the testing times of Covid-19, the applications developed and launched have helped Citizens as they can apply and get the services of MCD without having physical contact with anyone
- Transparency
 - o Starting from application submission to processing and delivery of service, the system is transparent for different levels.
- Minimized Human Interference due to automated processes.
- Minimization of travel burdens to take a service
- Beneficiary can track his application status
- OTP based authentication of the right citizen
- Inter applications integrations and dashboards available.

Current Status

Phase I & Phase II of the project have been completed; around 16 applications have been made Go-Live, Phase 3 & 4 are progressing. (Phase-wise status is mentioned in the Section 4.2a)

Hardware/Software

Hardware:

- NIC Cloud (MeghRaj). / National Data Centers (NDC)
- VM has been used for hosting of applications
- The DC site of the applications is at NDC Bhubaneswar
- The DR site for the applications is at NDC Pune

S/W Environment:

- OS – Linux RHEL 8.0 (Complete Open-Source environment)
- Application development environment: – Java Spring MVC framework
- Database: Postgres Ver 12, Hibernate

Middleware:

- Open Stack Server
- VMware

Packages-integrated / deployed:

- Apache (httpd)
- Tomcat
- JDK

- Open SSL
- Mod SSL

Certification (Certifying Agency)

Since all applications are hosted on NIC Cloud, the Cyber Security Policy of the Government of India is followed by Cyber Security Group, Application Security Division, National Informatics Centre, is the Certifying Agency. All applications are 3rd party Security Audited by CERT-In impaneled agency and verified by NIC cyber security cell.

Disaster Recovery and Service Continuity

- Infrastructures is VM Ware based.
- The DC site at NDC Bhubaneswar while the DR is NDC Pune, all data is replicating.
- Replication from the DC to DR is done on a real-time basis so that no data is lost in case the DC goesdown
- Auto Alerts are received through CCC (command & control Centre), in case any service is down.
- A proper Backup Policy is in place, and routine tests for data restoring are carryout.

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 Tax Return (SDMC only)	PTR Application is an integral part of the MC Suite of IT Application facilitate the citizens of Delhi having a property under SDMC, NDMC, and EDMC area to submit Property Returns Online. The system auto-calculates the tax and Online Payment Gateway is integrated for payment of Taxes. • It facilitates citizens to easily pay property tax returns without visiting MCD premises. • Similarly, MCD officials can use Dashboard extensively to keep track of day-to-day progress on tax payments received and use it for necessary decision-making to achieve the targets. • Launching of PTR application helped MCD in achieving	NA	Property Returns submitted: 3870 Revenue collected: 11.07 Cr	Property returns submitted 283571 Revenue: 168.46 Cr.

	property tax collection of more than 80% of FY 2019-20 on a YoY basis for FY 2020- • 21 even in a pandemic situation.			
Registration of Birth and Death (RBD)	RBD Application is an integral part of the MC Suite of Application which covers the population under SDMC, NDMC, and EDMC. It provides a Simplified, Responsive, Effective, and Transparent paperless platform to citizens of all Municipalities to register and download Birth and Death Certificates. RBD Application facilitates Citizens to register for Birth & Death and download certificates from any internet point thus eliminating the requirement of a personal visit to the MCD office. It facilitates Change of Details in Birth/ Death Certificates, Viewing the status of the application and downloading the Certificate using a personalized dashboard by citizens. Hospital can Register the Birth & Death of citizens and Issue certificates instantly. The same can be downloaded by citizens on their own at any time and from any internet point.	NA	NA	Certificates issued: Birth:20757 Death:9532 (SDMC only)
Licensing Applications	The MCD grants different types of Licenses viz. Health Trade License, Veterinary License, General Trade / Storage License, Factory License. • Licensing applications provide a Simplified, Responsive, Effective, and Transparent paperless platform to citizens of all Municipalities to apply for and download the various Licenses. • It also facilitates the MCD officials to do their internal processes and file dealings thereby • Automating the backend workflow. • Option to raise the deficiency and get the	NA	NA	

MC Suite of IT Applications for Delhi

	• Citizen to correct it through the system is also there			
Health Trade License	• As per provisions under the DMC Act, 1957, the MCD grants health trade licenses (HTL) to the traders in order to run their trades of restaurants, hotels, motels, etc. • It is integrated with Unified Portal of MHA • Currently, DMCs are granting Health Trade Licenses to about 60 types of Health Trades.	NA	NA	Applications received: 531 Revenue: 9.81 lakhs
Veterinary License	• Veterinary department deals with Issuance of Licenses of Horse Buggies, Cattle Dairies, Meat Shops, Meat processing units, etc. • The Application facilitates online registration and payment. • Online workflow-based system for processing of the application • It is a paperless and faceless application. • System calculated fees	NA	NA	App. launched in 2021-22 (5-4-2021)
General Trade/ Storage License	• MCD grants General Trade and Storage License under Section 417 of the DMC Act-1957. • There is a feature of 10% Random Scrutiny Selection for Officers • Online workflow-based system for processing of application • It is a paperless and faceless application. • System calculated fees	NA	NA	Applications: 64 Revenue: 13.23 lakhs
Factory License	• MCD provides a License to eligible persons/ organizations to establish & run factories, workshops, or trades/s 416 of the MCD Act, 1957. • This application allows Citizen Instant issuance of Provisional License on paying the system	NA	NA	Applications: 207 Revenue Collected

	calculated fees online. • Online workflow-based system for processing of the application • It is a paperless and faceless application			25.1 lakhs
Tehbazari Permits (Renewal)	• Tehbazari, a combination of two words i.e., "Teh" + "Bazari", means to utilize surface for the purpose to sell anything. • This application deals with the renewal of existing Tehbazari permits	NA	NA	NA
Mobile AttendanceAPP	During Covid-19 when biometric-based attendance was stopped, a GPRS-enabled Mobile App for marking attendance by the MCD staff was developed and launched. More than 80K officials of MCDs registered devices and started marking attendance. Dashboard for the same is also developed and made available			>80K officials & SKs of MCD are registered

Implementation

Following is the plan and achievement in respect of 30 applications

Phase 1 (completed) –

- MCD unified Web Portal and
- My Services through the portal
- Property Registration, Tax Assessment, Calculation and Payment
- Registration of Birth & Death
- Mobile App. for GPRS enabled Attendance with (Lat./Long and photo)
- e-Mutation Certificate Download

Phase 2 (completed) – (Licensing & other Applications)

- Health Trade License
- Factory License Application
- General Trade License
- Veterinary Trade License
- Tehbazari permits
- Hawking licenses
- Hackney Application
- PRICE, Engineering Department Estimate Preparation
- Town Planning approval system
- Community Hall Booking system and MIS

- Booking-Unbooking of un-authorized construction

Phase 3 (under development) –

- OBPS (Online Building Plan approval) integration
- Solid Waste Management
- Land Estate Uploading System
- RP (Remunerative Project)
- User charges

Phase 4 (to be taken up) –

- Asset and vehicle management system
- Municipal Secretariat Information System
- MCD Employees work Bench (integration with attendance App)
- Nursing admission
- Finance Management System
- eHospital
- Drug inventory

As of date, it can be stated that Phase 1 and Phase 2 of the Project have been completed and the project is in Phase 3.

Improvements/Enhancements:

Multiple applications have been launched in the MC suite of Applications during the last year. A table of those applications which have been launched are given below:

S. No.	Applicati on	SDMC	NDMC	EDMC
1	Property Tax Return (PTR)	08/05/2020	08/05/2020	16/04/2021
2	Mobile Attendance App	15/08/2020	15/08/2020	05/01/2021
3	Reg. of Birth & Death (RBD)	16/10/2020	16/10/2020	05/04/2021
4	Factory License (FL)	05/12/2020	11/01/2021	31/03/2021
5	Health Trade License (HTL-MHA)	29/01/2021	05/02/2021	31/03/2021
6	General Trade License (GTL)	01/03/2021	01/03/2021	31/03/2021
7	Hawking Permits (Renewal)	05/04/2021	05/04/2021	08/04/2021
8	Tehbazari Permits (Renewal)	05/04/2021	05/04/2021	08/04/2021
9	Mobile App for Property Tax Return	20/05/2021	20/05/2021	20/05/2021
10	PRICE-Project info & cost estimation	08/09/2021	NA	NA

The applications to be launched within the next year are listed below:

- HealthHTL-2.0 (MCD Level) – In all 3 DMCs
- OBPS – In all 3 DMCs
- PRICE – In EDMC and NDMC
- SBM – In all 3 DMCs

- Land Management System– In all 3 DMCs
- Parking Management System– In all 3 DMCs
- Advertisement Management System– In all 3 DMCs

ENABLER

Processes Re-engineered

- Single Sign-On (SSO) and OTP-based authentication introduced for each and every citizen to access services.
- GPR in PTR: Earlier, the Citizen was dependent on the MCD official for calculation& verification of TAX, also he was not able to pay tax for previous years. But now GPR has done and taxpayers can pay through the newly developed system. Furthermore, since the system is online, a taxpayer can pay the Tax from any internet point that may take the help of CSCs and does not need to visit the MCD premises at any step of the Process.
- In the earlier system, the logins of all stakeholders were not present. For e.g., Hospital officials used to do their entire process manually by filling up physical forms and submitting them to respective MCD officials.
- The current RBD application is a FACELESS, comprehensive workflow-based application that plugs all the loopholes and creates a robust, transparent, accountable, and auditable mechanism for the generation of Birth and Death Certificates and keeping the records synching with legacy data too.
- No data exchange/exposure through e-mails or in excel sheets, only downloadable by authorized users in the desired format of XML/Txt.

Technologies

- Data Analytics: A comprehensive Dashboard has been created for the MC Suite of Applications which can be accessed by SSO login through Parichay (NIC Platform).
- KPIs are looked in through the dashboard for better monitoring and planning. They can also check the number and duration of pending applications and hence the delivery is being improved.
- Third Party Security Audit Report
- Third-party Security Audit Certificate
- NIC Security Audit Certificate
- Social Media Presence: Robust social media presence of SDMC, NDMC, and EDMC is present, and the social media team is also active on various platforms such as Twitter, Facebook, YouTube, etc. This helps the DMCs in the following manner:
 - Guidelines
 - Functional Requirement Specification
 - FAQs
 - User Manual
 - Test Cases
 - User Acceptance Testing

This Document repository brings standardization to the services and provides a better

transparency and accountability mechanism to the development and implementation of the applications.

People

Capacity Building

- A team of 73 technical persons with expertise in different domains has been formulated under the able leadership of Senior Management in both the SDMC (Nodal Department) as well as NIC. This team is in charge of the development, hosting, and maintenance of all the applications in the MC Suite.
- A robust helpdesk is established with 16 personnel who function from 8 am till 8 pm from Monday to Saturday which resolves the various issues and grievances of both the Citizens and MCD officials/ Other Stakeholders.
- Operational Support and training of MCD officials is a regular process.

Change Management:

- Multiple demonstration and training sessions have been organized for field officials for different applications.
- Different types of supporting documents such as SOPs, User Manuals have been created which help in using the applications.
- Leadership Support: Senior Management in both the SDMC (Nodal Department) as well as NIC have been overwhelming as they have provided their decades of rich experience to develop this MC suite.

VALUE INDICATORS

Learnings for sharing

- Effective planning of the project; Scope, stakeholders' roles, time & cost must be done
- IEC activities & Educative publicity of the system
- Pilot run should be arranged prior to rollout
- Interfaces/access/UI must be user friendly
- Un-scheduled downtime of servers/website must be avoided
- Risks of manpower and other resources should be mitigated.
- Change Requests must be controlled and their severity/ impact on the system must be quantified prior to incorporation & must be shared with the owner
- DR sites for database backups should be tested for data retrieval & restoring
- Help Desk/Call centre must be run round the clock

Key Challenges:

- Change in work culture and changed the scenario of UI
- Handling and migration of unstructured legacy data
- Connectivity in old buildings of Zone offices
- Retention of outsourced manpower
- Sensitization of user department regarding the various applications developed

Best Practices:

- Application Security Auditing, SSL, Encryption, DSC, SSO, etc have been implemented
- Parichay has been implemented and OTP-based authentication.
- API based integration and exchange of data among different applications
- Standardization of different processes prevalent, in accordance with the different organizations
- Capacity Building, Change management, including training and supported documents creation, etc.

Innovative / Disruptive Technologies Used:

- RPA (Robotic Process Automation)/ OCR: RPA is being implemented along with OCR to scan the documents submitted by Citizens, pick up relevant data from them and auto-fill them on the Citizens' application form.
- Chatbot/ AI: Chatbot is being implemented along with AI to train the bot to automatically reply to relevant responses to some basic questions put up by the Citizens.

Digital Empowerment

Digital Empowerment is done through the following steps:

- For Financial inclusion Payment Gateway has been integrated based on debit/credit card, INB, UPI, Check based payments.
- CSC-SPV/VLE has been integrated to help the persons in using and availing the online services.
- OTP based registration for applicants to get MCD services: Citizens can register for any application from any internet point, thereby eliminating the need to physically visit the MCD premises and Digitally empowering Citizens.
- Citizens are empowered to get certificates/licenses services in self-assessment mode without adding more affidavits and documents.
- Transparency and accountability: Complete transparency and accountability are maintained since:

All the applications are end to end digitalized from application by Citizen to the backend workflow by the official and complete trackability is there of the application, i.e., Citizen knows where his/her application is present at any point in time,

Green e-Governance

Various initiatives to promote green e-Governance have been taken. Some of them are listed below:

- Paperless System: Eliminates manual handling of applications and No printing of documents. Thus, contributing towards green governance.
- Minimized Physical Visits: Since Citizens can apply for and get the certificates/licenses/ pay taxes etc. online from any internet point, there is no need to physically visit MCD premises thereby reducing the Carbon emission from vehicles required for travel
- Application of Social Distancing/ directly apply from home and can get service delivery at home.

- In the testing times of Covid-19, the applications developed and launched have helped Citizens as they can apply and get the services of MCD without having physical contact with anyone
- e-Waste disposal has been planned by using a website developed for disposal of e-waste

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NICMEET

National Informatics Centre Haryana State Centre

Deepak Bansal and Bidyut Ranjan Gohain

PROJECT OVERVIEW

The outbreak due to COVID 19 pandemic has forced all the organizations to facilitate its employees to Work from Home (WFH) to the feasible extent, which was till now mostly synonymous with IT industry only. With this, video conferencing has become an integral part of daily life. The government is using video conferencing tools to connect with people to effectively deliver e-governance activities by maintaining social distance. The government has also understood its importance and is using this technology not only for day-to-day meetings but also exploring the use of this technology in the field of Education, Tele-Medicine and Judiciary etc. With growing demand and multiple uses of applications, high demand for facilitating VC service to many departments, National Informatics Centre has proposed to develop an ingenious Video conference solution to cater to the need of Government in the country.

Being an in-house product hosted in NIC Domain nullifies the security and leakage of data unlike other proprietary VC Solutions. It is completely secure with end-to-end encryption, scalable and easy to use solution.

Objective

Below are the major objectives of the project NICMEET,

- To provide a stable and consistent product to the stakeholders for uninterrupted web meetings.
- To make the product easy to use and accessible to its stakeholder.
- To be able to integrate with other projects/products easily where web meetings are required.
- Should be platform independent.
- Should have Chat, Shared Document Editing, Moderator Control, Recording facility, Background change, Low Processor and Bandwidth usage, Whiteboard facility with other features.
- Should provide Desktop/Mobile Screen sharing.
- Should provide a secure channel with End-to-End Encryption.
- Should be well connected with NIC Alert systems like Email, SMS.
- Should have Feedback Option for every user with real time issue resolutions.
- Should be ready to change as per the requirements, user experience and feedback.

Scope

The scope of the NICMEET is seamless, below are its functional and geographical scopes as per its implementation till date

Functional Scope:

- Facilitate its users to Work from Home (WFH).
- Minimized dependencies on commercial VC applications.
- Solution is developed using latest available Open-source Technologies.
- NICMEET is accessible over no. of Platforms, Operating Systems, Browsers and Devices. The top stats are as described in the image below,
- NICMEET is integrated with Other Projects, Telemedicine, Work from Anywhere, eHospital etc. to facilitate the Web Meetings on the go. The

Integration usage is more than 10% of the total Web Meetings.

Geographical Scope:

NICMEET has covered significant geographic area in very small time, below are some coverage statistics,

- Countries Covered: 39
- Indian States covered: 36
- Indian Districts/UTs Covered: 718
- Government Ministries/Departments Covered: 550+

(NICMEET Geographical Coverage over Maps)



(World Map)



(Asia Map)



(Indian Map)

Key Stakeholders

NICMEET is conceptualized to provided its Video Conference Services to the Government Sectors, But by Its design and usage, it has covered almost all aspects of the communication between the below sectors,

- Central Government Ministries/Departments/Authorities/Commissions/Offices
- State Government Ministries/Departments
- Other Public/Private Organizations/Bodies.
- Individuals.

Top Countries in which NICMEET is being accessed are India, United States, United Kingdom and many more.

Intended benefits

- Better collaboration: NICMEET video conferencing allows its users to collaborate with each other seamlessly through a secure channel. An increased number of Government Employees especially during the pandemic are in the fields, serving citizens directly, going about to combat crisis situations, tracking the progress of their regions or attending important meetings. This out-of-office nature of their job requires them to have an effective system that they can use to collaborate with other teams on-the-fly. Since web meetings can simulate face-to-face meetings effectively, government agencies located across the country and abroad can collaborate easily in real-time, from any place where Internet connection exists.
- Efficient Use of Man Hours: Traveling, commuting and schedule difficulties usually cost more as compared to direct capital. In addition, this also creates additional costs in other ways, most especially in terms of the man-hours; NICMEET reduces the travel times and thus resulting in better time management. The officials can have back-to-back web meetings without losing time in traveling which in turn boost the decision support systems as well. NICMEET is integrated with the Work from Anywhere Portal of the Government of India.

- Better public interactions: Government video conferencing has bridged the gap between the Government and the citizens. With NICMEET video conferencing, public sector representatives are now able to communicate directly with the stakeholders and public, and resolve grievances with the social distancing norms.
- Healthcare: Healthcare is the most affected sector during the pandemic, Hospitals and Doctors are crowded during peaks of COVID-19, at this time the general patients are at stake. NICMEET offers its integration with the healthcare systems through which Doctors and Patients can interact. The examples are, eHospital and Telemedicine applications.
- Mobility and Flexibility: On the go NICMEET Web meeting allows its users to be connected even when they are not physically present at their workplaces due to one or the other reasons. Which resulted in the better mobilisation of the workforce on the jobs with increased flexibility.
- Increased inter-departmental communications: Departments usually have distinct roles that could be interrelated yet they have different operational regions. Increased collaboration among government departments has only been possible via video conferencing especially during pandemic. Each and every department is nowadays aware of the progress of projects and the roles of associates involved. NICMEET provided a platform for seamless inter-departmental communication.

Current Status

- NIC Meet has been made operational since August 2020 and since then it has 2000+ registered users and 14,000+ VCs conducted so far amounted to a total 38500+ hours. Around 1,70,000+ guest users have participated in these VCs.



(Month wise VC, Participants and Duration Statistics)

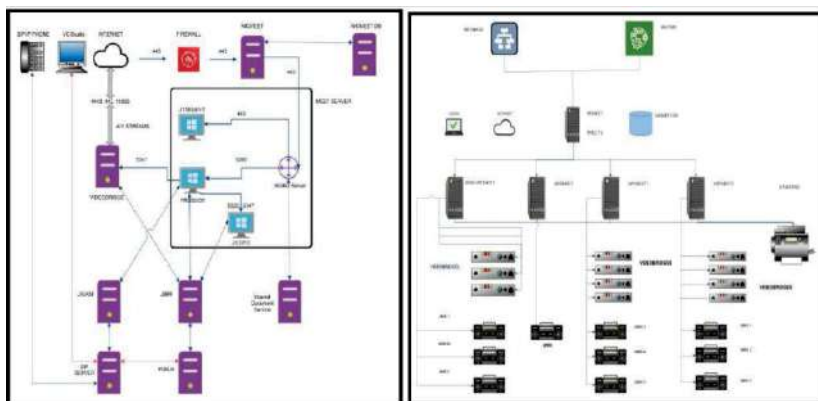
- Currently User Management, VC Scheduling, Group creation, VC Recordings, Chat, Share Screen, control VC audio/video, end to end encryption modules and intimation via email & SMS are functional.
- NICMEET is security audited by the Excellence Center for Application Security of NIC and hosted in Cloud in NIC Haryana Data Center over NICNET.

Audit Certificate Ref ID: NIC/CSD/IA/16733

- Real Time MIS Reports are available 24X7 with the Administrators which allows for better management of resources.

Hardware/Software

S. No	Frameworks	Technology
1	Operating Systems	Red Hat Enterprise Linux v7.2 Ubuntu v20.04 LTS Android
2	Application Front End	Angular v9.0
3	Application Processing End	Java v1.8 Spring Boot v2.4.4 Spring MVC v5.3.5 Kotlin v1.3 Lua v5.2
4	Back End	Postgres DBMS v11
5	Servers	XMPP Server: Prosody v1.0.4466 Reverse Proxy and Load Balancing Server: Nginx v1.18.0 Web Application Server: Apache Tomcat v8.5.0 Conference Manager: Jicofo v1.0-644-1 Relay Server: Jitsi Videobridge v2.1-376 Recording Server: Jibri v8.0-53
6	Monitoring Tools	Application Analytics: Matomo v4.4.1 Data Analytics: Metabase v0.39.4
7	Version Control System	Bitbucket v7.16 Source Tree v3.4.6
8	Tools	Document Editor: Etherpad v1.8.4 Whiteboard: EP Draw v0.0.3 Netbeans v12.0 IntelliJ IDEA v11.0.8 Visual Studio Code v1.31.1 PgAdmin v4 Putty v0.68 WinSCP v5.19.1 Jenkins v2.302
9	Configurations	Videobridges: 16 vCPU, 32 GB RAM, 60 GB HDD Meet Servers: 16 vCPU, 32 GB RAM, 60 GB HDD Recording servers: 8 vCPU, 16 GB RAM, 100 GB HDD Web Servers: 16 vCPU, 32 GB RAM, 60 GB HDD DB Servers: 16 vCPU, 32 GB RAM, 60 GB HDD Tools and Others: 8 vCPU, 16 GB RAM, 60 GB HDD



(The process Flow Architecture Diagram) (The System Architecture Diagram)

Certification (Certifying Agency)

- Yes, NICMEET is security audited by the excellence centre for application security of NIC, Lucknow, which is CERT-IN empanelled with audit certificate Ref ID: NIC/CSD/IA/16733.
- All Servers belonging to NICMEET are assessed and cleared for vulnerability assessments and are hardened.
- Implementation of recommendations of security advisories are also being carried out at Server as well as application level within timeframes.

Disaster Recovery and Service Continuity

- NICMEET design has been architected by keeping the most important objective of the platform in mind which is uninterrupted service delivery. By Design, NICMEET is self-load balanced and can also withstand the network changes.
- The complete infrastructure of NICMEET is hosted on the National Cloud at Haryana Mini Data Center. The Data Center itself has the state-of-the-art technologies and strategies for Disaster Recovery, Backup Management passing the benefits to NICMEET.
- The Complete infrastructure is well connected with CCC (Command and Control Center) at NIC HQs for resource Monitoring, Utilization Monitoring and Alerts Management System. Which further helps in increasing the Service Continuity and Reliability.
- The Split, Cascading Bridge Selection Load balancing strategies are in place.

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
Web Meetings	Total Web VC Meetings carried out since inception			14,143
Third Party Web Meetings	No. of Meetings between Users through Third Party Integration			1,477
Total VC Duration	The hours spent during all VCs			38,743 Hrs
Account Registrations	Total Registered Users			2,021
Guest Joining	Total Guests joining in the VCs			1,70,347

Implementation

The first Beta version of NICMEET was deployed in August 2020 for testing by the NIC Officers only. In a very Short Time, NICMEET gained popularity amongst other government departments and organizations. A restriction was placed for the NICMEET usage as to get an idea of the Resources in line with the handling of users. But the continuous developments, optimizations and especially the architectural design allows NICMEET to perform more than expected with the provided infrastructure. In a span of One Year, NICMEET registrations have crossed 2000 nos and at present more than 550+ Government Departments are using NICMEET. The Guest presence on NICMEET is also overwhelming as it crossed 1,70,000 visits for attending the Web Meetings in just 1 year of the launch of NICMEET.

Improvements / Enhancements

Rolled Out:

- Connectivity with desired / registered users face to face and multipoint (one to many up to 4000 users).
- Connection from desktop / mobiles / any other devices
- Simple browser-based Solution.
- Guest invitation by link
- Restriction of guests through authentication
- On-demand/on the fly Multipoint connectivity without any additional procedures
- Document Sharing from computer/mobile
- Collaborative editing / modifications of documents.
- On-line Chat facility
- Online attendance (log of participants entry and exit time stamps)
- Recording of the videoconferencing session with presentation/content.

- Audio control: - Exclusive speaker, assigning microphone right to few / selected participants
- On the fly Integration with Third Party applications.
- Selection of layouts (participants to be seen on the screen (Full Screen-speaker, bigger speaking participant and small images of others, All equal participants)

Under Development: There is an endless scope of improvements and feature additions in NICMEET, some of the current developments and features are listed out below which the team is trying to provide as early as possible

- Integration with Parichay and Jan Parichay for Single Sign On.
- Sip Communication with the Hardware based VC Studios.
- Specialized Training and Webinar Module.
- File sharing, just like Google drive. The Next cloud instance is being set up. Which will help sharing the Recordings, Chats and Files.
- More moderation controls.
- More than One audio channel transmission along with same video for enabling selection of multilingual audio translations (especially for parliament house events).
- Integration with WhatsApp Gateway, GIMS (SANDES).
- Multichoice questions and Polling facility.
- Introduction of DevOps.
- Implementation of Region based Video Bridge Selection Strategy for Region based load balancing.

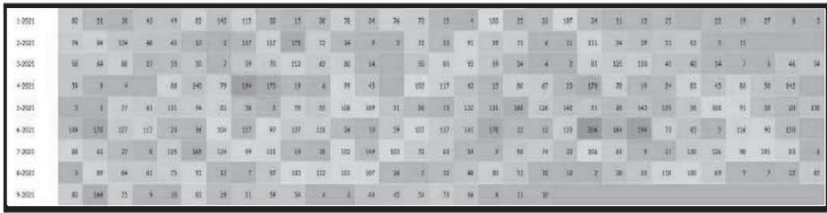
ENABLER

Processes Re-engineered

The NICMEET is based on the Jitsi platform which is developed by a group of contributors. On the other hand, Jitsi is also scattered with multiple modules written in different languages and supports various protocols. The team has sewed all bits and pieces together and created a standard integrated environment to achieve the most of the Jitsi components.

Technologies

NICMEET was launched with its Beta Version in the month of August 2020, during the peak of the first wave of COVID-19 pandemic and the pressure on the Video Conference system was immense then. For estimating the load vs user's vs computation vs bandwidth, MATOMO and CCC were integrated with the application, VC Core system, Videobridges. MATOMO is an open-source application data analytics tool and CCC (Command and Control Center) is a 2SNMP based monitoring and alert system. Both the systems have helped a lot in understanding the behaviours of users, applications and infrastructure. Soon the user base of NICMEET started increasing and to capture the insights Metabase, an open-source data analytics tool, was used to capture the behaviour of the VCs, Timings.



(Participants Heatmap over Time)

The Feedbacks from the Users helped the most whether it is an Error, Issue, Enhancement and Feature requests. Feedbacks helped us move ahead and deliver what the actual users wanted. The need of eHospital and Telemedicine like applications arose, it was envisaged that NICMEET may play a great role in connecting Patients with Doctors.

Further, the culture of Work from Home has also started happening in the Government Sector and a portal “Work From Anywhere” was also launched. For Employees Day to day interactions NICMEET is being used.

People

With a clear Strategy and Vision of the Management, the NICMEET has one core objective to provide a secure communication channel for its users with ease. To achieve this, several tools were analysed and implemented. The architecture has been designed as per the Agile Methodology which enabled the handling of Issues and Change requests in real time scenarios. Also, the modular approach followed enabled the team to provide solutions which were initially out of the scope of NICMEET like Third party Integrations, in a very short time.

The Leadership has supported a lot, during the development of such a vast technology platform, various resources from the respective divisions have been aligned to understand the nitty gritty of the technology. The infrastructure has also been provided as per the estimated demand of the team.

The NICMEET, by its design, has a very simple UI and with the passage of time UX has also been improved. Further, User manuals along with Feedback module has enabled its users to build their capacities. Video Conferencing sessions were also conducted for the senior officers on the know-hows of the interfaces. State Nodal Officers were also given roles and training to understand their role, control options and direct communication with the development team for better understanding and resolution of issues, If any, in the real time. Any desk sessions are created to cater a user specific issue whenever reported.

VALUE INDICATORS

Learnings for sharing

- Team Setup:** The field of VC is new to them. The technologies and protocols which are used in Video Conference Solutions are vast. The team members were selected from the existing pool of software developers who are responsible for developing the Web Portals, systems and surprisingly have no idea about the above-mentioned technology. The hard work and quick learning abilities made the team equipped with workable knowledge which was enhanced on a daily basis as they started working on the goal. It is not important to wait for the

perfect resources but if the resources are able to quickly adapt the technologies and learn accordingly then nothing seems to be difficult or impossible.

- **Technology Selection:** The chosen technology is the latest Open-Source technology and agile methodology was selected to develop the Modules. However, it also takes an amount of time to learn. But to reduce this time the very famous principles of the modern era are used such as SOLID principles. It shows that if the industry standards are followed properly then the experience gained will certainly reduce the time.
- **Infrastructure:** The NICMEET is based on the Jitsi platform which is recommended to be a most bandwidth consuming and resource hungry solution. Also, the network rules for communication needs many ports to be opened for better communication across the platforms. The team has sorted out the constraints by analysing the certain dependencies and worked smarter to get the solution hosted on National Cloud accessible over NICNET with selective grants of permission and protocols as and when required. The problem statement and identification of their root cause can help the teams to migrate from insecure environment to a secure one.
- **Multiple Browser Support:** In the modern world there are more than 100 browsers, each with different versions. The hurdle is that the most important Video Conferencing technologies present today are developed by Google. One of the many technologies is Web RTC (Real Time Communication) which has dependency over Google Chrome. The upgrade in WebRTC is rolled out with an upgraded version of Chrome but other browsers take time to upgrade. The VC solution, especially the Jitsi components also gets upgraded in time to get along with WebRTC and the team was facing issues of this problem. At present more than 450 Browsers (different versions) have accessed services of NICMEET.

Digital Empowerment

- **Health Sector:** Health Sector is providing essential service to citizens who are under medical emergency. To get consultation, traditionally patients have to go to the doctor physically, which costs in terms of travel expense, travel time, accompanying person time and also situations where the movement of the patients are critical adds extra risk. The COVID-19 crisis further added to this, as going out in public, or entering a sick patient's home, came with its own host of risks. NIC Meet provided a bridge between face-to-face communication with its integration with eHospital and telemedicine facility.
- **Government Sector:** Government agencies can use video conferencing to communicate in times of crisis or for more mundane issues, such as a review of the budget/schemes etc. Video conferencing also allows government agencies to communicate with each other without having to schedule an in-person meeting which will save time and public money. NICMEET being inhouse product and hosted on the Government owned server gives added advantage of security.
- **Legal Sector:** Alongside the rising fear of the pandemic, the year 2020-21 has seen a meteoric rise of the video conference meeting – not only as a business obligation but also as a social necessity. The legal sector can benefit significantly from video conferencing because lawyers rely on face-to-face consultations and meetings to progress cases, correspond with clients and grow their practices, which Covid-19 has made far from easy. Video conferencing, even 'post-

pandemic', enables legal professionals to do all of these things conveniently, thereby boosting productivity and efficiency. NIC meet integration with eCourts has a big potential in empowering the legal sector service delivery.

- **Education Sector:** With schools at all levels moving to online-only instruction in 2020-21 due to the novel coronavirus pandemic, teachers who previously only taught in person in the classroom now find themselves seeking ways to make their lectures and lessons capture and keep the attention of their students. There are various technologies instructors can use - from simply pre-recording or live streaming their lessons to interactive video conferencing software. In addition to the convenience online learning offers, instructors and students alike can benefit in multiple ways from classroom video conferencing: Content sharing, connect participants, recording functionality, engage others, interaction and collaboration. NICMEET provides all the features required for effective knowledge sharing.

Green e-Governance

- **Cloud based Infrastructure:** NICMEET is hosted on NIC Haryana data center cloud infrastructure. Cloud infrastructure allows resource sharing and real time downgrading or upgrading underlying infrastructure which enables effective use of resources therefore reducing the need of additional physical hardware purchases for changing requirements thereby reducing in e-waste and saving public money.
- **Completely Software based solution:** No additional devices are needed to access NICMEET Web VC service, it is completely browser based. Alerts and information flow allow instant reach of messages directly to the intended user thereby maintaining confidentiality in comparison to the traditional method of sending information.

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Odisha Assembly - Journey Towards Digital Transformation (Paperless Assembly)

Odisha Legislative Assembly & National Informatics Centre Odisha State Centre

Dasharathi Satapathy, Dilip Kumar Mandhata, Sarita Sahoo and Debananda Dora

PROJECT OVERVIEW

This Project is a Significant Footstep for transforming the Odisha Assembly into Paperless Legislature, in turn, being a key benefactor of Digital India. The paperless flow of Odisha Assembly business processes are realized through distributed and integrated implementation of several core software systems meant for different activities.

- **National e-Vidhan Application (NeVA):** NeVA is a work-flow system deployed on NIC Cloud, MeghRaj which helps the Chair of the House to conduct the proceedings of the House smoothly, Hon'ble Members to carry out their duties in the House efficiently and to conduct Legislative Business of the House in a Paperless manner. NeVA is a device neutral and member centric application created to equip them to handle diverse House Business smartly by putting entire information regarding Hon'ble Governor's speech, Budget, Hon'ble Members contact details, Rules of Procedure, List of Business, Starred/Unstarred Questions and Replies, Papers Laid, Committee Reports, Demand for Grants, Bulletins, Bills, Notices, News, etc. in their hand-held devices/smart phones/tablets and equip all Legislatures/ Departments to handle it efficiently. Soon, NeVA will completely eliminate the process of sending out paper-based notice or request or receipt of Business data transforming the Legislation to a transparent system.

The Odisha Legislative Assembly has successfully implemented the Question and Reply module of NeVA, this implies that the lethargic process and papers involved in a traditional system have been eliminated and there has been a successful shift towards digitization making movement of data easier and faster. And it does not end here, with successful implementation of the Committee Reports Module of NeVA, all the Annual Activity Reports of the Departments, Corporation Reports, Papers Related to Committee Meetings, DRSC Reports, DMF Reports, C&AG Reports, PAC Reports, White Paper, etc. are now published by the respective officers of the Odisha Legislative Assembly on the NeVA website making it visible to the public. This has led to a significant drop in piling of the hard copies of these reports in the offices.

- **Accounts Automation System:** The Automated Pay Bill generation System is responsible for processing various Bills regarding Salaries, Deductions, Allowances and Advances of the Hon'ble Members, Hon'ble Speaker and Deputy Speaker of the Odisha Legislative Assembly. Traditionally, this data was maintained in bulky ledgers, making it tiresome to access data. This Project eliminates the bulky ledgers and registers maintained by the accounts branch and helps it by storing the data digitally making data accessibility easier and faster. It is a role-based system, which means different users will have different access to the database as assigned to them by the admin, thus ensuring data security. The project is deployed on intranet of Odisha Legislative Assembly.

- **Press Clipping Information System:** The Press Clipping Information System is a digital library of all the published news relating to the Assembly in various print media. The system stores the clippings categorically with respect to Departments, clipping indexes, keywords, etc. and provides various filtering and searching methods for ease of retrieval. The traditional systems involved registers with cuttings from newspapers because of which maintaining and accessing a particular clipping had become cumbersome and time consuming. On the other hand, with the implementation of this platform, now these clippings are maintained digitally and are accessed by the tip of one's finger seamlessly in no time.
- **Odisha Assembly Website:** The Odisha Assembly website is an informative site developed for officials of Assembly and public. The Odisha Assembly website collects information from 3 core modules running behind the curtain. These modules are Question Information System, Bill Information System and Member Information System. The Question Information System is used as the key module of the application for processing and maintaining the Session Questions digitally, those are asked by Hon'ble Members in the House. The Member Information System efficiently manages the details of the Hon'ble Members of Odisha Assembly since year 1937.
- **Digital Audio Recording System:** The Digital Audio Recording System is a service-oriented platform developed for use by the Hon'ble Members of House and the officials for preparing necessary documents such as House Proceedings during Sessions. With the implementation of this system, the recording information from the House is preserved efficiently with a periodic partition manner. These recordings are accessed by the Reporters to prepare the House Proceedings. This system drastically overcomes the use of a huge number of papers involved in the Legislature and the significant amount of stenographic efforts along with providing error-free access of information.

Hardware/Software

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

- **National e-Vidhan Application (NeVA) Production:** Web Server: IIS 10
 - o Programming Tools: ASP .Net Core 2.2, C# .NET Visual Studio 2012 with Framework 4.5, C# .NET Visual Studio 2017 with .Net Core 2.2
 - o Design Technologies: MVC 4.5, WPF, WCF, Entity Framework 6.0, Evo Pdf (html to pdf generations), itext sharp (for cutting pdf and merge), TFS (Team Foundation Server) for common development/Version Management and auto deployment, ASP .Net Signal R core for Chat communication, Voting, House display
 - o Web technologies: HTML 5, CSS 3, JavaScript, JQuery, Json, Bootstrap
 - o Database: MS SQL 2017
- **Mobile Application IOS:**
 - o Platform: iOS
 - o Neva iOS App current Version no: 1.0.2
 - o Neva iOS App current Version no in app store: 1.3.45

- o Technology used front-end: Ionic version 1
- o Technology used Back-end: WCF, using rest API's
- o Using MacBook pro: OS version 10.15.3
- o Development Tools used: Sublime text IDE, Xcode Version 11.3.1, Visual studio code.
- o Third-party software: Not used
- Mobile Application Android:
 - o Mobile Platform: Android 4.0+, androidx.appcompat: appcompat:1.0.0
 - o Java Platform: JDK 1.8 version
 - o Android studio version: 3.6.3
 - o Neva Android App current Version number: 1.0.4
 - o Neva Android App current Version on Play store: 1.0.3
 - o Technology using front end: core java
 - o Technology using Back end: using rest API's
 - o Development Tools used: ADT
 - o Third-party software: Not used
 - o Mode of Information Exchange: WCF technology, SMS Gateway Service, E-Mail Gateway Service
 - o Hosting: MeghRaj Cloud
- Accounts Automation System Production:
 - o Web Server: WSGI server
 - o Programming Language: Python
 - o Packages: python-docx, fillpdf, num2words, py2PDF
 - o Web Framework: Django
 - o Client-Side technologies: HTML 5, CSS 3, Bootstrap, JavaScript, JQuery
 - o Database: SQLite 3
 - o Storage Engine: sqlite3
 - o Development Tool:
 - o Management Console for DB: SQLite viewer
 - o IDE: Visual Studio Code
- Press Clipping Information System
 - o Production:
 - o Web Server: Ngnix
 - o Programming Language: JavaScript for both Client Side and Server Side
 - o Execution Engine: V8 JavaScript Execution Engine
 - o Run Time: Node JS Version 14.17.6
 - o Web Framework: Express 5.0
 - o View Engine: EJS (Embedded JavaScript)
 - o Client Side JavaScript F/W: Angular 12
 - o Others Client-Side technologies: HTML 5, CSS 3, Bootstrap, JavaScript

- o Database: MongoDB4.0.10
- o Storage Engine: WiredTiger
- o Development Tool:
- o Management Console for DB: MongoDB Compass
- o IDE: Visual Studio Code Community Version
- Odisha Assembly website Production:
 - o Web Server: IIS 7
 - o Programming Language: C#, VB
 - o Web Framework: Asp.Net 3.5-4.0
 - o Client-Side technologies: HTML, CSS, JavaScript, linq, JQuery
 - o Database: Microsoft Sql Server 2008/2012
 - o Storage Engine: InnoDB
- Digital Audio Recording System Production:
 - o Web Server: IIS 7
 - o Programming Language: C#, VB
 - o Web Framework: Asp.Net 3.5-4.0
 - o Client-Side technologies: HTML, CSS, JavaScript, linq, JQuery
 - o Database: Microsoft Sql Server 2008/2012
 - o Storage Engine: InnoDB

Certification (Certifying Agency)

Yes, odishaassembly.nic.in – audited by Cyber Security Division, NIC, Odisha.

Disaster Recovery and Service Continuity

NeVA is hosted on National Cloud - MeghRaj with mirroring at local Data Centre and maintenance, security and disaster recovery have been taken care of. The NeVA data and application has been hosted in Delhi based servers which have added features like Emergency backup Mirroring along with Disaster Recovery, which makes NeVA Application fail proof. The information maintained in Odisha Assembly website is backed up in National Data Center (NDC). The detailed schedules and storage location of backup for all systems in this project are mentioned below:

- Daily Backup for NeVA in local data center (NDC)
- Daily Backup for Odisha Assembly website in local Data Center (NDC)
- Daily Backup for Digital Audio Recording System in local server during House session
- Daily Backup for Question Information System in local server during House session
- Monthly Backup for Bill Information System in local server
- Daily Backup for Press Clipping information system in local server
- Monthly Backup for Accounts Automation System in local server.

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
		Till 2020-21
Question and Reply processed	Total number of Starred and Unstarred questions received	22,245
Bills introduced and became act	Total No. of Bills introduced and became act (since 1937)	1728
Members details maintained	Total No. of Members (since 1937)	2558 (Unique: 1482)
List of Businesses (LoBs) processed	Total No. of LoBs	551
Reports processed and published	Total No. of Reports: Annual activity reports of Departments and corporations, C&AG reports, PAC reports, DMF reports, DRSC reports, and White paper	175
Salary bills processed and generated	Total No. of Salary bills and schedules for Hon'ble Speaker, Hon'ble Deputy Speaker and Hon'ble Members	41
Notices	Total No. of Notices	437
Demands for Grants	Total No. of Demands for Grants	42
Papers Laid in House	Total No. of Papers Laid in House	115

Implementation

With the implementation of this project, several milestones have been achieved in different phases. The following functionalities of this project have been implemented successfully till date.

- Hon'ble Governor's speech, Budget, White paper, Bulletins, List of Business, Papers laid, Demands for Grants, News, Notice for 6th and 7th Session of 16th Assembly have been made available in NeVA website and mobile app.
- Questions and Replies for 7th Session of 16th Assembly were processed digitally in NeVA work flow framework and made available in NeVA website and mobile app.
- Questions of all sessions of 14th, 15th and present, i.e., 16th Assembly are processed digitally in Question Information System and are made available in Odisha Assembly website.
- The Digital Audio Recording System is live during the session and maintains all the recordings during the session which are used by respective officials for

preparing the House Proceedings.

- Accounts Automation System for Hon'ble Speaker, Hon'ble Deputy Speaker, Hon'ble Members have been successfully implemented. All bills from the month of May, 2021 upto the current month have been processed and generated. The bills include: Pay bill, FAT bill, Water bill, Telephone bill, Motor Vehicle advance, Professional Tax, and HRA.
- The Press Clipping Information System has been developed and deployed successfully.
- The House sessions during the Covid-19 period were conducted successfully through Video Conference (VC) virtually connecting the Hon'ble Members from remote district/regional head offices/centers. The no. of questions asked in year 2020 was less because of the discontinuity of House Sessions during Covid-19 pandemic.

However, this is not a full stop to the digitization movement. This evolutionary project is a continuous and un-ending march aiming towards transforming the Legislation into a digital system entirely through potential future enhancements.

Improvements / Enhancements

- The issues in the developed system and the requirements according to work flow of Odisha Legislative Assembly have been identified and documented regularly. These issues and requirements have been communicated to the development team with proper follow-up. The features have been incorporated in the Odisha instance of NeVA progressively.
- The different components of the Accounts Automation System have been optimized for performance tuning. The security features such as role-based login, authentication and authorization have been incorporated to ensure data security.
- The Keyword search and Filter-wise search of the Press Clipping Information System have been incorporated as per the requirements of the Research wing of Odisha Assembly. The security features such as role-based login, authentication and authorization have been incorporated to ensure data security.

ENABLER

Processes Re-engineered

“Re-engineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance such as cost, quality, service and speed.” - Michael Martin Hammer.

The existing system of law making process was not only expensive, but also time consuming. At present, all communications amongst various stakeholders is through pen and papers in physical mode. Hon'ble Members of Legislative Assemblies give notices for Questions in writing on papers. Similarly, Assembly Secretariats and various Departments of the State Government do communicate with each other through paper mail which is not only expensive but slow too. Similarly, citizens could bring their grievances to the notice of their public representative for its resolution in writing on paper only.

This digital initiative outlines the potential areas of computerization, making the State Legislatures paperless by electronic laying of all the papers on the table of the House,

design development and implementation of the standard Legislation work flows, connectivity to all the State Government Departments, Mail/ Internet empowerment and other network services to the State Legislature, ICT Service to the Members of the State Legislatures.

The objective of this digital legislation project is electronic laying or e-laying of reports/ documents in digital format on the Table of the House and flow of information electronically amongst all the stakeholders. It also provides data analysis, information processing and comparative studies of all the State Legislative Bodies, which ultimately lead to improved efficiency of our Legislature. With the implementation of this digital platform, entire communication system between Legislators and Secretariat, Secretariat and Departments of State Government, citizen and their representatives has been functional electronically.

The Mobile friendly Application (m-NeVA) facilitates Ministers/Members to get the entire House Business including replies to questions and papers to be laid in the House, 45 minutes before the beginning of the daily proceedings whereas Hon'ble Speaker will get the entire House Business as and when available.

Technologies

The implementation efficacy of a paperless/digital project significantly relies on the use of the underlying technologies. The implementation technologies must be quite good enough or cost effective enough to give most businesses a good return on investment (ROI). The latest technologies are unbelievably effective at reducing or eliminating papers in an organization and achieving significant employee productivity gains within a very short period of time.

This project uses latest technologies for efficiently and seamlessly running the

The latest technologies not only facilitate the users a flexible framework for sending requests and receiving replies but also provides a faster, efficient and secure means for enabling the transmission of Legislative businesses to the stakeholders and public.

Various effective communication technologies are in place for facilitating easy and faster movement of files/notices/requests between different entities of this Digital Legislation system.

The database and cloud management systems are adequately able to deal with synchronization and concurrent access of information. In addition, the local data centers, the cloud storages and the local database servers in Intranet maintain the backups of information flow in different components of the project periodically with predefined schedules. In catastrophic situations, these backups are restored as and when required.

More importantly, the core software systems of this project are installed and updated on high-speed computing servers. These systems are equipped with all necessary hardware and software components to facilitate the functioning of the software systems. The individual software systems are regularly monitored, upgraded and tested both in unit and in integration in order to overcome the vulnerabilities, issues and emerging security threats. The different versions and patches of the individual components are released time to time. The necessary security solutions are implemented in local servers, cloud storage, data centers and in the communication devices to ensure flow of critical information among the business entities in the Odisha Legislative Assembly system.

The latest technologies used for user interfaces, computing, communication and storage

purpose guarantee smooth functioning of the business processes making the project a successful benchmark for Digital India.

People

Capacity-building is defined as the process of developing and strengthening the skills, instincts, abilities, processes and resources that organizations and communities need to survive, adapt, and thrive in a fast-changing world. An essential ingredient in capacity-building is transformation that is generated and sustained over time from within; transformation of this kind goes beyond performing tasks to changing mindsets and attitudes.

As an initiative for introduction of the project, a two day workshop, for appraising the Nodal and other Officers from Odisha State Assembly to familiarize them with the features and functionalities of the NeVA application, was held on 15th Feb 2021 and 16th Feb 2021 in Conference Hall, Odisha Vidhan Soudha and Bhubaneswar. The Orientation Workshop included technical sessions and group discussions over 2 days facilitating exposure for the delegates about the positive attributes of NeVA.

In order to facilitate the training for potential users of this digital project, a special NeVA cell with trained professionals and experts have been prepared. To strengthen the project, training workshops were also conducted to train and familiarize the officials of the concerned sections of Odisha State Assembly with this application. In continuation to the earlier capacity building measures extensive training workshops were also conducted at NeVA cell, wherein a team of officers and the staff from the different Departments of Government of Odisha were subjected to rigorous hands on training cum practical session. The officials participated in the session with great enthusiasm and showed much inquisitiveness in learning about the core functionality of the application.

As the officials of the Legislation bodies are the key users of this digital project, all possible methodologies are followed to make them familiar with the use of the systems. The training sessions are arranged in a regular manner and adequate supports are given during the real-time work flow of the Legislation processes.

VALUE INDICATORS

Learning's for sharing

“Every challenge you face today makes you stronger tomorrow. The challenge of life is intended to make you better, not bitter.” — Roy T. Bennett, *The Light in the Heart*

Since implementation of an entirely new system requires special structure, it's important for the implementation authorities or project coordinators to clearly understand how to properly run this type of workplace. It is essential to create a structured workplace that lets everyone work together cohesively. However, the project implementers face many challenges in putting the ball in court. But these challenges create learning opportunities that form the basis for building an efficient implementation system provided appropriate measures are taken with tactful actions.

With the tradition, this project also doesn't deviate from the myth of facing challenges during development and implementation. Several challenges were and still are being faced while taking the steps for transforming the entire lethargic paper-based Legislature into a complete paperless system. Understanding the underlying business workflows of the Odisha Legislative Assembly was the primary challenge as many complicated tasks comprise the whole system.

With proper documentation, the different activities and process flows of the state legislature entities are maintained along with the interaction among them.

Then, choosing the right technologies for development of the software systems for realizing the business processes was an ever-challenging task. With rigorous system studies from web resources, the necessary open-source technologies were chosen for design and coding purpose. The system requirements are gathered and documented with proper designs, notations and use cases. Effective Integrated Development Editors are used for better coding of the software components. Once the systems are developed it was a very challenging phase to create the real-time test cases with all necessary test parameters. In interaction with the potential users of the systems, appropriate test cases are prepared and the systems are tested in a phased manner both in unit and in integration. Then, the software systems are deployed in servers or cloud installing all dependencies and security solutions for smooth functioning of the modules.

Compared to the development and deployment of the software components in Odisha Legislative Assembly, to build up the people for using the system, it was even a greater challenge, as many of them are non-technical in profession. A solid foundation of training and task management is provided with technical experts to make the users familiar with the digital systems and making them feel to enjoy the freedoms of working conveniently with a flexible team.

Last, but not the least, like any other organization, the Assembly workflows are prone to dynamic changes, such as conducting House Sessions during Covid pandemic or addition of new business entities as per future requirements. These dynamic changes impose many challenges in implementing the new features to the existing digital project. With appropriate measures and flexibility, the scope for scalability of this project is expanded to incorporate the real-time dynamic changes.

Digital Empowerment

Objective of this project is to provide e-Governance solution for Legislative Assemblies to automate the process involved in working of Houses and managing constituencies by respective MLAs. The project also aims at to assist the Members of the State Legislatures to use the latest Information and Communication Technology (ICT) tools for preparing themselves for participation in the legislative debates and law making process and empower them to handle it smartly and efficiently through handheld devices.

Aim of this project is Delivery of public services (information dissemination) through the public portals to ensure reliability, efficiency, transparency and accountability of the Members of the State Legislatures and other State Government functionaries, which will enhance Strong electronic bonding between the citizen and their elected representatives and would ultimately, strengthen grievances redressal mechanism. The implementation of a single uniform NeVA solution in State Assembly has ensured sharing of information and seamless interoperability of data, which would strengthen our federal structure and ultimately further deepen the existing deep roots of democracy.

Implementation of this project in the State Legislature would on the one hand save on entire legislative exercise but expedite it also on the other hand, which would benefit the citizen and State. All the stakeholders including all the Departments of State Governments, Assembly Secretariats, Legislators, Citizen will benefit from the project.

Green e-Governance

This digital initiative is in line with the “Go Green” initiative and “Swachh Bharat Mission” of the Government of India. This will have long term impact on the

environment as several thousands of tons of papers will be saved, thus saving of lakhs of trees annually and by making the working of Legislature paperless, it will bring necessary transparency and cleanliness in Government Departments and Assembly Secretariats.

The process involved in working of House includes notices for Questions, Replies to the Questions, List of business (LoB), Text of Bills for introduction, consideration and passing, Text of all papers laid, Proceedings of the House, Synopsis of proceedings, Various reports (like Annual activity reports, DRSC Reports, C&AG Reports, PAC reports, White Paper and other Committee Reports) to be laid in House, Annual Budget and Supplementary Budget, which will have annual consumption of papers in the tune of Crores, which is equivalent to lakh of Trees.

Sr. No.	Published Report	No. of Publication	Approx. No. of Pages in each report	No. of Copies	Approx. No. of Papers Saved
1	Annual Activity Report	38	100	200	7,60,000
2	DRSC Report	40	100	200	8,00,000
3	C&AG Report	59	120	200	1,416,000
4	PAC Report	8	20	200	32,000
5	White Paper Report	1	53	200	10,600
6	Other Committee (DMF) Reports	29	100	200	5,80,000
Approx. Total Number of Papers Saved					35,98,000

The above table shows the number of reports processed and published in this digital platform with approximate number of papers used for them in a particular year 2020-21. This figure even grows much larger if all other paper-based Legislation business documents such as Budget, notices, LoBs, Member details, Papers laid, Bills, Demands for Grants, etc. are considered. It is noticeable that the production of this huge number of papers needs cutting down massive number of trees. This in turn, adversely affects our livelihood deeply by destroying the environment.

In addition, the implementation of this contactless mode of information transmission undeniably wards off the possibility of potential infections such as Covid-19 contaminations. On the other hand, the save of crores of rupees can add up to the economic development of the State, which can provide better Education and Health facility to the citizen.

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Online Performance Appraisal of Officers in MP State Health Service Using SPARROW

Department of Public Health & Family Welfare, Government of Madhya Pradesh & National Informatics Centre Madhya Pradesh State Centre

Mohammad Suleman, Sapna M Lovanshi and Sucheta Kak

PROJECT OVERVIEW

Description

SPARROW is a web-based software application to automate the processing of Annual Performance Appraisal Reports (APARs) of government employees. It is a sub-module of e-Office Mission Mode Project and facilitates online filing of Immovable Property Return (IPR) as well.

Objective

The aim of this system is to facilitate the electronic filling of PAR by officers in a way that is not only user friendly but also allows to fill from anywhere anytime as per their convenience. Similar convenience is also available to the officers at different Stages in the PAR workflow hierarchy. The system is also expected to reduce delays in submission of completely filled PARs.

Scope (Functional & Geographical)

This G2E e-Governance solution has been rolled out for about 4000 geographically disparate Medical officers (Class I and Class II) of MP State Health Service posted across all 7 Divisions, 52 district, 412 tehsils, 313 blocks, 54,903 villages of the state.

Key Stakeholders

General Administration Department (Govt. of MP), NIC (State unit & district centres), Officers posted in various Public Health facilities like Primary Health Centres (PHC), District Hospitals (DH), Divisional & State Offices, Training Centres, Gazette section of DHS, District Magistrates, Director (DHS), Health Commissioner (DHS) and Additional Chief Secretary (ACS) Public Health & Family Welfare Dept.

Intended benefits

- Comprehensive performance appraisal dossier(year-wise) is maintained for each officer of the Service which can be accessed anytime
- The recording and movement of PAR forms becomes quick and convenient.
- Inbuilt alert mechanisms through different modes are generated at appropriate Stages of PAR processing.
- The system provides status check so that the officers know where their PARs are pending.
- They are also notified in case any PARs are pending with them Problem of missing PARs & their untimely submission has been eradicated.
- Management of security and access rights as per organizational hierarchy /work-allocation ensured.
- Quick and correct decision making by government/management, especially for DPCs
- Optimum utilization of human resources
- Ensuring data security and integrity through transaction audit trails and

electronic/digital signatures.

Current Status

For the Assessment Year 2019-2020, 3892 PARs were generated for 3847 officers, out of which 3160 have been completed and closed successfully.

Hardware/Software

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

- Hosting environment: Virtualization mode using VMware
- Application Development framework: Java and PHP
- Web Server: Apache HTTPD
- Application Server: Apache Tomcat
- Operating System: Linux, Cent-OS 3.2.6: Database: PostgreSQL
- Services integrated: eSign, LDAP, Relay/SMS, CRL.

Certification (Certifying Agency)

- Infrastructure Audit: SPARROW application for Directorate Health Service has been deployed in collocation as well as co-hosting environment at State Data Centre, Bhopal, where security audit of DC is being regularly carried out each year (latest audit through KPMG).
- Application Audit: Each application/module of e-Office Product suite is also Security Audited at regular intervals. Latest audit done through M/s Secure Eyes.

Disaster Recovery and Service Continuity

Yes, Disaster Recovery (DR) setup under progress at NDC Bhubaneshwar.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes:

Name of e-Services	Brief service description with benefits	Volume (Nos) of Service year wise	
		2018-19	2019-20
Email account creation	For LDAP authentication into the SPARROW application.	3847	2153
Online trainings	Capacity building for application Administrators as well as end users	2127	-
Personnel Information Management System (PIMS)	For entering SPARROW on boarding employee details.	3847	-
Helpdesk (email, telephone, any desk)	For Technical Support and resolution of operational issues.	4320	2880

Workflow creation & PAR generation		3847	2172
PAR closure		3160	-

Implementation

Sr. No.	Target	Achievement
1	Administrative approval from Health Commissioner	Received approval from Health Commissioner February 2020
2	Sharing PAR physical formats with NIC to begin development process	February 2020
3	Creation of name-based govt. email accounts for all on boarding Users	3847 email accounts created successfully
4	Sensitization trainings through VC	2 sensitization training for Chief Medical Health Officer (CMHO) via video conferencing by senior leadership (Health Commissioner) of the department April & June 2020
5	Data gathering and verification	February 2020
6	Assignment of application authorization roles	February 2020
7	PIMS entries	April 2020
8	Deployment of application at SDC for User Acceptance Testing (UAT)	December 2020
9	Application Deployment in Production server	December 2020
10	Creation of PAR Workflows	December 2020
11	Preparation of User Manual (in Hindi)	December 2020
12	Online Training for all onboarding users – (Division-wise)	Approximately trained (Virtual) 2127 end users in multiple batches.
13	PAR generation	December 2020

Improvements / Enhancements

- Improvement/Enhancements during the last year--Integration of NRC (leave, training) forms.
- Improvement/Enhancements planned for Next year--Rollout for NG and Integration of online IPR (Immovable Property return).

ENABLER

Processes Re-engineered

- Standard data collection templates circulated to all the concerned for uniformity.
- PAR workflow channel standardized as per rule
- ACR channel rules uploaded on website for easy/online access and ensuring clarity. These rules were earlier available in physical format only
- Access to PAR is secure and at ease.
- Absence from duty reflected in ACR.

Technologies

- Unicode compliance
- DSC-enabled and eSign-enabled
- LDAP based authentication
- Role based access/authorization
- Data visualization via Dashboard & name wise tracking of PAR status.

People

Capacity Building: Massive online trainings have been held on multiple occasions across all levels of officials/officers at State Level as well as at the District Level.

Leadership Support: Passion-driven initiative and continuous follow-up by Ms. Sapna Lovanshi, Additional Director at DHS, PHFW.

Management of Change: Resistance to change experienced at all level of implementation and stakeholder where not in belief that paperless appraisal is possible within the Government system. PMU overcame this resistance by explaining the benefits to multiple stakeholders through virtual meetings during COVID pandemic, established 24X7 Helpdesk support at DHS Bhopal and NIC district offices for one-to-one discussion & quick resolution of issues.

VALUE INDICATORS

Learning's for sharing

- Framing implementation strategy/plan with set timelines from pre-rollout to go-live stage and further sustenance
- Hiring separate manpower to act as project implementation facilitator
- Ensuring Project ownership with end-to-end monitoring
- Continuous trainings imparted to remote users with reduced access to computers and limited IT awareness
- Establishment of 24X7 helpdesk support via email, telephone, remote access
- Availability of user-manual/handouts in local language

Digital Empowerment

Being Unicode compliant, SPARROW facilitates working in local language. This enhances easy on boarding by end-users and makes adaptability/change-management easy.

Green e-Governance

Paperless PAR generation has considerably 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 storage-cabinets, office-spaces etc.

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Public Service Commission Software for Transformation - PSC SoFT

*Himachal Pradesh Public Service Commission & National Informatics Centre
Himachal Pradesh State Centre*

D. K. Rattan, Ajay Singh Chahal and Sanjay Sharma

PROJECT OVERVIEW

Objective

The objective of PSC SoFT is to provide a comprehensive and integrated online ICT solution for the core functions of the State Public Service Commission (PSC), with configurable business processes, workflow, formats, messages, language and interactions with stakeholders. The stakeholders include the PSC Administrative and IT officials, State Administrative Departments, Applicants and Citizens. The solution aims to provide transparent, accountable and trustworthy services in selection of right candidates for the right positions and serves as a decision support system for the PSC Management and Authorities

Scope (Functional & Geographical)

The functional scope includes multiple software modules, which are, Departmental Requisition, Direct Recruitment, Promotional Recruitment, Recruitment/Promotion Rule, Help Desk and CMS website. The geographical scope is hosting of the PSC SoFT at Himachal Pradesh State Data Centre for implementation in HP PSC and available to stakeholders and applicants all over India for recruitment in Himachal Pradesh Government. The application is being offered as productized software to all other Commissions in country and multiple demonstrations and interactions have been held with almost Commissions of country to take forward the replication process.

Key Stakeholders

Stakeholders of the software and this eco system are:

- PSC Authorities/Officers/Officials,
- Government Departmental Officers,
- Applicants/Candidates/Citizens and
- Examination Centres Staff
- State Public Commissions for other States in India.

Intended benefits

- Reduced departmental requisition processing time for vacancies and other matters.
- Reduced candidate selection time for vacancies.
- Bilingual interface with local language support.
- Efficient, transparent, accountable, secure paperless operations.
- Cost reduction and Technology standardization.
- Configurable and customizable processes, workflow and formats for every document.
- Configurable final selection procedure based on reservations of all kinds.

- One time registration (OTR) of candidates with single dashboard for all their requirements.
- Online helpdesk module, integrated with the OTR system.
- Application Submission in minimum time as per eligibility of registered candidates.
- User friendly and Simple Interface for Applicants.
- Integrated, single source of data collection.
- Covers major functions of the Commission including end-to-end examination processing.
- Maximizes benefits to applicants/citizens and Government.

Current Status

The PSC SoFT has been implemented in HP PSC since June 2020 and 97 thousand applicants/candidates have registered and created their profile along with documents uploaded and 61thousands recruitment applications received for various vacancies advertisements and 86 departmental requisitions are in process, out of which process for 19 requisitions/recruitments are completed.

Hardware/Software

- HW: Three web servers with load balancer set up and one database server with always on feature. SW: Windows OS, MS SQL Server 2017.
- MW: IIS web server, dot-Net MVC framework, High-charts.
- Third party tools: SMS/ Email/ Payment gateway.

Certification (Certifying Agency)

Yes, the software system along with integrated software/gateway components has been cyber security audited in March 2020 by CERT-IN empanelled vendor AAA Technologies Pvt. Ltd. The software is based on the Enterprise Architecture Framework and has won the Open Group Award also for the same.

Disaster Recovery and Service Continuity

PSC SoFT has been hosted at robust and reliable IT infrastructure set up at State Data Centre, Himachal Pradesh at Shimla with disaster recovery (DR) set up for services continuity/availability, so that software and eco system is capable to stay online in case of disruption of any kind such as power outage, natural disaster, cyber-attack etcetera at primary location/data-center. The infrastructure is scalable and can be scaled up or scaled down as per user/client load on the application, making optimum use of ICT resources required at any point of time. The business and service continuity plan are in place to mitigate any risk arising out of any odd situation and ensuring service availability 24x7 to all stakeholders/citizens.

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

Candidate /Applicant One Time Registration	Applicants to register/ create-profile and upload documents once, if required may update. Avoids last date/movement panic/ mistakes.	Nil	Nil	124698
Applicant Applying for Post /Vacancy	Applying for post/ vacancy is instant, as steps are only choosing Post and paying Fee which avoids last date rush/ load/ processing.	Nil	Nil	58463
Requisition by Department	Requisition submission/ status/ recommendation available online.	Nil	Nil	160
Applicant Attendance at Exam Center	Decentralization attendance reduces process time.	Nil	Nil	8821
Help Desk	For addressing Applicant/ Citizen queries.	Nil	Nil	Total 6709 Resolved 6135

Implementation

The PSC SoFT has been hosted at HP State Data Centre and has been implemented in Himachal Pradesh Public Service Commission to its full extent of 100% and covers access/ availability to all stakeholders 24x7.

Improvements / Enhancements

After post rollout of PSC SoFT in June 2020, some enhancements are suggested by HP PSC after March 2021 by gaining experience and knowledge of post implementation scenarios; these are also done in the software system. Some of these are rolling back Requisition flow after final approval, changing examination center after issuing of Admit Card, Updating applicant documents/information after last date of applying. Many options are being added in software.

The PSC-SoFT has the potential for replication in other State Public Service Commission, by hosting it locally in the Government data center. Most of the business processes and functions are configurable and hence replication will not take much time. A demo site is created for the desiring Commissions so that they may get to know the various functionalities of this software.

ENABLER

Processes Re-engineered

The process re-engineering has been done for various process and sub process during the design and development of PSC SoFT. All processes and sub processes were automated and the following processes were simplified/ standardized as outcome of process re-engineering.

- Requisition Processing Flow Management

- Examination Types and Stages Configuration and Management
- One Time Registration option for candidates
- Online Help Desk
- Departmental Promotions Process Management
- Recruitment and Promotion Rules Process Management.

Technologies

PSC SoFT is based on Enterprise Architecture framework which provides a strategic context for efficient business operations and development and evolution of IT systems in response to constantly changing needs of business processes environment. Therefore, Public Service Commission Enterprise Architecture Framework (PSC EAF) has been designed and developed before design and development of PSC SoFT. The PSC EAF enabled opportunity to understand, optimize and re-engineer workflow and processes of the State Public Service Commission from holistic organizational view to end users from a fragmented legacy of processes (manual & automated) into an integrated, holistic and complete environment. The PSC EAF has been designed and developed using IndEA Framework, as IndEA is the Government of India Enterprise Architecture Framework for adoption by Government Organizations in India.

People

Capacity Building

Capacity building of all stakeholders has been done before and during the rollout of PSC SoFT. The HP PSC officers and employees were trained in various sessions. Similarly, all Departmental employees with reference to Departmental Requisitions were trained in separate training sessions. The staffs of various examination centers are trained with respect to attendance of candidates/ applicants appearing in the examinations as and when new examination center is allocated/ assigned for some examination/ test. For Applicants a short video has been prepared for one time registration (OTR) and Applying for a Post/ Vacancy advertisement and Help Desk module is available in the software system for addressing/ resolving their queries/ doubts. And standard and highly user friendly and easy to use and navigate user interface has been designed, so that applicant can use the software system very easily.

VALUE INDICATORS

Learning for sharing

At conceptualization and project proposal stage, the objective was to design and develop the software system. But during the system study and analysis stage it was thought that before design and development of the software system, the enterprise architecture should be developed to have holistic view of the proposed system and guidelines for future sustainability of the software and complete eco system. So, this innovative idea was agreed upon and enterprise architecture framework was designed and developed before proceeding to software system design and development. The PSC EAF was designed and developed which in turn mitigated the challenges which might have cropped up during other phases of the software life cycle like planning, analysis, design, development, capacity building, and rollout implementation etcetera. Another learning is that Commissions have a tendency to carry out modifications in recruitment process and are used to carrying out database-based changes at different stages after completion of preceding processes. Therefore, providing a software-based system is another learning.

Challenge is mainly training the employees in complete switchover from paper-based system to paperless system.

Digital Empowerment

The e-Governance initiative PSC SoFT is not a system where all beneficiaries of any Government scheme to be included mandatorily in spite various barriers in the society and system. But even then, the PSC SoFT have above features/functions because it has been designed and developed as configurable software system for various process flows and parameters. And can be configured for local language support for all stakeholders and applicants. Similarly, can be configured for amount of fee to be charged to various categories of applicants and can be zero as decided by the PSC authorities or State Government. Therefore, both financial inclusion and local language configurable features are available in PSC SoFT to enable digital empowerment to all stakeholders. HP PSC allows fee exemption for female candidates and candidates from specific categories. Candidates can get their forms filled through Common Service Centers also in case they have any issue of not having IT means to register/ apply for various posts.

Green e-Governance

The online software system instance of PSC SoFT has been hosted at State Data Centre by HP PSC and available to all stakeholders using internet connectivity at their local end. At Data Center level, all green computing practices are being followed with respect to use and disposal of ICT infrastructure equipment's and components, as per guidelines of Government/ Regulatory Body. And in this eco system stakeholders are not in control of HP PSC, therefore they must be following green computing practices as per guidelines from Government and Regulatory Bodies pertaining to their geographical limits with respect to ICT gadgets and hardware components. The entire solution is paper-less, with uploading of scanned copies of supporting documents/certificates in place of photocopies which also directly helps in Green e-Governance.

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Sandes (Government Instant Messaging System)

National Informatics Centre, New Delhi

Deepak Chandra Misra and Sapna Kapoor

PROJECT OVERVIEW

Objective

Sandes is developed for providing an indigenous instant messaging platform to facilitate communication for Government officials and citizens. Sandes is hosted on Government infrastructure, thereby making it a secure platform with the Government having strategic control of the platform. Sandes can be used by Govt. entities which include Central Govt., State Govt., Urban bodies, PSUs, as well as Judiciary for instant messaging and it is also available for the public.

Scope (Functional & Geographical)

Sandes platform consists of 4 major components:

- Sandes App offers various features essential in an instant messaging platform such as self-registration of user, instant communication using messages and files as well as group chatting. It also provides options for Audio/Video calling and conference facility, profile and contact management, Phonebook Sync, recording audio message, delete for all, view pinned messages, deleting media in chat. Special tags like marking messages as Priority, Confidential, option for auto disappearing messages etc. are also available. It offers configurable options for enabling Dark Mode, Display/hide read receipt, Display/hide user status, Run App in background for notifications, Media auto-download, Show phone book contact names, Automated backup etc. Sandes also provides chatbot enabled help, security related configurations and dashboard display. Sandes provides user the option to link their profile on Sandes to Aadhaar.
- The Sandes portal provides features for administration and monitoring of Sandes platform such as Organization management, Organization unit (OU) management, role management, official group creation and management, designation management, member management including user on-boarding and verification, broadcasting (filter users on designation, location, department etc.) , filtering, searching, real time dashboard, Sandes Web etc. Each organization has its own nodal officer who is responsible for onboarding users of their organization as well as management and verification of employees of their organization.
- Sandes messaging gateway allows integration with existing eGov applications to push messages to the targeted users through Sandes platform at no cost. It has facility to deliver fully secured End-to-end encrypted OTP and messages. It enables Confidential Messaging as a Service (CMaaS).
- Sandes Web enables users to access the features of application on desktop/laptop. Sandes facilitates communication in any language, thus enabling its usage pan India..

Key Stakeholders

- Developing agency: NIC, Monitoring and Administration: MeitY, Users- Government officials (belonging to Central Govt./State Govt./Urban Bodies/ PSUs, Judiciary) and citizens

Intended benefits

Sandes is available for Government officials and citizens for instant messaging. The strategic control of Sandes lies with the Government of India and is governed by the Privacy Policy and data retention policy as per Govt. requirements. All communication through Sandes is end-to-end encrypted including messages, files and audio-video calls. Moreover, it offers encryption of backup and data at rest. Provision to broadcast a message in any language, attach a file along with the message and send to selected users based on parameters such as their location, designation etc. has been provided on the Sandes portal.

Sandes has been integrated with various eGov applications thus providing a secure, tractable and no cost alternative to SMS for OTP, alerts, notifications and broadcasts. Service Delivery option introduced in Sandes enables two-way communication between Govt. and public.

Current Status

180 organisations from various Ministries are using Sandes platform. On the Sandes Platform, over 9.8 lakh registered users (including public) have exchanged 3.7 cr messages so far. Furthermore, over 80 eGov applications have been integrated with Sandes thus providing option for sending messages, alerts, OTP from these external applications at no cost.

Hardware/Software

Mobile Technology: Native Android with Java for Android and Swift5 with Objective C for iOS.

Software Stack:

- Ejabberd: XMPP server for Instant Messaging and component services.
- Mnesia
- Golang
- PHP Symfony and Nginx
- AngularJS and Web Sockets
- STUN/TURN Server and WebRTC for Audio/Video calls
- PostgreSQL
- Redis Cluster deployed for caching and live configuration
- J2EE web services and Apache Tomcat
- ELK for aggregation and analysis of logs
- HAProxy
- MCU based group audio-video calls

Certification (Certifying Agency)

Security Audit of Sandes has been conducted by Cyber Information Research Agency (CIRA), IIT Chennai and Defence Cyber Agency (DCA).

In addition to the above, the comprehensive security audit of Sandes is being done by the internal security audit division called as NIC Application Security Audit and Assessment Division on regular basis. Conducting audit of security is a continuous activity which is followed by security audit by the competent Government agencies.

Disaster Recovery and Service Continuity

Presently Sandes is primarily hosted at NDC Shastri Park Data Centre (DC) with its Disaster Recover (DR) site at Bhubaneswar. DR is in real-time sync with DC having manual failover. For Business continuity, multiple nodes at primary site (DC) have been set up for every component with automatic failover, so that, there's no single point of failure in the production architecture. However, in order to handle the scenario of shut down of services of entire data centre, mechanism of real time cross data centre replication of all components is in place at DR location (NDC Bhubaneswar), which can be manually triggered to take over all the components of Sandes.

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
Instant messaging	One to one chatting and group chatting amongst users	16 lakh	1.21 cr	2.33 cr
Audio/Video calling and conference	Enables users to audio/video call multiple users through conference facility	NA	16.9 K	1.06 lakh
File sharing	Users can share any files/images/contacts/ Audio/video one-to-one with their contacts or in group	23.8K	42.55 K	4.48 lakh
Chatbot requests	Users may send any request on chatbot for information on aspects such as weather or to view dashboards	NA	20.4 K	2.57 lakh
Group Creation	Provision to create official, informal and list groups from portal and app	491	1440	5202
eGov Applications Integration	Integration with eGov applications enables the platform to send messages/alerts to selected users at no cost	9	19	55
eGov Application Messaging	Integration with eGov applications enables the platform to send messages/alerts to selected users at no cost	2.44 lakh	18.63 lakh	30.13 lakh

Sandes (Government Instant Messaging System)

Organisations onboarded	Any Govt. organisation can be onboarded on the platform. Then, organisations will have access to various functionalities of portal like onboarding users, creating official group, verifying users etc.	17	73	90
Message Broadcast	Facility to broadcast message in any language, share files to users from the portal. There is also an option to filter on designation, location etc. while selecting target users broadcasting a message	37 K	3.13 lakh	19.64 lakh
Users Registered	Users have option to self-register on the platform through their mobile number. Organisations can also onboard users belonging to their respective Organisation	3.2K	65.4K	9.13 lakh
Integration	Integration of Sandes with NIC email, Collab Files Lok Samvaad and Digilocker enables to exchange data with these platforms from within the App.	NA	NA	NA

Implementation

Sandes has been made available on Google Play Store and Apple App Store for Government and public.

Ministries: Major Ministries on Sandes platform are Ministry of Power, Ministry of Defence (MoD), Ministry of Communications, Ministry of Electronics and Information Technology (MeitY), Ministry of Jal Shakti (MoJS), Ministry of Rural Development (MoRD), Ministry of Home Affairs (MHA), Ministry of External Affairs (MEA), Ministry of Finance (MOF) etc.

Organisations: Over 180 organizations including Niti Ayog, BSF, CBI, Department of Posts (DOP), PESB (Public Enterprise, Selection Board), National Police Academy, Indian Railways, Indian Navy, Indian Army, National Security Council Secretariat (NSCS), IB, CRPF, NSG, DRDO, DDW&S, Gujarat Police and many State Govt. departments are using Sandes

Users: Currently, there are over 9.8 lakh registered users who have exchanged 3.7 cr messages so far.

States: Over 16 States have been onboarded on Sandes platform which include Kerala,

Gujarat, Haryana, Rajasthan and Uttar Pradesh etc.

Judiciary: All High Courts have been onboarded and all judges and judicial officers under the purview of these HCs are on Sandes platform.

eGov applications: Furthermore, over 80 eGov applications have been integrated with Sandes such as eOffice, NICemail, PFMS, Narega Soft, Jeevan Pramaan, eCourts, eTaal, e-way Bill, PDS, NSP, JEECUP e-Counselling etc. These facilitate pushing messages, alerts, OTP to targeted users through Sandes platform at no cost.

CSC and other beneficiaries: Common Service Centers (CSC) have been onboarded on Sandes platform. Broadcasting of messages to Swachhagrahis and beneficiaries of Har Ghar Jal Yojana is also enabled through Sandes platform. 24*7 support desk service has been made available at toll free number for resolving issues/queries and gathering feedback, suggestions.

Improvements / Enhancements

- Audio/video conference facility
- Finger and biometric of locking Sandes App.
- Sandes introduced features to increase flexibility for users by providing configurable options such as:
 - o Dark Mode
 - o Display/hide read receipt
 - o Display/hide user status
 - o Run App in background for notifications
 - o Media auto-download
 - o Show phone book contact names
 - o Automated backup.
- Sandes Web was provisioned for accessing features on desktop/laptop.
- Option for service delivery introduced to facilitate 2-way communication with users for various schemes such as MGNREGA.
- Option for remote wipe-out and remote backup.

Proposed enhancements in next year: Enhanced AI based chatbot, desktop version, UI/UX improvement, integration with external applications (other than eGov) are some of the major milestones in the future roadmap. The Sandes Team is also working on scalability of the system to handle the envisaged load. It is proposed to migrate entire infrastructure to Kubernetes for auto-scalability.

ENABLER

Processes Re-engineered

- Sandes enables Government communication on a secure indigenous platform with specially designed emojis and tags.
- The Privacy Policy and data retention policy of Sandes has been designed as per Govt. requirements.
- Currently, SMS and e-Mail are delivery channels for communication and information dissemination. However, there is a cost involved while sending SMS to users. Sandes is developed with an objective of providing a delivery channel

which has no cost and effectively tracks delivery of messages.

- Sandes has been integrated with eGov applications which enables sending G2C messages, alerts, and notifications at no cost to the selected target users. This helps in information dissemination and improving the inclusiveness of all citizens.
- SMS which was earlier in plain text has now been end-to-end encrypted using Sandes platform.

Option has been introduced to facilitate 2-way communication for service delivery for users who maybe beneficiaries of schemes such as MGNREGA etc. Various means of accepting requests for different Govt. services can be brought on Sandes to enable a single window solution for all Govt. services in future.

Technologies

- Open source-based technologies have been used in Sandes with indigenous development and deployment
- End-to-End encryption: All messages and files shared are end-to-end encrypted wherein only sender and receiver can view the message/file and no third party including the Sandes application can read/have access to actual message/file content. This ensures that the communication is secure, and the privacy of the users is maintained. The end-to-end encryption solution is completely indigenous and IPR has been acquired for the same.
- Honeytrap: Honeytrap has been inbuilt on Sandes platform to identify potential sources and eventually mitigate the risk of any malicious activities.
- Chatbot: Users may send any request on Sandes chatbot for seeking any general information or to view dashboards.
- Dashboard: Sandes dashboard helps provide real time statistics and identify trends for usage of Sandes in terms of message activity, active users, registration on app, top and bottom performers etc. both on daily as well monthly basis. These help to derive insights in user behaviour, thereby providing background to identify most sought for features and functionalities to be enhanced accordingly.
- All messages and files shared are end-to-end encrypted. Access and error logs are analyzed using ELK.
- ejabberd XMPP server has been used which provides Instant Messaging and component services. Redis cluster is deployed for caching and live configuration.
- WebRTC has been used for Audio/Video calls in Sandes..

People

Teams for planning, requirement gathering, development, testing, implementation, security and infrastructure design, roll out/ promotion have been deployed. A governance structure for management and escalation is well in place for these teams.

The team composition includes skilled resources from varied domains in different divisions (apart from Sandes division) such as Mobile Application Competency Centre, Application Security division, Network and Infrastructure division etc. who provide key inputs on regular basis. Data centre team for handling the project operations has been deployed.

Sandes feedback mechanism is designed in a holistic manner so as to cover feedback from different channels such as email, service desk as well as feedback list group on

App. A Feedback evaluation team has been deployed which analyses all the feedback received through 3 channels (detailed below) and provides suitable response.

- A 24*7 toll free number 1800111555 has been provided for users to record their feedback, suggestions, queries and issues. Users may also visit the service desk website <https://servicedesk.nic.in>.
- Email support has also been also provided to users at support-sandes@nic.in.
- Users may submit their feedback on the feedback list group provided on Sandes App.

POC is conducted for various departments (both intra department and across departments in Govt. organizations) to gather feedback for the Sandes platform. Beta testers provide valuable insight in terms of identifying issues, evaluating performance of application on different devices, versions of Android/iOS. This is collated, finalized and shared with the development team as part of the feedback mechanism. Based on the feedback collected, change management process is initiated for enhancements of features or introduction of new functionality in the platform.

Training sessions are regularly conducted for the help desk personnel with an objective to train them so that they can respond to any query/complaint raised at the toll-free number/service desk email.

VALUE INDICATORS

Learnings for sharing

- Sandes platform has been designed and developed after conducting comprehensive surveys of available products, assessment of their capabilities as well as understanding the requirements of Govt. and public for a secure instant messaging system.
- Sandes platform has a modular architecture, wherein, every single feature of the App is customizable using roles by complying with organization policies. The backend architecture adheres to the microservice architecture that is container ready. Sandes focusses on delivering a cross product of features from popular instant messaging platforms and requirements based on Government communication policies.
- The development and deployment of indigenous End-to-End encryption solution for messages and files in Sandes was a technically challenging and intensive task which required various rounds of deliberations and extensive research by the competent team members. Sandes team has applied for IPR for the developed E2EE solution.
- Use of Redis for caching of instant response from server for user registration, contacts, group management, scheduled jobs, email routing etc. in instant messaging.
- Messaging gateway using micro services allows external eGov applications to push messages to Sandes users.
- The API micro services are created to provide REST based services for user registration, contacts, group management, scheduled jobs, email routing etc.
- STUN and TURN protocols are implemented for Audio/video call & conferencing services. Dedicated media server is configured to handle encoding compression and streaming of video data for the group video conferencing.

- Various modules are analyzed to identify bottlenecks and are re-engineered to make them more efficient. For example, end to end encryption is optimized for group communication.
- Feedback on Sandes received from different channels namely support email, feedback group and feedback from onboarded organizations are regularly compiled and implemented to improve the product. Feedback and inputs from organizations participating in POC are incorporated and fine tuning of the system is done to address the performance issues.
- Some security features have also been enhanced. A service for ease of integration with existing applications has been deployed. To cater to large user base, provisioning of Data Centre exclusively for Sandes has been undertaken.
- While deciding the team structures for performing various activities pertaining to Sandes, the composition of the testing team has been done with the view to cover maximum possible mobile devices of different types as well as varied flavours of Android and iOS. Adequate care has been taken to select beta testers situated across various locations pan India wherein network operators and bandwidth availability may differ. A pre-release staging environment which is a replica of the production environment has been created.
- Git is used to maintain version control and configuration information for each update in Sandes application. The source code is uploaded to multiple Git repositories that are centrally managed with secure access control.

Digital Empowerment

Sandes is an initiative for Atma Nirbhar Bharat under the Digital India Programme. In today's era of Mobile First approach, Sandes empowers all users to communicate in a secured way through this indigenous platform.

All Indian citizens can use Sandes for instant messaging since it is publicly available on Google Play Store/Apple App Store. Sandes enables communication in any language thereby helping in catering to needs of citizens belonging to varied demographics and lingual backgrounds.

Green e-Governance

By enabling users to send messages and files from Sandes to their email or Digilocker account, Sandes facilitates storage and retrieval of documents. It reduces the need of physical copy of documents, thereby leading to a positive impact on carbon footprint.

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Service Plus

National Informatics Centre, New Delhi

Deepak Chandra Misra and Sreejith N P

PROJECT OVERVIEW

Objective

“Service Plus – a versatile solution for service delivery, makes all Government services accessible to the common man in his locality, through common service delivery outlets, ensure efficiency, transparency, and reliability of such services at affordable costs to realize the basic needs of the common man.”

Scope (Functional &Geographical)

Functional

- E-Governance is understood as the use of Information and Communication Technology (ICT) at all the levels of the Government in order to provide services to the citizens.
- In 2010, National Informatics Centre (NIC) conceptualized a configurable framework that may be adopted across various government entities across India under the guidance of the Ministry of Panchayati Raj (MoPR).
- Service Plus empowers officials with a simple drag-and-drop interface that makes even complicated processes seem easy.
- The framework being increasingly used since 2012 has evolved with various powerful tools/modules such as Service Coverage Selector, Target Beneficiary Definer, Form Designer, Document Designer, Service Charge Calculator, Task/Process flow Designer, SMS/Email Notification Definer, DSC/eSign Signer, Report Designer and many more.

Geographical

- Within a decade, emerged out to be the widely used framework catering 33 states and 9 central ministries and about 260-line departments for about 2200+ services across the country.

Key Stakeholders

Central ministries, departments, organizations, state-level government organizations, and local bodies.

Hardware/Software

- JAVA Spring metadata-based framework
- Postgres Database
- Hosted on Linux based servers
- Load Balancer is used for load balancing
- Angular based reporting module

Certification (Certifying Agency)

Yes, AAA Technologies Private Limited

Disaster Recovery and Service Continuity

Yes, Disaster Recovery Site is setup

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
Issue of Income Certificate (Jharkhand)	Income Certificate issuance to all applicants of Jharkhand State	11,96,618	10,71,011	6,20,765
Issue of Local Resident Certificate (Jharkhand)	Resident Certificate issuance to all applicants of Jharkhand State	13,93,282	10,16,291	3,61,291
Issue of Caste Certificate (Jharkhand)	Caste Certificate issuance to all applicants of Jharkhand State	16,64,546	6,18,793	7,98,755
Issuance of Residence Certificate at RO level (Bihar)	Resident Certificate issuance to all applicants of Bihar State	4,41,468	6,99,571	73,75,498

Implementation

- Since 2012, emerged out to be the widely used framework catering 33 states and 9 central ministries and about 260-line departments for about 2200+ services across the country.
- The framework has helped to process over 91 million citizen services applications and raise revenue of about Rs 954+ crore since inception for the Government of India thereby providing ease of access to the citizens as well as the authorities.
- It is proclaimed that its eService Delivery Framework – Service Plus has facilitated a plethora of online applications resulting in smooth governance during the Covid-19 pandemic

Improvements/ Enhancements

During the lockdown period, this framework was extensively used by different stakeholders. The e- Pass services offered by 18 states were configured using Service Plus. All the services related to COVID-19 have undergone frequent version updates to accommodate the frequent policy changes of various governments. Following are some major enhancements/features developed in the last few years in the Service Plus framework:

- Integration with Arogya Satu App
- Integration with Digi locker for storing and fetching issued documents directly from the applicant's account
- Integration with PFMS for DBT transfer
- Integration with any external application to make the services available to apply via any external system which is configured in the Service Plus framework.
- Provision to claim chargeback against any application basis various conditions
- Treasury Integrations with various states.
- Many more.

ENABLER

Processes Re-engineered

Service Plus enabled user departments in re-engineering the processes involved in service delivery. Manual process has been replaced with automation tasks, routing the applications based on pre-defined rules.

Technologies

Service Plus facilitates integration with Mobile Application Service Provider. By using this facility, Services defined on Service Plus can be offered to the citizen through any mobile app.

People

People involved in this project are top management from User Departments. They provide administrative directions and form teams to quickly roll out services. Capacity building is done to the teams of user departments on how to configure services, handle change management in rolled-out services with the help of versions.

VALUE INDICATORS

Learnings for sharing

Being a domain-agnostic framework, Service Plus facilitated the roll-out of 2000+ services of multiple domains and departments. With a growing user base, capacity building is becoming a huge task. In order to address this, Service Plus is planning to engage roll-out agencies. Roll-out agencies will have readily available resources who are trained on the functionality of Service Plus to support/assist user departments in quickly launching their services on electronic platforms.

Digital Empowerment

Service Plus is a multitenant framework that is being used by various states/UTs and departments of the nation. While considering various cultures, languages, and financial inclusions in the e-service, this application provides the following features to easily roll out e-services at any level of the nation:

- Configurable Multilingual Forms as per the applicants
- Demographic Authentication with Aadhaar using fingerprints, retina scanning, personal details, etc.
- Category based charge collection for an application. Configurable dynamic

charges can be collected as per the category of the applicant.

- Online/Offline and Kiosk based application submission as per the comfort level of the applicant.
- Mobile Application for Applicants as well as Officials
- Offline Setup for remote locations with limited connectivity. The offline data can be synced later with live servers.

Green e-Governance

Service Plus facilitates Government organizations in digitizing their services end-to-end hence reducing physical submission of application forms from citizens/applicants, electronic approvals to reduce physical file generation.

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UP-DARPAN Dashboard for Hon'ble Chief Minister

Hon'ble Chief Minister Office, Uttar Pradesh

Alok Kumar, R. H. Khan, IPS Sethi, Ajay Gopal Bhartariya, Vaibhav Agarwal, Shalini Singh, Vijay Singh Pal and Kamlesh Singh

PROJECT OVERVIEW

The Government of Uttar Pradesh has introduced different welfare scheme for the betterment of the citizen at district or sub level. To monitor the performance and engagement of the scheme from time to time a single window platform is implemented which will be used by different Government officials. The platform will be used to view the launched schemes, registered users and accordingly different reports can be generated which will further be used to defined new strategies and decision making at administration level.

NIC-UP has developed a highly configurable and customizable dashboard product named as – DARPAN and offering it as SaaS. DARPAN is being used as a tool to transform complex government data into compelling visuals. DARPAN identifies trends in data to gain enhanced perspectives of various government schemes/ projects, the dashboard allows users to personalize their view to prioritize the information they require.

DARPAN Current Status in Uttar Pradesh

- Number of Active and on-board State Chief Minister Dashboard: 1
- Number of Active and on-board Divisions Dashboard: 18
- Number of Active and on-board Districts Dashboard: 75
- Number of Departments integrated:58
- Number of integrated Sectors: 27
- Number of integrated Schemes: 590
- Number of registered KPIs: 2755

Key Stakeholders

- State Level – Hon'ble Chief Minister, Chief Minister Office, Additional Chief Secretary, Principal Secretary, and Secretaries & HoD's of the Departments.
- Division Level – Divisional Commissioner and other concerned officials.
- District Level - District Magistrate, Chief Development Officer, and other concerned officials.

Intended benefits

- DARPAN facilitates actionable insights and enable concerned Departments to take appropriate measures at right time. Eventually, this would enable to align Key Policy Makers and Executioners take adequate measures to improve the Scheme's progress vis-a-vis envisaged outcomes.
- DARPAN also provides secure channel with MIS of respective schemes to provide real time data through Application Programming Interface (API).
- DARPAN acts as a robust platform for quick on boarding of Government Schemes and can generate Score cards based on the performance. Schemes-wise

and district-wise ranking can be generated as per the performance.

- DARPAN is easy to access, providing on-demand visibility and insight. There is no need for users to wait for monthly/weekly reports to check progress or respond to changing conditions.
- Well-crafted DARPAN dashboard show updated results for each project, saving precious time and resources.
- DARPAN provides all the key values without having to code or analyze information separately.
- Display data in Map View and time series with drill down up to lowest granularity level.

Hardware/Software

Development Environment	
.NET Framework Versions	Microsoft .NET 4.8
Languages	C#, Visual Basic .NET
Web Frameworks	ASP .NET Web API 2, ASP .NET
Communication Frameworks	REST Web API, SOAP Web Services
Client End	HTML 5, Javascript, JQuery, Bootstrap, JSON
IDE	Microsoft Visual Studio 2017
Back End	
Database	Microsoft SQL Server 2017
CLOUD Resources	
Cloud Name	MEGHRAJ
Web Servers (Windows)	4 VMs
Database Servers (Windows)	2 VMs
Operating System	Windows Server 2012 R2
Web Server Software	Microsoft IIS Server 10
Database Server Software	SQL Server 2017 with always on availability groups
Others	
Authentication Tool	PARICHAY SSO (NIC SINGLE SIGN-ON)
SSL Provider	Lets Encrypt
Version Control Tools	Visual SVN Server, Tortoise SVN
Chart Visualization Tool	amCharts
Debugging Tool	Chrome Dev Tools
Mobile App	
Development Framework	Android Studio 4.1.1
Target Devices	Support Android Ice-Cream Sandwich (API Level 15) to Latest Android Version
Deployment	Google Play Store

Certification (Certifying Agency)

Yes - DARPAN is security audited by Cyber Security Group Application, Security

Division, National Informatics Centre on 5 Nov 2019.

Disaster Recovery and Service Continuity

DARPAN Database Servers are configured with Always on Availability Groups (AAG) which provides the high availability and disaster recovery capabilities at the SQL server level. Disaster Recovery (DR) is under process to be setup at National Data Centre Hyderabad with configuration of AD-DS and setting up Always ON for Data Base. Two App server(s) will be configured Load Balancer and assigned a new Public IP. In the event of failure of primary, domain will be mapped with Public IP of DR site.

All DARPAN Web Servers are configured behind the Load Balancer that ensures no single server bears too much demand. By spreading the work evenly, load balancing improves application responsiveness. It also increases availability of portal for users.

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
UP-DARPAN Dashboard for Hon'ble Chief Minister Office.	UP-DARPAN CM Dashboard is being used by Hon'ble CM office to gauge the performance	Projects/Schemes Onboard: 141 KPIs registered: 890 Departments Onboard: 27 Sectors Onboard: 17	Projects/Schemes Onboard: 271 KPIs registered: 1604 Departments Onboard: 46 Sectors Onboard: 25	Projects/Schemes Onboard: 590 KPIs registered: 2755 Departments Onboard: 58 Sectors Onboard: 27 (Statistics till 15 September 2021)

Implementation

The objective and goal is on boarding of various flagship programs so that a centralized dashboard can be prepared for the view of CM Office officials and other stakeholders.

At present, 590 schemes of 58 Departments have been on-boarded on DARPAN Portal which is being monitored through its 2755 Key Performance Indicators where data is getting updated on real time basis, directly from MIS of the scheme, wherever possible by consuming two open APIs, exposed by DARPAN.

DARPAN developed by NIC-UP is bilingual configurable product offered as SaaS and implemented for the entire 75 district dashboard, 18 Commissioner dashboards along with Hon'ble Chief Minister Dashboard.

Improvements / Enhancements

DARPAN was launched in January 2018 with a target to prepare an Analytical Dashboard depicting progress of Government of UP flagship schemes on its defined KPIs with appropriate granularity and frequency. It was also decided to integrate this with MIS of respective schemes to show the progress on real time basis by integrating through API to avoid any manual intervention in KPI's data.

During last one year following improvements/enhancement were rolled out.

- As per the requirement of the CM office, a new reporting interface has been implemented to display overall data porting status along with MIS integration report status for better tracking of the projects/schemes.
- Dashboard has been further configured/ customized to add user desired features.
- Comprehensive drill down DARPAN Utilization report (User/Field Officer/NIC User) has been added in the system.
- Migration from SOAP web services to secure REST API.
- Integration of Single Sign-On (PARICHAY) implemented.
- Integration of SANDES (Government Instant Messaging System) implemented.
- Provision to upload project on site images to monitor progress of physical works in various schemes viz. SBM, MGNREGA to show incremental progress.
- Provision has been added to provide wrapper to group all the projects of various departments having same KPI for efficient monitoring, i.e., SLA monitoring of services provided under Janhit Guarantee Adhinyam.

Improvements/Enhancement, planned for next one year:

- Applying analytics and AI based on legacy data so to predict scheme performance.
- Collection of related national/international benchmark/parameters to compare with other international standards.

ENABLER

Processes Re-engineered

DARPAN displays information of the government welfare schemes/project in an objective and quantifiable way to understand not only its success but also its weak points and areas need for improvement. The product is meant to provide administration, at a glance single window status of different departmental schemes with further drill-down capability for detailed monitoring of schemes at various administrative levels. It allows instant access to critical information and gives a clear picture of how you're doing with your key projects.

DARPAN is designed and developed to address a wide range of objectives and monitoring the strategy of the U.P. Government, which can monitor department's activities to achieve service level targets.

DARPAN is fully configurable for every state. State Administrator of every state has the special privilege to decide the look and feel of the portal in their respective states.

To support dynamic real-time monitoring of the project, Web APIs are consumed at regular intervals to display state-specific data at various micro and macro levels.

Regular data update is done through APIs at predefined frequency.

Technologies

- Descriptive analytics implemented in DARPAN Dashboard aims to gain valuable insight from the data being analyzed for various government schemes/projects. DARPAN integrates with heterogeneous systems by handling multiple time-stamped master databases with varied data granularity which is regularly updated

through web API at the predefined frequency (daily/monthly/quarterly/fortnightly/yearly). Data Analytics in DARPAN is a great way to glean insights from raw data without having to code personally.

- All the visualization of all departments and districts of state fit in a single screen. Department KPI's further zero in leading & lagging districts also displayed on Map. It helps departmental HOD/Officials to monitor the system effectively and take necessary action if needed.

The dashboard includes Key Performance Indicators to assess the performance of each department/district of various states. The ranking is classified into 3 categories.

The departments scoring 75% or above on the KPI will be shown in green while red will be used for departments faring poorly with 50% or less. The departments scoring between 50% and 75% will be reflected by Yellow color.

The same ranking formula is applied to Districts also.

- Performance Score $\geq 75\%$: Best Performing District/ Department [Green Color].
- $50\% \leq \text{Performance Score} < 50\%$: Worst Performing District/ Department [Red Color].

DARPAN Dashboard has been designed to encourage healthy competition among the participating department by ranking them on formula-based parameters related to the Key Performance Indicator (KPI) of the comprising projects of the particular department.

People

VC session has been conducted for the District Informatics Officers, NIC-UP. Regular training programs are being conducted at district, Commissionery and State level for State Government officers.

VALUE INDICATORS

Learning's for sharing

- The biggest challenge in any digital enablement is its adoption. The vision behind DARPAN Dashboard was to develop a configurable bilingual product which can be customized by the State Administrator as per the requirement of their states. So any state may onboard DARPAN Dashboard with minimal coding intervention. Key part of this project was integration with respective MIS through API and its visualization.
- Later SOAP web services were migrated to light weight Web APIs with token key for frequent schemes KPI data update as per defined frequency.
- Security Audit is the most essential feature of any eGOV application. DARPAN Dashboard Application is properly security audited.
- Analytics is core of any Dashboard Services. Descriptive Analytics is implemented in DARPAN Dashboard through number of configurable parameters. Formula based Ranking of districts/departments helps to measure the outcome and impact of the various government schemes for taking appropriate and timely decisions and actions.
- During its implementation, it was observed that in maximum cases, frequencies of schemes were defined as monthly by respective Service contributors and it

takes almost one month for any change in KPI's detail. Later on it was reduced to daily in schemes wherever possible.

- Secured authentication was enabled by integrating with NIC's PARICHAY (SSO Platform) where credentials of almost all government officials were maintained.
- A 24*7 helpdesk was made operational so to minimize the issues of integration and hardware infrastructure has been strengthened which provides seamless access of application.
- DARPAN gives the Administration a tool needed to deliver real-time, dynamic project monitoring without the need for coding or programming through web API. It allows evaluating progress a particular project is making in near-real-time, so one can easily measure the time it takes to meet the desired goals. And it allows decision-makers to institute changes as needed.

Digital Empowerment

- The user of this application is from Apex office including participating departments who are involved in policy making activity. The application provides an integrated view which empowers the user to monitor the progress of any schemes and take necessary steps for its better implementation. Critical KPI dashboard provides the consolidated view of any critical KPI.
- This application is using best of Data Quality standards which is using as benchmark for other dashboards.
- DARPAN is a dashboard for Analytical Review of Projects across the nation, transforms complex government data into compelling visuals. It gives the State and District administration a tool needed to deliver real-time, dynamic project monitoring without the need for coding or programming through web APIs.
- DARPAN is a highly configurable multilingual national product that can be easily customized as per the requirement of different states. It has been successfully implemented with minimal effort in 34 States/UTs. In U.P. DARPAN Dashboard has been implemented in all 75 districts.
- Innovative Dashboard Analytics using Time-Line Series/Graphical/Statistical reports/Multiple Graph Choices for administrative monitoring or informational purposes.
- Integration with SANDES (Government Instant Messaging System) to facilitate the instant notification to stakeholders at the trigger of various portal related activities.
- GIGW Complaint and responsive Website to adjust to heterogeneous devices. View Dashboard from any Device.
- DARPAN Mobile App provides flexible & convenient dashboard services at your fingertips.
- Allows users to personalize their view to prioritize the information they require to get the enhanced perspective of the priority projects.
- The portal has a formula-based automatic grading system of departments and districts to assess the physical and financial progress of the project.
- The generic solution was required to integrate with a heterogeneous system by handling multiple master databases with different data granularity.

- Design a detailed timeline reporting interface having different configurable sections and their elements.

Green e-Governance

- DARPAN is self-sustainable as the project implementation has been done by the NIC UP State Unit, which is available for s/w support on a 24 x 7 basis and software is being worked upon by the officials of the various states. It satisfies the requirement of all the stakeholders and all modules within the project are interdependent and efficiently managed.
- All data in DARPAN Dashboard Services is periodically updated in real-time, it is easily shareable by downloading reports in jpg, pdf, excel format. It results in saving in consumption of power and paper, disposal of e-Waste.
- All the data transactions at DARPAN Dashboard Services are being done electronically using web API and E-mail alerts are generated to reduce paper consumption. Further integration with SANDES (Government Instant Messaging System) helps in less usage of paper based communication.
- Various services required by the department have been provided online with role-based access to reduce paperwork within the department.
- All communications with stakeholders are done using email, video conference, or telephone. Communication through paper or physical visits has been reduced to the bare minimum.
- Availability of DARPAN through Mobile App further ensures anytime, anywhere access on one hand and less power consumption and resources on the other hand.

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2. Agriculture, Animal Husbandry, Forests and Environment

E-SANTA (Electronic Solution for Augmenting Nacsa Farmers Trade-In Aquaculture)

***Marine Products Export Development Authority & Ganges Consultancy Services
LLP & Comconsulting***

K. S. Srinivas, Usha Singh and K. V. S. Sarma

PROJECT OVERVIEW

Objective

National Centre for Sustainable Aquaculture (NaCSA) is an extension arm of the Marine Products Export Development Authority (MPEDA) formed in 2007 with the objective to encourage and uplift the small and marginal aquaculture farmers through the organization of clusters and promotion of Best Management Practices in shrimp culture. NASA has so far registered 752 societies in eight maritime states with a farmer base of 18211 covering 12607 ha of farm water area producing on an average 40000-50000 MT of L. vannamei shrimp/year. Present marketing practice involves middlemen who take away a good portion of the profit leading to exploitation of the small and marginal farmers. Since the middlemen combine the material procured from various farms, it would be difficult to ensure traceability which is essential for international trade and also leads to mixing of the material tested for antibiotics and PHT not tested for antibiotics leading to rejections in exported consignments. A direct selling mechanism between farmers and processors/exporters can help in ensuring fair prices for farmers and also ensures traceability. The farmers face several challenges in shrimp culture, most importantly to obtaining a remunerative price for their produce. Farmers fail to get a fair deal due to the existing market structure with middlemen between them and the buyers. The exporters also face numerous challenges such as consistency in the product purchased and quality-related issues. To connect the society farmers to markets/processors in a single platform and to receive better prices for good quality produce, Nasca has taken the initiative to connect the aqua farmers and buyers to interact directly and buy the produce directly from farmers by eliminating the middleman completely. It led to the idea to form an e-commerce platform to help the society farmers and developed e-Santa (Electronic Solution for Augmenting NaCSA farmers Trade-in Aquaculture) portal for a cozy environment among sellers and buyers with help of NaCSA. It enables widely dispersed buyers and farmers to interact and execute purchase transactions. Each step in the e-Santa process is captured electronically, and all transaction data is routed through the ESCROW account, reducing risk and time for completion of the process between the seller (aqua farmer) and buyer (exporter).

Scope (Functional & Geographical)

e-Santa is a digital platform between PAN India Aqua Farmers and Exporters to meet, interact, negotiate, and buy Aquaculture produce digitally. This helps in eliminating Middlemen & acts as a bridge between both parties.

- Platform is available in multiple languages viz Hindi, English, Telugu, Tamil, Bengali, and Odiya
- Easy registration of farmers and buyers by fetching and validating details using MPEDA APIs
- The Bank account and PAN number of Exporters and Farmers are verified through APIs

- Farmers can list their crops and exporters can list their requirements
- Aqua Farmers can sell their crops in the e-Santa platform without any middlemen intervention.
- Aqua Farmers can demand better pricing for their quality product also demand and supply will be balanced through the e-Santa platform. Both farmers and exporters avail benefits for e-Santa at large.
- NaCSA acts as the facilitator for the entire transaction/Sale.
- Trade happens directly between Farmers and Exporters; Hence Farmers have the freedom to quote the price
- Exporter/Buyer access trusted data from MPEDA-NaCSA e-Santa Platform for arriving right decision.
- Escrow based Digital Payments is a game-changer in this platform.
- Dashboard designed to verify various parameters in e-Santa by the Chairman, MPEDA, and CEO, NaCSA to provide action plan and guidance to the concerned officials.
- Project Management Unit (PMU) takes care of support and maintenance, training, user change request, PMU is made available for training and support. They will take care of the change requests also.
- Policies for digital transactions are framed and legally vetted

Hardware/Software

Software: PHP with Laravel Framework

Database: MySQL Database

Hardware: Linux (Apache Web Server)

Third-Party Services Used:

Digital Payment & Escrow Management: M/s Razor Pay

Broadcast services: Smart Chat

Certification (Certifying Agency)

Yes, e-Santa has done its cyber security audit and it was audited by “M/s AKS IT Services, Noida, UP”

Disaster Recovery and Service Continuity

As of now we have implemented a “Backup agent” for our PR servers and currently planning to create a DR environment too.

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
Simple Onboarding of Farmers&	They just need to use their existing MPEDA registration IDs to join this platform. It's a seamless journey to join the	Not Applicable (NA)	NA	NA

Buyers	platform.			
Exploring the Crops	Exporters can explore the crops available with smart search options w.r.t Geography-wise, Quantity Wise, Count Wise & Desired Price wise. This helps exporters to pick the right product.	NA	NA	NA
Advanced Chat Options	Exporters & Farmers can chat online & however other ways of communication like emails, SMS has been integrated too.	NA	NA	NA
Lab Reports e-validation	A feature to fetch the certificate from the source of truth i.e., Laboratory Software has been integrated for better authenticity to exporters while making purchase decisions.	NA	NA	NA
Digital Payments with Escrow service	This is one of the game changing approach where the money will be collected online & kept in defined escrow accounts and will be disbursed to the farmers once the sale is done.	NA	NA	NA
Advance payment options for booking	First time in this Industry Exporters are paying advance for booking a crop which is placed in the escrow account giving an assurance to the farmer.	NA	NA	NA

Implementation

Post launching the platform by Honourable Commerce Minister, Shri Piyush Goyal Ji, MOCI, GOI the first live transaction was made on the same day of inauguration i.e., on 13.04.2021. In the span of 5months farmers made a sale value of Six Million Rupees and are planning to increase the trade and achieve 50 million Rupees sales by the closing of this financial year 2021-22. As of now, the platform is Live. 274 Farmers and 53 Exporters have registered on the platform. Farmers have started listing the crops and sale has been started.

Improvements/ Enhancements

A year and those which are planned to be rolled out during next year.

Role-based additional Logins for exporter's employees to cater the need of their Finance, Purchase & other teams; Smart chat feature between exporter and farmer has been given. Platform made available in multi-lingual for better understanding & adoption by the user. Future Enhancements: Planning to give a mobile app for farmers and exporters for easy access with complete security features.

ENABLER

Processes Re-engineered

Before e-Santa:

Previously middlemen were purchasing a product from farmers at a lower price and selling the same to exporters at a higher price without any quality assurances and proper traceability. Middlemen are deciding the market.

After e-Santa:

e-Santa will help Aqua farmers and buyers to interact directly on the platform and buy the produce directly from farmers, this will eliminate the middlemen completely ensuring traceability, better price, and quality products.

Technologies

Data Analytics:

Based on the time series data & real-time sales Supply & demand can be predicted & we can start giving recommendations to farmers on what variant & count has demanded over the market

Knowledge Management:

Based on feed, seed, harvest days & produce info we can create a knowledge base and understand the winning models for better produce.

People

- Brain Child & Strategy: Shri K. S. Srinivas, IAS, Chairman, MPEDA and President, NaCSA
- Brain Storming & Insights: Dr. M. Karthikeyan, Director, MPEDA
- SME & Execution: Shri K. Shanmukha Rao. CEO, NaCSA
- Inputs: Aqua section and EDP section, MPEDA
- Technology Building: M/s Gangez Consultancy Services LLP & Comconsulting.

VALUE INDICATORS

Learnings for sharing

- Selling of Perishable goods is different from the selling of normal goods, here before harvest (i.e., before getting the real product to hand) we should calculate the predicted quantity and collect advance, the post-harvesting final amount should be recomputed basis on final harvested quantity.
- The outcome of the harvest can only be known post-harvesting; all the advances collected should be kept on the Escrow account till the final sale is completed. This has been taken into consideration to protect the interest of both Farmers & Exporters.
- Given feasibility have a negotiation session between farmer and buyer so that both of them can discuss and finalize the price.

Digital Empowerment

- Platform is made available in multi-Language (6 languages viz., English, Telugu, Tamil, Hindi, Bengali, Odiya): <https://esanta.gov.in/>
- Platform caters to full digital payments with various payment modes.

- Platform gives SMS and emails alerts

Green e-Governance

- Our product is hosted in a cloud environment so there is no hardware at our level.
- E-Santa architecture is designed in a way that is totally digital and paperless.
- There is no need for additional hardware required in the entire process.

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PM –Kisan Samman Nidhi Portal (PM-KISAN Portal)

**Ministry of Agriculture and Farmers Welfare, Govt. of India & National Informatics
Centre, New Delhi**

Vivek Agarwal, Rakesh Tiwari, Ranjna Nagpal and Pratibha Lokhande

PROJECT OVERVIEW

PM KISAN is a Central Sector scheme with 100% funding from Government of India. It has become operational from 1/12/2018. The scheme is being implemented by Department of Agriculture, Cooperation and Farmers Welfare. It was launched with the objective to augment the income of the Farmers and to supplement the financial needs of the farmers in procuring various inputs to ensure proper crop health and appropriate yields, commensurate with the anticipated farm income at the end of the each crop cycle. This in turn will help to protect them from falling in the clutches of moneylenders for meeting such expenses and ensure their continuance in the farming activities. The PM-KISAN portal is designed, developed and implemented by National Informatics Centre.

Objective

The PM-KISAN portal was launched with the following objectives-

- To provide end to end mechanism for transfer of funds directly to the bank accounts of the farmers
- To provide monitoring tool at various levels
- To build verified Farmer's database in the process.

Scope (Functional & Geographical)

- Scope of the Scheme
 - o Originally the scheme was launched for small and marginal landholding farmers but later it was extended to all landholding farmers in the country through Cabinet decision dated 31.5.2019
 - o From December 2019 Payments are to be made only to Aadhar authenticated beneficiaries
- Scope of the PM-KISAN Portal
 - o Registration of Beneficiaries from Block, Sub-district, District and State Level
 - o Online registration
 - o XML bulk uploading
 - o Self registration facility at portal
 - o Registration through CSC integration
 - o Registration through Kisan Suvidha Mobile App
 - o APIs from State databases
 - o Lots creation and Account Validations
 - o Request for fund transfer (RFT) by States
 - o Fund Transfer Order generation by Center
 - o Digitally signing of RFTs and FTOs
 - o Correction Windows for correcting Beneficiary details
 - o PFMS integration for benefit transfer
 - o User Management and access control
 - o Aadhaar Authentication – Online, Bulk
 - o Income tax verification
 - o Monitoring of Physical Verification

- o NTRP integration for refund from ineligible beneficiaries.
- o Farmer's corner for online registration, checking Beneficiary and payment status, correction of Aadhaar details
- o Automation of processes
- o MIS reports and Dashboards
- o Linkages to external Systems (PM-Dashboard Paryas, States applications)
- o PM-KISAN Mobile App
- o Help-desk Online interface for attending farmer's queries and resolving of queries in distributed manner by states and districts officials.
- o IVRS Both in Hindi and English
- o Chat bot in Hindi / English

Key Stakeholders

- Farmers
- Department of Agriculture Cooperation & Farmers Welfare (DA&FW)
- States
- PFMS (Government Accounting System)
- NPCI
- NIC
- CAG
- UIDAI
- Banks
- CSCs

Intended benefits

Direct Benefit of Rs. 6,000 per year in three 4-monthly installments of Rs 2,000 each per farmer family.

Current Status

- The Scheme is being implemented online through Direct Benefit Transfer (DBT) mode for which an exclusive web-portal www.pmkisan.gov.in has been created.
- Portal helped in disbursal of funds to large number of farmers in very short period of time.

Hardware/Software

Portal: Asp.NET, Angular JS, Microsoft SQL

Dash Boards: High chart

Mobile App: Android

IVRS

Certification (Certifying Agency)

Yes, Cyber Security Division, National Informatics Centre. Security Audit conducted by Cert-in empaneled agency

Disaster Recovery and Service Continuity

Yes, DR is available at NIC Data Centre, Hyderabad.

Strategy for DR:

- Active Directory and ADC
- DFS for content Updation.
- SSL certificates on DR web servers

- RPO / RTO up to 15 minutes latency.
- Database VMs
- Always-On features
- Linkage of Primary AD servers with DR AD servers.
- Provision for Differential Backup
- Provision for Full Backup
- Provision for file system back up as per requirement
- CRL Server at DR
- Provision for log server
- Provision for GSLB – Global Server Load Balancing

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Numbers
Registration of beneficiaries	11.83 Crores.
Farmers benefitted	11.47 Crores (Received a least one installment)
Aadhar Verification from UIDAI	10.92 Crores
Mobile App	60 lacs + downloads
IVRS	4 Crores calls received
Self Registration through CSC	80 lacs+
Grievance Redressal& Management System	Queries received at online system: 10 lacs + Reply sent 7.28 lacs queries Queries under process with states: 2.84 lacs
Online Window for Refund from ineligible beneficiaries	Approx. Rs. 261 Crores recovered from the ineligible beneficiaries.

Implementation

Implemented In all States up to Village level. So far 11:83 Crores farmers have been registered on the portal and 11.47 Crores farmers have been benefited from the scheme.

Improvements / Enhancements

- Integration with NPCI for Aadhaar look up service to get Aadhaar seeded bank account status
- Reengineering for list opening process
- Integration with NTRP for transfer of refund from States to Center by Offline (NEFT/RTGS) and Online (Net banking methods)
- Real time Gap Analysis Report
- Technical Query Management System
- User management – more checks introduced, more control at State Level
- Improved Self Registration
- Bulk IFSC updating facility for change in IFSC due to merger of banks
- Process automation of XMLs files sharing and consumption of files from PFMS /

Banking system. Auto generated email is sent to concerned officials on completion of activity.

- Utility for Consumption of ACK / NACK responses from PFMS
- Addition of new reports and enhancements of existing reports
- Document Management for managing SOPs, User Manuals, etc.
- Enhanced capacity of FTO generation to more than 2 crores per day
- Re-processing of transaction failure data
- Mechanism built for States for partial signing of RFTs for districts frozen within a List/batch
- Process reengineering - Exclusion of inactive records dynamically at the time of Lot freezing for reducing the number of failed FTOS and invalid RFTs.
- Bulk correction facility in almost all the modules (Bank Account correction, Physical verification, Ineligible Marking for exclusions, Refund, Refund Transfer from State to Center, Revocation from ineligibility)
- Facility to print receipt for farmers for refunded amount.
- Identification of duplicate accounts and provision for corrections
- Facility for recording date and reason of ineligibility in case of ineligible beneficiaries
- 10% beneficiaries list provided for Physical verification by random selection from paid beneficiaries of Financial Year 20-21 April-July.
- Interface for PMU for updating of State Agency details and SNO details
- User activation and de-activation window for States Nodal Officer
- Ineligibility revocation window
- PFMS Bank Master Updating service
- Provision for changing the payment mode

ENABLER

Processes Re-engineered

- Introduction of Farmers Corner for self-registration of farmers
- Digital signing of RFTs
- Digitally signing of FTOs
- Automation of various steps for smooth flow of data
- Correction window opened for states
- MIS Reports and Analytics Dashboards
- Physical verification of beneficiaries in 5% beneficiaries
- Beneficiaries' Aadhar verification from UIDAI and Aadhar Based Payments
- Integration with CBDT database for checking of farmer's exclusion status

Technologies

- Cloud based architecture having separate servers for Application, database, APIs
- Microsoft SQL always on Database feature is being used for high availability
- Usage of Digital Signature for e-Governance
- SSL and TLS enabled portal for security
- Load Balancer for application servers to distribute the load
- Signed XML data transfer for secure bulk uploading
- IVRS
- Mobile app for wider reach

- Linkages to external system using APIs like PFMS, PM Dashboard, DBT dashboard, Income Tax, CSCs

People

There are various organizations involved in the PM-KISAN and all work in cohesion to deliver the benefits to farmers, like -

- DA&FW
- States
- PFMS
- NPCI
- NIC
- CAG
- UIDAI
- Banks
- CSCs

DA&FW conducts weekly review meetings with all stakeholders for monitoring and Implementation of the scheme. NIC has conducted various e-learning sessions for capacity building of the stakeholders. Various reports and dashboards are made available for monitoring from the highest level.

VALUE INDICATORS

Learnings for sharing

The major challenge in the project was identification and uploading of the farmers' information on the portal and develop end-to end mechanism for quick transfer of money. To overcome this challenge various channels were opened. States can upload the farmers' lists thro' xml or transfer from State portals directly in case this information is available in the State portals. Farmers' corner was opened on the portal for Farmers' for self-registration. Linkage was established with CSC's for registration of the farmers. Mobile app has been developed for farmers for registration.

To overcome the problem of wrong information entries, various correction windows were opened for invalid data detected at various levels of the processing like Aadhaar validations with UIDAI and Account validations with PFMS. Bulk Aadhaar authentications were carried out for meeting the mandatory condition of the scheme for Aadhaar authentication introduced from December 2019 onwards. Online feature was provided for correction of names as per Aadhaar.

Failure of account validations due to change in IFSC codes because of recent merger of banks was a challenge. Bulk corrections windows were provided for faster processing for such cases. Constant interactions with PFMS and NPCI are carried out for making the processes faster and reduce the gap between the sanctions and actual transfer of funds in the accounts of the farmers.

Proper infrastructure was planned for the project separating Application, Database and API servers. Applying always on and load balancing principles.

Being payment involved, security is of utmost important. To meet the security requirements, portal is security audited from cert empaneled vendor and implemented on Secured Socket Layer. To avoid the attacks from outside the country, geo fencing has been adopted.

For smooth information exchange with external systems, standard codes for locations,

banking system, units etc. are being adopted. APIs are being used for information exchange.

Digital Empowerment

The main objective of the scheme is financial inclusion of the farmers.

It was launched with the objective to augment the income of the Farmers and to supplement the financial needs of the farmers in procuring various inputs to ensure proper crop health and appropriate yields, commensurate with the anticipated farm income at the end of the each crop cycle. This in turn will help to protect them from falling in the clutches of moneylenders for meeting such expenses and ensure their continuance in the farming activities. Under PM-KISAN scheme direct benefit of Rs. 6,000 per year in three 4-monthly installments of Rs 2,000 each per farmer family under the scheme. Benefits are being transferred directly into the accounts of the farmers. PM-KISAN portal is providing end to end mechanism to meet this objective.

It is being implemented all farmer families across the country.

Various majors are being taken for inclusion of beneficiaries in the scheme. Various channels are opened for registration of beneficiaries. Special drives are conducted by States from time to time for identification of beneficiaries and correction of their details, so that no beneficiary is left out.

Green e-Governance

PM KISAN portal provides end to end technological solution from registration of beneficiaries, electronic verification through Aadhar kyc, PFMS account validation, income tax verification and transferring of cash benefits directly in to the beneficiaries' account.

The whole processing is through online portal <https://pmkisan.gov.in>. Besides these, the portal also facilitate to farmers for knowing the status, registration of farmers queries related to registration status and payment.

The portal is taking care of more than 11 Crores + beneficiaries in respect of cash benefit transfer. Mobile App and IVRS are another electronic mean to serve the beneficiaries for knowing the status.

These over all paper less processing performing through the portal contribute in Green e-Governance.

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3. Citizen Services, Social Welfare & Grievance Redressal

Digital Monitoring of Tribal Sub Plan (Scheduled Tribe Component) and Funds/Grants given to States/UTs & Other Institutions/Organizations

Ministry of Tribal Affairs, Govt. of India

Naval Jit Kapoor

PROJECT OVERVIEW

Objective

- Online Monitoring of Central Scheduled Tribe Component of 41 Ministries, having 268 Central government schemes of Rs 78, 256 Crores for 2021-22.
- Monitoring of funds /grants of More than Rs 3500 Crores given to 35 States/UTs under following schemes:
 - o Grants under Article 275 (1) of the Constitution of India
 - o Special Central Assistance (SCA) to Tribal Sub-Scheme (TSS)
 - o Scheme for development of Particularly Vulnerable Tribal Groups (PVTGs)
 - o Institutional Support for Development and Marketing of Tribal Produce
 - o Mechanism for Marketing of Minor Forest Produce (MFP) through Minimum Support Price (MSP) and Development of Value Chain for MFP (MSP for MFPs)
- Monitoring of grants of Rs 120 Crores given to 27 Tribal Research Institute and 38 Centre of Excellence, recognized by Ministry of Tribal Affairs.
- Monitoring of Rs 100 Crores of grant given to 150 NGOs.

Scope (Functional & Geographical)

- The Comprehensive IT System shows performance of each scheme and initiatives wherein funds of Rs. 2,00,000 Cr are available annually with MoTA, 41 Ministries and 31 States and UTs. Ministry grants 5 scholarship schemes starting from 9th to post-Doctoral and monitors expenditure of INR 2500 Cr each year. Grants of Rs. 120 Cr annually given to 250 NGOs for 350 projects in 24 states in 300 districts who provide health and education to about 10 Lacs beneficiaries. Besides. Information of 286 Eklayya Model Residential School (EMRS) for 73,391 students, 24 Tribal Research Institutes across India, 38 Centre of Excellences, carrying out extensive research on tribal development. Information about initiatives for education, livelihood, health etc. carried out by States through 4 Grants schemes with funding of Rs. 3000 Cr annually is captured. The performance of 41 Ministries with budget of Rs 51,000 Cr on 336 Schemes is monitored through STC MIS using PFMS data.
- MoTA is responsible for not only implementation of its own schemes but also monitors Central and State Tribal Sub-plan with funds of Rs. 2,00,000 crores as enumerated below. Central Ministries/Departments– 41 Central Departments/Ministries having more than 300 schemes with budget of 51,000 cr. are required to spend as mandated by NITI Aayog. For this STC MIS portal of Ministry compiles scheme wise, State wise, Ministry wise expenditure through PFMS Geographies – Funds are given to 31 states/UTs by MoTA and 40 other Central Ministries in Education, Health, Livelihood, Infrastructure, which are integrated

with scheme specific portal Beneficiaries: Tribal population of about 12.50 Cr is directly or indirectly benefitted through various scheme. Direct benefit to more than 50 lacs beneficiaries is given under various schemes of Ministry every year. CEO NITI Aayog launched Performance Dashboard and NITI and PMO asked all Ministries to adopt best practises of NGO and Scholarship scheme.

Key Stakeholders

Internal stakeholders: 10 major divisions of the Ministry namely Scholarship division, NGO division, TRI division, IT division, Livelihood, Grant, FRA, CLM along with Trifed, NSTFDC, 286 Eklavya Model Residential Schools etc. are internal stakeholders. Further Finance, Pay and Accounts and PFMS are also associated with budget release process External Stakeholders: 40 Central Government Ministries, 31 State UTs, 300 Districts, 27 Tribal Research Institutes, 38 Centre of Excellence, 250 NGOs, 30 lakh Scholarship Beneficiaries, 577 Universities and Institutes, Canara bank, DBT mission, 1500 Mentors and Mentees of Facebook's GOAL program, PMO, Niti Aayog, DBT Mission, Consulate General of 12 countries are primary external stakeholders. NITI has ranked MoTA 5th amongst all Ministries in Data Governance quality Index, 3rd in data-based governance and top in Data Security and Data sharing with Other Ministries. It is sharing data of 6 schemes on PMO dashboard, NITI and DBT Mission.

Interdepartmental integration:

Integration with other departments:

- 40 Ministries implementing Tribal Sub Plan
- PRAYAS Dashboard at Prime Minister's Office for data of 6 schemes
- Output-Outcome Monitoring Dashboard at Development Monitoring & Evaluation Office (DMEO), an attached office and NGO Darpan Portal of NITI Aayog
- DBT Bharat- Portal of DBT Mission
- TRIBES INDIA-TRIFED
- NCST
- NSTFDC
- PIB
- PFMS and EAT Module
- CEDA of NIC
- Digi-Locker of MeiTY
- UIDAI for Aadhar

Hardware/Software

Name of IT Application	IT System Architecture	Operating System	Application Software
Stcmis.gov.in	Web-Based	Window	Dot Net
Ngo.tribal.gov.in	Web-Based	Linux	Java
Tritribal.gov.in	Web-Based	Window	Dot Net
Repository.tribal.gov.in	Web-Based	Linux	Java
Adiprasaran.tribal.gov.in	Web-Based	Window	Dot Net

Grants.tribal.gov.in	Web-Based	Linux	Angular
Adiprashikshan.tribal.gov.in	Web-Based	Linux	NGINX
Adikalakar.tribal.gov.in	Web-Based	Windows	Dot Net

Certification (Certifying Agency)

Yes, Proper security audit process has been completed from NICS I empaneled agency for security audit certificate.

Disaster Recovery and Service Continuity

Yes, as per the National Data Centre policy guidelines.

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
NGO Portal	Monitoring of PROJECTS sanctioned to NGOs	1006199 beneficiaries; 159 NGOS	1187917 - Beneficiaries; 140 NGOS	578792 BENEFICIES; 102 NGOS
STC -MIS PORTAL	Monitoring of STC Fund	-	38 MINISTRIES	41 MINISTRIES
ADI GRAMS PORTAL	Monitoring of grants given to states	-	35 States/UTS	35 STATES/UTS
TRI PORTAL	Monitoring of funds given to 27 TRIS ,38 CoEs	26 TRIS; 100 CR	27 TRIS; 60 CR	27 TRIS; 120 CR

Implementation

Mission has successfully achieved its objective of consolidating all information related to monitoring various grants/funds.

- 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 e-office developed by NIC. During covid, despite 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 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

- 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. The database has the capability of generating various MIS reports like state-wise, District wise, institute wise, gender-wise, stream-wise reports for monitoring and coordination with various Stakeholders through Monitoring Dashboard.

- 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.

- 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 enterprenurship Program in collaboration with Facebook, goal.tribal.gov.in-
- Swasthya Portal: Database of Health and Manpower Infrastructure for 117 Tribal districts (swasthya.tribal.gov.in)
- Sickle Cell Support Corner: (scdcorner.in)
- Gap analysis of 1,17,000 villages

K. National Tribal Virtual Art and Culture Portal: Documentation of art & culture of 700+ different tribes of India.

L. National Tribal Migration Repository: End to end data base of Tribal Migrants on five parameters(shramshakti.tribal.gov.in)

M. Document Management and Tracking system: Document tracking and monitoring system for enhancing work output & proper management of documents

ENABLER

Processes Re-engineered

- Use of pre-existing as well as new infrastructure and manpower resources for implementation of diversified ICT implementation on the Ministry.

- Conceptualization of Portal and use of ideas across multiple think tanks through brain storming / idea exchange for process re-engineering.
- Adaptation of consultancy mode for the technical / analytical dashboard solution to minimize the cost and attain a focused scope with involvement of existing technical manpower.
- Idea generation by involvement of other stakeholders like State Govt, NGOs, 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
- Application of data governance concept for data handling
- Holistic approach to integrate sub components of Ministry data and its processes in terms of monitoring & management.
- Use of interactive dashboard for monitoring of existing activities as well as policy making for future time.

Challenges faced in implementing Process changes

Like other e-Governance project, this project also required 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 towards methods 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 conceptualization, development & implementation of this project the Ministry has faced the following challenges:

- Integration of different sources of data at multiple level of Ministry through by adopting uniform method
- Estimation of scalability and ICT resources in terms of volume and complexities
- Completeness & consistency of data digitization 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 into a single platform with regular integration and improvement
- Interactions and data exchange with external vendors/other government departments
- Coping up with new tool / technologies specific to Data Analytics using Business Intelligence tool
- Information security aspect implementation and awareness of same among other

stakeholders

The Lessons learnt from the Process re-engineering exercise

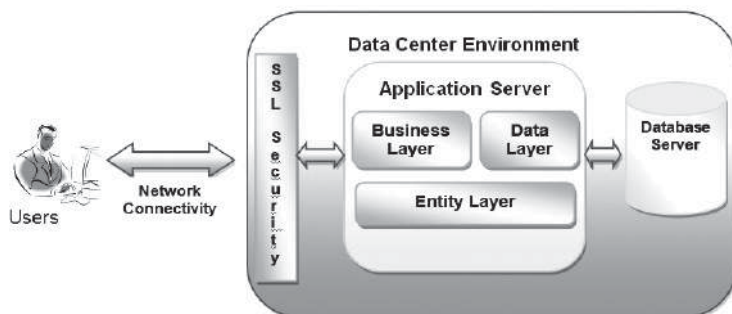
During the process of conceptualization, development and implementation of this project in Ministry of Tribal Affairs, following learnings emerged:

- For any such type of multiple sources related 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 important to keep the manpower resources and relevant stakeholders updated about business requirements and technological know-how through capacity building program at multiple levels.
- It is important to have in depth understanding with proper documentation of all levels of information of project units by involvement of multiple stakeholders so that the dependence factors can be identified for further solution.
- Selection of the right tool / technologies by involvement of suitable agencies with high expertise for long term support and high efficiency.
- Need for active involvement of both technical as well as functional level teams in collaborative manner with involving implementation agency, if any.
- 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 incorporate new suggested operational process if applicable.

Technologies

Application Flow: As below

Data Analytics:



- In the project the major components are the implementation of interactive dashboard using Microsoft Business Intelligence tool over data collected from multiple sources. The features of the implemented Data Analytics solution are 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 variants of dashboard across multiple data sources.
- Regular update of Business intelligence tool versions for latest features and security
- Proper handling of security aspects over Business Intelligence tool
- Identification of multiple use cases for advance analytics using R / Python machine learning language as future plan with integration of output with Dashboard.
- Selection of Business Intelligence tool with flexibility to cater more data sources with integration considering future need.
- Involvement of NIC having rich experience of analytics inside Government domain.
- Capacity building and grooming to existing technical team of NIC at Ministry level for long term sustainability with low cost.
- NITI Aayog in its recent report on Data Governance quality Index (DGQI), has ranked the Ministry of Tribal Affairs amongst Top 5 Ministries with respect to use of Technology. It is also the Top Ranker with 5/5 points with respect to Data Security & HR Capacity,

Technology related challenges faced: Major technological challenges faced are:

- Selection of right tool & technologies for data analytics
- Process of completion & correct data digitization with appropriate validation for high data quality
- Integration of multiple sources of data at single dashboard
- Maintenance of Business Intelligence tool over On-premise environment
- Parameterized application to cope up with rapid changing requirement
- Estimation and handling of data volume
- Setup up of disaster (off-location) recovery site
- Facility for Integration of other e-Governance projects / data
- Information Security and credential encryption
- Integration with other analytical software for Machine Learning activities
- 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 utilization of software at field level through capacity building program by involvement of appropriate authorities.
- In depth requirement understanding in term of collection and integration from

multiple sources at the time of conceptualization and planning phase only with information flow.

- Proper due diligence and understanding of environ before finalization of Business Intelligence tool / Technologies under on-premise environment.
- Need for active involvement of both technical as well as functional level man-powers during planning and implementation phase of the project.
- Need for appropriate capacity building programs by involvement of technical & operational manpower through training / awareness program.
- Need of mindset to accept change process as well as capability to incorporate new suggested operational process if applicable.
- Phase wise implementation strategy will be the better option with proper PoC (Proof of Concept) of analytical capabilities and possibilities before final launch of project.
- There is a need to regularly update the tools and technologies with security implementation.

People

Capacity Building

Leadership support for capacity building, visibility of actions with current status

Leadership support from following levels:

- 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 – NICS (Centre of Excellence for Data Analytics)
- External stakeholders like – Piramal Swasthya
- Institute of Imminence LIKE IIT D, CoE recognised by MoTA
- Hired Consultants from agencies

Capacity building

- Change management / capacity building in terms of trainings
- Conceptualization of change process as per targeted goal
- Planning and identification of stakeholders for change process
- Process Re-Engineering as per the applicability and reviews at multiple level.
- Regular periodic meetings to get the feedback and improvements
- Sessions/guidelines to data workers
- Video conference session between officials of multiple stakeholders
- training and grooming to manpower for desired output as per instruction
- Awareness and importance of data, data quality, analytics, its impact etc. through conduct of multiple workshops 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 field level/ Domain decisions)
- Hired Consultant with expertise (Consulting Activities)
- External Agencies

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 utilization & 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[s]

- Prioritize the issues in a targeted manner
- Using existing manpower and enhancing their capacities leads to better results
- Hands-on exposure to technology impacts positively
- Important to select the right candidate with right skillset for capacity building
- Need for consistent upgradation & refreshment of operational guidelines by trainings/sessions
- Awareness about importance of key factors and results is essential
- Need of business process uniformity before adoption of such projects is essential
- Involvement of functional knowledge experts leads to better impact
- Integration of implementer and end-users creates better impact
- Successful implementation of knowledge dissemination is an important factor; and for that workshop & conferences are very effective.

VALUE INDICATORS

Learnings for sharing

The Ministry of Tribal Affairs had to work on several fronts which included:

- Aligning with 41 Ministries.
- Every Ministry has its own data management and reporting system. The Ministry of Tribal Affairs had to undertake a series of meetings to align the partner Ministries to this objective and obtain the data.
- NGO partners who are implementing different projects funded by the Ministry of Tribal Affairs to improve health and Education outcomes. The Ministry has partnered with several community-based organisations to implement health projects. These projects are currently being implemented across the country. The Ministry also reached out to them to collate all relevant materials. In addition, it reached out to other partners of the Ministry- the Centre of Excellences and

Tribal Research Institutes to create a rich knowledge section.

- Lastly, working with the larger development sector and within that, the organisations who work on tribal health and nutrition, to collate their on-ground interventions.

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

In order to ensure broader dissemination, the project continuously engages with a number of not for profits and grassroot organisations to ensure that information is being disseminated to the community and the needs of the community are being addressed through project.

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.
- I 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 characterized by distinct geographical and climatic features. Known as a cold desert. With reducing precipitation, increasing average temperatures, and reduced glaciers to water the villages any-more, 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 liters 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. It will help in rehabilitation of abandoned villages and can change economy of the village by solving water problem, plantation of trees and irrigation. The stupas are source of tourist attraction and plantation of trees through community participation and engaging local in-Home Stay project will help in their economic upliftment. 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. In 2 years. Ice Stupas would be established in 50 villages for drinking water and water irrigation required for agriculture and would go a long way in changing economy of the area.

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 localized 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. The project involves preparing an integrated development solution around springs, ranging from establishing piped-water supply infra-structure for drinking and irrigation purposes to rural tribal communities. This project is broadly implemented with the help of community support, training on para-hydrologists and Online Platform – GIS based Spring Atlas. 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 spring shed and watersheds.
- 1250 Acres of land in the catchment area treated under the spring shed/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/spring sheds 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 utilization and ultimately adopting the green e-Governance.
- MoTA utilizes the service of government authorized 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 bio-diversity conservation while positioning India as the Global Leader in the field of environment and sustainable development.

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Duare Sarkar (Government at the Doorstep)

Government of West Bengal

Manoj Pant, Choten Lama and Mainak Mukhopadhyay

PROJECT OVERVIEW

Objective

Delivering services to citizens is one of the core responsibilities of any government. Services are therefore critical in shaping trust in and perceptions of the public. Due to various advances in technology, media, higher education levels, the expectations of citizens today have been raised and they seek more transparent, accessible, and responsive Government. And these expectations keep rising. Many governments, across the country are continuously striving to improve service delivery through online portals or “one-stop shops” like centralized call centres, but still struggle to meet the citizens’ expectations. It’s been confirmed via a survey conducted by the McKinsey Center for Government- those citizens continue to feel frustrated by cumbersome or confusing websites and find it is often still necessary to speak with multiple parties before their question is answered or their request is completed. There are three guiding principles to ensure that citizen satisfaction measurement efforts generate accurate, actionable insights: -

- Let citizens tell you what matters most
- Identify natural break points in citizen satisfaction
- Combine public feedback with internal data to uncover hidden pain points

The major goals of DuareSarkar (DS) programme are described as follows: -

- DS offered to citizens the opportunity to get services offered in a bouquet of twelve identified development schemes encompassing livelihoods and economy, agriculture and services, health and well-being, food and hunger, education and learning, with cross-cutting implications for gender equality, equity, and empowerment through participation in outreach camps organized at local levels.
- The government, with the intention of facilitating change, promoting equity, and achieving sustainability in the development paradigm included KhadyaSathi, SwasthyaSathi, Caste Certificates, Sikshashree, Jai Johar, TaposiliBandhu, Kanya Shree, Rupa Shree, Aikyashree, Manabik, MGNREGA, and Krishak Bandhu – all of these schemes having strong linkages with Sustainable Development Goals (SDGs).

Scope (Functional & Geographical)

- SwasthyaSathi (swasthyasathi.gov.in)
- Aikyashree (wbmdfcscholarship.org)
- Sikshashree (wb.gov.in/government-schemes-details-shikshashree.aspx)
- Krishak Bandhu (krishakbandhu.net)
- 100 Days’ Work/MGNREGA (nrega.nic.in/netnrega/home.aspx)
- Kanya Shree (wbkanyashree.gov.in/kp_4.0/index.php)
- Rupa Shree (wbcdwdsw.gov.in/User/rupashree_prakalpa)
- Manabik (jaibangla.wb.gov.in/login)

- Caste Certificate (castcertificatewb.gov.in)
- Jai Johar (jaibangla.wb.gov.in/login)
- TaposiliBandhu (jaibangla.wb.gov.in/login)

Other Schemes:

- Bangla AwasYojana
- Pension - Old Age
- Pension - Disability

The Sustainable Development Goals (SDGs) which these selected schemes aim to achieve include:

- No Poverty
- Zero Hunger
- Good Health and Well-being
- Quality Education
- Gender Equity

Inclusive and Sustainable Economic Growth and Decent Work for all: Caste certificates, being issued at the DS camps to families belonging to the marginalized community, ensure access to benefits under different affirmative initiatives of the government. The Kanyashree benefit, in convergence with other existing skill-based schemes, has armed the young girls with better vocational training and job prospects.

- Reduced Inequality
- Sustainable Consumption and Production
- Promote just, peaceful and inclusive societies
- Revitalize the global partnership for sustainable development

The basic functionalities of the Duare Sarkar portal (<https://ds.wb.gov.in>) may be summarized as follows: -

- Dashboard
- Download User Manual
- Download DS/PS Mobile App
- User Maintenance: Mobile Numbers of Officials across the State are registered in DS Portal.
- State Level Users
- District Level Users
- Block/LB Level Users

Key Stakeholders

The target beneficiary groups of the DS project are as follows: -

- Older persons
- Transgender
- People with Disabilities
- Commercial sex workers

- Remote and Rural Communities
- Prison inmates
- The Poor
- The Unemployed
- Women
- Youth

Intended benefits

DS, backed by the West Bengal Government's strong commitment to uphold citizens' rights and ensure they have easy access to the benefits under various schemes tailored for their needs, is an example of how IT systems can be designed for effective, efficient, and transparent governance with the goal of providing seamless and universal delivery of services to citizens, irrespective of gender, caste, creed, religion, or economic status.

The detailed qualitative, quantitative economic, social, and environmental impacts of the DS project are as follows: -

- Social Inclusion - Transgender, Persons with Disabilities, Sex workers
- Lowering of economic burden – SwasthyaSathi, Khadyasathi, Krishakbandu
- Access to education & health – Scholarships to different targeted communities and Swasthya Sathi
- Infrastructural need addressed through Paray Samadhan
- Strengthening of IT infrastructure to meet the demand in terms of bandwidth, server space, user-friendliness
- Improved G2G Governance through integration and convergence

Hardware/Software

DuareSarkar (DS) is hosted at West Bengal State Data Centre (WB-SDC) and it is made available at <https://ds.wb.gov.in>. The project is based on an inter-operable, browser-based application. The application complies with the Interoperability Framework for e-Governance in India (IFEG). The technological aspect datasheet of Duare Sarkar is as follows: -

Hosting environment at WB-SDC equipped with Hardware Firewalls and other network equipment, security patches are updated regularly

Followings are the deployed to implement the Duare Sarkar project: -

- Microsoft: Visual Studio 2015, SQL Server 2014, Windows Server 2012 R2, Web Server: IIS 7.0, HP DL 560 Gen8 Servers (2 x 2 App Server and DB Server), D-Link Datacenter FCoE Switches (Rijie RG S6220-48XS4QXS) – 2 numbers, EMC VNX8000 Storage, Checkpoint CPAP-SG12400-NGFW Firewall - 2 numbers
- Browser-based Application. Accessibility, Platform & Browser Independent. Security Standard followed: OWASP
- Open-Source Reporting Tool ITextSharp is used for the generation of reports for viewing online.
- Robust backup & disaster recovery mechanism with DR at National Data Centre, New Delhi.
- Load-Balancing & Always On methodologies are implemented for the

Application and DB Servers (2 + 2) at WB-SDC to ensure uninterrupted access of Duare Sarkar

- Configurable, Customizable using front end interface paving easy on-boarding of new schemes/benefits
- AI-driven trend and future prediction & prescription for better management of DS camps e.g., Queue management during peak hours, ensuring availability of specific departmental officials for handling high demand of certain beneficiary schemes in certain localities, etc.

Mobile Apps to facilitate: -

- Geo-Tagging of DS Camps across the State for ease in monitoring
- Real-time Status Reports ensuring robust monitoring and control mechanism
- Field level Inspection of Schemes under Paray Samadhan with geo-tagged photo capturing etc.
- Integration with Departmental Portals through Web API
- Online dynamic dashboard

Security aspects of DS Portal:

VAPT Test of Servers prior to deployment, implemented over HTTPS using SHA-256 with RSA Encryption TLS 1.2 SSL, OTP/CAPTCHA based 2 Step Authentication to prevent DOS/robot, Application S/w developed as per OWASP guidelines; uses standard Web technologies and techniques such as HTTP redirects, cookies, JavaScript, and strong symmetric key encryption (MD5 Hashing) both in code level & database level, role-based access to deliver the service, encoded HTML and URL outputs.

Certification (Certifying Agency)

Cyber Security Certificates received from STQC, a CERT-In empaneled agency declaring the project free from Cyber Security Vulnerabilities e.g., Cross-Site Scripting (XSS), Injection Flaws, Malicious File Execution, Insecure Direct Object Reference, Cross-Site Request Forgery, Information Leakage, and Improper Error Handling, Broken Authentication and Session Management, Insecure Cryptographic Storage, Insecure Communications, Failure to Restrict URL Access, Buffer Overflows and Denial of Service.

Disaster Recovery and Service Continuity

WB-SDC, Kolkata where Duare Sarkar Portal is hosted, has a Disaster Recovery facility with a DR site located in IDC, Shastri Park, New Delhi. Asynchronous replication over WAN using FC-IP protocol and seamless connectivity with DR site over 34 Mbps leased line minimizes any negative impacts to Duare Sarkar operations. In a nutshell, the following strategies are in place: -

- Co-located System in State Data Centre
- 2 App & DB Server with SAN Storage
- Load Balancing (Array Load Balancer) through 2 App Server following Least Connection Algorithm
- SQL Server Always on Failover Clustering between 2 DB Servers. If one of the servers, or nodes, fails, another node in the cluster can take over its workload without any downtime

RESULTS INDICATOR

Duare Sarkar (Government at the Doorstep)

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 Camps (01/12/2020 to 08/02/2021)	Camps of Duare Sarkar			32830
Total Foot Print Registered	Beneficiary Registration in Camps			2.75 crore
Total Service Delivered				1.62 crore
<i>Scheme Names& Description</i>			Total Services Delivered	
KhadyaSathi The scheme aims to ensure that almost 90 per cent of the population comes under food security			20,13,639	
SwasthyaSathi Launched on 30th December 2016, the scheme is a step to assure basic health cover for secondary and tertiary care up to Rs. 5 Lakh per annum per eligible family covered. On 26th November 2020, the state government decided to extend the benefits of the scheme to all citizens of the state.			85,13,006	
Caste Certificates It serves as a legal document and proof of an individual's belonging to a certain community and assists in eligibility for receiving benefit/positive discrimination extended by the government. Such benefits include scholarships and admissions in educational institutions funded by the government. For employment in the public sector, there are relaxations of age and educational criteria as well as reservation of a fixed number of posts for Candidates belonging to these communities.			22,10,780	

Sikshashree The scheme involves an annual grant given to SC and ST school going students belonging to Class V-VIII			31,101	
Jai Johar This is a pension scheme for members of the ST community who are above 60 years of age.			7,921	
Taposhili Bandhu This is a pension scheme for members of the community who are above 60 years of age.			39,886	
Kanyashree A cash transfer scheme aimed at retaining girls in schools and preventing their early marriage			3,65,254	
Rupashree The scheme involves one-time financial grant of Rs 25,000 for economically stressed families at the time of their daughter's marriage			98,876	
100 Day's Work (MGNREGS) Mahatma Gandhi National Rural Employment Guarantee scheme also called 'Eksho Diner Kaaj', is one of the most prominent schemes implemented in the state which specially guarantees, to every rural household, 100 days of unskilled wage employment in a financial year, in order too-set the lean agricultural period that results in unemployment and the spiraling chain of poverty.			12,12,930	
Aikyashree A scheme that aims to provide scholarship to students belonging to minority communities in the state.			5,48,477	
Krishak Bandhu It is a unique assured financial assistance to farmers and farm household families of West Bengal. Krishak Bandhu ensures a single-digitized card-based identity for all farmers of the state. The farmers with one or more acre of landholding are entitled for Rs. 5000 per annum (Rabi &			11,25,579	

Duare Sarkar (Government at the Doorstep)

KharifSeason) assistance with minimum Rs.2000 per annum assistance on pro rata basis. Under the 'Death Benefit Scheme', farm families would be receiving aone-time lump sum of Rs. 2 lakhs on the event of death of persons covered under the scheme.				
Manabik The scheme provides financial assistance to Persons having at least 40% disability and it has no income bar. The amount that is provided as monthly pension under this scheme is Rs. 1000.			46,239	
Paray Samadhan – Infrastructure Road repairs, installation of street lights etc.			7,865	
Paray Samadhan – Manpower Deployment of doctors, appointment of conservancy staffs etc.			527	
Paray Samadhan – Supply Installation of garbage bins, availability of drinking water etc.			1,408	

Implementation

Though the project is primarily targeted at the elderly & weaker section of the society, the benefits accrue to the entire population of the State (~9.12 crores as per Census 2011). Local-level camps were organized to cover 100% of the habitations in the state. All 23 administrative districts, including the 344 Development Blocks, 118 Municipalities, 7 Municipal Corporations within such districts, in the State of West Bengal were covered under the Duare Sarkar project. The Duare Sarkar project worked on the Spoke-Hub model, where the DS portal hosted at WB State Data Centre is the hub for e-delivery of services to all its stakeholders. The beneficiaries under Duare Sarkar include senior citizens, persons with disabilities, transgender, commercial sex workers, prison inmates, the poor, and the marginalized. The outreach camps in gram panchayat / ULB Ward levels across the state acted as extended delivery centres to register intending beneficiaries and subsequently the desired services to the citizens at the grassroots level. Though the project is primarily targeted at the elderly & weaker section of the society, the benefits accrue to the entire population of the State (~9.12 crores as per Census 2011). To ensure that targeted goals are achieved, the Impact Assessment of Duare Sarkar was made with the following 2 major objectives: -

- To quantify the satisfaction amongst beneficiaries about Duare Sarkar initiative
- To understand the significance of this initiative and the perception of the beneficiaries. The conclusion from Calling and IVR: -
- Nearly 95% of beneficiaries responded that they were satisfied with the 'Duare Sarkar' camps with beneficiaries from Dakshin Dinajpur most satisfied (98%)
- As per IVR analysis, more than 80% of beneficiary believes that 'Duare Sarkar

initiative also helped the common people across West Bengal

Improvements/ Enhancements

The Duare Sarkar portal was set up at the end of November 2020 to support the ambitious 60-day (subsequently extended) Duare Sarkar outreach campaign of the Government of West Bengal. The prime goal of the campaign was to deliver services to the citizens of the state through the organization of local level camps in such a way that it became convenient to the citizens to go to the camps and access these services.

ENABLER

Processes Re-engineered

DuareSarkar is a strategy employed by the West Bengal state government to improve the delivery of benefits of existing schemes to citizens by bringing the administrative machinery physically closer to the intended service recipients. Instead of relying on the old “supply-driven” government service delivery model, demand for services was generated at the grassroots through sharing of information about schemes, eligibility criteria, etc. and then outreach camps were set up where members of the public could easily access the administration and avail the desired services.

Technologies

Duare Sarkar is developed as a web-enabled application and hosted in the West Bengal State Data Centre (WB-SDC). The stakeholders access it through a web browser (client application). The project is developed with ASP.NET 4.5 as Frontend and MS SQL Server 2014 as Backend Database. The database is mounted on Windows Server 2012. The related ICT solution also constitutes JavaScript, CSS, Open-source reporting library iTextSharp, NIC SMS gateway, Android-based Java Application, Adobe Flash Player, IIS Web Server 7.0, XML, and Service-Oriented Architecture (SOA). Because of its Responsive design, Duare Sarkar is accessible through web browsers from PCs, Smart Phones, Tablets, etc

Leadership Support

“Duare Sarkar” has been conceptualized by Smt. Mamata Banerjee, Hon’ble Chief Minister of West Bengal as an initiative for her government to reach the citizens of the state and to deliver to the government services and entitlements at their doorsteps through the organization of local-level outreach camps. After this idea was shared by the highest political executive of the state and responsibility of implementation thrust upon the shoulders of the state government machinery, the Duare Sarkar campaign was launched in right earnest to achieve the goal of reaching government services and schemes to the unreached. Their respective heads and nodal officers are presented in the below table:

Task Force / Project Monitoring Team	Head	Nodal Officer(s)
Tier-I	Shri A. Bandyopadhyay, IAS, Chief Secretary to the Government of West Bengal	Ms. Choten Lama, IAS, Secretary to the Government of West Bengal & State Nodal Officer, Duare Sarkar
Tier-II	Shri HK Dwivedi, IAS Additional Chief	

	Secretary, Planning, Statistics & Programme Implementation Department	
Tier-III	District Magistrate of concerned districts	Officer Nominated by DM
Tier-IV	Block Development Officer (BDO) of concerned Blocks	Officer Nominated by BDO

- Task Force / Project Monitoring Units worked round the clock and reviewed implementation status.
- A full-time dedicated team comprising of Senior Software Developers, Software Developers, and Software Support Personnel were engaged by the Planning, Statistics & Programme Implementation Department which worked under the guidance of NIC
- Help Desk support and trouble-shooting units were set up under a team of young IAS officers, given geographical and subject jurisdictions. This team of officers worked in close association with the Technical Team.

The PMU of Tier-II was responsible for (a) the Creation of User Credentials for Tier-I and the Heads of Tier-III. Duare Sarkar system-generated Secret Pins for the registered Mobile numbers were sent as SMS to concerned users (b) Creation & Maintenance of Master tables of Duare Sarkar under their purview (c) Arranging Training/Workshops on Duare Sarkar (d) Submitting Implementation Status Reports to the higher-level PMUs for review of Duare Sarkar (e) Interacting with NIC for Technical issues as and when required. Considering the criticality, reach, and extent of Duare Sarkar and to ensure its smooth execution, State Government issued notification vide Memo No. 01/DS/P&S/20 dated 26th November 2020 towards the formation of DS Monitoring Committees were constituted at different levels:

State Level Apex Committee under the chairmanship of the Chief Secretary, Government of West Bengal was formed with the following members:

- Additional Chief Secretary, Agriculture Department
- Additional Chief Secretary, Home & Planning, Statistics & Programme Implementation Department
- Additional Chief Secretary, Panchayats and Rural Development Department.
- Director General of Police, West Bengal
- Principal Secretary, Finance Department
- Principal Secretary, Backward Classes Welfare Department
- Principal Secretary, Tribal Development Department
- Principal Secretary, Urban Development and Municipal Affairs
- Commissioner, Kolkata Municipal Corporation
- Secretary, Women and Child Development Department
- Secretary, Food and Supplies Department
- Secretary, Non-conventional and Renewable Energy Resources Department-Convenor and State Nodal Officer

- Secretary, Information & Cultural Affairs Department
- Secretary, Minorities Affairs and Madrasah Education

A State Level Task Force for "Duare Sarkar" became functional under the Additional Chief Secretary, Planning, Statistics & Programme Implementation Department comprising of the following officials:

- Smt. Choten D Lama IAS, Secretary NRES Department
- Secretary Information & Cultural Affairs Department
- Secretary and OSD in Chief Minister's Office
- Secretary, Health Department
- Additional Secretary, Tribal Development Department
- Special Commissioner, Kolkata Municipal Corporation
- Additional Secretary, Backward Classes Welfare Department
- Commissioner Urban Development & Municipal Affairs Dept
- Special Secretary, Minority Affairs & Madrasah Education Department
- Special Secretary, Food and Supplies Department
- Special Secretary, Women and Child-development and Social Welfare Department
- Special Secretary, Agriculture Department
- Director Information & EO Joint Secretary
- Joint Secretary, Panchayats & Rural Development
- Joint Secretary, Finance Department
- C. At the District Level, a District Task Force with the following members was engaged to ensure success
- of the "Duare Sarkar" initiative:
- District Magistrate - Chairperson
- Commissioner of Police/Superintendent of Police
- Additional District Magistrate/s looking after the respective Schemes identified
- All Sub Divisional Officers
- District Head/ Nodal Officer of the concerned department
- District Information and Culture Officer
- District Informatics Officers of NIC

At the block level, Block Level Task Force worked with the following members:

- Block Development Officer - Chairperson
- Officer in Charge of the PS or his representative not below the rank of SI.
- Block Level Official of the Concerned Departments
- Extension Officers
- There was an initial top-down push from the DS State level leadership to drive adoption and fill rate, beyond which it became a self-fuelled engine driven by the field level officials who executed the outreach camps.

Capacity Building: - A comprehensive capacity-building exercise, designed to train to participate departmental officials and the field level officials of the Gram

Panchayat / Municipal Ward levels (identified for operating Duare Sarkar beneficiary registration system in Camps or Mobile App based Field-level Inspections) to use the new system, preceded the implementation of the project.

VALUE INDICATORS

Learnings for sharing

The key challenges faced by the Government before deployment of the Duare Sarkar project may be summarized as follows:

- Ensuring COVID protocols were followed in Camps. Emphasizing and reinforcing measures to prevent infection with the aid of posters, audio-visual aids, signs, and visual cues in addition to engaging volunteers.
- Ensuring uninterrupted internet connectivity in camps mainly in remote rivers in islands and hilly regions.
- As there was the deployment of a large number of personnel, they required training at various levels for different activities in the camps
- Short-training & motivational programs were arranged for the field-level officials to address the issue of limited computer literacy and tech-savviness

The major issues identified prior to the implementation of Duare Sarkar were related to:-

- Lower bandwidth & intermittent Internet connectivity and
- Interrupted power supply in different DS camp locations throughout the State, particularly in rural areas.
- Providing Seamless e-Services to thousands of concurrent users
- Providing multiple real-time transaction status reports at various levels

To overcome the aforesaid challenges, the following measures were initiated: -

- Responsive design of the DS portal to make it accessible even through Mobile devices
- Mobile App to capture DS Camp transactions
- State of the Art Web Server, Application Server, and Database Servers installed at WB-SDC with disaster recovery facilities are being used for providing seamless e-Services to the external stakeholders.
- 2x2 App and DB Servers with Load Balancing and SQL Server Always ON were made available for ensuring 24x7 availability of DS portal without any downtime
- Measures are taken at the application level to generate database view-level MIS reports on real-time transactions from the MIS (replica DB) server.

Digital Empowerment

The introduction of Duare Sarkar has resulted in the following positive externalities in the area of digital inclusion:

- With regards to financial inclusion, the campaign initially did not include banking as a service, mostly because the state itself was in innovation mode.

However, as the model became a tested one, capable of being scaled up and replicated, financial inclusion was identified as one of the major areas where government intervention would be required. Accordingly, though not directly under its control, the state government reached out to the State Level Bankers Committee seeking assistance and support in this regard.

- Apart from the opening of bank accounts, due to the fact that most of the schemes which have been included in the campaign consist of an element of DBT, the deeper the coverage of the service recipients, the deeper is the financial inclusion in the state. Also, the authorities in the Postal Department were also reached out to help in those areas where there is no coverage of banks.

Green e-Governance

ICT facilities created under the Duare Sarkar project have taken care of green e-Governance to the extent possible: -

- Obviated the need for taking printouts by ensuring easy retrieval of data at any time through the electronic information management system
- Huge savings in terms of travel due to the curtailment of the requirement for citizens to make multiple trips to administrative departments/offices.
- Duare Sarkar service recipients are not required to visit the Dept. for getting their investment support and hence saving them time and travel costs.
- Information sharing and communication amongst offices at all levels using strong MIS built into the project has reduced the need for manual delivery of information which in turn further rationalized vehicle use and reduced carbon footprint.
- Sending SMS Alerts to the Duare Sarkar Beneficiaries Mobile Numbers, providing them the status of service requested.
- The need for sending hard copies of reports to higher authorities was reduced and most of the updates were sent through system-generated SMS, emails, and also through Mobile Apps/ online eco-friendly portals.
- To save resources and power, the existing ICT facilities like West Bengal State Data Centre and the existing PCs/Laptops already available through departmental budgetary provisions have been repurposed.

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Kritagyata - Pension Sanction and Payment Tracking System

*Department of Administrative Reforms, Training, Pension and Public Grievances,
Govt. of Assam & National Informatics Centre Assam State Centre*

Suchitra Pyarelal, Kavita Barkakoty, Manabendra Goswami and Bandana Dutta
Tamuly

PROJECT OVERVIEW

Objective

Kritagyata is an online pension sanction and payment tracking system which aims to reach pensioners and bring them under a 'one-stop solution' digital platform with the features of Timely and accurate calculation of retirement dues. It helps Retirees to fill their forms from home or any other location and helps to track the status of pension.

- Submission of forms by the retiree well in time before the date of retirement. Time delay is minimized. No chance of misplacement of documents.
- Trouble of filling in repeated details of name and address is minimized.
- Correction in forms can be done by the office if required
- Online return and receiving are possible. Online verification of documents is available.
- Online Approval and Generation of Pension Payment Order.
- Online verification of scanned service documents. No manual calculation.
- Tracking of Grievances.
- Monitoring of updated status.

Key Stakeholders

- Retiree
- DDO and Head of Offices (Custodian of Service Book)
- Director of Pension
- Accountant General, Assam

Intended benefits

Intended to deliver Pension and other Pensionary benefits on the next date of Retirement. Approximately 1700 cases have been processed and 807 PPO have been generated.

Current Status

The Project covers the State of Assam and has presently been adopted across the state in around 128 offices under Education Department for online PSU/Department Pension Processing of School Teachers.

Hardware/Software

- Technology (OS, App, DB)
- OS: Windows Server 2016, Data Centre Edition
- Web Server: IIS 10.0 with .Net framework 4.7
- DB Server: SQL Server 2012 Enterprise Core
- Deployment model (Tenancy)

- VM 1: Database Server
- VM 2: Webserver
- Deployed on Cloud. Cloud Location: Assam State, Guwahati

Certification (Certifying Agency)

Extension Permission for hosting the site/application on NIC Cloud had been granted without completion of security audit on 9/5/2021 11:14:29 AM. Security audit at BBA level 2 is completed through the Regional Centre of Excellence for Application Security, National Informatics. The BBA level 2 report was created by IBM Security App Scan Standard 9.0.3.13 iFix001, Rules: 19712 Scan started: 1/20/2021 3:58:42 PM

Disaster Recovery and Service Continuity

The process has already been started for hiring the DR site at NDC. Currently NIC State Mini Data Centre, Assam has maintained backup storage having space of 100TB. Present all data backup are maintained separately. Scheduling for incremental backup is done on daily basis and full back up through 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
DDO Interface	Creation of user id and password and personnel details of the Retiree. For online submission of forms and uploading facility.			2051
Retiree Interface	Alerts receive about the creation of user id and password. Online submission of forms and uploading facility. Action taken history can be viewed at every stage of processing. Submission of Grievances.			2051
Head of Office Role	Verification forms online; Return and Receive online in case of any correction. Scanning and uploading of Service Verification Report along with Service Book. Generation of Pension Calculation Sheet. Approval and forwarding to Director of Pension.			1783

Director of Pension	Approval of Form-7; Calculation sheet. Generation of Pension Payment Order. Maintenance of Action History and other details of each Retiree. Maintenance of Tracker Report.			PPO issued – 807 PPO not issued- 959 PPO Returned -17

Implementation

All District Offices dealing with the Pension cases of Provincialized School Teachers and Employees are covered. Target achieved during June 2021. All the features applicable for submission of forms, approval of pension calculation sheet, and forwarding with scanned documents of Service Matters are incorporated.

Improvements/ Enhancements

- Online uploading of Service Book is introduced.
- Tracker is introduced to identify resubmission of files after a return.
- PayScale Management is introduced in case of pay fixation to be done in view of Specific Court order
- Features of viewing every action as per the timeline are enabled at the Retiree interface.

ENABLER

Processes Re-engineered

- Filling of forms is limited to 7 against the earlier requirement of 14 in numbers. Repeated filling of the same data is not required for every action that is required during the process.
- Physical visits of the Retiree to the Administrative Office are minimized.
- Sending Service Books to be dispensed with. Scan copy can be uploaded.
- View of PPO details of Pensioner's Portion with the credential of Retiree

Technologies

- The Kritagyata portal adheres to the responsive web design.
- The data/content through the web services are digitally processed and verified with the concerned officers with their user credentials.
- The portal adheres to the security guidelines of the Regional Centre of Excellence for Application Security
- Analytical reports are available.

People

Key criteria for the success of such a wide-scale adoption of the State e-Governance Portal are the multifold Capacity Building exercises taken up.

- Online training at regular intervals for both the Department users and Retiree

- Specific Capacity building program for Head of Offices.

In addition to this training the following steps were taken for smooth handling of user queries and issues:

- Modular Training through Video conferencing
- Provision of trained onsite support personnel to be positioned dedicated in the Department through PMU.
- Availability of demo portal for hands-on and practice with mock Retirees/HOO.

Encouragement and Recognition:

- Workshop for Users of Kritagyata portal is also being conducted at Assam Administrative Staff College at regular intervals for imparting full physical training including discussion of queries and feedback from the users

VALUE INDICATORS

Learnings for sharing

Major learning with this widespread implementation across the State in varied kinds of offices 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 accelerate the pace.
- Systems must not be thrust upon users; they must win the acceptance of users for wide adoption
- Periodic reviews and higher targets.

Digital Empowerment

- All Stake Holders across the State, irrespective of geographical location, may access submission /verification, etc.
- All calculations relating to Pension and other Pensionary benefits can be processed by Departments, encompassing various types of activities
- 24 X 7 availability of the portal with Comprehensive Information for all stakeholders.
- Pension Process Status and other decisions are available in the public domain, empowering Departments and Retirees to alike.

Green e-Governance

- Implementation of online Pension Sanction and Tracking reduces the use of Physical and incomplete submission in the Administrative Offices and Physical Visit of the Retiree to the concerned Offices.
- Digital Archival of Documents.
- Online Reports Generations.

- Easy access to each module for Pension processing.
- Offices have lesser documents to maintain.
- SMS Alerts for every action taken.

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National Helpline against Atrocities on SC/ST Members under PCR Act 1955 and POA Act 1989

***Ministry of Social Justice and Empowerment, Govt. of India &
National Informatics Centre, New Delhi***

R Subrahmanyam, Bharat Lal Meena and Arpita Barman

PROJECT OVERVIEW

Objective

States and Union Territory administrations are the implementing authorities for the Protection of Civil Right (PCR) Act, 1955 and Prevention of Atrocities Act (POA) Act, 1989 and Ministry of Social Justice and Empowerment is the nodal authority for monitoring the implementation of both the Acts.

- Based on the utilization certificate and the proposal received from States/UTs, Central assistance (CA) is provided to State Governments and Union Territory administrations for the following activities under the Centrally Sponsored Scheme for implementation of the Protection of Civil Right (PCR) Act, 1955 and Prevention of Atrocities (POA) Act, 1989:
 - Functioning and strengthening of scheduled castes and scheduled tribes protection cell and special police stations,
 - Setting up and functioning of exclusive special courts,
 - Relief and rehabilitation of atrocious victims,
 - Incentive for inter-caste marriage where one of the spouses is a member of a Scheduled caste,
 - Awareness generation.
- The funding pattern of the Scheme is such that, over and above the committed liability of respective State Governments, the expenditure is shared between centres and States on a 50:50 basis, and UTs receive 100% Central Assistance. Central Assistance is released based on utilization certificates furnished by the States/UTs. As per rule 12(4) notification dated 31.03.1995 and further amended and notified on 14.04.2016, the District Magistrate or Sub -Divisional Magistrate or any other Executive Magistrate shall make necessary administrative and other arrangements to provide relief in cash or in-kind or both within seven days to the victims of atrocity, their family members and dependents according to the scale as provided in Annexure-I read with Annexure-II of the schedule annexed to these rules and such immediate relief shall include food, water, clothing, shelter, medical aid, transport facilities, and other essential items.
- Notional/Adhoc amount without receipt of utilization certificate is released by this Ministry in the first quarter of the financial year for ensuring that no atrocity victim is left without receipt of relief due to shortage of Central Assistance. At present, the mechanism is not available to know the total cumulative expenditure incurred and the unspent amount available with State/UTs in a particular month for the current financial year to enable this office to release further Central Assistance. Therefore, a mechanism is required to track the record of expenditure incurred w.r.t. number of atrocities commissioned against SC/ST victims. A self-actualized IT-based system is required to be established so that States/UTs can

make entries of expenditure incurred and cases registered across State /UTs. If any grievance is there then an IT-based system should be made accessible through e-messaging or e-voice system to arrange immediate corrective action by executing authorities based on auto reporting done by a call Centre with a web-based self-service portal as per the Protection of Civil Rights (PCR) Act, 1955 and Prevention of Atrocities (POA) Act, 1989.

- Grievance's redressal mechanism: If any grievance is there then an IT-based system should be made accessible through e-messaging/text or Interactive voice response system (IVRS) to arrange immediate corrective action by executing authorities based on auto reporting done by the Call centre with the web-based self-service portal as per the provisions available in the Protection of Civil Right (PCR) Act, 1955 and Prevention of Atrocities (POA) Act, 1989.
- Auto compliance of the Acts: Arranging auto compliance of provisions of the Acts and its rules like arranging relief within 07 days of lodging FIR, filing charge sheet within 60 days of registering FIR, and arranging State, District, and Block level Vigilance and Monitoring Committee meetings, etc. It is pertinent to mention here that more than 50000 FIRs are registered every year for which relief and other bits of help are provided by States /UTs and so grievances of the victims are required to be redressed as per the provisions of the Act.

Scope (Functional & Geographical)

- Establishment of 24x7 Call Centre: a Toll-Free Call Centre with a web-based self-service portal which would be a self-actualized system to generate awareness and ensure effective implementation of the Acts and its rules under the Centrally Sponsored Scheme; is needed in the country. This call center would be specific to the PCR Act, 1955, the POA Act of, 1989 and rules thereon. Web portal for the call center for effective implementation of the Acts and monitoring.
- Design, development, and implementation of self-service helpdesk and grievance redressal system.
- Technical support during implementation and operation of the Call Centre system and help desk portal. Operation and maintenance of the call center.
- Coordinate with the ministry in PAN India rollout.
- Mobile application

Key Stakeholders

- Ministry of Social Justice and Empowerment as the central nodal agency for funding and monitoring of the scheme and acts.
- State/UP welfare departments as state nodal agency for implementation of the scheme, fund disbursement, and monitoring at the state level.
- The District Magistrate/District Collectorate as implementation and sanction of funds as per the Acts.
- Ministry of Home Affairs at State level for registration of FIR, investigation, and submission of Charge sheet as per the Acts.
- Courts for prosecution and disposal of the cases as per the acts.

Intended benefits

- Single point of contact for citizens.

- Awareness about the Act.
- Effective implementation.
- Timely registration of FIR, the release of relief, completion of the investigation, submission of the charge sheet, and disposal of the case in a time-bound manner.
- Effective monitoring by all Nodal authorities.
- Complete electronic trail from complaint registration to disposal.
- Effective utilization and monitoring of funds.
- Improve in accountability of the implementing agency.

Unlike exiting helplines and call centers, this application is an integrated model of 3 different systems i.e., Call center, helpline, and grievance redressal. The application is also integrated with many external systems as NGO Darpan from Niti Ayog, ICJS from MHA, email, cloud, and SMS system from NIC, Toll-free/PRI service from Telecom Service provides as Airtel, BSNL. The next phase will have integration with PFMS from M/o Finance, eCourt System, CCTN system from MHA and State home department, etc.

Hardware/Software

Call Centre software

Technology	Specifications
Technology Framework	Asterisk an open-source framework
Languages	Python, PHP
Operating System	Linux
Database	MySQL 5.5 +

The Call Centre system and CRM are integrated using API with the NHA application. Open-source SIP phone X-lite is used at the Call Centre system for Voice communication. The Call Centre system is integrated with the ISP system for identification of the location of incoming calls and forwarding to statewide/language-wise campaigns. The campaigns are programmed to respond in local language and also a provision to select the language preferred i.e., Local, Hindi, or English. The call will be forwarded to the operator in the central campaign if the local operator is not available or busy. The call center operator module has a single sign-on to both the call Centre CRM and the NHA application.

Hardware for call Centre System: 2 nos. of 2U rack servers of the following specification

- HDD-1TBx2
- Memory-32 GB
- CPU—2.4 MHZ Intel(R) Xeon(R).

Software details of Self-Service Portal

Technology	Specifications
Technology & Framework	PHP 7 + -- CakePHP (3.3.x)
Languages	English
Operating System	Linux
Database	MySQL 5.5 +
Email / SMS	SMTP / SMS Gateway

Web Server	Apache 2.4.x with PHP 7+
Script	JavaScript, HTML 5
PHP / Apache modules	PHP – GD Library, bcmath module, OpenSSL, module, PDO, PDO_PGsql, module, curl, Apachemod rewrite should be enabled.
Other	Ability to set up Cron Jobs Ability to override options using. htac cess

Hardware details of the Self-Service Portal: The servers are located and hosted in NIC Cloud. # VMs of the following specification is allotted

Hardware	Details
OS	RHEL 7.0
VM	3
VCPU	16 (May need to extend based on user traffic)
RAM	64 GB (May need to extend based on user traffic)
HDD	200GB (may need to extend, based on data)

Certification (Certifying Agency)

Yes, 3rd party auditing by CERT-In empaneled auditor AKS

Information Technology Services Pvt Ltd as well from Nic Application Security division before public hosting

The application is available at <https://nhapoa.gov.in>

Disaster Recovery and Service Continuity

Presently there is 2 sets of servers for the Call Centre application and the self-service portal is hosted in NIC Cloud. Presently 4 VMs are allocated for the same.

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
Implementation of provisions of the Act and its rules	- Lodging of FIR immediately - Providing relief within 07 days - Filing charge sheet within 60 days - Disposal of cases within 60 days of filing Charge sheet			Starting in the month of April 2021
Grievance redressal and	- Registration of grievance - Redressal of grievance and tracking of status			Starting in the month of April

awareness generation	Auto escalation if not redressed as per the Act provisions			2021

Implementation

Presently the application is available to the public where complaints can be registered. The 24x7 call center in Hindi and English is operational. IVRS in 22 Languages operational from PAN India. The hiring and training of call center operator in 22 regional languages are under process

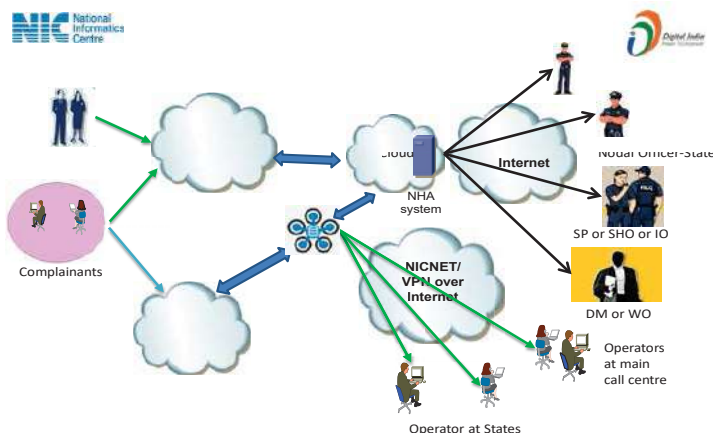
Improvements/ Enhancements

Roll out in 3 states had been completed and remaining under process. The state welfare department has to hire operators in regional languages and create IT infrastructure. PAN India rolls out is expected to be completed as soon as the state welfare depart is ready.

ENABLER

Processes Re-engineered

This application has an integrated system where complete automation is done from the time a call is made to the call center till the conclusion. It is a completely automated process flow as per the process defined in the PCR and POA acts, complete tracking of the complaint till disposal and monitoring of each call, complaint, FIR, Relief, and disposal. The application is as per GIGW and responsive for all browsers, devices, and networks. It also has a mobile application for dedicated use. The Call center is using the latest technology using SIP and VoIP. Though the Call Centre infra is installed in central NOC, the call center operation can be started for any location with just a desktop and Internet connections.

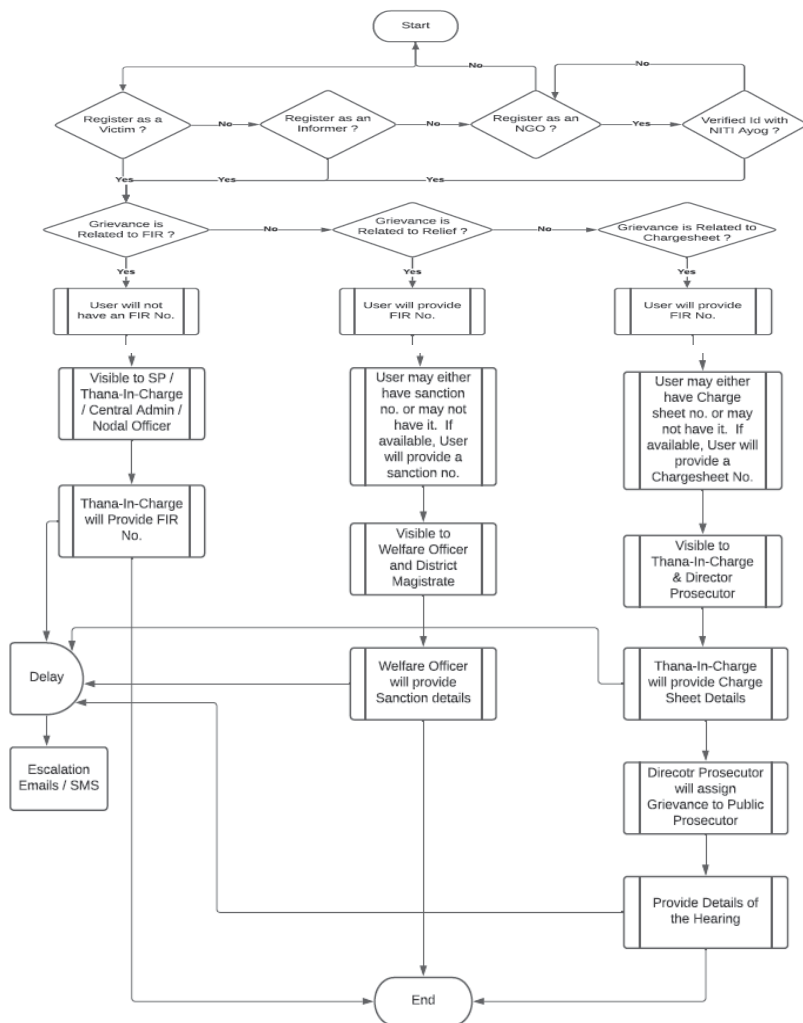


IHA project

6

The Software has complete workflow and implementation of the PCR Act 1955 and POA act 1989.

National Helpline against Atrocities on SC/ST Members



The application is integrated with another external system through Bharat API Gateway. The Application has the following features and Modules.

- Masters Management for all tables created as User type, functional, FAQs, Escalation matrix, notifications, details of the state, district, blocks, PS as per LG directory.
- User Management for registration, verification, login, profile updating, reset password with auto notification. Officer's login for Resolution officers.
- Registration of grievance
- Track the Complaint
- Dashboard for the public, Users, NGOs, and Resolution officers

- Auto escalation as per the POA act.
- Auto as well as manual Assigning of Complaint.
- Inbuilt audio-visual tutorials and manuals provided.

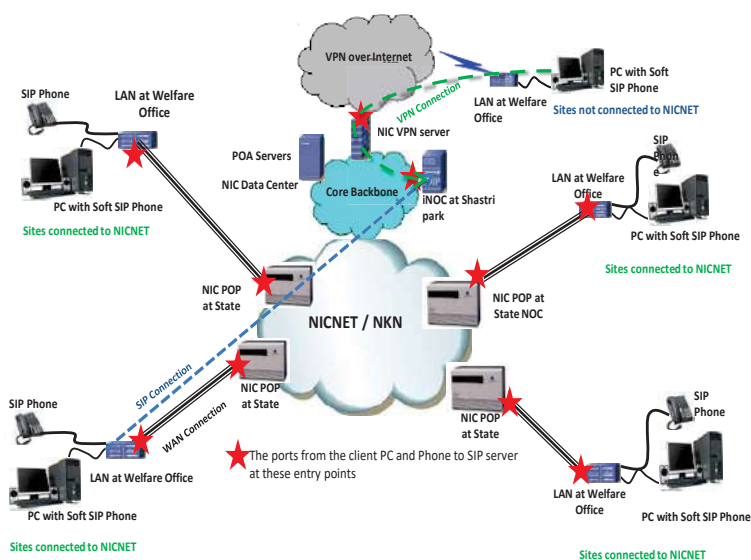
Technologies

Call Centre Architecture

The Call Centre servers and PRI link shall be terminating at NIC iNOC at Shastri Park. The complete system shall have complete redundancy and failover. The communication shall be through SIP technology within NICNET/NKN and with Remote VPN for locations not presently connected to NICNET/NKN. A Layer 2 VPN shall be created for connecting all State Welfare departments over NICNET/NKN. In Phase II, in those locations where NICNET/NKN connection is not available, the respective departments shall connect to the nearest NIC POP through Leased Line/ SDWAN.

The network diagram is enclosed for reference.

Multi-location and Multi-lingual Call Centre for POA project of M/o Social Justice and Empowerment



The State Welfare Department shall procure the desktop with Headphones and connect to the VRF network at each State Welfare department with a minimum of one operator for 24x7 operation. The operators/Agents shall be provided a softphone on all desktops and one IP phone.

Self-Service Portal.

The application is developed in HTML, CSS and Bootstrap for frontend, and Cake PHP for backend and APIs. Apache Web server is used. Deployment architecture is as follows.

People

All the stakeholders of the Act like SHO/In-charge of the police station, SP, DSP, DM, DGP, and Secretary/Principal Secretary of the Welfare Department at States/UTs have been made accountable through this web-based service portal. So, capacity building is the inbuilt feature of the project.

VALUE INDICATORS

Learnings for sharing

Awareness generation is one of the objectives of the project. It provides every information about the Act and helps in its execution effectively.

Digital Empowerment

It is an effort to make provision of the PCR and POA Acts IT-enabled so that same can be implemented electively through a web-based self-service portal.

Green e-Governance

It is 100% GO green.

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Online Social Security Pension (RAJSSP)

Department of Social Justice & Empowerment, Govt. of Rajasthan & National Informatics Centre Rajasthan State Centre

O. P. Bunkar, Suresh Gupta and I. D. Variyani

PROJECT OVERVIEW

Online Social Security Pension System is an e-Governance initiative of Government of Rajasthan for effective and timely disbursement of Social Security Pension. It is a web-based solution to facilitate and maintain Pensioner information, verification of pensioners, Sanctioning of pension and Disbursement of pension Payments. The Application facilitates electronic payments as well as payments through Electronic Money Order/Money Orders. The software is being used in the treasuries, Sub-treasuries, Offices of Sanctioning authorities e.g., Sub divisional Officers (SDO) and Block Development Officers (BDO) and verification authorities e.g., Tehsildars. It covers various Social Security pension schemes of Government of Rajasthan. The application has also been integrated with the various projects of the state that includes E-Mitra/CSC, Jan Aadhaar and UID projects to facilitate online application from applicant and Yearly verification of the pensioners.

Goals & Objectives

State Government of Rajasthan is committed to place high premium on providing social assistance to weaker sections of the society. Efficiency and transparency in disbursement of the social security pension is one of the utmost priorities for the Government. To ensure transparency and accountability in government financial Transactions, State Government has taken up this project. This is an e-governance initiative for effective and timely disbursement of Social Security pension.

The Objective of the project was:

- Provide citizens better access to information for transparency and public accountability.
- Social Security Pensioners portal.
- Efficient processing of pension sanction and disbursement.
- Effective Planning and monitoring.
- Electronic Payments.
- Robust MIS as a tool for better Decision Support system.
- Hassle-free & timely pension payments.
- Interface with Banks and Post Offices for Pension Payments and Reconciliation.

The application is operational across the state and being used extensively for the Pension Sanction, Verification and Payments. It is well integrated with the important projects of the state and UID.

Salient Features

- Integrated with six different applications that include E-Mitra, Jan Aadhar, UID, SSO, Pay Manager and Rajkosh Applications.
- Local Language Interface
- Role Based system
- Work Flow based Application

- 24 by 7 accessible
- Electronic Payments
- Handling Large volume of Pensioners (86 lakhs Plus)
- Being used across the State

Current Status

The application is in use across the State. The Centralized electronic payments are being made using this system. Online Application and Yearly verification process through Kiosk/E-Mitra with biometric authentication is being used. The Integration with UID interface and Jan Aadhar Platform is working fine. Overall, the application is being fully utilized and operational across the State. It is handling large volume of 86 lacs plus pensioners.

Hardware/Software

Application has been deployed at State Data Centers where rack servers are installed.
OS – Windows Server 2012

Database– SQL server 2014 Web Server – IIS

Application deployed in dot Net Technology.

Certification (Certifying Agency)

Yes, the application has gone under security audit by CERT-IN empaneled agency “CyberQ Consulting Pvt. Ltd.”

Disaster Recovery and Service Continuity

Presently Application is hosted at NIC State Data Centre. Software oriented database backup and redundancy are in place. DR plan is under 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
Pension Payment	It facilitates monthly payments to pensioners either through Electronic Payments in to Bank Account or through Money Order.	7,73,75,374	8,90,91,968	9,19,64,366
Pension Sanction	It facilitates applicant to apply and get sanctioned the application through online services of E-Mitra/CSC.	7,82,078	11,61,235	7,82,285
Jan Aadhar Service	It facilitates to get data directly from State Resident Hub to avoid data feeding.	10,35,172	11,76,526	10,94,146
Yearly	It facilitates yearly verification biometrically using Thumb	52,41,722	61,15,462	62,59,213

Verification	impression and Aadhaar at E-Mitra/CSC kiosk.			

Implementation

Stake holder inclusiveness and participation:

- Sanctioning (SDO, BDO) & Verification (Tehsildar) Authorities (Approx. 750)
- Treasuries & Sub-treasuries (287)
- Departments – Finance Department and Social Justice & Empowerment Department
- Pensioners (86 lakhs Plus)
- Post Offices & Banks
- E-Mitra/CSC.

Geographical Area Spread:

Over 86 lakhs pensioners covering around 250 sanctioning authorities' offices of the 34 treasuries and 253 sub-treasuries of Rajasthan State are covered under this project. The System is running in treasuries & sub-treasuries, SDO and BDO offices of the Rajasthan.

Improvements / Enhancements

Social Pension application is being used extensively in the State. It has facilities for Application Receiving, Sanctioning, Verification and Payments. The major activities which were extended during last one year includes-

- Centralized Pension payments through One DDO-One Treasury.
- Auto Processing of Pension.
- Auto Escalation of Application Verification and Sanction.
- Auto Sanction within specified time frame.
- Paperless application.
- Kisan Pension Yojana
- Yearly verification process through UID biometric authentication.
- Online Application through E-Mitra/CSC and SSO of the State
- Electronic Payments.
- SMS Services on Sanctioning and Disbursement of Pension.
- Intimation of Sanctioning of Pension through Voice Call.
- Integration with Jan Aadhar Platform.

The Major outcomes and achievements of the project are:

- Software is being used by around 750 locations covering 86 lacs beneficiaries.
- Software helped to identify the duplicity of pension cases.
- Timely Sanction and Disbursement due to Single DDO- Single Treasury.
- Sanctioned within Time frame due to auto sanction Process.
- Consolidated Database of the pensioners is available with the Department.
- Online Application at E-Mitra/CSC reduces physical presence at far offices and applicants are not required to move instead they get services at door as there are around 44,000 E- Mitra/CSC kiosk across the State.
- Aadhaar Integration has helped to ensure uniqueness and identify duplicity.
- SMS services ensure the information about payment and sanction of Pension.
- Money order writing is a repetitive job as it is prepared on monthly basis. Therefore, considerable Manpower efforts are saved using this software and staff

can spend more time in other creative activities of the offices.

- Electronic Payments has made the payment disbursement faster and makes the environment green friendly as it saves lot of papers due to non-requirement of generation of Money Orders.
- Taken up Business process re-engineering by streamlining manual practices.
- Online Status enquiries of pension cases reduce physical movement by pensioners.
- Faster payment processing and disposal of pension cases as data are available on line.
- Helped decision makers as database is available online in various formats.

Innovative Ideas

- Single DDO-Single Treasury for Payment process and disbursement.
- Auto Pension processing.
- Auto sanction and verification in Specified time frame.
- Yearly verification process through UID biometric authentication was introduced.
- Integration with Jan Aadhar Platform and Online Application through E Mitra/CSC.
- Electronic Payments was introduced which saves crores of rupees as a commission of Money order and lots of paper are saved by not printing Money Orders.
- Intimation of Sanctioning of Pension through Voice Call was introduced.

Pre-Deployment scenario	Post-Deployment scenario
No single point of information was available. Whenever information was required to be captured, it was collected either through Phones from various locations or was used earlier available information.	Online Application (https://rajssp.raj.nic.in) is available 24 by 7 and is being used as a single point of information. The information is available on a single click.
Lack of consistent and Accurate Data. Because of non-availability of single source of information, every time different information was being received and it was difficult to ensure the accuracy of the information.	The consistency and accuracy of the data may be ensured due to availability of the data at a single point and the same portal is being used across the state.
Transparency of the information was not possible as record was not up-to-date and was difficult to trace.	The information is available and may be traced at any point of time.
Access was restricted to office timings.	Accessible 24 by 7.
Writing money orders by hand was a time consuming and repetitive exercise. It was a full month job.	Money orders are printed through system and it saves lot of time. Manpower may be engaged in other creative activities.
Distribution of pension in time was not possible through manual process. As lakhs of money orders was written by hand. It causes irregular payment	It is possible to distribute the pension in time and process of writing Money order has been made systemized.

distribution and payments are made once in a two or three month.	
Electronic payment was not possible as record were not digitized.	Electronic Payment is being made into the pensioner's Bank Account whose has open accounts in Banks.
Tracking of Pensioner application and payment status was not possible.	The online application has made the tracking possible.
Pension Sanctioning and Verification process was manual and cumbersome.	The online system has been very useful in automating the process of sanctioning and disbursement of social security pension.

ENABLER

Processes Re-engineered

To implement the Social Security Pension System in a sustainable manner various Government Orders were issues and reforms were carried out.

- Single DDO-Single Treasury Formula was adopted for pension processing and payment disbursement.
- Auto Sanction with specified time frame.
- Paperless application with Jan Aadhar Integration.
- Treasuries & sub-treasuries were asked to entertain only computerized sanction orders.
- Format of pension Application were changed and receipt format were modified to cope up with the use of technology.
- Pattern for allotment of Sanctioning order were changed and made uniform.
- Electronic Payments.
- Social Security Pension Rules were made compatible according to the need of online system.

Business Process Re-engineering (BPR) process has made tremendous effect on the working of the functionaries as well as cost saving. The Electronic payment itself saves Rs. 300 Cr per Year which was paid against the commission of money Order to Post Offices. Earlier Money orders were printed and sent to Post Offices. The post office used to charge 5% of the amount as a commission. Electronic Payments have also encouraged Green Governance because money order printing for the volume of more than 86 lakhs pensioners was a huge task and it required lots of paper and printer cartridges. Money orders printing also take long time and then sorting it village wise was a tedious job. In such a case sending money order in time was not feasible and pensioners used to get pension in the gap of two to three months. Electronic payments have made timely disbursement of pension possible.

Earlier Pensioners were required to present themselves once in a year before sanctioning authority as a proof of their aliveness. It required pensioners to travel and stand in a queue for long time. The Yearly verification process has been changed and it has been associated with biometric devices using Thumb impression and Aadhaar at E-Mitra/CSC kiosk. This has eliminated physical presence of pensioner before sanctioning authority.

The submission of application process has also been made online. Now application can be

submitted online from E-Mitra/CSC Kiosk. Applicant is not required to move to any office for submission of application in a physical way. Earlier application along with various documents were required to be submitted physically at designated offices and papers used to travel between different offices for verification and sanction of pension. Now the complete workflow has been automated and papers are submitted online at E-Mitra/CSC Kiosks.

Simultaneously application has been integrated with the Jan Aadhar Platform of the State. This has eliminated the feeding of personnel and demographic data and directly may be retrieved from the Jan Aadhar application.

Intimation of sanction and payment of pension has also been enabled using Voice call and SMS respectively.

Various formats of the application have also been changed to make it unique across the State and it has reduced the ambiguity among the various formats.

Technologies

Complete application is web based and role based. The standard technology protocol has been used while exchanging the information with other systems. The new technologically innovative ideas which were added during the last one year include.

- Auto Scheduling of Payment Processing.
- Aadhaar based Login credentials.
- Online Application at E-Mitra/CSC.
- SMS Services during Sanction and Payment Process.

People

Change Management

User department requests NIC for any change in requirements. NIC team undertakes the job, designs and modifies the software as per the new requirements and then asks the department to perform acceptance testing and report feedback. The performance testing is done to the level of satisfaction of the user department and then the new version of the software is released. Refresher Training sessions for master trainers are also organized in case of major changes.

Capacity Building

Various training programs and workshops were organized to train and sensitize the workforce. Initially master trainers taking 4 persons from each treasury consisting of one person from Treasury, One from Sub-treasury, One from SDO Office and One from BDO Offices i.e., 136 personnel were imparted training and declared as master trainers to impart further training at their respective locations to rest of the users. Video conferencing sessions were also held to impart the training to users. Refresher training sessions were also organized for the master trainers to make aware them the changes carried out time to time in the application. Training sessions were also organized at district locations.

Project Financials/Sustainability

- At Sanctioning Authority Level: No Manpower was sanctioned. Existing Man Power was trained to use the software. Hence the software did not put any burden on the offices.
- At Treasury Level: No Additional manpower was provided. Existing Treasury Staff were imparted training to use the software.

- Existing hardware available at Sanctioning authority and verification authority offices were used to operate the application. No additional hardware was procured for these offices.
- The Additional hardware were already made available to treasuries were used for this application. The Treasuries were already equipped with the hardware.

To ensure sustainability of the project following procedure were adopted:

- Online sanctioning of the pension was made mandatory at sanctioning authority level and treasuries were directed to entertain only online sanctions.
- Proper trainings were organized.
- Proper Technical support was provided to Treasuries, SDO and BDO offices.
- Refresher training programs are being organized time to time.
- Video conferencing sessions are being held with the users.
- Review meetings for the progress are also being held.

VALUE INDICATORS

Learning for sharing

Key Achievements -Software is being used by around 500 locations covering 86 lacs beneficiaries. Money order writing is a repetitive job as it is prepared on monthly basis. Therefore, considerable Manpower efforts are saved using this software. Electronic Payments has been extended. SMS and Voice Call Intimation have been enabled. Use of UID services have helped to identify duplicity and double pension cases. Online Application though E-Mitra/CSC has eliminated to approach offices located at distances.

Key Challenges - To adopt new formats of Application was a big challenge. Imparting training across the state was a major challenge. Development & Implementation of Uniform software for the large numbers of department was a challenge. Printing of large numbers of Money Orders was a huge task to manage. Integration with Other Departmental Web Application was a big challenge.

Use of UID Aadhaar Project – The application has been integrated with UID Aadhaar Project to verify correctness of Aadhaar Number and authenticity of Information.

Key learning from the project:

- It was assumed that the Project has social impact so it will be implemented with the minimal efforts but this theory did not apply. The lesson learnt from the project was that any Project should not be taken in a light way for the purpose of implementation strategy. Developing a project is not as difficult as implementing it in masses.
- Use of the right technology in the right place with appropriate administrative decision benefits the masses.
- Strong Top level commitment and support is the key to success.
- Proper training and availability of Documents to user is a major issue in the success of the project.
- Proper monitoring at all the levels of the stakeholders is a panacea for the success of the project.
- Proper and sufficient time should be allotted in the System Study. As incomplete

or poor system study would ruin the complete project and would cause delay in implementation of the project. Proper system study would reduce the implementation and development efforts.

- Proper Help Desk facility should be established at least initial period of the project till it establishes.
- Change Management process should be followed for the changes/improvement to be carried out time to time.
- System should be tested thoroughly before deployment.

Digital Empowerment

- Language Interface – The Application has been developed with local language support. It supports both English as well as Hindi Languages.
- Financial Inclusion- 99 % payment is done electronically.
- Training and Capacity Building - Various workshops and training programs were organized to empower the stakeholders to make use of this system. Help desk facility has also been established to sort out grievances of pensioners.
- SMS/Voice Call Services – System has been made enabled to send SMS and Voice Call services to intimate beneficiaries about their payment and sanction status.

Green e-Governance

Electronic Payments have been introduced in the System. Payments through Bank Accounts are increasing exponentially. Earlier payments were only being made through Money Orders. Money Orders were being printed in lacs and it consumes lots of papers and Power. Electronic payments save consumption of paper and power. In such a way, green governance is being implemented through this project. Similarly, Acceptance of online application form and scanned documents have reduced the use of paper.

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4. Ease of Doing Business, E-Procurement & E-Auction

E-Procurement Solution Rollout at Coal India Limited and Subsidiary Companies

Ministry of Coal, Govt. of India & National Informatics Centre, New Delhi

Binay Dayal, R. K. Patra and Usha Saxena

PROJECT OVERVIEW

Coal India Limited (CIL) the state-owned coal mining corporate came into being in November 1975. With a modest production of 79 Million Tonnes (MTs) at the year of its inception CIL, today is the single largest coal producer in the world and one of the largest corporate employer with manpower of 2,59,016 (as of 1st April 2021). CIL is a Maharatna company - a privileged status conferred by the Government of India to select state owned enterprises in order to empower them to expand their operations and emerge as global giants. The select club has only ten members out of more than three hundred Central Public Sector Enterprises in the country.

In pursuance of the recommendations of the committee on Public Procurement to tackle corruption and ensure transparency, CIL took action for setting up a dedicated Coal India e-Procurement Portal [<https://coalindiatenders.nic.in/>]. National Informatics Centre (NIC) was given the responsibility for extending technical support and setting up this portal which was made operational on 1st May 2013. The primary objective of this portal is to provide a single point access to the information on procurements made across Coal India Limited and its Subsidiary Companies.

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, CIL has created dashboard of Coal India e-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 CIL & its Subsidiary companies.

Objective

- e-Publishing: Publishing of all tender enquiries, corrigenda thereon and Award of Contract (AoC) on the CPP Portal automatically.
- 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 the provision of the CIL Purchase Manual, Central Vigilance Commission (CVC), Department of Electronics and Information Technology.

Scope (Functional & Geographical)

- CIL e-Procurement Portal provides Tendering and Tender Cum Auction facility for procuring goods, services & works.
- CIL e-Procurement Portal has been implemented across all Eight Subsidiary Companies.
- Major functional aspects include Organisation Onboarding, User Management, Tender creation and Publishing which caters to Open/ Single/ Open Limited/

Close limited/Global tender, with multi cover options, Tender cum Reverse Auction, QCBS etc.

- Collate Tender Information of CIL and its Subsidiary Companies
- Corrigendum, Award information, Product Category wise segregation
- Vendor Debarment information across CIL and its Subsidiary Companies.
- Geographically this e-Procurement Portal covers Coal India and its Subsidiary Companies located across India. CIL subsidiaries namely Eastern Coalfields Limited (ECL), Bharat Coking Coal Limited (BCCL), Central Coalfields Limited (CCL), Western Coalfields Limited (WCL), South Eastern Coalfields Limited (SECL), Northern Coalfields Limited (NCL), and Mahanadi Coalfields Limited (MCL) and one mine planning and consultancy company that is Central Mine Planning & Design Institute (CMPDI).

Key Stakeholders

- Bidders / Contractors
- Government officials and Decision Making Authorities
- Procuring Entities

Intended benefits

- One stop shop for all Procurement related Information
- Reduction in paperwork, Easy to rework and avoid errors
- Enhancing transparency, ease of doing business
- Visibility of tenders across the world
- Ensuring compliance with CIL guidelines
- Standardization of process bringing in uniformity across subsidiaries
- Payment Gateway with complete secrecy for receipt of online EMD and workflow based automatic refund. This leads to enabling bidders with more float money in hand, in turn more participation and achieving higher index of ease of doing business.
- Immense visibility due to auto mirroring in Central Public procurement Portal leads to doing away with News Paper Advertisement enabling considerable revenue savings.
- Real time Active tender information, timely notifications, easy for Bidders
- Reduction in transaction cost and other operational costs.
- Presented Case study in Annual Workshop wherein 100 organizations from the domain participated
- CIL was adjudged and awarded Best Performers in 2018
- CPPP Annual report has contributions of salient tenders of CIL

Current Status

No. of Subsidiary	No. of Departmental Users	No of Bidders	Total no of Tenders published	Total values of tender (in Rs. Cr) published
8	20,138	55,227	2,13,985	3,84,198.64

Hardware/Software

Completely on Open Source technology adhering to Open Standards

- Cloud Computing
- Linux
- Apache
- Drupal CMS
- Two factor authentication with Digital Signatures
- Secured Encryption of all bid documents at client end
- PostgreSQL Database
- Front end-Java Enterprise Environment
- Replication of data & backup facility
- Scalability

Certification (Certifying Agency)

- Certified by Standardization, Testing and Quality Certification (STQC) in Dec 2020. 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

- CIL e-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) have 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

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

No. of tenders floated	Creation and publishing of tender online leads to higher visibility, easy access	35144	33728	33396
Value of Tenders (in Rs. Cr)	Indicates the value of tenders floated online. Captured during tender creation	49777.05	56209.84	108635.55
No. of bids Received	Participation Index. How many bids are received in all	94185	99286	122328
No. of tenders Awarded	Count of completed tenders. Those tenders which have completed the cycle.	25212	24807	20007
No. of Online Payment transactions	Payment like Earnest Money deposit, tender Fee taken online – Count of transaction	70431	77423	25959
Value of Online Payment transactions (in Rs Cr)	Value of Payment like Earnest Money deposit, tender Fee taken online	458	605	244

High Value Tenders Awarded

Tender Id	Tender Description	Category of Tenders	Value in Cr
2020_MCL_177208_1	Development and Operation of SIARMAL OCP as per Part-II (Scope of the Project) of Contract Agreement and other requirements specified in the Contract Agreement.	Service	36,819
2020_CCL_176120_1	Development and operationalization of Kotre Basantpur Pachmo OCP for 25 Years in MDO Mode	Service	9,294
2018_CILHQ_99501_1	Supply, Installation and Commissioning of 190T Rear Dumpers	Goods	3,255
2017_CILHQ_73862_1	Bulk Explosives	Goods	3,247
2019_CILHQ_144271_1	Conclusion of Running Contracts (RCs) and empanelment as Reserve RC holders for a period of two years from the date of issue of RC for supply of Bulk Explosives to all the subsidiary companies of CIL	Goods	2,931

2018_CILHQ_112646_1	Supply, Installation and Commissioning of 96 nos of 240T Rear Dumpers	Goods	2,990
2019_CILHQ_159623_1	Supply Installation Commissioning of 6 No 24M3/88R Electrical Walking Dragline alongwith Consumable Spares, Consumables for 12 month of Warranty period from date of commissioning of Equipment and thereafter Spares Consumables for period of 120 month	Goods	2,405

Implementation

The portal was launched in May 2013 to adopt electronic tendering for all procurement in the CIL and its Subsidiary Companies. The number of tender floated from the inception of the portal has grown exponentially and is depicted in the table below:

Sl. No	Year	No of tenders floated (count)	Total value of tenders floated (in Rs. Cr)
1	2013	26	11.16
2	2014	5950	19621.10
3	2015	21698	15949.76
4	2016	27535	22613.78
5	2017	31831	39746.15
6	2018	35302	51511.15
7	2019	34355	53124.31
8	2020	30878	98956.65
9	2021*	26410	82664.58
Total		2,13,985	3,84,198.64

*Till 26th September, 2021

- Implementation of eProcurement system across CIL has brought about a major institutional transformation Public procurement.
- It has enabled the Officials to effectively use the system, abide by laid down rules and procedures and carry out tendering process in a smooth and effective manner.
- It has enabled the senior management to monitor the same in a quantitative manner and step in whenever needed.
- Various kind of analysis, automation, process improvements have been possible by using a centralised platform for eProcurement.
- Bidders have benefitted significantly due to readily available information in their dashboard, automatic alerts for various stages of tenders, 24x7 support help line and system based intimation on selection/rejection with reasons.
- There has been substantial reduction in RTIs and litigations after implementation of this system

Improvements / Enhancements

- Major enhancements rolled out recently include –
 - Vendor Debarment based on performance and other factors.
 - Integration with the Government eMarket Place
 - Integration with MSME / Startup
 - Tracking of IP address of bidders during Reverse Auction to identify the cartel bidding.
- Planned for next year:
 - Integration with ERP system of Coal India for pre and post tendering which enables end to end automation.
 - Building an advanced Analytics Dashboard
 - Chat Bot for first level assistance.
 - Repository of all Tender Documents for analysis to cull out Best practice.

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 / corrigendums from various Organisations across the CIL and Subsidiary Companies are assimilated. Active Link takes to the specific RFP of each organisation reducing the time to search for bidders.
- Tender documents were standardized, Departments encouraged to follow Standard Bidding document.
- Price Bids/Bill of Quantity (BoQ) for tenders were standardized in few select templates. This enabled department to adopt one amongst the standard ones leading to uniformity.
- Well defined process of System Malfunctioning is made available. In case of any issues of portal malfunction 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.
- All the old tenders are Archived for future references.
- Tender cum Auctions with an without H1 elimination
- Auto extensions configuration leading to saving time and efforts.

Technologies

- Integrations through the API / REST web services
- Coal India 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

Leadership

- Thrust from top leadership to gradually adopt eTendering for all procurements.
- Necessary support and guidance from CIL top management. This includes revisiting process and policies as and when required.

Key criteria for success of such adoption is the multifold Capacity Building exercises taken up.

- Daily Online Web based training.
- Customised Classroom Trainings at User Premises
- Bidder/Supplier specific Capacity building
- Setting up of Project Monitoring Unit (PMU) at CIL HQs at Kolkata and at each Subsidiary.
- 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.
- Availability of demo portal for hands on and practice with mock tenders.

VALUE INDICATORS

Learnings for sharing

Major learning with this wide spread implementation across the CIL & its Subsidiary Companies 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.
- 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 and encryption
- Easy access to Tender information.
- Offices have lesser documents to maintain

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Kerala - Single Window Interface for Fast and Transparent Clearance (K-SWIFT) for Ease of Doing Business

National Informatics Centre Kerala State Centre & Kerala State Industrial Development Corporation Ltd.

P. V. Mohan Krishnan, M. Kasthuri and M. G. Rajamanickam

PROJECT OVERVIEW

Objective

KSWIFT is a key digital reform undertaken by the Kerala government with the objective to provide all requisite clearances and information to investors in a hassle-free and paper-less manner. KSWIFT as a one-stop digital platform for obtaining all requisite clearances/approvals required to start business operations and to act as a Single portal that integrates the existing clearance systems of the various Departments/Agencies without disruption to the existing IT portals of stakeholders.

It provides 79 services from 21 departments in Kerala related to businesses & industries. Access to all these services is now available through a single sign-on user credentials. Also, KSWIFT has eliminated the need for investors to visit multiple platforms to gather information and obtain clearances from different stakeholders and provide time-bound approvals and real time status update to investors. Instant approvals based on self-certification, MSME module has also been integrated in KSWIFT and as on today issued 13,044 MSME Acknowledgment Certificates. KSWIFT 2.0 includes 79 Services of 21 Departments including Renewals, Instant approval of MSMEs, GIS based land allotment module, Online Incentive (ESS) module, Payment of Professional Tax etc.

Key Stakeholders.

The key stakeholders are the Investors and multiple Government Departments. KSWIFT is also provides information dissemination for investors about government policies, incentive schemes, land and infrastructure availability. Investment Wizard, an automated system to help investors understand the approval process for proposed projects.

Intended benefits

Despite being the Single window for interaction between investors and Government departments and handholding support to the investor fraternity across all districts in the State. The following are the key benefits of the KSWIFT,

- Common Application Form (CAF): Single e-Form across multiple departments with unique identification number.
- Guide Me WIZARD: Auto identification of services based on Questionnaire.
- Alerts: Real-time notification and alert via SMS, e-mail.
- Tracking: Online tracking of applications and approvals within fixed timelines.
- Dashboard: MIS Reports/Dashboard on Application status; Department wise/District wise etc.
- Automated Fee Calculation: Auto calculation of fees based on the validity of service availed.
- E-Payment: Integrated Payment mechanism through e-Treasury and Bank gateway.

- Digital Approval: Downloadable digital approvals.
- Validate the Approvals: Third Party Verification of Approvals based on Unique ID.
- Deemed Clearances: Auto generation of Deemed approval beyond set timeline.
- Query Handling: Systematic Time bound Investor Query Handling mechanism.

An Investor will have the following features in KSWIFT upon registration,

- Applicant will have a personalized account.
- Entrepreneur can submit applications for new projects through their account.
- Fee can be paid online through payment gateway integrated with KSWIFT while applying for various services.
- Application status and intimations will be available to the investor in their dashboard.
- Investors can communicate online related to any clarifications raised by Government Departments.
- Real time tracking of application status and query handling.
- Final certificate can be downloaded directly from the KSWIFT without physically visiting office.
- All the project details and list of projects are displayed in the personalized account.

A Government Official will have the following features in KSWIFT,

- Government Official will have a personalized account.
- System to check the status of applications
- Officer have the feature to ask Clarifications, Approval/Rejection etc.
- Easy search, retrieval & archival of investor applications
- Verification of past and recent payments of Applicant.
- Dashboard to view all the applications and their supporting documents.
- Repository of all approved certificates.

Current Status

- As on today, 26411 users have registered, and 1029 approvals have been issued through the KSWIFT within the specified timelines. To issue instant approvals based on self-certification, MSME module has also been integrated in KSWIFT and as on today issued 13,044 MSME Acknowledgment Certificates. INR 2100 Crore Investment facilitated through KSWIFT despite the presence of multiple Department/Agencies platforms in the State.

Hardware/Software

Deployed using open-source stack

PHP, APPACHE, POSTGRES,

Certification (Certifying Agency)

STQC Audit clearance certificate

Disaster Recovery and Service Continuity

Hosted at Kerala Sate 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
EODB Registration Services (79 Nos.) of 21 Departments	• Single point of contact for EODB mandatory clearances • Common Application Form (CAF) for clearances across departments • Auto identification of mandatory Industry related clearances • Real time availability of data and services to all stakeholders • End to End delivery of service to the end user	28	520	681
EODB Renewal services (15 Nos.) of 7 Departments			1	62
EODB Auto renewal			-	10
MSME clearances	• Provision for online verification of clearance Certificate • Auto Acknowledge /Clearance for MSME for 3 years on self-declaration • Provision to obtain mandatory clearances for MSME with 3 Years • Provision for online Renewal/Auto renewal of services		1060	9120

Implementation

On boarded 21 Departments and 79 services as per Govt target plan.

Improvements / Enhancements

On boarded 7-dayclearance for investments above 50 Crores and automated approvals for MSME's with investment below 10 Crores.

Target for next year (2021-22) are

- Integration of Additional Departments and Services: FSSAI, CZMA, Drugs, Health, LSGD (Additional services), integration of New PCB Portal etc.
- KSWIFT Mobile App for availing acknowledgement Certificate and composite license from Bureau; Application Tracking Facility
- Revamped Common Application Form: Modify the existing common application form for normal approvals under Single Window Clearance Board.
- Separate webpage for Bureau: Workflow for 7- day industry license for non- Red

non-MSMEs (Investment above INR 50 Cr.) and workflow projects between INR 10 Cr. and INR 50 Cr.

- Standard Design Factory in industrial Parks- Hassle free end-to-end online workflow for availing built up space in industrial parks.
- Enhanced and simplified user interface: Revamp of UI/UX for improving user experience.

ENABLER

Processes Re-engineered

Government of Kerala (GoK) has been taking many earnest and proactive steps to improve the ease of doing business environment in the State. The State had been undertaken with specific emphasis on simplification of the existing Acts & Rules and introduction of information technology to make governance more efficient, effective, transparent and user-friendly. The main aim has been to identify specific areas for improvement in various aspects of doing business in the State.

The Kerala Legislature on 6th April 2018 unanimously passed the omnibus legislation – “The Kerala Investment Promotion and Facilitation Act 2018” creating a landmark in the history of industrial Kerala. Major changes introduced by the Government under this engagement include self-certification regime and auto-renewals, procedure for the abatement of nuisance, revision of discretionary powers, reduction in time limit for issue of consents/permits for granting approvals, delegation of power, increased validity period of licenses/registrations, reduction in number of supporting documents, third party certification, revamped Single Window Clearance Board to issue Composite License and mandated deemed approvals. This was followed up with amendments to ten State Rules.

Department of Industries facilitated implementation of various digital reforms to meet the fast-paced approval timelines and streamline the application process for entrepreneurs in the State through a unified e-platform, a Common Application Form and Online Clearance Mechanism K-Swift (Kerala Single Window Interface for Fast and Transparent Clearance) with Department web portals and payment gateways. The online Single Window System KSWIFT - Kerala Single Window Interface for Fast and Transparent Clearance (KSWIFT), was built to meet the fast-paced approval timelines and streamline the application process for entrepreneurs in the State through a unified e-platform, a Common Application Form and payment gateway.

Key features & benefits of KSWIFT portal include:

A one stop-shop to set up an enterprise in Kerala and a single point contact for investments to the State. Functionalities of KSWIFT portal include:

- Common Application Form (CAF) across multiple departments with unique identification number.
- Online tracking of applications and approvals within fixed timelines.
- Auto identification of services based on Questionnaire.
- Real-time notification and alert via SMS, e-mail and through Dashboard.
- Auto calculation of fees based on the validity of service availed.
- Integrated Payment mechanism through e-Treasury and Bank gateway.
- Downloadable digital approvals.
- Third Party Verification of Approvals.

- Auto generation of Deemed approval based beyond set timeline.

KSWIFT has been integrated with the existing web portal of departments / agencies and Interface/workflow for non-ICT Departments/Agencies that do not have an existing online mechanism. KSWIFT 2.0 launched in 2020 includes instant approval of MSMEs, Integrated with Central Inspection System for the conduct of compliance inspection, GIS based land allotment module, Online Incentive (ESS) module, Payment of Professional Tax etc. Presently, 79 services of the 21 Departments / Agencies are being made available in KSWIFT, which includes Renewal services.

Technologies

- Responsive public interface for enabling portal access from mobile in English
- SMS/Email penetration
- Payment gateway integrated
- Role base dashboards.

People

Capacity Building

- KSI DC as the nodal agency facilitates the coordination between State Govt., NIC and the stake holding Depts. , providing support for rolling out and operationalization of the project
- Live DEMOs to stakeholders
- User manual, videos, and presentations have been made available at the portal for any time reference
- More than 25 series of training and handholding sessions conducted
- Around 3500 users have been trained
- Around 5000 users are accessing the system

VALUE INDICATORS

Learnings for sharing

The Online Single Window Clearance Mechanism occupies an important place in the Business Reform Action Plan (BRAP) put forward by Department for Promotion of Industry and Internal Trade (DPIIT), Government of India. It provides for online application, submission of documents, tracking of applications, approval and payment for business related approvals / clearances / NOCs etc. without having to make physical visits to the concerned authorities. The envisaged system was designed considering the above-mentioned functionalities encompassing the full cycle of an investment proposal.

An information wizard is incorporated in the online single window mechanism for the auto generation of list of clearances/approvals required for starting and running an enterprise in the state based on the information provided by the user. The portal also sends automated SMS/email notifications in case of application submission, queries raised or when the query is approved or rejected.

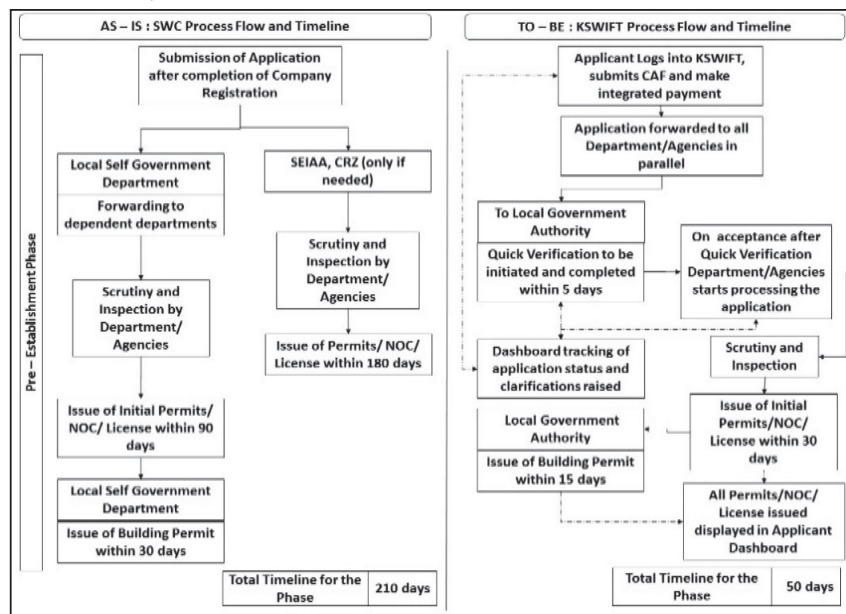
Kerala Single Window for Fast and Transparent clearance (KSWIFT) is a transparent fast track Online Single Window Clearance System for entrepreneurs to avoid procedural delays in getting statutory clearances from various authorities concerned throughout the life-cycle of projects. The State Government has introduced an online single window clearance

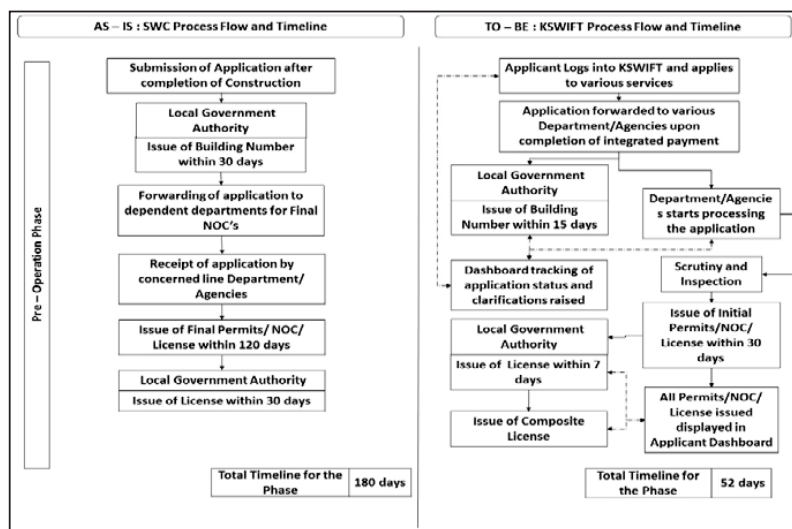
mechanism to facilitate fast and time-bound grant of licenses, permits and clearances thereby transforming the State into a vibrant investor friendly destination and to accelerate its industrial growth and employment generation across all categories. The new online single window clearance mechanism shall act as a one stop-shop to set up an enterprise in Kerala and a single point contact for investments to the State.

Salient Features

- Single point of contact for entrepreneurs across multiple departments.
- Common Application Form (CAF) across multiple departments with unique identification number (UIN).
- Eliminating multiple point of contacts with Department/ Agencies.
- Online tracking of applications and approvals within fixed timelines.
- Real-time notification and alert via SMS, e-mail and through Dashboard.
- Parallel processing to expedite grant of clearances.
- Deemed approval beyond set timeline of 30 days.
- Integrated Payment mechanism through e-Treasury and Federal Bank gateway
- Institutional arrangements for Single window clearances through State & District Cells
- Downloadable digital approvals at fingertip.
- Digital Composite License binding on all Departments with a validity period of 5 years
- Investors can apply for Government services 24x7 through the KSWIFT portal.

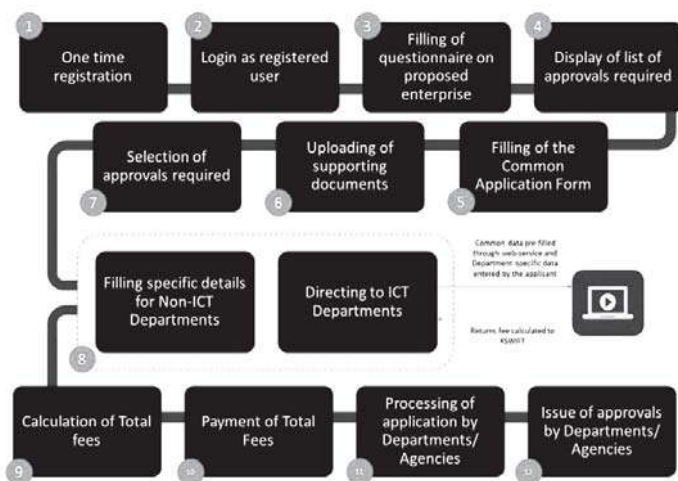
KSWIFT – Integrating Government Activities and simplifying procedures there by reducing time for delivery of service to citizens.





Workflow of the system

All departments which issue clearances for setting up an industry have their own application form which needs to be filled by the applicant and submitted along with the required supporting documents. A lot of information captured in these forms is common between departments. This leads to duplication of effort from the promoter as he has to fill the same details in multiple forms. This process was simplified by introducing an online single window clearance mechanism with a common application form integrated with multiple Department/Agencies. The common application form will first capture all the common details of the promoter as well as the establishment that are sought by various departments. It will then proceed to capture the specific information for the department(s) from which the applicant requires clearances. The flow of the proposed system was finalized as below:



The online single window mechanism has been integrated with the existing web portal of departments / agencies concerned viz., KSEB, Electrical Inspectorate, Labour, Water Authority, PCB, Fire & Rescue, Mining & Geology, SEIAA and Factories & Boilers. Interface for non-ICT departments / agencies that do not have an existing online mechanism viz., Forests, Ground Water, Directorate of Panchayats, Directorate of Urban Affairs and Chief Town Planner. The platform also provides independent and composite licenses with a validity of 1 to 5 years. Provision for deemed clearances has also been introduced.

MIS – User Specific Dashboard Design

As part of the reforms, an Investment Promotion and Facilitation Cell was constituted at the State and District levels on behalf of the Kerala State Single Window Board responsible for smooth interaction with applicants and issuing speedy approvals. In order to facilitate the cell in effective monitoring, tracking of applications user specific dashboards were designed with pre-defined functionalities and report generation capabilities in KSWIFT.

Digital Empowerment

Advantages for Investors:

Trust: A transparent platform to deliver Government to Citizen Services by reducing unwarranted human interface for creating conducive environment for industry

Single Touch: KSWIFT is a simple entrepreneur friendly web portal that enables potential Investors to get online Clearances/Licenses/ Permits from concerned departments with ease and minimal 'running around'.

Transparent: A portal that provides real time status update on the clearance process with detailed inputs on stage wise clearances and processing timelines. Verification of clearance process ensured at all points of time by both officials and third party.

Statement: A comprehensive set of reports containing list of clearances, clearances status, clearance flow, details of projects etc., can be generated at any point of time

Quality: The portal will play an ideal role in meeting the demands of the entrepreneurs and will be critical in improving the Ease of Doing Business environment of the State. The system will ensure world class quality service towards ensuring considerable gains for the entrepreneurs.

Green e-Governance

Online submission, Provision for e-Payment and status tracking, Online query raising and reply, electronic flow of data and Online service delivery makes the system Cashless, Paperless and Faceless.

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Tenders, Madhya Pradesh – The Madhya Pradesh Government E-Procurement System

Madhya Pradesh State Electronics Development Corporation Ltd, Bhopal & National Informatics Centre Madhya Pradesh State Centre

Nand Kumarum, Awantika Varma and Arvind Soley

PROJECT OVERVIEW

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 Tender's 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 Tender's portal.

Objective

MP Tenders GePNIC system has been implemented with the 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 5400 tendering organizations.

Scope (Functional &Geographical)

MP Tenders provides Tendering and Tender Cum Auction facility for procuring goods, services work, and sale of land & properties. MP Tenders portal has been implemented across all the departments from Nagar Palinkas 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 stages tendering, QCBS, Non-Disclosure Agreement, and so on.

Key Stakeholders

- User Departments/organizations using the system for online tendering
- Bidder / Contractor who participate in the tenders and auction

Intended benefits

- 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 costs, and other operational costs.

- Bringing in transparency and speed in the tendering process.

Current Status

Over the last 3 years, Govt of Madhya Pradesh has processed 1,72,478 tenders of worth Rs 3,00,50.00 crores and 5,837 Department users and 41,664 Bidders are seamlessly accessing the system. 603 pieces of training are held and 7977 users have participated.

Hardware/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 authentication with Digital Signatures
- Digital Signing of all documents.
- Secured Encryption of all bid documents at the client end.
- Replication of data & backup facility
- Scalability
- Flexibility in deployment parameter configuration
- Log Management through Log4J

Certification (Certifying Agency)

- Certified by Standardization, Testing, and Quality Certification (STQC). Complies with Deity's EPS Standards, e-Governance Guidelines, mandated by Min of Finance, for e-Procurement System.
- Certified by World Bank for compliance with all MDB guidelines and for use in procurement National and International Competitive Bidding.

Disaster Recovery and Service Continuity

The Madhya Pradesh Government e-Procurement System of NIC is deployed on infrastructure setup spread across various National Data Centers of NIC at New Delhi and Hyderabad. This involves a number of servers, Data Storage, Communication networks. The Primary Servers / Storage is hosted in ISO-27001 certified National Data Centers, New Delhi.

GePNIC Infrastructure (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 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 are 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 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	27,946	65,515	55,498
Value of Tenders (in Rs. Cr)	Indicates the value of tenders floated online. Captured during tender creation.	36,268	1,12,627	1,04,186
No. of bids Received	Participation Index. How many bids are received in all	44,748	1,40,342	1,29,860
No. of tenders Awarded	Count of completed tenders. Those tenders which have completed the cycle.	15,252	37,378	31,401
No. of Tenders from municipal bodies	Municipal bodies play a vital role in the last mile of governance. Numbers of tenders floated.	11,915	29,867	17,681
Value of Tenders from Municipal bodies (in Rs. Cr)	Municipal bodies play a vital role in the last mile of governance. Value of tenders floated.	10,488	9170	7,490
No. of Bidders Registered	Bidders registered - Count	11,895	13,104	12,599

Implementation

MP Tender's portal has been implemented across all departments of the state government of MP within a year. Providing the functionality of Tendering and Tender Cum Auction by MP Tender's 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 Tender's system is now being used by Directorates to Local bodies in each district of State. It is widely used by the educational institutions, Pradhan Mantri Gram Sadak Yojana, Health departments. Excise auctions were carried out at the 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 the government of MP was migrating from one system to another the challenges were very different. As officials and Bidders were very used to a particular system for a long, they took some time to adjust to the new system. It was mitigated by providing training, User manuals and online support by the 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

Periodic enhancements are part of the system life cycle. The latest accomplished ones are:

- PAN India Vendor Debarment information
- Dashboard 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
- Chatbot 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 a few select templates. This enabled department to adopt one amongst the standard ones leading to uniformity.
- Another salient step in this system was all bids get encrypted on the client end. No form-based price bids
- Tender Input Form / Corrigendum Input form was made available for users to easily adapt the system
- All essential documents are kept in a section Called Download in the Homepage for easy access. This enabled quick retrieval by respective stakeholders rather than circulation to all.
- Well-defined process of System Malfunctioning is made available. In case of any issues of portal malfunction, the active tenders are extended as per policy. This has brought a lot of faith in the system for the 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

The 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 the success of such a quick adoption across the state:

- Daily Online Web-based training
- Customized Classroom Training at User Premises

- Specific Supplier Capacity building
- Setting up of Project Monitoring Unit (PMU) at Bhopal
- Setting up of 24 x 7 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.
- NICS I impaneled agencies trained in eProcurement roll out 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 decisions are available in the 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
- Godowns were 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.

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5. Education, Training & Employment

DigiPharMed

Pharmacy Council of India & National Informatics Centre Telangana State Centre

K Rajasekhhar and B. Suresh

PROJECT OVERVIEW

Pharmacy Council of India is involved in the Regulation of the Pharmacy Education in the Country for the purpose of registration as a pharmacist under the Pharmacy Act.

To implement the act, the PCI is performing following functions.

- Prescribe minimum standard of education required for qualifying as a pharmacist.
- Framing of Education Regulations prescribing the conditions to be fulfilled by the institutions seeking approval of the PCI for imparting education in pharmacy.
- Ensure uniform implementation of the educational standards throughout the country.
- Inspection of Pharmacy Institutions seeking approval under the Pharmacy Act to verify availability of the prescribed norms.
- Approve the course of study and examination for pharmacists i.e., approval of the academic training institutions providing pharmacy courses.
- Withdraw approval, if the approved course of study or an approved examination does not continue to be in conformity with the educational standards prescribed by the PCI.
- Approve qualifications granted outside the territories to which the Pharmacy Act extends i.e., the approval of foreign qualification.

To facilitate implementation of the Act and accomplish the above functions and duties, a national Digital Platform DigiPharMed has been created.

With role-based access controls.

- Pharmacy Institutions can submit applications for registration of the courses online, submit requisite testimonials, online, pay fee online.
- The applications are scrutinized, verified and feedback is sent in case of issues.
- After preliminary scrutiny, through a rule-based selection process, the inspectors are selected and deputed for physical inspection of the institutes.
- The entire field inspection process is carried out digitally and objectively by the inspectors transparently with a mobile app.
- Geo-tagged time-stamped photographs gets uploaded to the inspection report automatically during the inspection process. So, for the first time in the country the field inspection process was digitized and reporting time reduced drastically.
- Based on the field inspection reports, the Executive Committee and the Central Committees of the Pharmacy Council take decisions, digitally through an objective rule-based workflow process efficiently and effectively.
- Entire process is objective, paperless, cashless, faceless, multi-tenant and backed by ruled based innovative cutting-edge technology based scalable secure cloud and mobile based digital platform.

Hardware/Software

SW environment is based on open-source technologies. Cloud Based Application Servers, Java, Spring Boot framework, Client Side, Angular framework. Middleware Hibernate. Backend – PostgreSQL and MongoDB.

Architecture is scalable and secure.

Certification (Certifying Agency)

Yes.

Preliminary certifying agency is: Ms Locuz Enterprises Solutions, Hyderabad a ICERT empanelled Agency. Final verification by: Cyber Security Divion, NIC, MIT.

Disaster Recovery and Service Continuity

Yes.

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
Services to Institutions	Registration of educational institution in pharmacy sector. Submission of applications digitally in a Standard Information Form prescribed by the PCI. Seek registration of the new courses. Seek approvals for additional intake of students. Seek permission to start new courses. Change of addresses etc.,	3387	3697	3568
Services to Faculty	Registration of the faculty in the pharmacy sector, transfer of faculty. Facility to update their academic credentials, research publications and other intellectual contributions. Facility to transfer from one institute to another etc.,		50233	63379
Student	Institutes and pharmacy courses details. Educational and other learning opportunity services.		9693	131574
Inspectors	Mobile based user-friendly app services to carryout field inspections objectively in a transparent manner and submit digitally signed tamper proof inspection report in situ digitally in time instantaneously.		1542	1543

Implementation

The project is being implemented geographically in the entire country in all the States and UTs including the North Eastern States since inception very successfully. The representatives of all the 3568 institutions offering courses in the pharmacy sector in the country were onboarded successfully as planned. All the faculty members (63379) specialized in the pharmacy sector in the country were onboarded successfully as planned. All the 1543 Inspectors appointed by the pharmacy council of India, and located in all the states of India were onboarded successfully as planned. Based on the success this year, new goal of onboarding students was set, and so far, 1,31,574 students studying various pharmacy courses in the country were onboarded successfully. So, project has achieved the targeted objectives successfully.

Improvements / Enhancements

The Selection of Inspectors is Objective and Rule Based. Renewal process is mostly objective and automatic based on key measurable metrics. The Preliminary Verification of the Application is done by Rule based Validation Process. The Financial Transactions are Cashless and Reconciliation statements are generated objectively in time. AI based approval process for decision support is planned for next year.

ENABLER

Processes Re-engineered

- Earlier paper applications with hundreds of enclosures in document form used to be submitted, this process has become paperless.
- Fee Collection has become online. Fee calculation become objective. Payment process is secure and cashless.
- Scrutiny and verification became digital. Functionaries are able to do even from their homes during the pandemic.
- Inspection selection process became objective and digital.
- Filed inspection process became digital;
- Field inspection reports are submitted authentically through mobile app in time.
- The agenda notes is prepared automatically by system and not manually.
- The decision-making process is objective end to end workflow based and efficient.
- No need to carry voluminous books and applications to the meetings.
- For colleges, the process became simple and user friendly.
- Even the Faculty details and student details are obtained in time.
- Data is flowing in time and authenticated by the institutions.
- Accountability of institutions increased.
- Help Desk facilitated tracking and closure of issues in time.
- Overall efficiency, productivity and effectiveness improved.

Technologies

- Enterprise architecture facilitated integration of the institute's data, faculty data and students' information seamlessly with the rule-based approval system. Data Analytics facilitated detection and reconciliation of failed financial transactions

in time.

- Knowledge management applications such as DLMS facilitated creation of digital archive of all the previous records and record room automation with easily re-retrievable context sensitive content securely.

People

The Officials of PCI, more than 63,000 faculty members, over 3500 heads of the institutions more than 1500 inspectors' 131572 students were onboarded to the DigiPharMed in the country successfully. Not a single training programme was conducted to these stakeholders. As the system is very user friendly, the functionaries are able to use themselves from day one easily. For resolving issues online and mobile based technical help desk facility created. Based on the feedback, the system is being improved continuously every year.

VALUE INDICATORS

Learnings for sharing

- To facilitate authentication of the content user friendly mobile based digital signing system introduced indicatively.
- To ensure scalability concurrency and high availability, appropriate deployment architecture was devised.
- All un-structured content is being stored in the no-sql databases to avoid latency and conserve storage space.
- All the functionaries were digitally empowered and a help desk system deployed to report and resolve the issues.
- To add the additional functionality, a functional requirements management system and digital change management system was developed and deployed, to ensure digital record of all the communication.

Digital Empowerment

- The Heads of Educational Institutions offering professional courses in Pharmacy Sector, their faculty, in the country located in the remote North Eastern States and other remote locations with weaker internet connection also were onboarded, by properly devising the system UI and UX which needs minimum or low bandwidth.
- The mobile app for inspection is so designed taking into consideration the last-mile issues in the vicinity of institutions located in the North Eastern States and remote districts in the country.
- Special focus was given to the User Interfaces and User Experience design so that even first-time users of smart phone or digital systems shall be able to use it comfortably, easily and speedily.
- Remote Inspection Management Solution also designed and developed to carry out inspections remotely during the Covid Pandemic.
- Were able to carry out the work normally, even during the lockdown period due to end-to-end digitization of the entire workflow.

Green e-Governance

The system is cloud based and hosted at NIC Data Centre. So, no extra hardware was advocated or prescribed for procurement. All the stakeholders were able to use the system using their existing digital resources, i.e., their desktops or laptops and mobile phones. Even for digital signature also no extra hardware prescribed. So, system was designed to maximize the usage of already available electronic systems, so scope for extra hardware or ICT gadgets or infrastructure eliminated. The process is paperless, so it facilitated saving of a few thousands of papers every year.

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Hrex portal

***Department of Employment, Govt. of Haryana & National Informatics Centre
Haryana State Centre***

Sharandeep Kaur Brar, Rajinder Pal and Deepak Bansal

PROJECT OVERVIEW

The Government of Haryana had conceived a web portal <https://hrex.gov.in> as a database of all potentially employable candidates in the state, who could then be linked to opportunities on job portals, thus maximizing the scope of employment for residents of Haryana. The portal was launched by Sh. Anoop Singh Dhanak, Hon'ble Minister of Labour & Employment, Haryana. The portal has been instrumental in facilitating 8,75,854 applicants, 7414 employers including aggregators and contractors have been onboarded onto the portal to facilitate job linkages for the candidates. Additionally, all employment exchanges have been provided access to facilitate linkage of job seekers as well as local employers.

In order for the operational plan to materialize, focussed activation would have to be undertaken for various players in the government and private ecosystem. These points would be instrumental in playing the critical functions of increasing awareness about this portal and facilitating registration of candidates and employers and enabling tracking of linkages. The ecosystem players which can be tapped for this purpose are:

- Employment exchanges (65) under the Department of Employment
- Common Service Centres (~7000) under MEITY, Govt. of India
- Other departments such as Industries, Labour and MSME
- Private points of sale such as kirana shops and mobile recharge shops

To activate each of these nodal points of the ground, certain capacity building may be needed in terms of manpower augmentation, tech augmentation, training for dealing with potential candidates and employers. This will have to be done via a concerted and phased campaign run by the Department of Employment.

Additionally, external partners would also play a key role in the entire ecosystem, by providing specialized services such as career counselling, interview preparation and skilling to specific candidates who are applying and getting shortlisted for jobs. This would ensure a higher conversion from registration to placement for candidates registering on this portal.

Geographic Coverage

Haryana State

Key Stakeholders

- Unemployed Youth
- Private/Government Employers
- Employment Exchanges of Haryana
- Department of Employment, Haryana

Intended benefits

- The Portal will mainly benefit the unemployed youth, deserving candidates to get

job related information and increase the chances of get absorbed in the various sectors as per their qualification and experience. The Registration, Renewal and Updation of profile made easy without visiting the Employment Exchange. The Department is also empowered to monitor their Employment Exchanges very efficiently.

- Easy disposal of Unemployed Allowances – With the introduction of the Portal, it can automatically generate the list of illegible candidates for Unemployed Allowance.
- Search illegible candidates – Based on the search criteria the portal can automatically provide the seniority wise list of candidates for submission to Government Department. The Private Employers can search and generate illegible candidates from the pool of registered unemployed youth.

Hardware/Software

Frameworks	Technology
Operating Systems	Red Hat Enterprise Linux v7.2
Client Side	Angular v9.0, Type Script, HTML 5, CSS
Server Side	Spring MVC v5.3.5, Hibernate, JPA
Back End	PostgreSQL DBMS v11
Servers	Apache Tomcat

Certification (Certifying Agency)

Yes. The Application Security Audit and Web Server hardening has been done through ISMO, Haryana and C-DAC which is CERT-IN empaneled.

Disaster Recovery and Service Continuity

- Hrex portal is hosted in NIC Haryana mini cloud.
- Automated periodical backup schedule for database and web VM.
- For minimal loss web VM image can be restored in new VM when required.
- Continuous monitoring and routine restoring activity is performed for service continuity.

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 Registration of Unemployed Youth	Unemployed youth can register online on the portal. After registration registered user can login to the system and various information relate to renewal, Unemployed Allowance, information regarding vacant post posted by employers become visible.	618565	838813	887378

Renewal of Registration	Renewal can be done within grace period and outside grace period.	-	-	-
Addition/Deletion of personal information	Addition/Deletion of personal information i.e., Mobile number, email ID, Addition of new Qualification, Specialization etc.	-	-	-
Apply for new vacancies posted by employers (Private/Government)	Can directly apply to the post, posted by employers and intimation received for scheduled interview, placed and after joining automatically remove from the Live Register.	29064	16573	26085
Conduct Job Fairs by Employers	Job Fairs can be organized by the employers with the permission of the Department. In published job fairs registered unemployed youth can participate by sending their consent to participate by login into the portal. The employers can shortlist applied candidates and fixed time for online or offline interview. Before the Covid-19 pandemic the job fairs were held in physical location and now job fairs are held online.	167	139	185
Providing list of candidates to employers	1. As request received from a Government Department the portal automatically generate a list of illegible and senior candidates and made it available to the requesting Department. 2. In case of Private Employers, they can search candidates based on their desired qualification and experience and shortlist and can call for interview.	-	-	-
Various Monitoring Tools for Employment Exchanges, Directorate.	1. Live Register 2. Dead register 3. Candidate Placed 4. Vacant post published by employers etc.	-	-	-

Time line for unemployed youth.	5. Job Fair details			
Call center to update the profile of unemployed youth	The Call Center setup in the Office to update the profile of the candidates and to provide career counseling.	-	-	-

Implementation

The Application is first released on October 2019 after porting all data from the older version of the Application. The old application was developed in core PHP and was not complete with many bugs. Data was also not in normalized and proper format. So a new application has been developed in latest platform with all required minimum modules as required by the Department. The complete data from Mysql ported to Postgresql – normalized it, making it compatible with NCS Portal and after user acceptance, released the Application on October 2019. Instructions has been given to all (65) Employment Exchanges of Haryana to reach each and every registered unemployed youth to visit the site and register themselves on the portal. With feedback from all stakeholders i.e., Directorate, Exchange, Unemployed Youth and Employers and incorporating their feedback, the portal finally inaugurated finally on 7th January 2020.

As per the initial plan all the targets have been achieved. The module which has been planned to implement are

- Online Registration and Profile updation by unemployed youth
- Automatic renewal of registration within grace and outside grace period.
- Providing list of illegible candidates to Government Department based on their seniority. Seniority is decided based on their registration on the portal.
- Job Fair by the Employers – A Job Fair module where Employers can select candidate's base on their requirements and can select candidates from the pool of illegible candidates in the Portal.
- It is mandatory for Employers of the State to register on the Portal and must inform the Department about their vacancies. For any Grade-III/IV employees it also mandatory for employers to select candidate from the Portal.

Improvements / Enhancements

- All Post advertise by the Employers will be visible on the Portal and Registered candidate can apply directly in those post.
- Information relate to vacancies must post in the Portal by the employers and after selection of the candidates the same will be updated in the Live Register and the selected candidate will move to Dead register.
- The candidates moved to Dead Register can come back to live register by applying online and by verification by the Employment Exchange Officer.
- Integration of seamless integration with PPP (Parivar Pehchan Patra) data of Haryana.
- Integration with NCS portal so that candidates apply on hrex portal become visible on the National Career Service portal.

ENABLER

Processes Re-engineered

Complete manual process has been transformed to digital processes which minimize the visit of unemployed youth to Unemployment Exchanges for Registration, Renewal, Unemployed Allowances, to Apply for vacant post etc. The system becomes more transparent by automatic generation of illegible candidates for vacant posts and unemployed allowances etc. Integration with NCS portal will widen the scoop of unemployed youth of Haryana.

Technologies

With the implementation of the portal Unemployed Youth get every vacancy related information through email and SMS. The call center provides the career counseling and updating of profile. All Job Fairs are held online by following a schedule process as decided by the Department.

People

A call center has been established in the Office premises of the Department with 35 hired manpower for updating the Candidate Profile and career counseling. The system allots 100 unemployed youth every morning in their login and the operator call the candidate to know the present status and update the database with fields like consent for working in private sector, expected salary, consent for working outside the State etc. Selected candidates for Government vacancies are provided with free interview materials and counseling. All District Employment Exchange Officers are engaged to visit the selected candidates for counseling.

VALUE INDICATORS

Learnings for sharing

- Study of the previous Application developed in 2016 in core PHP.
- Study of the process flow of various module of the Portal.
- Study of the old database – its tables – restructuring the tables without losing any information. Filter out the wrong information, stored data in wrong format.
- Porting the old mySql data into new PostgreSql database keeping in view of NCS compatibility.
- Technology Selection
- Planning and Development of the Portal
- Testing and Deployment
- Feedback and Integration
- Training and Handholding
- Maintenance and Support

Digital Empowerment

- Previously the Unemployed youth are not getting proper information on vacancies posted by the Employers but with the portal, using their smart phone the candidates can browse through the site can get all this information.
- The call center helps them to appearing in competitive examination by providing adequate study material and counseling.

- The District Employment Exchange Officers are engaged to reach all potential unemployed youth to motivate and to provide career guidance etc.
- Planning to display all advertised vacancies on the portal home page so that unemployed youth can apply directly on those vacancies.
- With the integration with NCS (Nation Career Portal) the unemployed youth of the State gets more exposure and more opportunities.

Green e-Governance

- The portal is hosted on NIC State Cloud and paper less processing of application etc. has been adopted.
- With introduction of SMS and eMail – sending paper-based letter, notification has been reduced.
- Online platform reduced the movement of unemployed youth and also Officers of the Department.
- In Job Fairs VC or telephonic interview reduced the movement of candidates which save money and time. This reduced time and money for employers also.

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Implementation of RTE 12.1.c in the State of Uttar Pradesh

Department of Basic Education, Govt. of Uttar Pradesh & National Informatics Centre Uttar Pradesh State Centre

Anamika Singh and Ashesh Kumar Agarwal

PROJECT OVERVIEW

Objective

The Basic Education Department of Uttar Pradesh envisions a stakeholder centric, transparent, efficient and self-sustaining system in the state. The department plans to realize this vision through the effective and optimal use of ICT, change management techniques, process reengineering and project management. This program of RTE 12.1.(c) online implementation has been conceived and developed to achieve the following objectives:

- The project is leading the implementation of RTE 12.1.(c) policy in the State of Uttar Pradesh
- This ensures the admission of underprivileged children in private unaided schools of Uttar Pradesh
- Develop a stakeholder centric, simple, speedy, user friendly & reliable process
- Build consistency in the process
- Provide transparency and objectivity in the valuation of the properties
- Bring speed, efficiency, consistency and reliability.

Scope (Functional & Geographical)

The project aims to automate the current process of school registration, application, lottery, allotment, admission confirmation, child tracking and measuring learning outcome with the usage of application software.

Functions:

The main part of the program is to enable maximum children to get enrolled into the scheme. This portal has multiple functions like: Mapping of Schools (Urban and Rural), School Registration (Urban and Rural), Student Application, Application Verification, Randomization of the application, Lottery, Seat Allotment etc. It also has modules like: Mapping, School registration, Application, Lottery, Allotment, Student module, BSA module, Directorate module, Admin module, Student Status module, etc.

The entire project can be divided into 2 major components:

- Design, implementation and maintenance of web-based application for implementation of RTE 12.1.(c) in the State of Uttar Pradesh.
- Development and Hardware/Software Specifications at NIC.

Geographical: The portal is stakeholder centric and supports the State of Uttar Pradesh in smooth implementation of the policy.

Key Stakeholders

- Basic Education Department, Uttar Pradesh
- NIC, Lucknow Schools
- Children
- Parents

- District Education Officers and Department

Hardware/Software

Technology used: C#, JavaScript

Application Server: IIS7

Database Server: MSSQL 2008R2

The Application is hosted in 1 Database Servers (VMs)

Hosting location of Right to Education UP State Data Center, Lucknow.

Infrastructure details at UP State Data Center:

- Web/App Servers: This cluster VM Application Server works on Server Load Balancer (SLB)
- Database Servers: Two database physical Server on Fail over cluster Server.
- NAS: Not Available.
- SAN: UPSDC are using SAN Storage Technology.

Certification (Certifying Agency)

Website Security Audit (<http://rte25.upsdc.gov.in/>)

Certificate No: AKSIT/2020-21/322 Dated: December 16, 2020

IG Stamp & Registration / PRERNA

AKS Information Technology Services Private Ltd.

Disaster Recovery and Service Continuity

Disaster Recovery (DR)/Near DR Centre: 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 daily backup is maintained on the DR site taken through application.

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
School registration	The schools register themselves on the portal filling in their complete information. They also fill in the details of each child studying under the RTE policy in their school from the time since the policy has been implemented			17,882
Mapping	District Education Officers map the schools based on the ward the schools are located in	19,962	20,929	33,843

Application	Eligible children under the scheme fill out the online application form, uploading the required documents	1,49,000	1,98,000	2,53,000
Lottery and Allotment	The District Education Officer verifies the applications. The applications with complete details and documents are considered for lottery. The applications are then randomized and the seat allotment function is executed	53,643	64,606	99,188

Implementation

The target of the implementation is 100% and we are currently at 98% implementation. Through the online portal, year on year we receive maximum number of applications and have maximum allotments. This year we had targeted 100000 allotments and achieved 99,188 allotments.

Features:

- School registration
- School Mapping
- Online filing Applications
- Verification of application by District Education Officers
- Randomization of verified application
- Allotment of School to applicants
- Filling of student data by schools
- Filling confirmed admission data
- Reporting of each table
- Student/ Applicant Status check
- Process control of each process in the portal
- Add/ Delete/ Edit School
- Reimbursement filing by schools, verified by DEO and sending verified demand to Directorate for disbursement of amount
- Financial-aid filing by schools, verified by DEO and sending verified demand to Directorate for disbursement of amount

Improvements / Enhancements

During last one year we optimized the School registration and Student module. We have enhanced our other modules too and integrated it with MIS Reporting Future Development points:

- Grievance Redressal system
- GIS Mapping
- Integration with Online recognition
- Live dashboard
- CRM

ENABLER

Processes Re-engineered

The RTE implementation process was offline till 2017 and was shifted to online mode after that. Through automation the work become simpler and easier. The online process helps to cater to all the 75 districts for smooth implementation of the scheme. Initially the application for rural schools were offline but this year onwards it has also been integrated in the online process. Year on year we keep adding new functionalities to the portal which we think are needed to optimize the implementation process.

- School registration
- School Mapping
- Online filing Applications
- Verification of application by District Education Officers
- Randomization of verified application
- Allotment of School to applicants
- Filing of student data by schools
- Confirm admission data filling
- Reporting of each table
- Student/ Applicant Status check
- Process control of each process in the portal
- Add/ Delete/ Edit School
- Reimbursement filing by schools, verified by DEO and sending verified demand to Directorate for disbursement of amount
- Financial-aid filing by schools, verified by DEO and sending verified demand to Directorate for disbursement of amount

Technologies

All the technical initiatives were taken to fully automate the processes needed for implementation of the scheme. The following initiatives have been taken:

- Provision of login ids to infuse accountability in operations
- Provision of SMS & E-mail Alerts
- Provision of Camera to upload documents
- Reduction of manual records with computerized standardized documents
- Inbuilt mechanism of security and quality control for crucial registration data
- Easy web access to parents, schools and department for their records
- Easy retrieval of records and reduction in manual efforts of the registration staff in the day to day working.
- Reimbursement claimed by schools through online portal
- Reimbursement verification and submission to Directorate through online portal
- Financial aid claimed by schools through online portal
- Financial aid verification and submission to Directorate through online portal
- Generic approach was adopted to make the system scalable and transparent

People

Capacity Building

Capacity building/Training has been provided to department personnel on different modules of RTE portal Software such as Preparation of School Master Databases, School registration, Mapping, Application, Lottery, Seat Allotment and other enhanced and developed modules. These all initiatives have been supported by our partner organization named RightWalk Foundation.

VALUE INDICATORS

Learnings for sharing

- Defining roles and responsibilities of the officers/staff.
- Process reengineering for better service delivery
- Simplification of Process
- Use of modern technologies like camera etc.
- Study of departmental activities
- Deciding suitable software architecture for the department
- Procurement of suitable hardware/software
- Software design, development & testing
 - o portal solution framework,
 - o application software solution,
 - o security architecture,
 - o network architecture,
 - o data flow requirements,
 - o data storage requirements,
 - o Encryption at various levels of the solution etc.
 - The solution design is based on system standards to enable the interoperability and integration of solution with external solutions.
 - Support Hindi and English and UNICODE compliant.
 - Overall human resource development for technological output
- Coordination with Department and NIC for making RTE 12.1.(c) implementation successful.
- Getting support from the departmental officers/staff.
- Documentation
 - Online web based RTE 12.1.(c) Technical and user manuals
 - User Manual in Hindi & English
 - Comprehensive Training

Improving the quality of services to the stakeholders- This improvement of quality will be in terms of

- Easy availability of information
- Increase in number of channels for providing services / information to the stakeholders

- Reduced cycle time for application processing by automating the backend processes
- Greater transparency and accountability during the process
- Visible improvement in the quality and level of services provided to the stakeholders in the State
- Increase in transparency
- Ease of administration and effective monitoring of work
- Leveraging the benefits of ICT in new system

Digital Empowerment

Initially the applicants who were unable to access the online portal were facing difficulty in submission of the application form. Now, with the enhanced portal in place all the applicants irrespective of rural or urban are able to fill the online application form. In case someone is unable to fill the application form online, they can fill and submit the prototype of the online application form at the Education office in person and it is the responsibility of District Education Officer to fill it online.

Green e-Governance

- Removal of manual records with auto generation of computerized standardized documents.
- Easy access to stakeholders for their records
- Easy retrieval of records and reduction in manual efforts of the department and stakeholders in the day to day working.
- Electronic Form of documents.

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MedhaSoft Portal

Department of Education, Govt. of Bihar & National Informatics Centre Bihar State Centre

Manoj Kumar, Shailesh Kumar Shrivastava and Rajesh Kumar Singh

PROJECT OVERVIEW

Direct Benefit Transfer (DBT) to beneficiary related schemes administered through different departments. Greater financial inclusion and improvements in government capabilities to authenticate beneficiaries and directly transfer entitlements to beneficiary bank accounts have transformed the delivery of subsidies and social protection programmes. DBT framework to education delivery addresses specific and contextual challenges of access, equity and quality. The emphasis on delivering benefits directly reduces leakages, increases beneficiary choice, and eliminates intermediaries between the beneficiary and the state. DBT is the direct transfer of entitlements or cash into beneficiary bank accounts, replacing in-kind benefits. Majority of total welfare spending has transitioned to DBT. Direct transfers can be applied through different instruments, depending on the context and needs of different areas:

- Unconditional Cash Transfers (UCTs) to cover direct or indirect costs of education.
- Conditional Cash Transfers (CCTs) and scholarships in rural areas to encourage behaviour change and stimulate demand. These include cash transfers to parents from marginalised communities conditional on enrolment, attendance, performance or completion of schooling.

However, there is a greater opportunity to use DBT for system transformation. When applied to education more systematically, such transfers can allow parents and students to be the primary stakeholders of the system since funds follow the student rather than the school. In the current structure of school education, school principals, teachers and administrators are the primary stakeholders, with parents and children playing a secondary role. If designed correctly, DBT can help to address concerns of school and teacher accountability. DBT provides the government with greater administrative control over the utilisation of funds and allows it to track the impact of investment on each child. DBT is a quality tool; different design schemes can solve specific problems of access, equity or quality.

The emphasis on delivering benefits directly reduces leakages, increases beneficiary choice, and eliminates intermediaries between the beneficiary and the state. The goals of the education department is "to bring about a driving force in the State of Bihar through educational reconstruction as a change in the educational situation will then bring improvement in all spheres, and the atmosphere of despair, cynicism, and violence will give way to a firm determination to deal with the environment, social, cultural and gender issues". Within the above mentioned framework the specific objectives which are aimed to be achieved include:

- Universalization of Elementary Education, as a composite programme of Universal Access, Universal Enrolment, Universal Retention and Universal achievement.
- Drastic reduction in illiteracy
- Modification in the educational system to serve the objects of equality for women & their empowerment
- Inculcating Equity & Social Justice in educational endeavours
- Relating education to the working & living conditions of the people.
- Laying special emphasis on all educational activities on science and environment.

Followings are the Activities Carried out under the project:

- Creation of School Profile
- Digitization Student related data along with Bank Account details, Aadhaar Number, Mobile Number
- Verification of Account Details through PFMS
- Matching of Account details with Beneficiary details and locking of student details
- Marking of Student Attendance
- Aadhaar Authentication and Mobile Phone verification
- Portal of 10th Pass Students for Scholarships including SC/ST Students
- Portal for 10+2 class students for Financial Assistance under Kanya Utthan Yojana
- Portal for Graduate Students for getting Rs. 25,000 after passing graduation.
- Portal for Marking Mid-day Meal to students and transfer of funds
- Portal for transferring funds for Purchase of Books by Students through DBT.

Objective

The emphasis on delivering benefits directly reduces leakages, increases beneficiary choice, and eliminates intermediaries between the beneficiary and the state. The goals of the education department are "to bring about a driving force in the State of Bihar through educational reconstruction as a change in the educational situation will then bring improvement in all spheres State Govt has developed and implemented MedhaSoft Portal with help of NIC. The main objective is to bring about a qualitative change in the fund disbursement process to large number of students into their Bank Accounts.

Scope (Functional & Geographical)

- Registration of Students at Schools
- Transfer and Maintenance of Student records
- Bank Account Verification through PFMS
- Direct Benefit Transfer to 1.96Crore Beneficiary

- 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.
- Payment of various Benefits to the students such as Dress, Scholarships, Cycle, Napkins, Mid-day Meals and Books through DBT.
- Marking of 75% Attendance which is mandatory for conditional transfers.

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
- 85,537 Schools both Govt. and Govt. Aided.
- Citizens of Bihar State through Web Site <https://MedhaSoft.bih.nic.in/>
- Using Mobile App “MedhaSoft”

Key Stakeholders

Following are the key stakeholders in the SVAMITVA Dashboard:

- Education Department, GoB.
- SC & ST Department, GoB.
- BC & EBC Department, GoB.
- Minority Welfare Department, GoB.
- Bihar Education Project Council (BEPC).
- NIC, Bihar.
- Students, Teachers and Citizen of Bihar through online Portal.

Hardware/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
Operating System	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

Certification (Certifying Agency)

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 Bhubaneswar. 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 Additional 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.

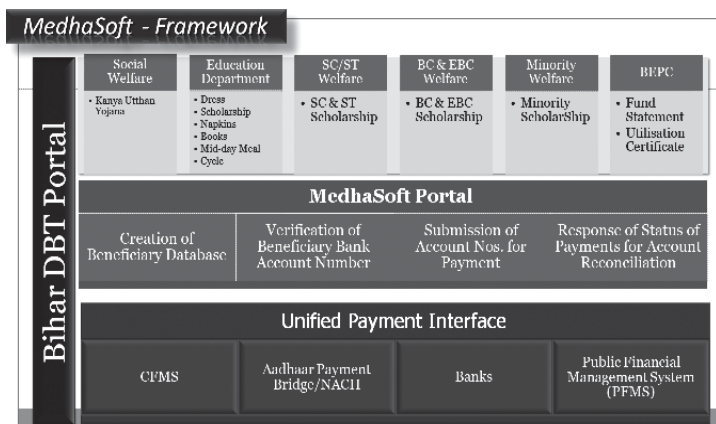
RESULTS INDICATOR

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
Data Digitization of Existing Beneficiary	Data Digitization		1.85 Crore	1.92 Crore
Aadhaar Authentication	Digital Identity verification of Beneficiary		2.2Crore	1.05 Crore
Online Data Entry of New Students	Submission of Application through Mobile App for grant of financial Assistance		52 Lakhs	32 Lakhs
Account Validation through PFMS	Verification of Accounts, Beneficiary Name, Active, closed, others name etc.		1.95 Crore	40.42 lakh
Attendance Entry	75 % Attendance Entry		-----	-----
Payment Generation	Sending Payment to Beneficiary through PFMS		7.39 Crore Transactions	-----
Online Query, SMS alert and Reporting Service	Query, SMS Alert and Reporting for all levels of Applications		3.28 Crore	2.1 Crore

Implementation

MedhaSoft DBT Framework



Delivery channels

- SMS Alert
- Online Enquiry
- Mobile App
- Helpdesk and Kiosk
- Call Centre Support

Methodology:

- Master Data of entire 86,000 or more schools were prepared and validated.
- Student Admission details has been prepared containing personal details, aadhaar number, mobile number and account number, parent details etc.
- Medhasoft Mobile App has been developed which allows Schools to submit student details.
- The details submitted are validated through PFMS and Aadhaar Platform on day-to-day basis.
- The final submission is also validated by Block and District Level Officials.
- Based on Approval of district level authorities payment is released through Public Finance Management System (PFMS) directly to the bank account of students.
- This is one of the biggest databases of students catering at least 7 to 8 schemes of the department.

Improvements / Enhancements

Improvements/ enhancements specifically rolled out during the last one year

- Identification and verification of Students details by School Authorities
- New Scheme Post Matric Scholarship has been launched by state govt.
- Workflow Based with Roles for Entry and Verification and Approvals

- Yearly Financial Assistance to the Students
- Accurate Targeting of Beneficiaries.
- Most of the Services are accessible through Mobile Phones/Tablets
- Direct Benefit transfer to 1.73 Crores Beneficiary
- Process Reengineering of schemes for simpler flow of information and funds.
- Greater Accountability of concerned authorities.
- Online Interface for Registration, SMS Alert, Document Submission, Approval by different levels of governance.
- Elimination of redundant processes in fund transfers and fast processing of applications.

Improvements/ enhancements planned specifically during the next oneYear:

- Online Admission Process
- Validation with Caste, Income Certificate
- Digital Document Portal
- Online Evaluation Cycle for Students
- Rationalisation of Students and Teachers
- GIS Mapping of Remaining Schools and infrastructure
- Integration with BSEB databases.
- Integration with University Examination System UMIS.

ENABLER

Processes Re-engineered

Process Flow of Fund Disbursement:

Stages of Fund Transfer in DBT



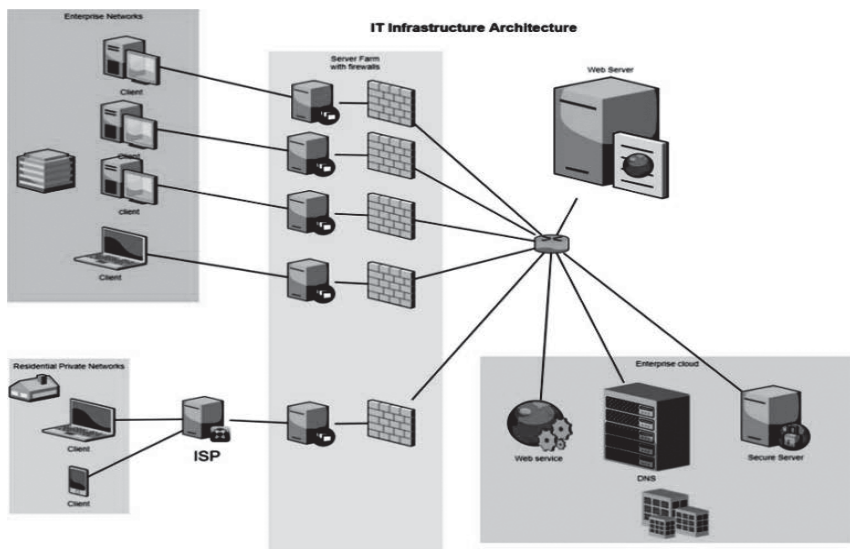
Processes Re-engineered through Medhasoft

- Submission of Application through Mobile App or Online

- Verification and Approval of Beneficiary Online through Various Roles
- Mobile Verification for Alerts through OTP
- Account Validation through PFMS platform
- Matching of Names through Fuzzy Logic
- Approval for Payment at different level of Field formations and HQ level.
- Processing of Payment Files through Digital Signature
- Aadhaar Authentication and validation.
- Reduction of Bank Accounts and Centralised Payment System
- Integration with PFMS for automated Payment and Beneficiary Validation.

Technologies

- Workflow 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 such as Aadhaar and PFMS.
- Aadhaar Service Integration for Aadhaar Authentication and digital identity establishment.
- API integration for offline applications.
- Mobile Application Development for Hybrid Platforms



People

State Apex Committee

This is headed by Chief Secretary with Additional Chief Secretary/Principal Secretary, Education, Finance, Social Welfare, SC & ST Welfare, Minority Welfare, BC & EBC Welfare, Project Director, BEPC, Director Primary Education, Director, Secondary Education, Director Higher Education, Director Mid-day meal, State Informatics Officer as Members. This is apex body for taking policy decision for DBT related activities and student services.

State Project Core Team

Principal Secretary, Education 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 advises 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 teamwork under overall supervision of Principal Secretary, Education Department, GOB 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 DB related 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 schools, blocks and districts but also interact with field formation for collecting data. In addition, the 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 and School level Support

In order to support project at District 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 with both officers and resource persons of BEPC 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/BEP Data Officers has been trained to use the application and provide technical support to the Project. Training has been conducted for all offices including School Principals, Block Resource Centres and District Planning Officers staff.

Workshops with Stakeholders adoption of latest technologies for Service Delivery

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

The application is first of its kind to address the requirements of large number of students studying in class I to Graduation. MedhaSoft establishes a transparent procedure for quality service delivery to the students. The project can be implemented across country through MHRD as same kind of monitoring and control mechanism is necessary for all the states.

Key Learnings

- The current innovation is a unique feature probably addressing the urgent needs of streamlining activities related to Students Payment Systems.
- The activities of Schools centers 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 teachers to visit Block Resource centers.
- 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.
- SMS alert helps to deliver information at different stages of application and payment processing.
- Online Authentication of Students and large database management
- Integration framework with Service Oriented Architecture

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 workflow management with dashboard for each stakeholder
MedhaSoft Portal	On-line Web Portal and 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 through PFMS
Help Desk and KIOSK	Available for Search Facilities and login of each beneficiary
Mobile App	Online Portal for Entry of Students, Online Submission of Form, SMS Alert, Online Enquiry
Dashboard	User based dashboards most of the stakeholders

Green e-Governance

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 aims 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 Students and Schools.
- 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 Schools for Accessing data and Marking attendance
- Group Communication through various Channels.
- Video-Conferencing for Training large number of operators

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National Scholarships Portal
National Informatics Centre, New Delhi
Shashi Bhushan

PROJECT OVERVIEW

Objective

National Scholarships Portal (NSP) was launched by Hon'ble Prime Minister of India under Digital India Programme in July 2015. It was aimed to build a unified digital platform to bring synergy, transparency and efficiency in Scholarship disbursement in India. The prime objective of the National Scholarship Portal (NSP) is to create a unique, simplified and user-friendly platform for students to help them avail benefits of educational scholarships in an efficient and transparent manner.

Scope (Functional & Geographical)

- Providing common platform to students to search and apply for scholarship.
- A single platform for all scholarship applications verification for verifying authorities.
- A single platform for all Ministries/Departments/States to disburse their scholarships
- NSP's presence is at PAN India level

Key Stakeholders

- DBT Mission
- Ministry of Minority Affairs
- Ministry of Social Justice & Empowerment
- Ministry of Labour & Employment
- Department of Empowerment of Persons with Disabilities
- Department of School Education & Literacy
- Department of Higher Education
- North Eastern Council (NEC), DoNER
- University Grants Commission – MHRD
- All India Council for Technical Education - AICTE
- Assam
- Himachal Pradesh
- Lakshadweep
- Puducherry
- Tripura
- Uttarakhand

Intended benefits

Timely disbursement of scholarships into the bank account of Students (especially low-income group) through DBT to facilitate them to continue their education.

Current Status

Annually, more 1.28 crore students apply in 104 Scholarships schemes at NSP. Cumulatively in last five years, NSP has disbursed Rs. 11,100+ crore to approximately to over 3+ Crore beneficiaries directly into their account.

Hardware/Software

S.no	Item	Tools
1	HW	Cloud resource in PaaS model from NIC Cloud
2	Middleware	HA proxy, Nginx
3	Software	Client end
		NICDsign for Digital signing, bootstarp UI
		Server end
		Java, Struts, Springboot
		DB/Analytics tools
		Kibana, PgAdmin, Grafana
		DB
		Postgres, Elastic search, promethous
		Monitoring/De ployment Tools
		Nagios, Grafana, Jenkins, Openshift, Gitlab, Docker

Certification (Certifying Agency)

Yes, the formal certification has been obtained with respect to Cyber Security.

Cyber Security Division of NIC, MeitY, Govt. of India.

Following activities have been done by the certifying agency as part of comprehensive audit of the NSP system:

Functional Testing: The NSP application has been tested for process flows etc. in order to smoothen processes for various type of users:

- Security Testing: Security testing is done w.r.t. Cyber Security, OS hardening, Server Hardening, Load Balancer Hardening, Firewall etc. A software load balancer has also been implemented.
- Performance Testing: The NSP application has been tested for performance so that it can bear the load of approximately 5 Lakh applications per day and their processing along with verification.
- Others: API services to communicate data between 2 applications and for Mobile App has also been audited.
- Beyond these checks, the application is hosted in NIC's secured cloud services that offer enterprise level security features.

Disaster Recovery and Service Continuity

The NSP Web Portal is hosted in the NIC's Secured Cloud Services with adequate facility of Disaster Recovery (DR) at different locations for continuity of the Services in event of any contingency, in accordance with the guidelines of Government.

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
Ministry/Department onboarding	Ministry/Department onboarding	18 (Ministry -10, State-8)	21 (Ministry - 10, State-11)	26 (Ministry - 11, State-15)
Schemes onboarding	No of schemes onboarded	59	80	109
No of Applications received on the portal	This service facilitates the user/students to submit their application for receiving the scholarship	1.52 Crores	1.2 Crores	1.28 Crores
No of application verified on the portal	Nodal officers (Government official in field mostly at District level) verifies the submitted applications through their logins	1.11 Crores	93.62 Lakhs	84.30 Lakhs
No of applications qualified for scholarship	NSP engine generate merit list based on various criterions specified in Ministries' scholarship guidelines and provide the final outcome to the Ministries for scholarship disbursement	78 Lakhs	79 Lakhs	78.12 Lakhs
No of Student received the scholarship	Number of students for which Ministries send the payment instruction to the PFMS for payment (Scholarship disbursement)	70.67 Lakhs	72.39 Lakhs	68.28 Lakhs

Implementation

NSP is a cloud-based application and fully configurable in nature. Ministries/Department who desires to onboard on NSP has to submit the onboarding request before the beginning of an academic year so that students can apply for scholarship online. The on-boarding TAT is 2 days and post this, department can start using the application.

Improvements / Enhancements

In current academic year, 109 schemes (26 central sector + 26 state level) of 11 Ministries/Departments and 15 states were on-boarded on NSP. For AY 2020-21, 1.28 crore students applied for scholarship under fresh and renewal category from 14+ Lakh institutions. Out of this 1.11crore applications were final verified by districts/states nodal officers. Total 68.28 lakh students have received scholarships by DBT through PFMS amounting to INR 2846 crores approx.

ENABLER

Processes Re-engineered

NSP is a, single and simple application form for 109 schemes onboarded on NSP and has been devised in collaboration with all Participating Ministries and DBT Mission. The Government Resource Planning (GRP) yielded a secured system with all schemes of scholarship clubbed together under one umbrella of NSP. The complex processes from application submission to processing and disbursement of scholarships to meritorious and deserving students is done in a simplified and transparent manner and became feasible only because of adoption of adequate Government Business Process Reengineering (GBPR) enabled through NSP.

The in-house developed powerful Business Intelligence (BI) engine in NSP automatically decides the eligibility of applicants against available scholarship schemes at the time application submission. NSP is further powered by its deduplication engine which is deduplicating the application based on various possible parameters like (name, age, address etc.) at the time of submission.

Technologies

For development of NSP, the technology environment is blended with innovation by adopting primarily open source like Java, JavaScript, JQuery, Postgres/ MySQL with hosting environment Linux, Apache, Postgres/ MySQL. NSP is based on Enterprise Architecture, having following features: The governance perspective defines the processes and standards involved in delivery of Scholarships by which the governance operates on a day-to-day basis. The students' perspective defines the interactions among the various scholarship processes and standards used by the stakeholders. The information perspective defines and classify the raw data (such as document files, databases, images, presentations, and spreadsheets) that the various Ministries/ Departments/ State Govt. require to efficiently operate scholarship schemes. The technology perspective defines the hardware, operating systems, programming, and networking solutions used by the NSP. Moreover, Ministries/ Departments/ States benefited by DSS and Big Data Analytics.

People

Capacity Building

Number of workshop-cum-training programmers are conducted on regular interval for various States/ Ministries/ Departments to create and maintain system operation capacity in the users. The governing officers involved in the operation of NSP Web Portal are adequately trained on the Operation and Management of the system. Constant Apex Level leadership support from the user department and NIC is provided to motivate the middle and operational level management to adopt the changes and work efficiently.

VALUE INDICATORS

Learnings for sharing

The key learnings from this project are:

- Think global, act local. The demographic of India is unique. It has rich and economically weaker section both at extreme. It has highly advanced villages at par with developed cities and remote village where earning livelihood is a big challenge. Devising a strategy to cater to every segment is a challenge
- The Government Process Reengineering is continuously being carried out

wherever required, in order to create a good experience for the users and streamline the overall process,

- Adoption of open-door policy, means, any stakeholder can communicate at any level and if felt necessary project guards take immediately decisions. Beside this in case and if they require to discuss the matter with their higher-ups same is done without time lag.
- Funds disbursement through DBT, thereby eliminating middleman, has been instrumental in providing substantial and direct benefit to users, High trust-level between the developers and other stakeholders has been very essential for success of the project.

Digital Empowerment

- One-Page single scholarship form designed for every scholarship onboarded on NSP to simplify scholarship application.
- Visibility of more than 100 scheme on a single portal has brought transparency in government operations to a new benchmark in India.
- Intermediaries are eliminated from the system
- Financial assistance is directly passed to user accounts through DBT.
- Auto escalation keeps system owners focused towards delivery.
- Year on year system is being strengthened for faster yet effective verification process.

Green e-Governance

Following measures are taken as part of Green e-Governance:

- Energy optimization at Data Centre: The system is deployed using state-of-the-art cloud services provided by NIC. NIC provides this facility to several federal and state bodies of the Government. Adequate optimization of processing power as per the requirement leads to energy efficient system.
- Disposal of e-waste: All the hardware / electronic equipment used under this project will be disposed upon reaching end-of-life, as per the guidelines of Government of India for disposal of e-waste.
- Reduction in paper consumption: NSP is completely paperless system. The end-to-end processing of the application, from submission till funds disbursement is done through the system. For A.Y. 2020-21, the system has received 1.28 Crore applications from students. Considering only application forms by students, if submitted in hard copies, would be approximately 64000tonns of paper assumption: 75gsm (5-A4 sheet per application and 1.28crore application). Thus, for AY 2020-21 NSP has saved over 64000tonnss of paper, apart from the paper that would be used to process the applications.

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NTA Examination System

National Informatics Centre, New Delhi

Shashi Bhushan

PROJECT OVERVIEW

Objective

Examination Management Services was launched to help National Testing Agency (NTA) assess competence of candidates for admissions and recruitment, which has always been a challenge in terms of matching with research, based international standards, efficiency, transparency and error free delivery. The system was conceptualized and entrusted to address these issues aiming to achieve the following objective:

- One integrated solution for multiple tests/examinations.
- Integration with external systems (Payment Gateway Integrators, SMS Services, Email Services).
- Key Performance Indicators based on number of registrations, tests and feedback.
- A simple solution, easy to adopt for applicants.

Scope

Functional

- In order to address the standardization process of requirement, the scope covers Candidate Registration System, Admit Card and Score Card of Examinations.
- The hosting of all the listed applications including design and development of:
 - o Candidate Registration System
 - o Application Correction System
 - o Image Verification System
 - o Dashboard and Various MIS Reports
 - o Downloading application data
 - o Hosting of e-Admit Card and Score Card
 - o Interface for applicants to view and download the Admit card and score card as per approved Format
 - o Interface for applicants to challenge the answer key
 - o SMS and Email Integration
 - o Integration of Payment Gateway of Banks, UPI, E-Wallets.
- Handing over of registration database including binary photo images of applicants to NTA for further usages.
- Storage of applicant's mobile number and email id will be in encrypted format and will be utilized only for sending alerts to the applicants during registration process.

Geographical

NTA conducts eminent examinations at PAN India level with the support of NIC.

Key Stakeholders

- Applicants

- Examining Bodies (JNU, DU, NCHM, IITs, NIITs etc.)
- National Testing Agency representative of Ministry of Education
- National Informatics Centre
- Payment Gateway Providers (Banks, UPI, E-Wallets etc.)
- EPG Integration Team.

Intended benefits

- Hassel Free and Transparent services for Applicants
- Timely information dissemination to all stakeholders
- Single configurable system easy to adapt for various National/State level academic, eligibility and recruitment.

Current Status

Annually, more than 37.77 lakhs candidates applied for various National/State level academic, eligibility and recruitment examinations.

Hardware/Software

Item		Tools
Hardware		Cloud resource in PaaS model from NIC Cloud
Software	Client end	.NET
	Server End	.NET
	DB	MS SQL

Certification (Certifying Agency)

Yes, the formal certification has been obtained with respect to Cyber Security.

Details of certifying agency: Cyber Security Division of NIC, MeitY, Govt. of India.

Following activities have been done by the testing agency as part of comprehensive audit of the system:

- Functional Testing: The application has been tested for process flows, business rules etc. in order to smoothen processes for various stakeholders.
- Security Testing: Security testing is done w.r.t. Cyber Security, OS hardening, Server Hardening, Load Balancer Hardening, Firewall etc. A software load balancer has also been implemented.
- Performance Testing: The application has been tested for performance so that it can bear the load over 5 Lakh applications per day and their processing along with verification.

Beyond these checks, the application is hosted in NIC's secured infrastructure that offer enterprise level security features.

Disaster Recovery and Service Continuity

The application portal is hosted in the NIC's Secured infrastructure with adequate facility of Disaster Recovery (DR) at different locations for continuity of the Services in event of any contingency, in accordance with the guidelines of Government.

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
Examination Bodies on boarding	NTA conducts examinations for various Examining Bodies information system platform for quick replication and avoid duplicity in authentication	6	7	6
No of Applications received on the portal	This service facilitates the user/students to submit their application.	Aprox.13.05 Lakhs	Aprox.18.95 Lakhs	Aprox.5.90 Lakhs
No of application verified on the portal	The candidates registered on the portal and paid Fee for examination.	Aprox.13.02 Lakhs	Aprox.18.83 Lakhs	Aprox.5.85 Lakhs

Implementation

NTA Examination System is a web-based application and fully configurable in nature. The Examining Bodies who desires to conduct exams approaches NTA which intern share the details their exams to NIC. After detailed analysis on-boarding TAT is ranges between 2 to 7 days and post this, application made live for candidates to register for the examination

Improvements / Enhancements

Future initiatives towards improvements by

- Integrating with Digi-Locker to avoid counterfeit of document issued by NTA.
- Elimination of manual intervention
- Integration with Umang for availability of information anytime anywhere
- Integration with NIC e-Tall Services to get Real-time count of visitors to fine tuning of infrastructure.

ENABLER

Processes Re-engineered

NTA examination system is a simple and configurable application system used for various categories of examinations. It has been devised in collaboration with all participating examining bodies and NTA. The Government Resource Planning (GRP) yielded a secured system with all examinations of NTA clubbed together less than one umbrella of NTA. The complex processes from application submission to processing and disbursement of Examination information to candidates is done in a simplified and transparent manner and became feasible only because of adoption of adequate Government Business Process Reengineering (GBPR) enabled through NTA examination system.

Technologies

For development of Examination System, the technology environment is blended with

innovation by adopting primarily on .Net and MS SQL with hosting environment windows.

Examination System is based on Enterprise Architecture, having following features:

The governance perspective defines the processes and standards involved in delivery of examination by which the governance operates on a day-to-day basis. The students' perspective defines the interactions among the various examination processes and standards used by NTA.

The technology perspective defines the hardware, operating systems, programming, and networking solutions used by the examination system.

People

Numbers of workshop-cum-training programs are conducted on regular interval for new stakeholders that are on-boarded via NTA, to create and maintain system operation capacity in the users. The governing officers of NTA involved in the operation are adequately trained on the Operation and Management of the system. Constant Apex Level leadership support from the user department and NIC is provided to motivate the middle and operational level management to adopt the changes and work efficiently.

VALUE INDICATORS

Learning's for sharing

The key learning's from this project are:

- Think global, act local. The demographic of India is unique. It has rich and economically weaker section both at extreme. It has highly advanced villages at par with developed cities and remote village where earning livelihood is a big challenge. Devising a strategy to cater to every segment is a challenge.
- The Government Process Reengineering is continuously being carried out wherever required, in order to create a good experience for the users and streamline the overall process, considering the sensitivity of the system trust-level between the developers and other stakeholders has been very essential for success of the project.

Digital Empowerment

- Configurable application which can be customized for any prospective examining bodies
- Visibility of Examination Information and Public Notices pertaining to exams.
- Intermediaries are eliminated from the system
- SMS and Email integrated with system to provide ease of communication with the candidates.

Green E-Governance

Following measures are taken as part of Green e-Governance:

- Energy optimization at Data Centre: The system is deployed using state-of-the-art secured infrastructure provided by NIC. Adequate optimization of processing power as per the requirement leads to energy efficient system.
- Disposal of e-waste: All the hardware / electronic equipment used under this project will be disposed upon reaching end-of-life, as per the guidelines of Government of India for disposal of e-waste.

- Reduction in paper consumption: Examination System is completely paperless system. The end-to-end processing of the application, from submission till funds disbursement is done through the system. For A.Y. 2020-21, the system has received 37.77 Lakhs applications from Candidates. Considering only application forms by Candidates, if submitted in hard copies, would be approximately 6033 tons of paper (assumption: 75 gsm (8-A4 sheet per application and 37.77 Lakhs application). Thus, for AY 2020 -21 Examination System has saved over 6033 tons of paper, apart from the paper that would be used to process the applications.

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Online NOC and Affiliation System for the opening of new Courses/ new Colleges

Department of Higher Education, Govt. of Uttar Pradesh & National Informatics Centre Uttar Pradesh State Centre

Monika S. Garg, Amit Bharadwaj and Ashesh Kumar Agarwal

PROJECT OVERVIEW

Objective

The Government of Uttar Pradesh envisions a Paperless/Timeless/ Contactless and more Transparent Affiliation system of state universities. The Government of Uttar Pradesh plans to realize this vision through the effective and optimal use of ICT, change management techniques, training, process reengineering, and project management. The objectives of this fully automated affiliation system are: -

- Simple user-friendly & reliable registration process from HEI's.
- Provide transparency.
- Paperless/Timeless/ Contactless affiliation system.
- Application tracking system.
- No hard copy of Documents required.

Scope (Functional &Geographical)

Higher Education Department, Government of Uttar Pradesh has decided to fully automate the affiliation system of the state universities of Uttar Pradesh. This project will cover all the universities/colleges of 75 districts of Uttar Pradesh.

Aims of the project: -

The project aims to automate the NOC and affiliation system of the universities for the opening of New Courses and New Colleges with the usage of this application software.

The entire project can be divided into 2 major parts;

- Design, development, implementation, and maintenance of web-based application for Online NOC.
- Design, development, implementation, and maintenance of web-based application for Online AFFILIATION.

Key Stakeholders

The “Online NOC and AFFILIATION” system has the following stakeholders:

- Department of higher education, Uttar Pradesh (Primary stakeholder)
- State universities of Uttar Pradesh.
- DARPAN (CM Dashboard) (<https://up.cmdashboard.nic.in>).
- All the Districts of UP.
- Higher education institutions.

Hardware/Software

Hardware – Two VMs 64GB RAM Storage 70GB

Operating System - Windows

Technology Used –ASP.Net, VB.Net, C-Sharp

Web Server – IIS

Database – MS-SQL Server

Services Integrated – SMS

The application is hosted in Uttar Pradesh State Data Centre, Lucknow.

Certification (Certifying Agency)

Yes, we have a security audit certificate.

Website Security Audit (<http://henoc.upsdc.gov.in>)

Certificate No: AKSIT/2021-22/312

Date of issue: 14th September 2021

AKS Information Technology Services Private Ltd, B-21, Sector-59, NOIDA-201309

Disaster Recovery and Service Continuity

The safety of the most valuable Registration data and documents is necessary. A DR/Near DR is necessary along with Data Centre. The uptime should be maintained at 99%, hence the DR site needs to be in active-passive mode. Since the department is using the UP State Data Centre, so they are also keeping DR for our system too.

RESULTS INDICATOR

Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefit	Volume (Nos) of Services year wise	
		2019-20	2020-21
Online NOC service	“Online NOC and AFFILIATION” software has been designed and developed using ASP.Net, VB.Net, and C Sharp in Windows environments. The Application and Database are hosted on UPSDC, Lucknow. The process of digitalization in the NOC and AFFILIATION system has been introduced. The application has been developed to make the system transparent. Accordingly, the entire application development logic, the database logic, and the presentation logic have been segregated. Total benefited HEI is 1820.	775 institutes applied for NOC	1045 institutes applied for NOC
Online AFFILIATION service	Total benefited HEI's (AFFILIATION) are 1979. till date	-----	1979 institutes applied for AFFILIATION

Implementation

Implementation Coverage achieved against the plan/target

“Online NOC and AFFILIATION” is an e-Governance service covering all the state universities in all districts of Uttar Pradesh. 100% Coverage and Implementation in terms of target/plan:

In Higher Education Department, under the e-Governance process in NOC and AFFILIATION, NIC had designed a software solution. The entire application development logic, the database logic, and the presentation logic have been segregated.

“Online NOC and AFFILIATION” features:

- Online filing of Registration/ Application for NOC.
- Online verification of Land by District Magistrate.
- NOC letter issued in digital mode.
- Online filing of Registration/ Application for affiliation.
- Online constitution of inspection panel by concerned universities.
- Online submission of reports by inspection panelists.
- AFFILIATION letter issued in digital mode.

Indicate improvements/ enhancements specifically rolled out during the last year and those planned to be rolled out during the next year.

- Issuance of NOC and AFFILIATION certificate.
- Applicant can track their application.
- MIS Reporting.
- Online verification of Land by District Magistrate.
- Online constitution of inspection panel by concerned universities.
- Online submission of reports by inspection panelists.
- AFFILIATION letter issued in digital mode.
- Integration of NOC and AFFILIATION system with “DARPAN” portal.

Future Development Points:

- GIS Mapping
- Integration with Land record data
- Integration with ‘Sandes App to send the NOC/ Affiliation letters

ENABLER

Processes Re-engineered

In view of computerization and the use of modern technologies, there is a need for re-engineering the existing registration procedure. Most of the Institutions are unaware of the university affiliation system. Hence, there should be an online portal for the “noc and affiliation” system:

- Earlier, the process of applying for NOC and Affiliation was manual. Now the earlier process of application moved manually is replaced by work-flow based online application.
- Now NOC and Affiliation system have been completed online. All the applications are checked and processed online by the concerned

university/Department/Person.

- All the process of NOC and Affiliation has turned to be Timeless/ Paperless/ Contactless and more transparent.
- The process offers the institutions a computer-generated application ID for tracking their applications.

Technologies

Technical initiatives taken to fully automate the affiliation system of the universities are as under:

- Registration process by institutions.
- Provision of login ids.
- Provision of SMS Alerts.
- Reduction of manual records with computerized standardized documents.
- Easy retrieval of records and reduction in manual efforts in affiliation system of universities.

Exchange of information with:

- College login.
- University Login.
- DM Login.
- Inspection panel login.
- CM Dashboard DARPAN.
- Technology Standards: HTML, JAVA Script, XML DATA/Message Exchange Standards
- CAPTCHA is used to protect the integrity of online polls by stopping hackers from using robots to send in repeated false responses and SHA512 is used for encrypting the passwords so as to keep it safe from hackers.

People

Capacity Building

Capacity building/Training has been provided to all the universities on different modules of “Online NOC and AFFILIATION” Software by NIC and universities trained all the colleges who intend to fill the affiliation form online. In addition, universities flash the contact number of their technical support person on the same portal.

VALUE INDICATORS

Learnings for sharing

- Defining roles and responsibilities of the officers/staff.
- Process reengineering for better service delivery
 - o Simplification of university affiliation Process
 - o Establishment of technical helpdesk by universities
- Comprehensive Training

Improving the quality of services to the institutions- This improvement of quality will be in terms of:

- Easy availability of information.
- Reduced cycle time for application processing by automating.
- Greater transparency and accountability during the process.
- Ease of administration and effective monitoring of work.

Leveraging the benefits of ICT in the new system exchange of information with:

- College login.
- University Login.
- DM Login.
- Inspection panel login.
- CM Dashboard DARPAN.

Digital Empowerment

- Workflow-based system.
- SMS at each stage.
- Application status tracking.
- Digital NOC/Affiliation letter.

Green e-Governance

- Removal of manual records with auto-generation of computerized standardized documents.
- Easy access to colleges and universities for their records.
- Easy retrieval of records and reduction in manual efforts of the affiliation system.
- Electronic Archival of Documents.
- Online tracking system of application.

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SEWAMITRA

Directorate of Training and Employment, Govt. of Uttar Pradesh

Kunal Silku, Pramod Kumar Pundir and Atul Kumar Gupta

PROJECT OVERVIEW

Objective

This SEWA MITRA Portal/Application aims to provide a one-stop solution for all domestic services to the Citizens of UP at reasonable rates with ease of booking at their own leisure, facilitating self-employment opportunities to Skilled/ semiskilled /Unskilled workers along with Logistics Support to the Service Sector Entrepreneurs and Start-Ups across the state (Urban, Semi-urban and rural) through a digital Platform.

Scope (Functional &Geographical)

The scope of this Portal covers everyone currently living in state of UP. Be it the technically Smart Citizen or naïve user with a keypad phone, to have availability of services at doorstep, across the state. SEWA MITRA will act as the magic digital connect between these segments where some are the verified supplier of the service, and the other party is the consumer of the service.

Key Stakeholders, Intended Benefits and Current status

Citizens	• Sewamitra Help Line 155330 to assist Layman Users in booking services for their daily needs. • Users can book services (24 x 7) through user friendly website and Mobile app • Rating n Review system along with open pricing to choose best service provider at affordable pricing • Dispute resolution through call center & local Sewayojan office • Both Small Duration (Day Jobs) and Long Duration Jobs (Project Jobs) can be catered through Sewamitra Platform.	Sewamitra Portal/App has gone Live along with Sewamitra Helpline - 155330 and the intended benefits are available to the Customers in 25 districts.
Skilled Labours	• ‘Work Near Home’ Opportunity for labours. • Skill Certification and Training for Uncertified Professionals • Assistance in Police Verification	Skilled labours on boarded by Service Providers are able to find work in their own district through Sewa Mitra Portal.
Service	• Digital Workforce	The Intended Benefits are

Providers	Management System • New Business Opportunity by Technology Enhanced Sewa Mitra Platform • Both Small Duration (Day Jobs) and Long Duration Jobs (Project Jobs) can be catered through Sewamitra Platform.	available to the onboarded Service Providers in 25 districts.
Government	• Stepping Stone to Organize, a completely unorganized sector • Verified Data for Employment Generation, Skilled Labor, Wages etc for policy formulation, review of existing policies and identification of intervention points. • Revenue generation for attainment of self-sustenance of SewaMitra Platform	Besides Providing Digitized Platform to Service Providers, a step has been taken to organize the skilled worker sector. Heuristics for Various Policy Measures is being gathered and shall be available after a period of one year.

Hardware/Software

Windows server 2019 data center edition

AWS Active directory using for User login and FSX FSX (using for data share between multiple nodes)
ALB is using to manage the load across multiple nodes.

Created ASG to create/delete new server as per load cross 80% for more than 5 min. SQL Server: Sql server 2014 Enterprise.

Advanced Firewall from AWS Server

Certification (Certifying Agency)

Yes, Certification has been obtained from Cert-In Empaneled Company named Innovator Infotech Private Limited.

Disaster Recovery and Service Continuity

- Advance Backup System (off Site): Daily Database Back up For Last 30 Days in S3 Bucket (Amazon Cloud Storage) Daily File Backup for Last 30 Days in S3 Bucket (Amazon Cloud Storage)
- Server Snapshot: Daily Complete Server Snapshot for last 7 days
- Document Restore process: In case of disaster whole protocol for restoring backup are in place and roles are defined from Team leader to server administrator.
- Server Audit: Audit has been done by internal team and external Audit Agency.

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 registration of Service providers	Paperless registration Process for Service providers willing to work on Sewamitra Portal	75	157	
Online Registration of Skilled workers	Skilled workers willing to work with Service Providers in their home districts .	75		7759
Online Domestic Services available on Sewamitra Portal as of 20.09.21	Salon For Women	6	7	244
	Massage For Women	5	6	
	Salon For Men	5	6	
	RO Service & Repair	14	16	
	Electrician	18	23	
	Appliance Repair	16	22	
	Cleaning & Disinfection	13	15	
	Carpenter	15	16	
	Pest Control	8	8	
	Plumber	15	18	
	Painter	11	12	
	AC Service and Repair	16	21	
	Massage for Men	3	3	
	IT hardware and Services	12	15	
	Tour and Travel Services	7	7	
	Tailoring Services	6	6	
	Nursing Services	2	1	
	Car Repair and Service	6	7	
	Diagnostic Services	41	1	

Implementation

Total Services :19

Total Service Providers:41

Total SewaMitrsonboarded:244

Total Districts Covered:3

(As on 20.09.21)

Improvements / Enhancements

Since only 5 months have passed after Go live of Sewamitra Portal and that too affected by post Covid scenario, the pace of Onboarding of Service Providers across districts has been relatively slow, as the economy is showing the signs of recovery, following aggressive target has been set:

Employment Opportunities for 1Lac + Skilled Labors in their district

Day Jobs

10 Lac + Day Jobs Opportunities to be created

SME

Growth Opportunities for 1000 + Small & Medium Service Provider

Projects

1000 + Project Jobs to be created

Coverage

Across the state (75 districts).

ENABLER

Processes Re-engineered

Government Process: Before Sewamitra, there was no Integrated Government Platform to provide Wage jobs to the Skilled workers, although similar type of work was being done in silos through SUDA or MGNREGA (to an extent), in an unorganized way, where mostly the focus was on capitalizing employment opportunities in government sectors and the opportunities available with citizens was unexplored. SewaMitra Platform has tried to fill this gap by providing an integrated digitized solution to cater to both government and as well as citizen needs, by organizing a completely unorganized sector.

Automation: Sewamitra Platform is providing Digitized Workforce Management System (DWMS) to the Service Providers and Start-ups at a very reasonable cost.

Standardization and Simplification: Sewamitra Platform is standardizing and simplifying the process of engagement of skilled worker for domestic works by citizens through its 24*7 available portal and app along with Sewamitra Helpline-155330. With the Noble thought of “Customer is king” it is providing the citizens a variety of vendors for various services, give their opinion about services availed and also to benefit through transparent online bidding process for project works.

Technologies

Sewamitra uses technology to simplify the process of finding the right service professional in nearby locality. SewaMitra platform is taking leverage of cloud computing platform AWS to perform complex Artificial Intelligence and Machine learning algorithm. Platform uses its advanced match-making algorithm to search for the nearest professional who matches the user’s requirements and is available at the given date and time. Advance Google Analytic has been implemented to review user movement over website and Application, understand pattern, demand and challenges. Call received from customer are being stored and sent to data analysis team for review. Whole traffic,

service request, service availability and other challenges are reviewed to make user experience smooth along with finding new opportunities to cater.

People

Capacity Building

Sewamitra Portal would help in Capacity building for Service providers by providing them Digitized Workforce Management System, Recognition of Previous Learning (RPL) for Skilled Labours and Heuristics for the Government as intervention Points in Skill and Employment Domain.

Leadership Support:

Sewamitra Data would help the Service Providers to know which skill is in demand in the market and hence employ that skill set or upgrade their workforce with the required skill set. Government would get inputs for facilitation of Skill development for skill set in demand in the desired districts across the state.

VALUE INDICATORS

Learnings for sharing

Conceptualizing a successful business model with Governments' Ideology of 'Antyodaya' is a big challenge, however with the help of DevOps methodology, it has been turned into reality where the continuous integration and continuous delivery model allowed the development and operational teams to perform everything simultaneously in development, quality assurance, security, and other operations.

Digital Empowerment

SEWA MITRA would present the "Self-Empowerment" business model and opportunity to all citizens across Uttar Pradesh. The user-friendly application has a simple registration and verification process for an eligible service provider to enroll them in the digital platform and start getting business inquiries directly from the customers on day one. There is a fixed transparent service fee against each category of services listed on the Portal, reducing conflicts or commercial disagreement between them and end-users. Being a bi-lingual (Hindi and English) application, SEWA MITRA would smooth sailing once launched. All geographic segments of citizens across the states (Urban, semi-urban and rural) are expected to benefit from the initiative.

Green e-Governance

Green e-Governance is about the application of Green computing practices to the domain of e-Governance. It involves adopting environmentally friendly practices concerning the creation, use, and disposal of ICT gadgets/infrastructure. There are several dimensions to green e-Governance, and prominent among these relate to the removal of e-Waste. Describe the specific steps taken and other Green Governance initiatives.

"SEWA MITRA" with its technology Partner is E-waste (Management) Rules, 2016 Compliant. As a result, it would reduce paper usage significantly. The earlier model of written communication through paper notes no longer exists with "SEWA MITRA", it is all going to happen online only. The staff, officers and the Stakeholders are being made aware and educated about E-waste and Green initiatives, encouraging e-mail communications with different stakeholders. All the transmission through the Portal is being done through automated E-mail and mobile SMS processes.

As a policy, the Government of Uttar Pradesh has already initiated excellent efforts towards green e-governance. All state government departments are working in that direction and follow the necessary guidelines issued to that effect.

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Tele Practice

*Department of School Education, Govt. of Chhattisgarh & National Informatics
Centre Chhattisgarh State Centre*

Alok Shukla and A. K. Somasekhar

PROJECT OVERVIEW

Tele Practice is a technical platform to conduct oral quiz or enable ‘speaking practice’ for students using social media platform ‘TELEGRAM’ as frontend and backend processing using ‘Python’. Teacher creates a Telegram group and adds students of a particular class (not more than 40) in the group. Teacher also adds a Telegram BOT named ‘NICCG edtech’ and gives ‘Admin’ permissions to that BOT so that NIC can programmatically access that Telegram group using Python. Teacher with her credentials, logs into the web application and schedules a practice on a topic for example ‘Prepositions’ or ‘Present Continuous Tense,’ at a particular time. There is a question database with question images and answer images for different topics (Currently available for English & Mathematics). Oral quiz at the scheduled time shall be conducted as follows.

At the scheduled time, all the students participate in the quiz from their homes and shall be online on telegram. Teacher puts a question image in the group (which is also automated). All the students are supposed to give answer as a voice message within 30 to 45 seconds; all students shall send their answers through voice messages. Like that 20 question images shall be put in the group and students answer through voice messages.

A python program has been written to automatically access the telegram group with the help of API provided by telegram. The python program shall retrieve all the voice files, will concatenate voice files answered by one student and add the voice file to a video with question images and correct answers written on it. That means the video file created for each student shall have question image, it’s correct answer in text and the voice as answered by the student. By seeing the two-minute video, student can grasp where he is wrong. Teachers are also given a provision to view the video and grade the video. To further personalize the video, student’s photo and name are also displayed in the first screen.

Capturing student’s name & photo and conducting quiz by the teacher is almost automated using Telegram BOTs. Students can send their name & photo by using a Telegram BOT command ‘/start’ created by NIC. Teacher can start the quiz by using the command ‘/startquiz’ and post question image in the group by using the command ‘/next’. The question images are available on the server and they will be sent to the Telegram group. Teacher need not have the question images on her mobile.

The python program shall create personalized videos for each student with their name, photo and voice answers given. The videos are available for the teacher to assess and grade them. Teacher can take necessary remediation based on the errors committed by the students as seen in the video.

Objective

- To provide a platform to conduct oral quiz to the students sitting remotely in their homes.
- To provide feedback to students on their oral answers by auto generating personalized video for each student.
- Introduction of gamification techniques to make learning more entertaining.

- To save teacher's time in conducting oral assessments so that they can use the saved time in remediation of the students.
- To encourage voluntarism to grade and mentor lower class students by higher class students and community.
- To send personalized info graphs to students and their parents to create awareness on government schemes based on data analytics.

Scope (Functional & Geographical)

- Currently Tele Practice is being used for improving English speaking skills for 6th to 12th class students in all high and higher secondary schools throughout the state.
- Tele Practice is being used to assess all 6th class students whether they have knowledge on all 15 Mathematics Concepts of primary level as defined by NCERT.

Key Stakeholders

- Students –Student shall take oral quiz or practice speaking to improve their learning and get assessed their understanding. Currently, it is limited to those students who have access to their parent's mobiles with internet. It is estimated that more than 70% students have such access except in remote and left wing affected areas.
- Teachers –Teachers are supposed to create Telegram groups, schedule practices, assess student's videos and take remediation measures to improve student's learning outcomes. Selected teachers also create question database.
- Samagra Shiksha and SCERT –To create and approve quiz questions and associated content.
- National Informatics Centre –To give complete technical support.
- Community Volunteers –To volunteer assessing videos and mentoring students.
- Department of School Education –Overall leadership, implementation, monitoring and necessary process re-engineering.

Intended benefits

- Students can take oral quiz by sitting in their homes and get feedback through personalized auto generated videos.
- Teachers are saved with 80% of the time to be spent on oral quizzes. Oral assessment of a student by a teacher is an essential, frequent and continual task in the teacher's academic work for effective teaching. But, so far oral assessment by a teacher has been one to one. So, to ask 20 questions to a student and listen to their answers, it takes minimum 15 minutes. Thus, it takes 10 hours to assess 40 students. But, using Tele Practice, oral quiz can be conducted to 40 students simultaneously in 20 minutes and to view the two minutes videos created, it will take another 80 minutes (40 X 2 minutes). So, 10 hours job of a teacher is now reduced to 100 minutes with the same intended outcome saving more than 80% of time which can be used for actual remediation work to improve student's learning outcome.
- The feedback from the students has made us know that they are able to speak without hesitation as they are speaking from their homes in their comfortable private place. When they understand from the auto generated video, what they

spoke was correct; they are relieved from the hesitation to speak even publically.

- As it is human psychology to prefer seeing again and again once own face, name and voice. Students are watching the auto generated personalized videos with interest, which actually is resulting in more learning.
- It is a general complaint and experience, especially in government; teachers generally over grade their students when teachers are asked to enter assessment results of the students for obvious reasons. But that is not the case with this assessment as it is keeping permanent evidence of student's performance in the form of auto generated personalized videos.
- Data analytics is now possible to exactly find out where remediation is required for the student and suggest necessary remediation.

Current Status

- Implemented in all high and higher secondary school throughout the state for English Speaking and primary mathematics concepts.
- 250 quizzes on different concepts have been created.

Hardware/Software

- Server – Windows server 2012
- Programming Environment – Python
- APIs – Microsoft Dot Net
- Open source Tools – 'FFMPEG' to auto generate video files, Google Speech to Text.
- Database – MySQL
- Telegram API

Certification (Certifying Agency)

- Security audit is under process.
- SSL certificate has been implemented.

Disaster Recovery and Service Continuity

Yes. Backup is taken transactional and full, on daily basis. Mirror server is maintained locally. Business can be re-started in an hour's time in case of serous hardware failure.

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
Students benefitted	Students from 6th to 12th who have taken oral assessment and got personalized videos.	-	-	7, 000+
Personalized videos created	Auto generated videos with student's photo, name and voice answers.	-	-	20, 000+

Quizzes created	Oral quiz questions mapped to learning outcome in English and Mathematics.	-	-	250

Implementation

Tele Practice is currently used only in high and higher secondary schools throughout the state. But, in future it is to be extended all middle, high and higher secondary schools. It is currently used for English speaking and primary mathematics concepts. But, planned to be extend to all subjects of middle and higher classes

Improvements / Enhancements

The initiative is implemented in this year only.

ENABLER**Processes Re-engineered**

- Quiz questions and practice methodology for English speaking has been standardized by expert group consisting of Samagra Shiksha and SCERT subject experts.
- The gamification techniques to motivate students, participate in the quizzes have been carefully designed by experts.
- The oral assessment taken through this system has been accepted for internal assessment purposes.

Technologies

- Social media platform 'TELEGRAM' is used to take the oral assessment because of the following reasons.
- Telegram has an open architecture and open API (WhatsApp is closed) to automate reading and sending messages to Telegram groups.
- Students and Teachers already know how to use Telegram like social media applications. To take advantage of that learning, the initiative uses Telegram as a front end instead of creating a separate app.
- 'Python', a powerful language is used to automatically access Telegram and create video files and also auto correct student's voice answers in addition to teacher's assessment with the help of Google's 'Speech to Text' API.
- 'FFMPEG', a powerful open-source media processing tool used to auto generate video files.
- Micro services have been developed to communicate between database servers, Python program and Telegram servers.
- As it is seen, the intervention is computational heavy and requires lot of computational power. But, NIC is using already existing server's computational power which is idle during night (9 PM to 6 AM) to auto generate videos. This resulted in optimal use of existing computational power.
- VIMEO, a YouTube like platform for video streaming is being used to store generated video files without any manual intervention.
- Intelligent Telegram BOTs have been created to take student's photo & name and to auto conduct quizzes.
- Data Analytics is used to give personalized suggestions to students based on

the assessment results.

People

- Dr. Alok Shukla, Principal Secretary, Department of School Education – Complete Guidance and leadership.
- Dr. Kamal Preet Singh, Secretary, Department of School Education – Leadership and change management.
- Dr. Ashok Kumar Hota, State Informatics Officer, NIC – Technical Guidance and Consultation.
- Dr. Narendra Dugga, Mission Director, Samagra Shiksha – Implementation.
- Mr. A. K. Somasekhar, Sr. Technical Director, NIC –Innovation, Architecture and Design.
- Dr. M. Sudhish, Assistant Director, Samagra Shiksha – Implementation support and content creation.
- Ms. Lalita Verma, Scientist – ‘B’, NIC – Team Lead for Technical Development.
- Mr. M. Muralidhar, Mr. Deepak Shrivastava, Mr. Dinesh Kumar Sahu, Mr. Vikas Pandey and Ms. ShanalVaishnav–Technical Development.

VALUE INDICATORS

Learning’s for sharing

- Use of social media which is already popular as a front end helps push the implementation easy.
- While designing technical interventions, especially in education, should include gamification techniques.
- One of the learning from this initiative is to involve every stake holder from the concept stage. The department has conducted many consultative workshops involving teachers, students, DEOs and subject experts from SCERT to validate the idea.
- The current technology allows multimedia processing and hence, e-Governance applications should see beyond Text and Image based applications.

Digital Empowerment

- The whole application’s user interface is in Hindi.
- Telegram is used as a front end, which has been designed to work in all kinds of smart phones and even with low bandwidth. This intervention takes advantage of that.

Green e-Governance

The initiative is paperless and fully digital.

Dr. Alok Shukla, Principal Secretary, Department of School Education, Govt. of Chhattisgarh, dr.alokshukla@gmail.com

Shri A. K. Somasekhar, Sr. Technical Director, National Informatics Centre Chhattisgarh State Centre, som@nic.in

Unified District Information System for Education (UDISE)+ Ecosystem

*National Informatics Centre School Education Division, Ministry of Education,
Govt. of India*

Saba Akhtar and Abhishek Kundu

PROJECT OVERVIEW

Objective

Unified District Information System for Education Plus (UDISE+) ecosystem is the official MIS platform from the Department of SE&L, under the Ministry of Education. It is the largest database of school education in India. It has 7.25 lakh registered users at the school level which is still expanding. Schools in UDISE are given a unique identifier: UDISE code. Components of the UDISE ecosystem are:

- UDISE Data Capture platform: Enables collecting information through an online form, from all schools up to class XII.
- School Directory Management: A centralized portal primarily for managing key details of schools within UDISE+.
- School Report Card: Provides key statistics of Indian schools based on UDISE code/school name.
- Dashboard: Provides a visual representation of data to make evidence-based decisions and monitor performance.
- Performance Grading Index (PGI): The tool provides 70 KPI (~50 KPIs leveraged from UDISE+) based insights on the status of school education in States & UTs.

Scope (Functional & Geographical)

The platform assigns UDISE code to schools to uniquely identify them. Enables real time exchange of information and online capturing of UDISE+ data comprising schools, students, and teachers' details

- Provides a platform to organize and classify all school data across the country, and build a credible database of school data.
- Enables leveraging data analytics on school data to identify factors affecting school performances
- Time-series data allows to study the trend over years and monitor improvement/growth
- UDISE+ rationalizes the capturing of school data with validity checks improves consistency and reduces error
- Provides traceability and audit trails of officials uploading the data
- Improved monitoring, and security of the sensitive school/teacher/student data
- PGI Tool provides insights on the status of school education in states/UTs including key performance levers and areas for improvement to ensure accuracy of data, a mobile application for third-party verification is currently in development.

Key Stakeholders

- Ministry of Education

- All State Education Dept.
- Autonomous bodies
- Schools
- Students
- Teachers
- Researchers
- public

Hardware/Software

S.no	Application	UI/UX	Technology	Database
1	School Directory Management	JSP, JQuery and Javascript	JAVA (Struts 2.0, Spring MVC, Hibernate 5)	Postgres 12
2	School Data Capture	JSP, JQuery and Javascript	JAVA (Struts 2.0, Spring, Hibernate 5)	Postgres 12
3	Know Your School	JSP, JQuery and Javascript	JAVA (Spring Boot, Hibernate 5)	Postgres 12
4	Data Sharing Platform	JSP, JQuery and Javascript	JAVA (Spring Boot, Hibernate 5)	Postgres 12
5	API Platform	JSP	JAVA (Spring Boot, Kong)	Postgres 12
6	GIS Mapping	Arc GIS	JAVA	Postgres 12
7	Performance Grading Index	Angular	java spring boot	Postgres 12 and Mongo Db
8	Dashboard & Analytics	Angular 10	Spring Boot, Apache Spark	Postgres 12

Certification (Certifying Agency)

The web application is secured as per the OWASP Application Security Verification Standard. Details of certifying agencies are as follows:

- Agency Name: AAA technology- Website application security audit. (CERT-IN)
- Certificate No: AAA/WAC/20190099
- Date: 14 November 2019

Disaster Recovery and Service Continuity

The Disaster Recovery and service continuity is managed in the UDISE+ ecosystem via deployment of backup server at different geographies. The real time data storage is disseminated nation-wide with data streaming at different locations to maintain the serve continuity.

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
School Directory Management	School Directory Management acts as a centralized School registry which facilitates the management of all the schools on real time basis in federated architecture. It caters all types of schools including private schools. • Standardized system for identification of schools. • Online registration for UDISE code allocation as national level identifier of school. • Self-service for modification of school information like school details, school status and school location • Real time tracking & monitoring			
UDISE+ School Data Capture	UDISE+ collects information from all schools imparting formal education from Classes I to XII in online mode from schools. Approx. 5000+ data points are captured on school profile, physical infrastructure, teachers, enrolments, examination results, etc. • School Account Creation based on UDISE+ code for online access • Monitoring & Verification of data by District, State and National level. • Certification and ownership of authenticity of School data by States • Auto consolidation of federated data at Block, District, State and National Levels • Exceptional reports, alerts and notifications as per service levels			
API Platform	API Platform shares the data of school directory and other collected data with several agencies for their			

	consumption. Major users are: National Scholarship Portal (NSP), Mid-Day Meal (MDM), National Achievement Survey (NAS) and Punjab Scholarship etc. • Develop a platform providing single window for configuration of API's • User Authorization with API Keys • API Client Filtering for maintaining data security • Enable security on data while in transit mode • It also enables for real time authorization and automation of data sharing along with user validation.			
Know Your School	Know your School is a module to showcase/ search school information and school report summary to public user. It also provides detailed school report card. • Search & fetch school related information based on identified parameters (school name, UDISE code and pin code etc.) • Reports have filtration option based on the category, management of a particular district/ block/ village. • Real-time information availability and detailed school report card.			
Data Sharing Platform	Data Sharing Platform enables the sharing of bulk data in line with Data Sharing Policy of DoSEL. It fulfils the demand of data globally for research and other purposes. • Enabled Data Sharing with registered users. • Data Sharing for Periodic data (bulk data), Real time data and Ad-hoc data request. • Aimed for data collaboration and partnerships amongst data providers and consumers			

	• Data Exchange through API, Web-form, Email and External devices			
Performance Grading Index (State & District)	The PGI for the States and Union Territories (UTs) has been designed to catalyse transformational change in the field of school education. The PGI State Application of NICMOE envisages that the Index would propel States and UTs towards undertaking multipronged interventions that will bring about the much- desired optimal education outcomes. • Central Repository providing single window for monitoring. • Online capturing & updating the data by concerned States/UTs at district and State/UT level. • Integration of multiple online portals namely Shagun, UDISE+ and Mid-Day Meal (MDM) as data sources. • Collection of best practices followed by States and UTs.			

Implementation

It was envisaged that automation via the digitization of processes may be done to avail the real-time data to authorities for monitoring and actionable. For the implementation of the UDISE+ ecosystem, a school needs to initialize/register under Unified District Information System (U-DISE). This system provides a flexible way i.e., self-registration using which a school can register itself under U-DISE.

Once the registration request is approved by a block-level official or district level official, the school will be added to the U-DISE system with a U-DISE code. The administrator can also initialize schools and approve/reject requests in School Directory management (SDMS). Afterward, training is provided to end-user at national, state, and district levels.

Improvements / Enhancements

The improvements and enhancements specifically rolled out for, Capacity Building and Awareness & Communication of UDISE+ ecosystem are as follows:

- In year 2019-2020 two National level training were organized for 725 district MIS is conducted.
- In year 2019- 2020, 7 State-level training was conducted for District, Block, and school level users related to Data capture format guidelines.
- Several virtual mode trainings are continuously conducted for creating awareness about the UDISE+ ecosystem.

- Training manuals, guidelines along with DCF is available at website for references.
- In contact us section of website, details of respective nodal officers are available for district and state level.

ENABLER

Processes Re-engineered

Online uploading of data: This feature of UDISE+ will also help the Department to make proxy checks on various components of schemes, provisions of funding, etc. which are covered under UDISE+ data. For example, it will allow the Department to map these schools which received funds for computers, and internet connectivity but which are not uploading the data online. Such checks will ensure that the equipment reaches the school and they are put to proper use.

Reduction in cost incurred for printing the DCF for schools: With digitization, the printing cost of DCF is saved. The size of the DCF has been reduced considerably and the schools are happier to receive a slimmer DCF rather than the earlier bulky one where half of the questions did not pertain to them. The reduced size of the data capture format will go a long way in eliminating data entry errors and thus make the data more consistent.

Data Verification: To ensure the accuracy of data provided through UDISE+, an application (App) for Third-Party Verification is one of the features of the UDISE+. The App will track the location of the person carrying out the verification to ensure that it is an on-the-spot verification and the report is not being uploaded from some other location.

Technologies

The major emerging technology-related initiatives are given below:

- Big Data Analytics is used to manage a significantly large size of data collected from the UDISE+ platform. Big Data analytics is leveraged to extract meaningful insights, such as hidden patterns, unknown correlations, etc. from the data pertaining to schools, teachers, and students across India.
- Image Pre-processing is going to be used to read physical forms filled in regional languages at the grassroots level, and then convert them into Hindi/English. The work is currently in progress, to leverage Tesseract, for performing Optical Character Recognition i.e., to read image and convert accordingly into the text.
- Apache POI is used as API in the UDISE+ ecosystem for the creation, modification, and visualization of MS Office files using Java programs. It is an open-source library by Apache Software Foundation to design or modify Microsoft Office files using Java program.
- Spring Boot is used for API creation in UDISE+ ecosystem which makes it easy to create stand-alone, production-grade Spring-based Applications that you can "just run".
- Postgres SQL DB: PostgreSQL, also known as Postgres, is a free and open-source relational database management system emphasizing extensibility and SQL compliance. It is used in UDISE+ ecosystem for the management of relational databases.

People

Capacity Building

It is a systematic approach to knowledge and skills development. It ensures an end-user is well versed in the offerings and processes involved while attaining expertise in terms of usage. For, Capacity Building and Awareness & Communication of UDISE+ ecosystem following activities were carried out:

- In year 2019-2020 two National level training were organized for 725 district MIS is conducted.
- In year 2019- 2020, 7 State-level training was conducted for District, Block, and school level users related to Data capture format guidelines.
- Several virtual mode trainings are continuously conducted for creating awareness about the UDISE+ ecosystem.
- Training manuals, guidelines along with DCF is available at website for references.
- In contact us section of website, details of respective nodal officers are available for district and state level.

Change Management

Most recommendations for enhancing user experience that may require minor changes without impacting backend rules are accommodated by the technical team after a feasibility study. Major changes are discussed at the Dept/Ministry level and implemented post proper approval. Feedbacks are received from Ministry/Department level also and incorporated accordingly.

VALUE INDICATORS

Learnings for sharing

The project had several challenges related to data authenticity & quality. Following are the challenges along with solutions which became learnings:

- The offline data collection system got replaced by the online data capture system
- Lack of accountability due to the absence of an audit trail got improved because of the online data capture system for each process used.
- Earlier several DCF's were used by different states but with the single DCF for all types of schools catering to all the necessary information capture.
- Lack of coordination and supervision was present in the system earlier, but with the centralized data collection and monitoring system.
- Multiple versions of data collection software were present amongst different states but with single instance software.

Digital Empowerment

Digital Empowerment in education is the ability to locate, organize, understand, evaluate and create information for using digital technology. It is the basic knowledge of digital medium, to utilize the technology of internet, smart phones, computer tablet. It is the introduction of information technology in every sector of the economy to empower people in education sector.

Presently, in the pandemic situation the provision of online training and knowledge imparting has been explored which was earlier catered through physical trainings.

Green e-Governance

Reduction in printing cost incurred for the DCF: With digitization, the printing cost of DCF is saved. The size of the DCF has been reduced considerably and the schools are happier to receive a slimmer DCF rather than the earlier bulky one where half of the questions did not pertain to them. The reduced size of the data capture format will go a long way in eliminating data entry errors and thus make the data more consistent.

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Uttar Pradesh Higher Education Digital Library

Department of Higher Education, Uttar Pradesh & National Informatics Centre
Uttar Pradesh State Centre

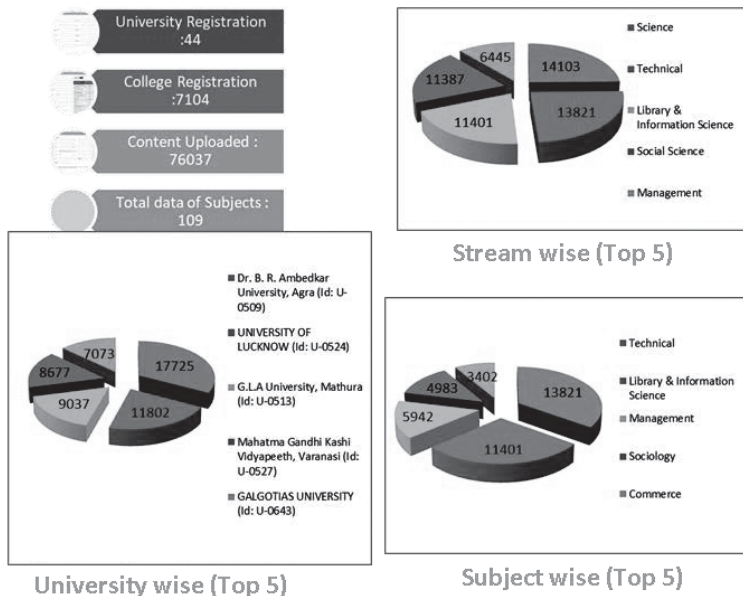
Monika S. Garg, Amit Bharadwaj and Ashesh Kumar Agarwal

PROJECT OVERVIEW

Objective

Department of Higher Education, Govt. of Uttar Pradesh has developed a unique digital library, containing notes and lectures of teachers. As of date, 76201 e-contents are available in the library in regional languages Hindi and English, in text, audio, visual, and video forms. The project was initiated during Lockdown 1.0, to address the challenge posed by Covid-19 leading to break in regular studies, the software and platform were put in place in less than 3 weeks with the help of NIC and other specialists with minimal cost, IPR/Copyright issues raised by teachers were resolved and thousands of e-contents were created and uploaded by the teachers. The portal was launched on Teachers Day, 5th September 2020, and the months of September and October were declared as “Vidyadaan Maah” and teachers were encouraged to contribute to the library, free of cost, in keeping with our culture of charity. The initiative was hugely successful and lots of e-contents were prepared by teachers and uploaded after due scrutiny at higher levels. Uttar Pradesh Higher Education Digital Library is unique in the sense that whereas other digital libraries normally have e-books, this library largely contains notes and lectures of the teachers. As a result, a student studying in any college can access the notes of the best teacher in the state and use them for revision, referencing, etc. To date, approximately 6.25 lakh visitors have accessed the portal, in about 9 months.

Following are the Statistics of the Digital Library:



Scope (Functional & Geographical)

Uttar Pradesh Higher Education Digital Library is a fully secured and authenticated web portal for students. This has been developed and managed by NIC UP. The portal structure allows the access and maintenance of data at three levels state, universities administration, and the collaborators of projects. For students, there is a role-based friendly dashboard containing all the required options to access, save and download the e-content data. This also provides the facility to log in or recover one's account if one has forgotten or misplaced the required login information. The students can easily recover their account using OTP based authentication process. Apart from this it also facilitates the students to access the media or e-contents subject-wise in various formats including text, video, audio, image, and PPT. For the smooth functioning of the e-library, NIC-UP uses asp.net as the front end and SQL server 2012 as a database. It is fully secured as also effortlessly user-friendly for both the experts and learners.

Key Stakeholders

Pradesh Higher Education Digital Library portal has the following stakeholders:

- Department of higher education, Uttar Pradesh (Primary stakeholder)
- NIC, Yojana Bhawan, Lucknow.
- Students.
- All the universities of Uttar Pradesh

Hardware/Software

Hosted at: UP state data center, Lucknow

Database: Microsoft SQL Server 2012.

Database size: 155 GB

Operating System: Windows

Server: Shared

Certification (Certifying Agency)

Yes, we have a security audit certificate.

Website Security Audit (<http://heecontent.upsdc.gov.in>)

Certificate No: AKSIT/2021-22/309

Date of issue: 13th September 2021

AKS Information Technology Services Private Ltd.

B-21, Sector-59, NOIDA-201309

Disaster Recovery and Service Continuity

The safety of the most valuable Registration data and documents is necessary. A DR/Near DR is necessary along with Data Centre. The uptime should be maintained at 99%, hence the DR site needs to be in active-active mode. The department is using UPSDC shared server so the DR of UPSDC will also be DR for the project.

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

Uttar Pradesh Higher Education Digital Library portal	Uttar Pradesh Higher Education Digital Library portal has been designed and in C# .net, SQL server is being used to maintain the database, The Application and Database are hosted on UPSDC, Lucknow. To achieve digitalization in Library. this application has been developed. Accordingly, the entire application development logic, the database logic, and the presentation logic have been segregated. Total benefited students are 624500.	-----	-----	624500 visitors 44 Universities 7104 Colleges 5475 Teachers 24 Streams 197 Subjects 76201 e- Contents

Implementation

Our nation and the government made efforts to convert Covid times into an opportunity. The Uttar Pradesh Higher Education Digital Library is one of them. This fulfills the dream of many students of getting an education at any place and any time. Uttar Pradesh Higher Education Digital Library is a unique pathway in itself in providing quality e-contents to the students according to their needs. This is a well-structured system developed by NIC UP. The state government along with all the universities got involved in shaping and managing the project. The contents get submitted topic-wise/subject wise get verified by the experts and sent to the data repositories and maintained accordingly. Further, the e-content data are provided to the students according to the keywords searched. For the effortless functioning of the e-library, there is a team of computer experts working continuously. There are cyber experts also for data maintenance and security. The audits are performed regularly to check any sort of malfunctioning and technical glitch. It has been designed and developed in such an easy way that the students can get the required information in very little time. It is a web portal with a content repository for archiving and managing the learning content for the students created by experts. Uttar Pradesh Higher Education Digital Library has played a very significant role in student's life in just a few months. The response has indeed been overwhelming and motivating for all the teams of developers. It is very compelling and boosting to see such response from the learners as the number of visitors which is nearly 6.25 lakh reveals itself. More than 4,100 teachers, Professors from 30 state/private universities, and 191 colleges have created content for 1,771 courses in approximately 109 subjects which they have designed as per the curriculum. Till now approximately 80,818 e-contents have been uploaded, out of which 76201 contents have been already approved by experts through rigorous checking of content quality and education norms and standards as per government/ University norms.

Improvements/ Enhancements

The module of Uttar Pradesh Higher Education Digital Library will provide access to the uploaded contents to the students. This module will be publicly accessible and no login id or password will be required to access this module. Contents will be searchable

based on the metadata uploaded by the content creator at the time of content upload. In addition to that search, filtering facility for the contents will be provided on the following parameters as well:

- Content Creator University
- Content Creator College
- Content Creator Teacher
- Subject of the content
- Subtopic of the content

Future Development Points:

- Screen reader for disabled
- Advanced analytical report formation
- Linking with other institutes.
- Hiring of own cloud space.

ENABLER

Processes Re-engineered

As per the traditional library approach, a student has to go to the library for the search of books and contents and start reading within the library hours. In Digital Library is 24x7 open for reading/download in and the Teachers can upload the content anytime.

Uttar Pradesh Higher Education Digital Library is a fully secured and authenticated web portal for students. This has been developed and managed by NIC UP. The portal structure allows the access and maintenance of data at three levels state, universities administration, and the collaborators of projects. For students, there is a role-based friendly dashboard containing all the required options to access, save and download the e-content data on all kinds of devices This also provides the facility to log in or recover one's account if one has forgotten or misplaced the required login information. Apart from this it also facilitates the students to access the media or e-contents subject-wise in various formats including text, video, audio, image, and PPT. For the smooth functioning of the e-library, NIC-UP uses asp.net as the front end and SQL server 2012 as a database.

Technologies

Our nation and the government made efforts to convert Covid-19 times into an opportunity. *The Uttar Pradesh Higher Education Digital Library* is one of them. This fulfills the dream of many students of getting an education at any place and any time. *Uttar Pradesh Higher Education Digital Library* is a unique pathway in itself in providing quality e-contents to the students according to their needs. This is a well-structured system developed by NIC UP. The state government along with all the universities got involved in shaping and managing the project. The contents get submitted topic-wise/subject wise get verified by the experts and sent to the data repositories and maintained accordingly. Further, the e-content data are provided to the students according to the keywords searched.

For the effortless functioning of the e-library, there is a team of computer experts working continuously. There are cyber experts also for data maintenance and security. The audits are performed regularly to check any sort of malfunctioning and technical

glitch. It has been designed and developed in such an easy way that the students can get the required information in very little time. It is a web portal with a content repository for archiving and managing the learning content for the students created by experts.

CAPTCHA is used to protect the integrity of online polls by stopping hackers from using robots to send in repeated false responses and SHA512 is used for encrypting the passwords so hackers cannot extract the passwords.

People

Capacity building/Training has been provided to all the universities on Uttar Pradesh Higher Education Digital Library by Higher Education Department and NIC. Universities trained all the colleges/teachers who want to upload their e-contents on that portal by workshop/webinars. In addition to this digital library, the portal flashes their technical support person's contact number for any kind of technical assistance.

VALUE INDICATORS

Learnings for sharing

The U.P. Higher Education Digital Library was developed on August 28, 2020, with the help of the NIC UP for all the students, aspirants, and learners. It has been designed and developed as a web portal with a content repository for archiving and managing the learning contents for the students contributed by the Lecturers, Professors, and faculty of various Universities/ Institutes. The proposed repository also includes search and retrieve features, metadata authoring, and editing features.

Digital Empowerment

- Workflow-based system.
- Content uploaded by the college's teachers and Researchers and moderated by the moderator appointed by the college.
- Bilingual contents.
- The site is responsive can be viewed on multiple devices including mobile.

Green e-Governance

E-governance is the ICT-enabled route to achieving good governance. An e-library refers to the management of a library using the ICT route. An e-library is a library in which collections are stored in digital form and accessed by computers. The content may be stored locally or accessed remotely via a computer network. This is the best way to replace the concept of the physical book from e-contents, is the best way for green e-Governance.

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6. Energy, Water, Food and Civil Supplies

e-MaapVigyan (ई-मापविज्ञान)

***Department of Food, Civil Supplies and Consumer Protection, Chhattisgarh &
National Informatics Centre Chhattisgarh State Centre***

Shikha Rajput Tiwari and Lalita Verma

PROJECT OVERVIEW

Objective

- Easier verification/stamping for weights and measures and simplification of licensing process.
- To make departmental work more transparent and better service delivery in no time.
- Promoting the Ease of Doing Business by using a common single window portal for complete departmental services.
- Depositing fees through e-challan and resolving them within the time limit.
- Implementing paperless services.

Scope

Functional

All applicants come through the state's single window system and register themselves, login and apply for departmental services. They fill the details of their businesses and upload documents as required. They pay prescribed amount as per Act and Rules online. The department then assigns it to the field inspectors. The inspectors do physical verification and fill up the online checklist of the same and forward to the Assistant Controller with digital signature. The Assistant Controller approves/rejects from his login and forwards it to the Controller with digital signature. The controller finally approves the application and issues the license with a digital signature. The online digitally signed license and Verification Certificate can be downloaded from the applicant's login.

Geographical

- The entire process of allotment and renewal of license has been implemented by this project throughout the state.
- In order to give equal opportunity to urban and rural areas, the departmental services are provided through common service centers (CSC).

Key Stakeholder

Controller, Assistant Controller, Inspector, Manufacturer, Dealer, Repairer, Packers, All Users of commercial weights and measures and Public

Intended benefits

- The process of application, their disposal and the supervision of legal metrology officers and review of their work has been improved using the same online system.
- License generation of manufacturer, dealers and repairers has time limit of 45 days but through online approval and license generation it is being done within 15 or less days.
- Verification process has time limit to verify within 15 days but many of the verifications completed within 4-5 days because of online.
- Compoundable offences are being resolved transparently, simply and

immediately through online case management system.

- E-governance has brought accountability, transparency, accuracy and efficiency in system.
- This system resolves many problems which were created by the geographical distance to user and departmental official both. Now all data and information of the whole state is available only one click on computer.
- Digital record keeping requires less physical storage space, ease of generating reports, easy to back up, keep safe in case of fire or theft, capture and access records on one go from different devices.
- Online database putting all the data that are important to a safe and secured place. All documents can be accessed anytime and anywhere.
- Real time monitoring of works of department people at all concerned levels has been possible.
- Generated revenue can be seen at one click instead of calculating manually.

For Beneficiary

Under the concept of Ease of doing business (EoDB), this system has facilitated the license holders with the following facilities which were not available earlier-

- Apply for the new license online from any place.
- Auto renewal facility.
- Can download the digitally signed license from anywhere.
- Online payment of the service charges.
- Increased transparency and reduced red-tapism and chance of corruption.

Current Status

• Certificates Issued for Original Stamping/Verification	: 75723
• Total Manufacturers Registered	: 55
• Total Dealer Registered	: 291
• Total Repairer Registered	: 233
• Total Issued Licenses	: 383
• Total Packers Registered	: 75
• Total Packers Issued Certificates	: 35
• Total Inspections	: 450
• Total case registered	: 445

Hardware/Software

Windows Server 2012, Microsoft SQL Server 2012, ASP.Net 4.5, Web Services, JQuery, Java, Bootstrap 4, RDLC Report, Ajax, Javascript, Exif-JS, iTextSharp, DotNetZip, SSL, Digital Signature Token.

Certification (Certifying Agency)

- Website security audited by cert –in empanelled vendor - iSec Services Pvt. Ltd.
- SSL certificate, Digital signature Token.

Disaster Recovery and Service Continuity

Yes. Backup is taken transactional and full, on daily basis. Mirror server is maintained locally. Business can be re-started in an hour time in case of serious hardware failure.

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
Original Stamping	Benefits for stamping of Fuel Dispenser, Tank lorry, Electronic, Flow Meter, In Motion Rail and Road Bridge and others	11340	13471	20839
Re Stamping	Benefits for Re-stamping Fuel Dispenser, Tank lorry, Electronic, Flow Meter, In Motion Rail and Road Bridge and others	4532	6283	11202
New License	Facility to submission of certification from user's premises-Manufacturer, Repairer, Dealer	0	0	30
License Renewal	Auto renewal - Manufacturer, Repairer, Dealer	0	0	354
Packer Registration	Facility to tracking every stage online -Manufacturer, Packers, Importers	0	0	34
Inspection	Legal justify process with every step tracking which creates transparency	0	0	450
Case Management	Legal justify process with every step tracking which creates transparency	0	0	445

Implementation

100% online system for verification, license, registration, inspection and case management.

Improvements / Enhancements

After the year 2018, all the departmental works are being done continuously through the online portal for the last 3 years, due to which the work of the department has gained momentum and it has become easy for the general public also due to its simplicity. Efforts are being made to make department work better & easier through this project to promote domestic & interstate trade and commerce in future.

ENABLER

Processes Re-engineered

Government process has been Re-engineered and necessary government orders have been released to affect the following:

- Applying online for licenses has been made legal in place of mandatory

physical applications.

- Auto renewal of licenses has been introduced in place of mandatory manual physical applications for renewal of licenses.
- Digitally signed licenses and renewals have been made legal.
- The license fee, which was earlier paid through draft or cash, has now been accepted through online payment.

Technologies

To meet stakeholders' requirement, following innovative ideas have been implemented:

- Use of digital signature on physical verification and approval process makes it authentic for stakeholders.
- PUSH SMS alert, certificates status update & notification alerts for stakeholder's awareness and convenience.
- Dynamic Dashboard, pendency checker at all hierarchical level accelerates the activities of stakeholders by quick repercussion.
- Geo tagged image upload solution for physical verification.
- Feedback option, user manual, screen reader for physically challenged person, bilingual content, search functionality, sitemap, archive etc. are the features available at website to make the execution the system user friendly, easily accessible, optimized and responsive.
- Discussion forum at social media like twitter, facebook and whatsapp to make it more efficient through e-governance.
- Program based calculation of service charges and generated revenue counting has resulted in considerable saving of manpower requirement at all levels.

People

- Ms. Shikha Rajput Tiwari, Controller, Department of Legal Metrology – Complete Guidance, leadership and change management.
- Dr. Ashok Kumar Hota, State Informatics Officer, NIC –Technical Guidance and Consultation.
- Mr. A. K. Somasekhar, Sr. Technical Director, NIC – Technical Guidance and Consultation.
- Mr. B. R. Sidar, Deputy Controller, Department of Legal Metrology–Implementation.
- Ms. Lalita Verma, Scientist – 'B', NIC –System Design, Architecture, Development and Implementation.
- Mr. Lekhraj Bowaria, Developer – Development
- Mr. Kileshwer Prasad Kaiwartya, Developer – Development.

VALUE INDICATORS

Learnings for sharing

- One of the learning's from this initiative is to involve every stake holder from the concept stage. The department has conducted many consultative workshops to design the system which actually helped all the stake holders own the system.
- Unless department uses any online system as a single source of truth for monitoring its own employees' work, the implementation of the system will be difficult. Controller, Department of Legal Metrology has used this system for weekly monitoring of the performance of her employees. Due to which the

system has been implemented in a short time.

- To bridge the digital device and making the system acceptable to all, online systems expected to be accessed by public must also be available through operated assisted Kiosks like CSCs.

Digital Empowerment

- Paperless Transmission of digital signed payment order with necessary document.
- Delivering government services digitally
- Digital signing

Information for All

- Web based platforms provided to users for track application status
- Online messaging to users/stockholder on application movement/payment would be facilitated through SMS.

Green e-Governance

This project includes all functionalities with Paperless Digital Processing for all stakeholders. This taking all digital sign supporting document approving by digital sign, sending information to beneficiary through SMS service with mobile apps to save the paper.

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eKharid Portal, Haryana

Department of Information Technology, Electronics & Communications, Govt. of Haryana

Vineet Garg and Munish Chandan

PROJECT OVERVIEW

Objective

The Government policy of procurement of food grains has broad objectives of ensuring MSP to the farmers (remunerative prices for their produce) and availability of food grains to the weaker sections at affordable prices. It also ensures effective market intervention thereby keeping the prices under check and also adding to the overall food security of the country. Keeping this in mind, Haryana Government launched a revolutionary eGovernance initiative to bring transparency at all levels in the food procurement process.

Scope (Functional & Geographical)

The components of the software product are classified into information-based, transaction-based, and report-based components and further categorized into Government to Farmer (G2F) and Government to Government (G2G) services. The key features provided in the software application includes:

- Issuance of Gate Pass to Farmer
- Auction (H-Register) of farmer produce by Auction Recorder
- Preparation of J-Form & I-Form by Arthiya / Commission Agent
- Verification by Inspector of Purchaser
- Re-Verification by DM of Purchaser
- Sharing of I-Form data with Haryana State Warehousing Corporation (HSWC)
- Generation of payment file for further processing by Bank

Key Stakeholders

Department of Agriculture & Farmers Welfare (Nodal Department), Haryana State Agricultural Marketing Board (HSAMB), the Department of Food & Supplies and Haryana Warehousing Corporation (HWC), Citizen Resource Information Department (CRID), Govt. of Haryana.

Intended benefits

A collective requirement was put in by Department of Agriculture & Farmers Welfare (Nodal Department), Haryana State Agricultural Marketing Board (HSAMB), the Department of Food & Supplies and Haryana Warehousing Corporation (HWC), Citizen Resource Information Department (CRID), Govt. of Haryana.

current status:

e-Kharid Haryana portal have been used in Kharif season 2020 across all the 22 districts of Haryana. So far, more than 9 lakh gate passes have been issued through the platform.

Hardware/Software

Detailed below are the technical specifications up on which the eKharid Portal has been designed.

Environmental requirements: Hardwar and Software

Application Server information:

- Web Server Package: IIS 8.5, Window Server 2012 R2
- Operating System: Windows
- Framework: Dot Net 4.5, HTML: HTML 5, Language: C #

Database Server Information:

- MS SQL Database Server
- Version: MS SQL 2019
- Operating System: Windows Server 2019

Certification (Certifying Agency)

- The portal is security audited with a valid Safe to host - audit certificate
- Electronic consent is being captured by farmer during registration process. Data is maintained securely and accessed only through secure APIs. No manual intervention at database level is allowed i.e., access is only allowed through defined means and processes.

Disaster Recovery and Service Continuity

eKharid Portal is hosted at RailTel Data Centre Gurugram and the state policy for Disaster Recovery applies on the same.

RESULTS INDICATOR

Implementation

It was envisaged to develop the eKharid software application in-house basis Service Oriented Architecture (SOA) and host the application at one of the Data Centre's in the Haryana State and provide the services to various stakeholders involved as per role/access permissions across the State. The software has empowered the seller, purchaser, and commission agents with a wide spectrum of information-based, transaction-based and report-based services.

DITECH aligned a dedicated team of expert resources (including Project Manager, Consultants, Sr. programmers and Server Administrator etc.). Various phases of Software Development Life Cycle were followed:

- Planning and Requirement Analysis
 - o Stakeholder consultation sessions were convened for gathering all the requirements, roles, logics, outputs etc. from field level experts of User Department.
 - o Planning quality assurance requirements, timelines, transaction response and identification of the risks associated with the project specially timelines and scale of impact it may have at ground level was also in the planning stage.
- Defining Requirements
 - o Once the requirements were gathered, a detailed Software Requirement Specifications (SRS) document was prepared and same was vetted by User Department.
- Designing the Software Architecture
 - o Based on the requirements specified in SRS, software architecture was designed and based on various parameters such as product robustness, design,

modularity, and time constraints, the architecture design was finalized.

- Software Development
 - Based on the requirements specified in SRS and architecture finalized, software has been developed.
- Software Testing
 - User Department was involved in the testing of software application on staging environment and all the bugs/ defects reported by test users were tracked, fixed and retested, until the software application reached the quality standards for User Acceptance.
- Go-Live
 - Once the product was tested and ready for deployment in production environment, training sessions were conducted for creating Master trainers who further imparted role-based training at ground level. After training, software was put in production for official user across whole State of Haryana.

Improvements / Enhancements

- The application was made live within a span of 1 month and all the districts are using it for mandi operations.
- The project is helping district administrations in bringing transparency in Mandi Operations and also access to real-time reports in terms of gate passes issued, auctions done, crop wise procurement, pendency at various levels, payments done, etc.
- The project is helping in streamlining farmer produce procurement lifecycle and bringing transparency in mandi operations
- Real time reports for gate passes issued, auctions done, crop wise procurement, pendency at various levels, payments done, etc. have helped streamlining of operations
- No. of gate passes issued & auctions done: Approx. 10 Lakh
- Qty. of farmer produce purchased & verified: More 84,97,885.5 Ton

ENABLER

Processes Re-engineered

During the re-engineering phase, the new processes were designed based on the process redesign drivers. This involved rework, redesign, outsourcing or replacing of processes / sub processes. The new processes thus defined were implemented with IT enablement as follows:

- The system captures data at process initiation points: “Registration of Farmer at MFMB along with selection of payment method and mandi” where details related to farmer, land, crop, yield are captured, and unique farmer registration ID is issued to farmer.
- Verification of farmer accounts.
- “Auto Crop verification”- on matching of HARSAC, e-Girdawri and crop booking data.

- Crop verification after pushing of mismatched crops data.
- Centralized scheduling of farmers.
- Scheduling of farmers by mandi secretaries.
- Push gate pass SMSs to scheduled farmers.
- Rescheduling by farmers themselves.
- After verification, verified and minimal information related to farmer registered is shared with eKharid platform through secure API's.
- Correction of bank details for the processing of their payments of crop sold in Mandis.
- Issuance of gate pass to farmers as per the schedule
- Auction of crop as per gate pass and actual weight
- Inspection of crop yield
- Creation of I-Form & J-Form
- Verification & Approval by Inspector & DM of purchaser
- Payment's verification & disbursement, etc.

Technologies

- The idea is aligned with vision of paper less governance and brings transparency in system by providing access to meaning full data in real time and supports decision making & streamlining of farmer produce procurement lifecycle & mandi operations
- 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.
- Since the development of this application has been done in-house, the customization or additional features can be added in the application easily and quickly.
- Analytical dashboard for better insights and role-based access for users, so that every stakeholder can use this portal for better management.

People

Capacity Building

- DITECH aligned a dedicated team of expert resources (including Project Head, NIC Scientist, Consultant and Sr. programmers). Various phases of Software Development Life Cycle were followed: Planning and Requirement Analysis; Defining Requirements; Designing the Software Architecture; Software Development; Software Testing; and Go-Live
- A collective requirement was put in by Department of Agriculture & Farmers Welfare (Nodal Department), Haryana State Agricultural Marketing Board (HSAMB), the Department of Food & Supplies and Haryana Warehousing Corporation (HWC), Citizen Resource Information Department (CRID), Govt. of Haryana.
- Several trainings were provided to DROs, Grievance handling team, Field officers on various modules of MFMB operation. The trainings had been organized in a cascade mode. DITECH SeMT Team has trained about 100 plus

SMCs and 300 plus auction recorders who have further conducted training sessions

- e-Kharid Haryana portal is being used successfully for crop procurement year after year since its launch across all the 22 districts of Haryana and has benefitted farmers in selling their crops to State Government as well as the government agencies (like Haryana State Agricultural Marketing Board, the Department of Food& Supplies, Haryana Warehousing Corporation) involved in the procurement process.

VALUE INDICATORS

Learnings for sharing

Challenges:

The eKharid project in Haryana State was envisaged with the aim to address the following challenges related to:

Development Though-Process Detailing:

- The application has been developed with latest technologies, minimal infrastructure requirement.
- The application brings transparency in system and can be easily replicated by other States as well.
- The idea is aligned with vision of paper less governance and brings transparency in system by providing access to meaning full information in real time and supports decision making.
- The project is helping Purchasers in real time monitoring and bringing transparency in farmer produce procurement lifecycle.
- District Admins can see district level, mandi level procurement, auction, pendency reports in real time.
- This is a user-friendly platform and can be replicated by other States as well.

Digital Empowerment

- The idea is aligned with Digital India's vision of paper less governance and brings transparency in system by providing access to meaning full data in real time and supports decision making & streamlining of farmer produce procurement lifecycle & mandi operations
- Team was given a task to execute this project within 1 month while taking care of the security features, coding standards, etc.
 - o No. of Registered Farmers registered: 9 Lakh Plus
 - o No. of Commission Agents Operating on platform: 27K Plus
 - o No. of Gate passes Issued: 9.70 Lakh Plus
 - o No. of Auctions Done: 9.60 Lakh Plus
 - o Quantity of Farmer Produce Procured & Auctioned: 84,97,885.5 Ton
- Since the development of this application has been done in-house, the customization or additional features can be added in the application easily and quickly.
- The initiative has helped the State Government in bringing transparency in

process of farmer produce procurement. The project is helping district administration in bringing transparency and access to real-time reports in terms of gate passes issued, auctions done, crop wise procurement, pendency at various levels, payments disbursed, etc.

Green e-Governance

The idea is aligned with Digital India's vision of paper less governance and brings transparency in process of farmer produce procurement.

Since eKharid Haryana Portal is hosted at RailTel Data Centre Gurugram and the state policy for the same applies

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Integrated Watershed Management System (IMWS)

Department of Information Technology & Communication, Govt. of Rajasthan

Alok Gupta and Umesh Chand Joshi

PROJECT OVERVIEW

Objective

- Integrated Watershed Management System (IWMS) is Government of Rajasthan's flagship scheme to provide long term solution to the everlasting problem of water scarcity and provide IT solution for all Watershed related schemes such as RGJSY, IWMP, Atal Bhujal Yojana etc. Under the ambitious scheme, infrastructure is created in the adopted village to conserve & harvest rain water, making villages self-reliant during drought periods. A hydrological unit based on the Four Waters Concept is constructed in the village to harvest & store rain water. The stored water later serves the purpose of clean drinking water, and for other domestic & irrigation purposes.
- The programme is designed in such a way, that planning & execution to funding of the project is done through participatory basis from the village community. Financial & physical help from the citizens have made IWMS a colossal success in a short while.
- A revolutionary project launched in 2016, have been a godsend for this deserted land. In just two years, IWMS has covered 7,740 villages, making them self-reliant. In the Phase 1, IWMS was successful to make 3529 villages self-reliant. 94,000 water reservoirs were constructed, with the total expense of 1,192 crores. The water reservoirs accumulated a massive 11, 1270 million cubic feet water that benefited 41 lakh people & 45 lakh animals in whole. Eyeing such tremendous success of first year, estimation in three years IWMS will cover total 21000 villages in Rajasthan, finding a permanent solution of water scarcity.

Hardware/Software

- Software: Developed on Apxert platform of Agile Labs
- Database: Oracle
- Mobile Application on IBM MobileFirst Platform along with native development

Certification (Certifying Agency)

- Application hosted in secured environment of Rajasthan State Data Centre (RSDC)
- Safe to Host certification as per RSDC policy

Disaster Recovery and Service Continuity

- As per Disaster Recovery policy of RSDC

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
Mobile	To plan a work user needs	578452	208199	117947

Integrated Watershed Management System (IWMS)

Application – Geo Tag Photos Captured	to capture Geo Tag photos of work site and survey team.			
Total Approval of Works	All the planned works goes through a work flow-based system for final approval or rejection at different levels (i.e., District and State Level)	106733	154791	29782
Total Unique No of Routes - Surveyed for Planning	With this analysis the participation of different departmental users in survey process can also be ensured	15188	18671	3390
Work Related Transactions (Planning/Work Order/Sanction/Approval / Completion Certificate etc.)	User needs to create project online through web application and after this he needs to do work planning through mobile application	887082	223031	298205
Progress/Planning /Inspection/Routes /Events Geo Tag Photo Captured	For work planning with mobile application first user needs to generate route id for his survey	25256	22432	5212

Implementation

- The programme has been designed in such a way that everything from planning to execution will be followed in a participatory approach down to the village community level. In this programme, 3000 villages selected on the basis of priority in the first year and next three year around 6000 villages included in the abhiyan every year. Integrated Watershed Management System (IWMS) in Rajasthan is really helpful to conserve or save the water in the state. The government has budget of Rs.3, 600 crore for the first phase of the campaign.
- Rajasthan Government has created an online crowd-funding portal where donations for the campaign shall be accepted to a single rupee. The portal consists of a unique feature through which one can adopt a village or a lake in Rajasthan and contribute for the same. With planning in initial stages, there is a discussion of making contributions enabled through e-mitrans and web payment gateways. The Government is also set to invite Businesses to contribute towards IWMS through a CSR sub-campaign. Another sub campaign called ‘Chalo Rajasthan’ will be soon launched to call on the non-resident Rajasthani’s to contribute to the mission.
- Water Harvesting & conservation works will be implemented from the funds available under State departments, Non-Government Organizations, Corporate Social Responsibility (CSR), people’s participation, Non-Residents Villagers Club (NRV Club) etc to prevent the villages of Rajasthan from drought by doing watershed wise water budgeting for permanent solution. In first year around 3000

villages on the basis of priority were identified and, in coming 3 years around 21000 villages of the State will be benefited by the mission & permanent solution will be achieved by making them self-sufficient in terms of water. In remaining villages works will be implemented as per priority list in phased manner.

Improvements / Enhancements

- Mobile app is being enhanced and new functionalities are being developed.
- The department shall now include all other Watershed related schemes in future.

ENABLER

Processes Re-engineered

Government of Rajasthan always quest towards streamlining its projects to ensure ease to all stakeholders - fellow departments as well as citizens and other users. For the same, the department has implemented e-governance in Integrated Watershed Management System (IWMS) as the frequency of this process is very high, to the tune of several lakhs per year, and is increasing day by day. By integrating information technology, the project has enhanced operational efficiency in administration and service delivery. Along with this, re-engineering of this process has also implemented a transparent module which enables complete accountability to citizens as well as department stakeholders, standing true on all the key elements of good governance.

Technologies

The application consists of works planning, sanction & contract management, Works monitoring in integration with Rajasthan State GIS Application “Rajdharaa” and mobile application, Financial Management, Dashboards and Reporting etc.

Mobile App for IWMS with provisions to:

- Feed progress information from anywhere anytime
- Display dashboards and MIS reports to cater management requirements
- Contribution in ICT Activities and Decision Support System

People

Capacity Building

- Rajasthan has implemented an integrated scheme of capacity building and as per a policy decision it has been decided that every project is going to be having a specific component of IEC as well as capacity and capability building. It was ensured under the concept of “Suraj” that is good governance that every e-governance initiative is first implemented at the village level, that is called Last Mile, but Rajasthan considered it to be the First Mile. The project is then implemented at Gram Panchayat level and subsequently to districts covering the complete state. The project’s capacity building plan is enhanced every six months and is validated through internal evaluation, dipstick surveys as well as external third-party checks, to ensure whether the capacity, capability and IEC activities have been enough or not. Also, the implementation done by the government is properly utilised by the beneficiaries or not.
- Rajasthan has been very specific about ensuring that Change management is done for every single initiative and it is dully recognised that people and stakeholders are made equal participants to the project. Which means any

stakeholder who is having an impact or is impacted by the project is enjoined upon on the journey of final decision making in regards to implementation of the project. External and internal experts are hired for the process of change management to be hand in hand with technological implementation of every project.

VALUE INDICATORS

Learnings for sharing

This software is the country's first of its kind for complete works management (starting from planning till completion certificate) related to Water Harvesting & conservation works that leverages the GIS capabilities to its full extend (around 5 lacs Geo Tag Photos of works are already captured so far) and can be replicated for other States also.

- Making village self-sufficient in water & creating “Islands of Excellence”
- Integrated Watershed Management System (IWMS) is a four-year program, each phase of one year
- This programme is launched across 295 Blocks of 33 districts in Rajasthan
- People’s participation also invited in this abhiyan
- Mobilizing financial resources from multiple sources like Line Departments, NGO, Corporate houses, Religious Trusts, Non-resident villagers, social groups etc.
- Massive Use of technology in this program
- Construction of low-cost water harvesting structure

Digital Empowerment

For every project implemented by the state, the Government of Rajasthan has always guaranteed having the best of the class infrastructure and advanced technologies to be made available. Rajasthan has the biggest Big Data Cluster in the country as well as the biggest cluster for IBM pure app solutions and Oracle echo data, making the state a Tier Three data centre of the country. We have more than 4000 servers running out of the State data centre with the total capacity of 7 petabytes over which the entire set of applications and storages run. It is ensured that for every project the best set of technology is obtained for implementation of a project, wherein the Department of IT and Communications or an external technical committee decides upon what technology is going to be used. It is a mandatory state policy to get any project more than 25 lac to be approved by the State E-governance mission team head by Principal Secretary of IT Department.

Rajasthan happens to be the most progressive state in the field of social media. For every IEC, Change Management and Skill Building, social media is considered as important a platform as print or electronic media by the government. Due to social media’s reach till the last mile, it is judiciously used for promotion of the scheme, as well as to enhance user experience.

Prominent government pages:

- CMO: Following of more than 7 Lac
- GOR: Following of more than 5 Lac
- IWMS: Following of more than 3.5 Lac

Financial Inclusion is a key enabler to economic, social and transaction security of a country, thereby driving inclusive growth. It is for this reason that financial inclusion has been one of the key priorities for Government of Rajasthan. Rajasthan has always used innovative technology as an effective tool to expand financial inclusion, through various initiatives like Direct benefits Transfer, Mobile banking, Aadhaar enabled banking accounts, e-KYC's and many more. The government always ensure that every single project is bilingual in nature. Mandatory guidelines from Hon'ble Chief Minister and Chief Secretary of the state every application platform and front-end portal are in Hindi as well as English. Rajasthan has seven divisions and each division has its specialized portal and sectorial application aligned with the demographic and cultural aspect of that specific area.

Green e-Governance

Rajasthan State Data Centre is a 100% green data centre. The upcoming data centre in the state is going to be a Tier 4 data centre in the state and the only Tier 4 data centre in the country which is owned, operated and controlled by the government. Government of Rajasthan judiciously follows every policy of Green IT, along with this the state also has its own Green IT policy which is followed by all departments and outsourced sectors religiously. All environment friendly practices with respect to creation, use and disposal of ICT gadgets and infrastructures are followed. The Rajasthan Green IT policy has been prevalent since the year 2007 and was revised in the year 2015.

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Gujarat Targeted Public Distribution System

Food, Civil Supplies & Consumer Affairs Department, Govt. of Gujarat & National Informatics Centre Gujarat State Centre

Tushar Dolakia and Atul Khunti

PROJECT OVERVIEW

Objective

The Food, Civil Supplies, and Consumer Affairs Department (FCSCAD) in the State of Gujarat has been formed on 8th November 1965 as a separate department. This section handles the following operations:

- To manage the Distribution and Supply of Essential Commodities in the State,
- For the better management of the Public Distribution System, and
- To formulate policy for efficient supply of Essential Commodities.

Scope (Functional & Geographical)

The Gujarat Targeted Public Distribution System (GJTPDS) functional scope can be defined as that of enabling the aforementioned stakeholders mainly,

- The Directorate of Food & Civil Supplies (DFCS)
- The Gujarat State Civil Supplies Corporation Ltd. (GSCSCL)
- The Consumer Dispute Redressal Commission / Forum
- The Gujarat State Food Commission

to plan and monitor various initiatives and activities at district, taluka, shop-area and even observe individuals' events/interactions between the state and citizen thus becoming a powerful tool to deliver reliable citizen-centric services at the grassroots level.

The Gujarat Targeted Public Distribution System (GJTPDS) is implemented across

- District - 33 + 1 Ahmedabad City
- Taluka /Zone - 267
- No. of State Godowns - 258 (651 Godown buildings)
- No. of FCI & CWC Godowns (Lifting Points) - 34+ (FCI) + 16+ (CWC) = 50+
- No. of Fair Price Shops
 - o Rural - 12,692
 - o Urban - 4,309
 - o Total - 17,001 (all FPS are automated)

Key Stakeholders

- Directorate of Food & Civil Supplies (DFCS)
 - o To ensure supply & timely distribution of Essential Commodities.
 - o Formulation of policy for better management of the Public Distribution System
- Gujarat State Civil Supplies Corporation Ltd. (GSCSCL)
 - o Government-owned company.
 - o Procurement, Storage, and Distribution of food grains under NSFA.

- o Procurement, Storage, and distribution of PDS and other state schemes
- Consumer Dispute Redressal Commission / Forum
 - o To provide speedy and redressal of consumer disputes.
 - o Quasi-judicial bodies have been set up in each District, State level
- Gujarat State Food Commission
 - o To work as an Appellate authority of District Grievances Redressal Officers (DGRO)
 - o To ensure implementation of National Food Security Act – 2013
- Controller, Legal Metrology, Director Consumer Affairs
 - o Certification of weights and measuring equipment in the state.
 - o To promote consumer awareness & protect consumer's interest

Overview of National Food Security Act (NFSA) – 2013

The Act was enacted on September 12, 2013, having 2 types of category under Food Security

- AAY (Antyoday Ann Yojana)
- PHH (Priority Household)

PHH Criteria were decided by the State government and accordingly, Government Resolution was issued from time to time

- In Urban areas, it is based on "inclusion criteria"
- In rural areas, it is based on "exclusion criteria"

Initiatives under National Food Security Act (NFSA) – 2013

- To cover the gap, systematic identification of beneficiaries done with Aadhaar seeding memberwise in the Ration Card Management System (RCMS) under GTJTPDS
- Beneficiary wise data collected from respective departments and mapped with NON-NFSA Ration card database:
 - o Registered Disabled persons of Social Justice Department
 - o Registered Old Age Pensioners (above 60 years age) of Social Justice Department.
 - o Registered Widow Pensioners of Women & Child Development Department
 - o Registered Construction laborers of "Gujarat State Construction Labor Welfare Board"
- Data of above-mentioned categories were provided to field level officers for verification and carrying out NFSA-PHH inclusion process.

Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY)

With the Announcement of PMGKAY by the Hon. Prime Minister of India, Implementation of the same was carried out promptly in the state. Under this scheme, free ration was provided to Gujarat State Ration Card holders along with regular entitlement under NFSA those supplying approx. 2 times the regular quantum.

- Phase I: April 2020 to June 2020
- Phase II: July 2020 to November 2020

- Phase III: May 2021 to June 2021
- Phase IV: July 2021 to November 2021

Farmer Procurement

State Government procures various Commodities like Wheat, Paddy, Maize, and Millet directly from Farmers at Minimum Support Price (MSP)

- Online, Aadhaar verified Farmer registration with document upload, integrated with State Land Records,
- Deployed at village level through “e-Gram Kendra” of Panchayat,
- GSCSCL open up more than 150 procurement centers across the state
- Inform registered farmers one day in advance, through SMS and managing batches
- Deploys graders to check the FAQ parameters of the commodity and capturing the parameters online
- Online payment is done directly to the farmer’s bank account through PFMS

The procured commodity is distributed under TPDS/ Other Welfare Schemes (OWS) after carrying out verification from FCI.

GJTPDS Milestones, a decade long journey of re-engineering

- 2010 - Pan State digitization with Barcoded Ration Cards, Biometric based PDS System
- 2011 - Pan State initialized End To End Computerization, Online Allocation, Permits, Godown Gatepasses
- 2013 - Online Public Grievance Redressal System (PGRS)
- 2014 - NFSA Act 2013 implementation, Aadhaar Seeding in Ration DB, eFPS Automation
- 2015 - Digital Gujarat Integration
- 2016 - Aadhaar Enabled Payment System
- 2018 - Intra-State Portability, Automated FPS Permits, Aadhaar Enabled Public Distribution System
- 2019 - Online FPS Payments, Online Farmer Procurement, Inter-State Portability (Gujarat & Maharashtra States)
- 2020 - Under One Nation One Ration: Inter-State Portability (32 States)
- 2021 - Launched Integrated License Management Module for FPS under EoDB

End to End Computerization in PDS, notable points

- Ration Card Management System (RCMS) –Implements 2D Barcoded Ration Card with Aadhaar seeded.
- State Govt. has initiated the project through State NIC, in 2010.
- Digitization of all Ration cards beneficiaries has been completed and Ration Card Management System is in place (for the Beneficiary Management)
- The identity of the beneficiary is established by seeding Aadhaar number with the Ration Card database
- Ration Card related all applications are accepted online,

- o At village level at “eGram” center at Panchayat
- o Taluka level at “Jan-seva Kendra” or
- o On “Digital Gujarat” portal and processed by RCMS software.
- For data authentication, at various key decision stages, Aadhaar based Biometric verification of the department officer is adopted.
- Implementation of foolproof arrangements for identification of the poor for delivery and distribution of food grains in a transparent and accountable manner at the Fair Price Shop (FPS) level
- eFPS Web application
 - o In Gujarat state, All Fair Price shops are functioning through eFPS Web application. (FPS automation completed)
 - o Aadhaar based public distribution system was implemented in March’2018.
 - o Real-time distribution application, which verifies beneficiaries using Aadhaar based Biometric authentication or through O.T.P (One Time Password)
 - o ICDS Centre’s worker/helper avails food grains after authentication
 - o MDM Centre’s representatives avail food grains after authentication
 - o Types of authentication
 - Aadhaar based Biometric
 - Aadhaar based OTP
 - Failed Attempt
 - Sale with Alternative Documents
 - Offline Sale
- FPS Refund Module – to transferring entitled commission, credit notes, and other refunds directly to the FPS Bank account
- Inspection Module – to bring various inspections conducted by enforcement branch online.
- Vigilance Committee Module – online formation of Vigilance Committee at District, Taluka, and village/city level, and provision for uploading monthly minutes of meeting.
- iLMS Module – Under Ease of Doing Business (EoDB), a new portal was developed for the release of advertisements for inviting applications for fresh FPS license against proposed new ration fair price shop and also for renewal of an existing license after making online payment of the renewal fee.

One Nation One Ration Card

ONOR scheme facilitates beneficiaries to obtain their entitled food grains from any Fair Price Shop (FPS) of their choice across the country.

- Beneficiary can get their entitlement through Aadhaar Authentication only (Fingerprint or OTP)
- Pilot Scheme has been launched in August-2019 between 4 States
 - o Gujarat – Maharashtra &
 - o Andhra Pradesh – Telangana.
- ONOR scheme was launched across the country in June-2020. At present, more

than 34 State/UTs are covered under ONOR, and Integration with Central Repository (at GOI Server) has been completed.

- De-Duplication process for Ration card data has been carried out so all Aadhaar Numbers are unique in Central Repository.
- No Offline transaction is allowed under ONOR

Supply Chain Management

- Online allocation of food grains and automation of Supply Chain Management has been implemented in Gujarat State.
- Following Functionality is developed and implemented
- Release Order / Purchase Order, Transit Pass System, Standardization and stock entry, Godown to Godown transfer, Stock Register, FPS Permit / FPS Challan, Gate Pass, Delivery Challan
- Central PDS stock allocation in PDS software, as per scheme-wise configuration has been done upto FPS level.
- Automated PDS Permit generation in PDS software is done 15 days in advance for next month, taking into account scheme-wise closing balances.
- Fair Price Shop Holders can make online payment of bank challan via integrated Payment gateway Modes
 - o Internet Banking
 - o RTGS
 - o Credit/Debit Card
 - o UPI
 - o CASH
- On successful payment and online reconciliation, paid challans immediately display on Godown Manager's dashboard in software, ready for Gate Pass processing.
- Permits and Available Stock displayed on FPS dashboard in e-FPS software
- After Doorstep Delivery is done, SMS alerts at various stages to stakeholder

ICT Logistics Solution in PDS

- ICT Logistic Application has helped in the modernization of Supply Chain Management which includes the transformation of complete logistics operations of PDS.
- Monitoring & Analysis of data is critical functionality for obtaining seamless Supply Chain Management
- Real-time information of allocation, issuance, and movement of vehicles and commodities.
- GPS-based tracking of vehicles for transportation of commodities.
- Implementation of the system has decreased the probability of pilferages/diversion.
- Real-time applicability of penalty on breach of Service Level Agreements (SLA).
- Generation of transport pass, delivery challan, using smart mobile applications
- Instant confirmation of delivery using OTP/ Sign on glass in the form of ePod

which includes a photograph with time stamp and geo-location.

- MIS reports for Management to make decisions.
- Command & Control Centre (CCC) which monitors activities of movement of vehicles and Redressal of complaints reported from stakeholders.
- Integrated Weighbridge Solution to weigh the received commodity from FCI/Supplier and commodity dispatched to FPS.

Key Achievements during COVID – 19

- Free of Cost Distribution - Distribution of free of cost “Food Basket” of Wheat, Rice, Sugar, Salt & Dal to for NFSA card holders 68.80 Lakh Ration Card holders i.e., 3.36 Cr. Population covered under N.F.S.A (April to June)
- Free of Cost Distribution - Distribution of free of cost “Food Basket” consisting of 10 kg Wheat, 3 kg Rice, 1 kg Sugar & 1 kg Dal/ Chana per family to 61.04 Lakh Ration Card holders covering 2.50 Cr. Population who are not covered under NFSA. For NON-NFSA APL1 families (April and May)
- Distribution under PMGKAY Distribution of 3.5 kg Wheat & 1.5 kg Rice (5 kg of food grain per person) to 68.80 Lakh NFSA ration card holders under “Pradhan Mantri Garib Kalyan Anna Yojana” (PMGKAY) (April to Nov)
- Ann Brahma Scheme - Distribution of free of cost “Food Basket” of 3.5 kg Wheat & 1.5 kg Rice (5 kg of food grain per person) and 1 kg Sugar, 1 kg Dal, 1 kg Salt per Family to migrant laborers & homeless
 - o 6.36 Lakh Beneficiaries have been covered during April – May 2020
 - o Identification of beneficiaries and distribution of Food Basket through concerned Mamlatdar
- Deposition of Rs.1000 cash transfer to the bank account through Aadhar based Direct Benefit Transfer (DBT) by PFMS
 - o 68.80 Lakh NFSA Ration Cardholders
 - o 6.80 Lakh identified construction workers were covered

CM Jan Samvad Setu (Beneficiary Feedback Module)

- Hourly PDS data (distribution data) transfer to CM Dashboard team by web service
- Every hour, random selection of beneficiary
- Beneficiary are contacted on phone and feedbacks are being taken for service level through standard questionnaire for 14 parameters
- Transfer feedback to department for further action

Public Grievance Redressal System (PGRS)

- To Lodge online complaint/Grievances, an applicant can lodge his/her complaint at
 - o <https://dcs-dof.gujarat.gov.in> (It is compulsory to give mobile number)
- Toll free Number: Any of the Citizen of the state can lodge his/her complaint on toll free number
 - o 1800-233-5500, 14445 (ONOR)
- Complaint automatically reaches in login ID of concern Dy.mamlatdar of Taluka.

- If Complaint is not Disposed of within 15 Days, it is transfer to District Supply Office and after that higher authorities following an escalation matrix

Hardware/Software

Front End: Microsoft .NET 3.5, 4.5, 4.6, MVC

Backend: Microsoft SQL Server 2012, Redis Server 3.2.12, CouchDB 3.1.0

Servers: Windows Server 2012 R2, Windows Server 2019

Web Servers: 13

Database Servers: 2 separate clusters, with total 5 active nodes and 2 passive nodes

Hosted out of the Gujarat State Data Center (GSDC)

Certification (Certifying Agency)

Regular 3rd Party Security Audit done via an empaneled agency of the Gujarat State Data Center Applicable modules have cleared UIDAI compliance audit by empaneled audit agency.

Disaster Recovery and Service Continuity

- 2 separate database clusters are maintained and monitored 24*7, with total 5 active nodes and 2 passive nodes.
- Daily transactional backup is taken with weekly full backup schedules.

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
PDS eFPS Bill Receipts	Generation of Bills of commodities availed by beneficiaries from Fair Price Shop.	8,36,67,040	7,61,59,229	11,58,36,957
Ration Card Applications	Offers online submission of applications for new ration card, add member, change in address, deletion of member etc.	28,54,658	27,14,102	17,19,731
PDS e-Permits Issued	Generation of Permits for food grain allocated to FPS.	10,47,891	12,14,518	11,53,190
FPS Payment Challan Amount	Payment to be made by FPS owner to Civil supply Corporation against permit.	Rs. 132 Crores	Rs. 474 Crores	Rs. 407 Crores
PDS Delivery Challans	Generation of Delievry challans from Godown to FPS	3,92,788	4,60,557	5,49,400

PDS Transit Passes Printed	Transit pass for delivery of food grain from FCI to Godown	89,052	1,01,692	1,57,996
Farmers Benefited under MSP	Issuance of receipt against commodity purchased under Minimum Support Price scheme at Purchase Centre	1,59,663	2,46,723	2,08,331

Implementation

The project, including all modules, implemented across the state in all the districts.

Improvements / Enhancements

Improvements/ enhancements specifically rolled out during the last year:

- Rolled out Pradhan Mantri Garib Kalyan Ann Yojna (PMGKAY) for all eligible beneficiaries during Covid-19, distributing free rations across state
- Deposition of Rs.1000 cash transfer to the bank account through Aadhar based Direct Benefit Transfer (DBT) by PFMS during Covid19 pandemic lockdown period.
 - o 68.80 Lakh NFSA Ration Cardholders
 - o 6.80 Lakh identified construction workers were covered
- ICT Logistics Solution in PDS - it has helped in the modernization of Supply Chain Management which includes the transformation of complete logistics operations of PDS
- Inspection Module – to bring various inspections conducted by the enforcement branch online.
- Vigilance Committee Module– online formation of Vigilance Committee at District, Taluka, and village/city level, and provision for uploading monthly minutes of meeting.
- iLMS Module – Under Ease of Doing Business (EoDB), a new portal was developed for the release of advertisements for inviting applications for fresh FPS license against proposed new ration fair price shop and also for renewal of an existing license after making online payment of the renewal fee.
- FPS Refund Module – to transferring entitled commission, credit notes, and other refunds directly to the FPS Bank account.
- My Ration Mobile App - Dissemination of information to citizens related to ration cards, entitlement, quantity availed during last six months etc.

Planned improvements/ enhancements to be rolled out during next one year:

- Integration of Ration Card with Digilocker.
- PFMS Integration in Farmer Procurement Module
- Custom Milled Rice module in Farmer Procurement Module

- Gunny Bag Module in Farmer Procurement Module

ENABLER

Processes Re-engineered

- To manage the Covid-19 pandemic situation various processes had to be automated like allocation order generation, system generated Bank challan preparation for commodities which were to be distributed free of cost was done for all 17000 shops
- FPS Stock was calculated in real-time and billing was subjected to the ceiling of available stock thus providing exceptional planning support and identification of pain areas
- End-to-End supply chain was automated with real-time godown stock position dashboard and GPS-based tracking of logistics up to Fair Price Shop level to monitor supply channels and efficiency and overall availability of food grain in the system.
- All aadhaar seeded NFSA ration card data is continuously shared with the central repository where all states' ration card data are de-duplicated and thus duplicates get eliminated and further also enabled inter-state portability under One Nation One Ration card.
- The farmer procurement process was standardized using a step-wise online registration, integrated with Land Records of the State, with aadhaar demographic verification and mobile OTP-based 2-factor authentication, further calling farmers in batches adhering to covid protocols and online purchase of various commodities under MSP scheme and PFMS based payments thereafter.
- Ration card forms were extended to Jan Seva Kendra and village level eGram centres via web service integration so as to simplify the entire process to apply for various ration card forms in a single place.

Technologies

With the digitization of almost the entire population of Gujarat State with aadhaar seeding and correlated with monthly distribution to 70 Lakh ration cards out of 1.3 Crore ration cards it is safe to say that the Ration Card database is one of the most dynamic and updated repository of citizen and his interactions.

Periodic analysis with similarly positioned databases via integrated backend web services or through data sharing; between national ration card repository, Oil Marketing Companies, and PNG connection companies, Registered Disabled persons of Social Justice Department, Registered Old Age Pensioners (above 60 years age) of Social Justice Department, Registered Widow Pensioners of Women & Child Development Department enabled informed exclusions and inclusions under Food Security Act and ensuring bonafide and efficient delivery of government subsidies with minimum wastage

Using GPS-based tracking of vehicles used in logistics from FCI to State Godowns and

then from State Godowns to FPS with route analysis, delay alerts, stoppage alerts, overspeeding alerts, and setting up a G-SOC, Gujarat state Supply Operations Center has enabled more responsive and lean supply chain management.

Enabling payments to farmers/FPS, and also receiving advance payments from FPS against deliverables via integrated payment gateway supporting UPI, and also through NEFT & PFMS has brought down the turnaround time in the delivery cycle drastically, and more transparent.

With transaction data at FPS made available in the public domain has enabled a robust social audit mechanism in the State and made the system more accessible to citizens.

With an online grievance module and a working helpline, also bolstered with CM Jan Samvad ecosystem has enabled a feedback system with the actual beneficiary.

People

To achieve the above target consecutive training of stakeholders at State, District, Taluka, and FPS levels were organized, and applicable processes were explained in detail using video conferencing and also through local televised programs through BiSAG.

VALUE INDICATORS

Learnings for sharing

As this project addressing key challenges of PDS like identifying actual beneficiary and seamless supply chain management, we have learned lot many things from it glimpse of the same as follow,

- Continuous training is necessary when we are re-engineering business processes because many time officer gets confused between old procedure and new procedure.
- When we develop something for the common citizen, it becomes very apparent to develop help documents, video aids, FAQs, and set up an accessible customer support center so that confusion can be avoided and application becomes self-speaking.
- It is necessary to communicate information/status to end beneficiary time-to-time. SMS/Emailalerts help to solve the gaps.
- It becomes very mandatory to design clear roles and responsibilities in the processes among stakeholders and authenticate using undisputable authentication and authorization protocols.
- Making a configurable system as much as possible with built-in fail-safes to address any unseen circumstances which never existed at the time of study and initial launch, remain agile with the re-engineering and continuously add-on to it to shape the system as per the demanding practical situations but still build some sense of standard operating procedures in a dynamic system.

Digital Empowerment

Such a big e-Governance initiative usually is expected to be as inclusive as possible, in this aspect:

- Financial inclusion – most channels of manual calculation of payable amounts and avenues of manual payments were replaced with digital options but still keep an option for manual payments for the tech-averse populous.
- Pan state rollout ensured coverage of even the remote tribal pockets right up to the urban poor under a single system with an option to avail food from anywhere in the State or rather anywhere in the Nation through portability under NFSA and PMGKAY.
- Farmers were able to shield themselves from predatory market situations or even adverse crop results with the government supporting them through the MSP scheme, since GSCSCL setup a robust, reliable, and transparent online system, the Government of Gujarat made GSCSCL the state nodal agency for 3 years running for procurement from farmers under food grains, pulses.

Green e-Governance

The system is completely online and paperless.

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Shri Atul Khunti, Scientist F, (Senior Technical Director), National Informatics Centre Gujarat State Centre, ab.khunti@nic.in

7. Health & Wellbeing

ASHWIN (Asha Workers Performance and Incentive) Portal

Department of Health, Govt. of Bihar, National Informatics Centre Bihar State Centre

Pratyaya Amrit, Shailesh Kumar Shrivastava and Rajesh Kumar Singh

PROJECT OVERVIEW

One of the key strategies under the National Rural Health Mission (NHM) is having a Community Health Volunteer i.e., ASHA (Accredited Social Health Activist) for every village with a population of 1000 people. ASHA plays an important role in bringing primary health services to rural areas. She is an inevitable component in bringing health services to the grass root level by creating awareness on health and mobilizes the community towards local health planning and increasing utilization and accountability of the existing health services. ASHA facilitators are the main vehicle of monitoring, supportive supervision and on-site assistance for ASHA. One ASHA Facilitator supports approximately 20 ASHAs in her working areas.

At present, ASHAs are getting 53 types of performance-based incentives under National Rural Health Mission in Bihar state. Apart from the incentives paid from NHM, ASHA and ASHA facilitators are also getting additional performance-based incentive of Rs.1000/- per month from the State Fund for Immunization, Child Health, Maternal Health, Family Planning and etc.

87573 ASHAs have been selected against total target of 93687 and 4243 ASHA Facilitators have been selected against total target of 4685 in Bihar. Incentives payment to ASHA & ASHA Facilitators on time and also to maintain the transparency in the whole process was a challenging job. The pendency of remuneration payment ran in months and the accountability of delay could not be identified. There was an urgent need of IT based intervention to solve these impending issues.

Objective

- To streamline the process of recording the healthcare activities being carried out by more than 87,000 ASHA workers and more than 4,600 ASHA facilitators across rural areas of Bihar.
- Bringing transparency and reducing slackness in the chain of approvals.
- Centralized DBT of remuneration directly in the bank of accounts of ASHA workers and facilitators.
- To improve monitoring activities and performance analysis in terms of services rendered.

Scope (Functional & Geographical)

- Creation of Master Data of ASHA and ASHA Facilitators with containing personal details, place of posting, reporting hierarchy, aadhaar number, mobile number and account number.
- Web and Mobile based interface to record the activities being performed by ASHA and ASHA Facilitators.
- Web and Mobile-based interface for approvals of the activities.
- Centralized DBT enabled payments of remuneration.
- Performance monitoring in terms of services rendered.

Geographical Boundaries:

- The project has been fully implemented in entire state covering all districts of Bihar.
- 38 Districts of Bihar
- 534 Blocks of Bihar
- 8463 Panchayats of Bihar
- 9306 PHC, APHC and CHC across Bihar
- 1.10 Wards of Bihar
- 102 Urban PHC has also been started from April 2021.

Key Stakeholders

Following are the key stakeholders in the ASHWIN Portal:

- Health Department, GoB.
- State Health Society, GoB.
- NIC, Bihar.
- ASHA Workers and Facilitators.
- ANM (Auxiliary Nursing Midwife) at PHC.
- BCM (Block Community Mobilizer), BHM (Block Health Manager) and MoIC (Medical Officer In-charge) at Block Level.
- DCM (District Community Mobilizer) and DPM (District Program Manager) at District Level.
- DAC (Divisional ASHA Co-ordinator) at District level.
- Rural Masses of Bihar.

Intended benefits

- The process aims to release payment to ASHA and ASHA Facilitator by 20th of next month.
- Centralised list of ASHA and ASHA Facilitator Available online.
- Activity based payment as per NHM guideline.
- Rs. 1000 State Initiative for Protsahan Amount also included part of portal and will be added with NHM Amount.
- Reduction of 534 Bank Accounts into single account.
- Centralized Payment system also results in preparation of fast utilization certificate.
- No dependency on local banks and local accountants.
- Timeline has been defined for approval of daava prapatra by authorities.
- Performance evaluation of ASHA and ASHA Facilitator based on activities performed along with BCM, ANM and other workers. There is also planning to integrate beneficiary level payment with the same system.

Current Status

- The ASHWIN Portal has been developed and hosted at (<https://ashwin.bih.nic.in/>)

- The Mobile Application ASHWIN Bihar is developed and published at play store <https://play.google.com/store/apps/details?id=bih.nic.in.ashwin>
- The portal is integrated with PFMS and Aadhaar server for account verification and Aadhaar verification respectively.
- Presently 85609 number of ASHA workers are registered on the portal and submitting their claim form via Mobile/Web Application.
- Presently 4247 number of ASHA facilitators are registered on the portal and submitting their claim form via Mobile/Web Application.
- Multiple training has been conducted for block level officials BCM, BHM, MOIC and district level officials DAC, DPM, DCM and Civil Surgeons.
- 4 days Physical Training programme has been conducted at each block for ASHA, ASHA Facilitator and ANM.
- Remuneration payment of Rs.191.88 crore has been paid directly into the account of 84,038 number of ASHA Workers.
- The total number of NHM related activities recorded since December 2020 is 1,26,31,350 by ASHA workers
- Remuneration payment of Rs.35.41 crore has been paid directly into the account of ASHA Workers.
- The remuneration payment of August 2021 is being processed and delay in payments is removed.

Hardware/Software

Servers & Desktop: High End Blade Servers hosted at NIC Cloud, Local staging servers& Desktops

Operating System: Windows Server 2016, Windows 10

DBMS: SQL Server 2019

Web Server: IIS 10.0

Framework: .net Framework 4.5

IDE Software: Visual Studio 2019

Reports: MSRS

SMS: Mobile Seva of DEITY and NIC SMS Gateway

Mobile App: Android based Java Application

Unicode Support: Indic IME, Google API

Video Player: HTML 5

Certification (Certifying Agency)

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 Bhubaneswar. After completion of the process security certificate will be issued.

Disaster Recovery and Service Continuity

To keep the data and application safe and ensure service continuity the applications are hosted in cloud environment on virtual servers. Streaming replication of database has been setup which also acts a resource for reporting database. The daily incremental

backup is scheduled and full back up of database is being taken every fortnight. The DR has been requisitioned at Bhubaneswar and the mirror of entire infrastructure shall be setup. The backup request has been placed to cloud team for taking offline backups of the database and application. The backups are restored by implementation and operations team to ensure integrity.

RESULTS INDICATOR

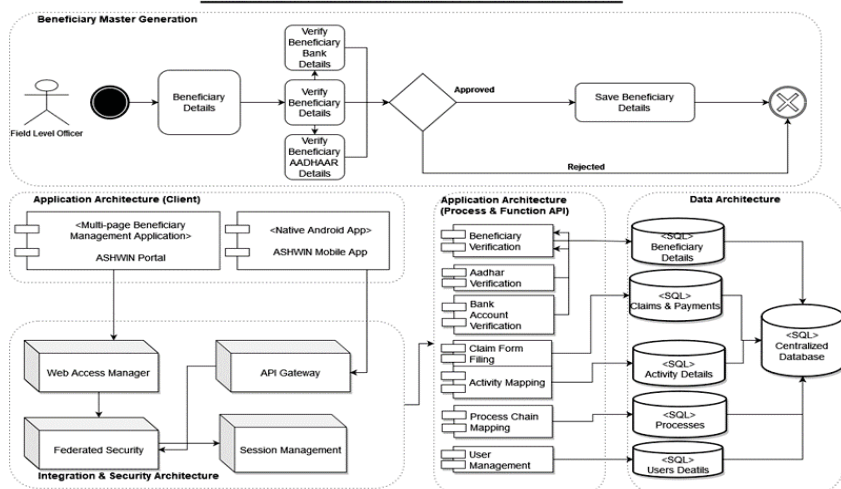
Description of various e-Services, benefits and their Volumes

Name of e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
ASHA Workers Registered	Data Digitization			85,939
ASHA Facilitators Registered	Data Digitization			4,259
PFMS Verifications	Data Verification			1,10,290
Aadhaar Authentication	Digital Identity			97,360
Health Activity Recorded by ASHA	Citizen Services			1.09 Crore
Approvals of Activities of ASHA	Citizen Services			1.072 Crore
Fund Transferred through PFMS	DBT			138.61 Cr
Payment Instruction Generation	DBT			10.05 Lakh
SMS Sent	Notifications			1.10 Crore

Implementation

Solution Architecture

Solution Architecture of "ASHWIN PORTAL"



Delivery channels

- SMS Alert
- Online Enquiry
- Mobile App
- Helpdesk and Kiosk
- Call Centre Support

Category of stakeholders

- State Administration
- District Administration
- ASHA Workers
- ASHA Facilitators
- Rural Health Functionaries viz. ANM, BCM, BHM, MoIC and DCM
- Citizen of Bihar

Methodology:

- Master Data of ASHA and ASHA Facilitator has been prepared containing personal details, aadhaar number, mobile number and account number.
- ASHWIN Mobile App has been developed which allows ASHA to submit Daava Prapatra (Claim Form) containing their daily and monthly activities classified as Institutional and Community activity.
- The Activities submitted are verified by Block Community Mobiliser and ANM for Institutional and Community Level activities respectively on day-to-day basis.
- After final submission of Daava Prapatra, it is further approved by Medical Officer Incharge (MOIC) of PHC.
- Based on Approval of MOIC payment is released through Public Finance Management System (PFMS) directly to the bank account of ASHA through State Health Society.
- Daava Prapatra of ASHA Facilitator is also submitted through Mobile App and after verification by Block Community Mobiliser (BCM) and approved by MOIC the payment is released directly to the bank account of ASHA Facilitator.

Improvements / Enhancements

- Registration and verification of all ASHA Workers and Facilitators.
- Submission of Online Claim form (Dawa Praptr) for payment of remuneration through Mobile App and Web-enabled Application.
- Workflow based with roles for verification and approval of claims.
- Timely payment of remuneration.
- Direct Benefit transfer to more than 90,000 Beneficiary to the tune of more than Rs. 138 Crores
- Performance analysis in terms of services rendered at village level.
- Weeding out inactive ASHA workers and Facilitators.
- Most of the Services are accessible through Mobile Phones/Tablets
- Process Reengineering of schemes for simpler flow of information and funds.
- Greater Accountability of concerned authorities.
- Online Interface for Registration, SMS Alert, Document Submission, Approval by different levels of governance.

- Elimination of redundant processes in fund transfers and fast processing of applications.
- Ease in dissemination of information through electronic delivery channels

Improvements/ enhancements planned specifically during the next one year:

- Activity linkages with beneficiary
- Automatic alerts regarding immunization, maternal and childcare.
- Digital Training Portal

ENABLER

Processes Re-engineered

Below is a comparison between pre- and post-deployment of ASWIN Portal:

	Before ASHWIN Portal	After ASHWIN Portal
1.	Manual submission of claims	Online submission using Mobile App and Web-enabled interface
2.	Manual recording of health-related activities by ASHA at village level	Activities are recording on daily basis which helps in preparation of Remuneration claim
3.	No SOP of verification and approvals of claims	SOP has been adopted and timelines have been defined to remove the bottlenecks that causes delay in chain of approvals
4.	Bank Account at all the Block Level for payment to ASHA. Payment was dependent on the discretion of Block level officials	Centralized Payment System using PFMS. Block Level Officials need to validate the claims submitted within a given timeline.
5.	Manual monitoring mechanism dependent on Field level functionaries	Online monitoring mechanism.
6.	Difficult to identify inactive ASHA workers and Facilitator	Online activity recording facilitated identification inactive workers
7.	Ad-hoc method of payments	Payment in the Bank Accounts of ASHA using PFMS

Following processes were re-engineered through ASHWIN:

- Online Registration of ASHA Workers and Facilitators.
- Verification of identify using Aadhaar, bank account using PFMS and Mobile Number using SMS based OTP.
- Mapping of chain of approvals from Panchayat; to PHC; to Block; to District; and; HQ Level.
- Role based Login.
- SoundexHindi; an AI based model to match Hindi names written in English; used to match beneficiary names with bank account names.
- Processing of Payment Files through Digital Signature.
- Account Reconciliation and UC Generation

- SMS alert at every stage of Application Processing and Payment Generation.
- Reduction of Bank Accounts and Centralized Payment System

Technologies

- Workflow system with roles-based authentication and authorization.
- Web-services for information sharing and data synchronization.
- Mobile app to gather data at the source.
- Data Analytics to identify non-performers.
- SMS Integration for alert
- SoundexHindi; AI algorithm for matching names of Beneficiary and name received from Bank
- XML based data transfer between various external systems
- Aadhaar Service Integration for Aadhaar Authentication and digital identity establishment.
- PFMS integration for DBT.

People

Capacity Building

The capacity building programs has been conducted regularly for different kind of stake holders. Initially a set of master trainers were trained and then the training program has been conducted physically at every block level. The video conferencing-based training is also conducted time-to-time in order to keep the stakeholders updated about new features and releases into the system. During the implementation phase the training program was taken as a massive exercise and interactive training materials have been prepared to keep the users interested. Master trainers at every block has been identified who imparts training to all the users.

Leadership Support

To ensure an effective implementation of ASHWIN, the leadership support has been provided for:

- Making Policies for adoption of ASHWIN as a solution.
- Setting up long-term scope and targets.
- Providing project oversight, direction and guidance
- Change management & Process re-engineering
- Regular review of the project.

Leadership support teams are available at following levels to ensure smooth functioning and sustainability:

- State Apex Committee: This is headed by Additional Chief Secretary, Health Department with Executive Director, State Health Society and State Informatics Officer as Members. This is apex body for taking policy decisions for ASHWIN implementation.
- State Project Core Team: Executive Director, State Health Society, Government of Bihar and SIO, NIC, Bihar has notified officers as Project Members of project team. This also have members from administrative officers etc. who advise 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 teamwork under overall supervision of Executive Director, State Health Society, GOB and State Informatics Officer, Bihar.

- **Project Steering Committee:** In order to support the 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 assists decision makers to use ICT in decision making process and create ICT enabled environment for planning and monitoring.
- **Resource Persons at District/Division/Block level:** The project is executed by District Health Society, in the respective district and blocks. The DAC, DPM and DCM are involved at Division/District Level to look after smooth functioning and resource requirements to ensure smooth execution of the project. The MoIC, BHM, BCM posted at Primary Health Centre looks after the block level functions. The Additional Primary Health Centers are looked after by ANM. ASHA and ASHA facilitators reports both to ANM and BHM. In order to support the project various kinds of resource persons have been hired or recruited. 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.

VALUE INDICATORS

Learnings for sharing

The application is one of its first kind where the ASHA workers, Facilitators and ANMs, who are little or no IT awareness, have started using the ASHWIN portal. The portal is an example that how simplifying the procedure can be effective in smoothening the core functions of an organization. The key takeaways from ASHWIN portal are:

- Every application targeted at rural population must use a mobile first approach.
- Application should be designed only after simplifying the operating procedures.
- Bandwidth constraints in rural areas can be addressed with designing the application which works in offline mode and supports deferred updates.
- Rollout supported by proper capacity building and workshops makes wide acceptance of system very effective.
- SMS alert helps to deliver information at different stages of application lifecycle.
- Aadhaar framework to ascertain Digital Identity and PFMS to verify Bank account of the beneficiary is the need of the hour.
- API based integration framework and Service Oriented Architecture need to be used for designing new systems.

- Reliability and availability of the system must be ensured.
- Responsive and supportive implementation team is needed.
- This application can be replicated across India as standard guidelines of NHM has been followed.

Digital Empowerment

- DBT transfer using PFMS platform in the bank account of the beneficiary.
- Mobile/Web based multi-channel service delivery.
- Bilingual (Hindi and English) and Unicode supported user interface.
- Conversion of manual into electronic processes.
- Collection of data at source using mobile devices.
- User-friendly and transparent process for stakeholders.

Green e-Governance

- The claim forms are being filled on-line using mobile/web application and OTP based authentication mechanism has been employed for finalization and approval of claim forms. The filling-up of manual forms are done away with saving a huge amount of paper.
- All orders, circulars and notification related to the schemes are being published on the portal itself.
- All the training materials, guidelines and user materials are available on the portal in electronic form.
- Aadhaar authentication services are being used to verify the demographic identity of the person. No need to use any physical document.
- SMS and eMail-based communications.

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Ayushman Bharat – Arogya Karnataka Card Distribution – a Novel Approach by the State

Department of Health & Family Welfare Services, Govt. of Karnataka & National Informatics Centre Karnataka State Centre

K. V. Thrilok Chandra, Suresh Shastri and R. Venkatesh

PROJECT OVERVIEW

Karnataka has launched the Universal Health Coverage scheme named Arogya Karnataka on 2.3.2018. A centrally sponsored scheme called Ayushman Bharat-National health protection mission, was launched by GOI on 21.3.2018 later renamed as Pradhan Mantri Jan Arogya Yojana (PMJAY). As both schemes had the same goal, scope and similar modalities for providing specified treatments to the poor and vulnerable populations of society, Karnataka state is implementing integrated Ayushman Bharat-Arogya Karnataka scheme since 30.10.2018 with advantages of the central as well as state schemes on assurance mode.

Beneficiaries can avail the scheme on producing Aadhaar card and Ration Card. To facilitate quick identification of beneficiaries for health care treatment under the scheme and easy implementation of the scheme AB-ArK cards are issued based on the Aadhaar Card and Ration card which have a unique ID. There are two types of AB-ArK cards available, the first being A4 size sheets at the cost of Rs 10/- per card and the other is the PVC card at a cost of Rs 35/- per card.

In March 2018, health cards also called as Arogya Karnataka cards were issued at 11 government hospitals and later expanded to all 27 district hospitals, 32 government medical colleges, 147 Taluk hospitals and 209 community health centers, 4 PHCs. Subsequently due to increased number of persons demanding health cards, hampering the functioning of the hospitals, cards were issued at 171 Bangalore one centers, 104 Karnataka one centers from November 2018. 4, 68,341 cards were generated from March 2018 to November 2018.

As there was increase in demand to avail the health cards, from all over the state, to avail the health benefits by the public and to avoid overcrowding at the center, and to reduce the delay in generating and distributing cards, permission was given to generate health cards in 8768 seva sindhu common service centers from March 2019 to hasten the health card distribution process.

To help the citizens to increase access for health care and to make sure that all individuals have AB-ArK cards to avail the benefits without delay, it has been decided to increase the number of centers to issue the cards. Hence, the department of health and family welfare services established AB-ArK counters in 20 MCH hospitals, 364 UPHCs and 58 ART centers across the state to issue AB- ArK cards, to the visiting patients by using available computers, printers and to purchase Biometric equipment as per technical specifications.

Financial assistance upto Rs. 5 lakhs per annum will be provided for treatment of family that comes under the definition of eligible in the ABArK card. The benefit limit of general patient shall be 1.5 lakhs for the family. This will be on a family floater basis even one person of family can use the entire money.

Hardware/Software

- Microsoft Dot Net

- Microsoft SQL Server
- RD service enabled biometric / IRIS
- MACID windows app for security authentication

Certification (Certifying Agency)

- SSL certificate obtained
- Security audit was done by STQS agency
- Aadhaar security audit done by CERTIN agency

Disaster Recovery and Service Continuity

- 3 APP servers and 2 DB servers with load balancer
- Always on is enabled on SQL database between DB servers.
- Regular backup at Karnataka state data center as per backup policy

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	2019	2020
AB-ArK Cards	Health Card	6,07,899	91,23,861	43,51,890

Implementation

In March 2018, health cards also called as Arogya Karnataka cards were issued at 11 Government Hospitals and later expanded to all District Hospitals, Government Medical Colleges, Taluk Hospitals and community health centers. Subsequently due to increased demand to health cards, which in-turn hampering the functioning of the hospitals, cards were issued at 124 government empaneled - Bangalore one center, Karnataka one center in November 2018. 4, 68,341 cards were generated from March 2018 to November 2018.

To meet the increased demand from all over the state, to avoid overcrowding at the center, and to reduce the delay in generating and distributing cards, permission was given to generate health cards in 5210 Seva Sindhu common service centers in March 2019 to hasten the health card distribution process.

To enhance access and to ensure that all individuals have AB-ArK cards without delay, The Department of Health and Family Welfare services established AB-ArK counters in 20 MCH hospitals, 364 UPHCs and 58 ART centers across the state to issue AB- ArK cards, to the visiting patients by using available Computers, printers and to purchase Biometric equipment as per technical specifications.

It was noticed that rural communities had difficult access to avail AB-ArK cards, hence Bapuji Seva Kendra's situated in village Panchayats were involved in issuing cards by utilizing available Computer, Printers and Biometric devices all over the Karnataka by training Data Entry Operators working in the Bapuji Seva Kendra's under the RDPR department in December 2019. The RDPR department also conducted IEC activities regarding the AB-ArK scheme, benefits of the scheme, at village level so that a greater number of people can avail the cards and benefit of the scheme at the earliest. Similarly, ITI e-seva centers started to issue ABArK cards in urban areas in addition to Bangalore

One, Karnataka One, Seva Sindhu CSCs since November 2020.

Some groups however were unable to receive an AB-ArK card due to difficulties with Fingerprint based biometric verification. These include elderly population, very young children, persons with disability such as leprosy or any other deformity. To address this, Department of Health and Family Welfare services undertook a drive to list such persons at the centers and ensured that iris scanners are installed in the government hospitals to cater to the needs of these groups.

Improvements / Enhancements

Last one year

- Rolled out in 17000 various centers in a secured manner
- Biometric and IRIS Authentication is made available.
- Mobile friendly web portal for JANA SEVAK
- Kutumba integration for Family ID creation

Plan for next one year

- Integration with Digi locker Pull service
- Auto creation of Health Card using Kutumba data
- Full-fledged implementation of ABArK Referral and ARS System

ENABLER

Processes Re-engineered

The Department of Health and Family Welfare Services, Government of Karnataka has engaged with multiple departments which includes; i) National Informatics Center for design and development of the application ii) Center for e-Governance for hosting the application in a safe and secured manner in State Data Centre. iii) Department for Rural Development and Panchayati Raj, and ITI to ensure adequate coverage for ABArK card issue in a streamlined and secured manner.

AB-ArK Cards were made available at door step of the beneficiary at no extra cost. There was no out of pocket expenditure to avail the cards. The benefits of the AB-ArK scheme were publicized even at village level and hard to reach areas on a camp mode.

The innovations to generate AB-ArK card in a streamlined manner helped to reduce the time taken in availing the cards, reduced the role of middle men and increased the credibility of Public Health Institutions. The System was secured through IP and MACID validations and Operators are authenticated through Aadhaar only. Logs were maintained on each level for auditing the system.

The department of Health and Family Welfare services undertook a drive to list the number of persons facing difficulties with fingerprint based biometric verification at the centers and ensured that iris scanners are installed in the government hospitals to cater to the needs of these groups.

After Integrating with Kutumba the process was simplified as the citizen has to validate at one UIDAI using biometric and KYC details of Aadhaar and Ration card.

Technologies

ABArK Cards were issued at 11 Government Hospitals and later expanded to all 27 District Hospitals, 32 Government Medical Colleges, 147 Taluk Hospitals, 209 Community Health Centers and 4 PHCs. Subsequently due to increased demand for

health cards, in-turn hampering the functioning of the hospitals, cards were issued at 171 Bangalore One Centers, 104 Karnataka One Centers from November 2018. 4,68,341 cards were generated from March 2018 to November 2018.

To meet the increased demand from all over the state, to avoid overcrowding at the center, and to reduce the delay in generating and distributing cards, permission was given to generate health cards in 5210 Seva Sindhu Common Service Centers in March 2019 to hasten the health card distribution process.

To enhance access and to ensure that all individuals have AB-ArK cards without delay, The Department of Health and Family Welfare services established AB-ArK counters in 20 MCH hospitals, 364 UPHCs and 58 ART centers across the state to issue AB- ArK cards, to the visiting patients by using available Computers, printers and to purchase Biometric equipment as per technical specifications.

It was noticed that, rural communities had difficult access to avail AB-ArK cards, hence Bapuji Seva Kendras situated in village Panchayats were involved in issuing cards by utilizing available Computer, Printers and Biometric devices all over the Karnataka by training Data Entry Operators working in the Bapuji Seva Kendras under the RDPR department in December 2019. The RDPR department also conducted IEC activities regarding the AB-ArK scheme, benefits of the scheme, at village level so that a greater number of people can avail the cards and benefit of the scheme at the earliest. Similarly, ITI e-seva centers started to issue ABArK cards in urban areas in addition to Bangalore One, Karnataka One, Seva Sindhu CSCs since November 2020

A Separate Dashboard and Data Analytics tool was prepared for generating reports in terms of District/Taluka/Village/center/age/ gender to improvise the card distribution in Karnataka.

People

Meetings were conducted under the chairmanship of Commissioner, H&FW, this has significantly improved the enrolment process and implemented the targets in a smooth manner. Training was provided through video and online classes.

Technical issues were supported through WhatsApp group to provide a solution in quick manner. This has improved the efficiency of operation and 1 lakh cards / day were issued. The Funds achieved through this Card issue process were utilized by the hospital for improving the IT infrastructure to cater better services.

VALUE INDICATORS

Learnings for sharing

The steps taken to prevent malpractice includes – MAC ID binding of the computer used by an operator, biometric authentication of operator as well as beneficiaries. There is a clear monitoring mechanism for AB-ArK card issue by creating computer based as well as mobile friendly dashboard. The District Leprosy Officer is the nodal officer in the district. At State level, a weekly review meeting by Commissioner and at district level monthly review meeting by Deputy Commissioners are conducted to review the progress of AB-ArK card issue. Initially cards were issued on the basis of OTP sent to the mobile number of the beneficiary or by scanning the QR code, this has led to the involvement of middlemen or touts, who had taken individual's Aadhar and ration card details in a community and issued the ABArK cards to beneficiaries by charging an extra amount above the charges fixed by Government of Karnataka.

This issue was raised by Print, visual media as well as community members. The Government of Karnataka is committed to provide transparent and corruption free governance to the people of Karnataka, hence the issue was taken as a priority and following measures were taken to curb malpractice. Cards were then issued based on fingerprint-based biometry from May 2019 to ensure presence of the beneficiary during card generation, thereby avoiding malpractice and middlemen.

Integration with Kutumbahas automatically generated Family Id with Ration card, APL/BPL with respect to Aadhaar and this has reduced the enrolment time and improved efficiency. API integration was provided to stakeholders, wherever validations and details are required.

Digital Empowerment

It was observed that, rural communities had difficult access to issue AB-ArK cards, hence 6021 Bapuji Seva Kendras situated in village Panchayats were involved by utilizing available Computer, Printers and Biometric devices and by training the Data Entry Operators working in the Bapuji Seva Kendras under the RDPR department in December 2019. The RDPR department also conducted IEC activities regarding the AB-ArK scheme, benefits of the scheme at village level so that a greater number of people can avail the cards and benefit of the scheme. Similarly, 325 ITI e-seva centers started to issue ABArK cards in urban areas in addition to Bangalore One, Karnataka One, Seva Sindhu CSCs since November 2020.

The innovations to generate AB-ArK card in a streamlined manner helped to reduce the time taken in availing the cards, reduced the role of middlemen and increased the credibility of Public Health Institutions.

The department of Health and Family Welfare services undertook a drive to list persons facing difficulties with fingerprint based biometric verification at the centers and ensured that iris scanners are installed in the government hospitals to cater to the needs of these groups.

Green e-Governance

Measures taken as per the E-Waste (Management) Rules, 16 issued from Karnataka State Pollution Control Board.

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e-Hospital Project

National Informatics Centre, New Delhi

Sunil Kumar and Naveen Kumar

PROJECT OVERVIEW

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, 628 hospitals have been on-boarded on the e-Hospital application from which 450 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 410 hospitals. Till date, over 42.81 lakh appointments have been booked from ORS with over 5,000 appointments being booked every day.

The e-Blood Bank application has been implemented in 53 blood banks with over 3.84 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)

Yes, 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 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	628
e-Hospital Transactions	Total number of transactions generated through the e-Hospital application	5,98,51,278	6,96,99,883	8,22,05,153 (Till 16 th Sept 2021)
Hospitals on ORS	Number of hospitals on-boarded on the ORS portal	189	240	410
ORS Appointments	Total number of appointments booked through the ORS portal	10,75,204	11,03,216	21,02,960 (Till 16 th Sept 2021)

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-Blood Bank.

Currently, 628 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 17.04crore transactions have been generated through e-Hospital with over 2.5 lakh transactions being generated every day. ORS has been implemented in 410 hospitals. Till date, over 42.81 lakh appointments have been booked from ORS with over 5,000 appointments being booked every day. The e-Blood Bank application has been implemented in 53 blood banks with over 3.84 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 MeraAspataal 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 CharakPalika 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-Hospital application to KGMU Community Eye Bank for organ donation of deceased patients in King George's Medical University Lucknow.

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.

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.

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, face sheet 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.

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 also been integrated with MeraAspataal 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 CharakPalika 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.

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.

Technologies

- Elastic Search (ELK) is used in eHospital project
- ICD 10, SNOMED –CT is used in the eHospital Project
- Integration of Lab with Lab analyzers.
- Generation of Health ID as per NDHM eco system.
- 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.
- HL7 compliant and Multitenancy in Cloud Computing

People

Capacity Building

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 Centre 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.

Green e-Governance

Energy Saved due to Multitenancy in Cloud Computing in e-Hospital Project.

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OxyCare Management Information System (OCMIS)

**Ministry of Health and Family Welfare, Govt. of India & National Informatics Centre
Himachal Pradesh State Centre**

Vishal Chauhan, Ajay Singh Chahal and Sanjay Kumar

PROJECT OVERVIEW

Objective

The main objective of the Project is to ensure the timely delivery, proper installation at the last level Health Facility across India up to CHC/Wellness Centre and functioning monitoring of OC/Ventilator /PSA Plant supplied under PM cares, donation, companies CSR Activities, Tracking, and ensure their function and problem resolution at time bound manner. This data is, therefore, available in the portal in the form role based dashboard at the PMO/Ministry and State/District Level. 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 (Functional &Geographical)

- The scope of the Initiative has been to develop the one mobile apps on Android and iOS (Apple) platforms, to be used by Health facility In-charge for receiving these items by scanning secret QR Code pasted on all device and send their daily reporting and issue directly to concern manufacture for quick resolution.
- For ensuring correct data capturing, QR based device information was capture through registered health facility in charge and capture the GIS location of the place where item has been received.
- The development of the portal became a necessity as MIS requirements of States/UTs were to be met and hence, a portal <https://oxycare.gov.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 the items were procured and supplied to all States and their health facilities up to CHC/Health wellness center. The key stakeholders are given below:

- Ministry of Health and Family Welfare, Government of India for placing procurement order of OCs under various source of funding through ONGC, BEL, Receiving in the stock and allocation of these items to State for District and Health Facility wise allocation.
- District Health officials in all States/ UTs for MIS for OCs allocation to Health facilities, updation and addition of health facilities and their in charge.
- PMO Interface: A separate role for PMO to view the progress and PAN Indian status report of the items dispatched received and their functional status.
- IoT based PSA Installation agencies: To map the PSA plant detail up to Health facility along with their IoT device detail and operate the PSA Dashboard for

real-time automatic data reporting through IoT.

Intended benefits

- Quick development of software solution to be offered to all States in a unified manner.
- Mobile First approach for data collection, to enable fast and easy roll-out in all States/UTs of India.
- Correct and standardized data format in the country.
- The cloud infrastructure will be scalable and hence, handle extremely high workloads, if the situation worsens.
- SMS based alerts to Stakeholders at the time of any transaction in the system
- Quick on boarding of Administrative / Health officials through existing NIC Email Id and password (SSO- Single Sign On Integration) so that no new users need to be remembered/ created for the Portal.
- It is a comprehensive and complete solution for the Oxy Care Management.

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.
- In nutshell:
 - Mobile Apps, Oxy Care was developed on Android and iOS platforms
 - <https://oxycare.gov.in> portal developed, security audited, hosted
 - Redundant cloud infrastructure created on NIC Cloud with DR at Hyderabad
 - Performance testing of solution done for 10,000 concurrent users
 - Comprehensive documentation, FAQs, movies for users to quickly implement the system
 - Solution implemented completely in all States/ UTs of India
 - Onboard 2,000 + Users

OC Stats	State Allocation	District Allocation	Dispatch to Districts	Received at Health Facility
Allocation/Dispatch/ Receipt	74469	68528	36446	19193

OC Stats	Total No. Health Facilities	No. of Health Facilities (Allocated)	No. of Health Facilities (Received)
Primary Health Centre	16918	5841	3047
Community Health Centre	15335	1912	1172
Health Wellness Centre	178511	8774	5963
Sub-District Hospital	2994	249	147

District Hospital	1782	143	99
Medical College	26	10	10
Total	215566	16929	10438

OC Stats	Allocated (OC)	Received (OC)
Primary Health Centre	9841	4415
Community Health Centre	9037	5144
Health Wellness Centre	12125	7205
Sub-District Hospital	1966	1239
District Hospital	1721	1116
Medical College	146	144

Oxy Care portal at <https://oxycare.gov.in>

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: 4 high end Virtual Machines (VMs) as web-servers behind load balancer and 2 high end VMs as database servers 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
- Middleware: Microsoft .Net framework for web-portal and Xamarin for mob-app.
- Packages-integrated (SSO Integration): APIs integrated for SSO Login – .nic and .gov domain based email id as login.

Certification (Certifying Agency)

Yes, the <http://oxycare.gov.in> portal has been cyber security audited through empanelled agency of Indian Computer Emergency response Team (CERT-IN) and Oxy care mobile apps have also been cyber security audited.

Above security audits are done for application software system and with respect to data center network level and virtual machines (VMs)/server level security audits are also done by NIC data center team through CERT-IN empanelled agency. These include all third party software or system software components used in these equipments/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's. With time new threats may emerge, so cyber security audits are to be done at regular intervals.

Disaster Recovery and Service Continuity

Considering the future scope for scalability, 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.
- 4 VM as web server and 2 VM as DB, so even if one server is down, Mobile app and portal will keep working.
- DR site at Hyderabad has been readied, but yet to be tested. This will ensure that even if 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 10,000 concurrent users 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 failure level.
- The portal has been enabled for both IPv4 and IPv6 so that it works with networks using only IPv6 at any point of time.

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
User Registration and Role Management	NIC SSO based user authentication with gov. and nic. Official's user email id. Role based access to application menu and dashboard. Use of existing COVID19 – Sample collection management information system platform for quick replication and avoid duplicity in authentication			5345
Stock Entry/Receipt through ONGC	Access was given to ONGC and their procurement agency for receipts of stock through manufacture and complete supply-chain with OCs tracking upto the last level at District Health Facility level, supplemented by various MIS Reports to check the real-time status of item delivery,			PO: 115000 Stock: OCs:74469 PSA Plant:1222 Ventilator: 87546

	installation and functioning.			
Allocation of items by Ministry to States	Ministry user for OCs allocation planning, Manufacture, Source of funding wise allocation to States and MIS Dashboard to track their delivery and functional status at the health facility level.			74469
Maintenance of Health Facility in charge and consignee master	The interface allow the user to add/modify State/District health facility and update their in charge detail for mobile app.			215566/1215
Allocation of items by State to District -> Consignee mapping for dispatch -> Health	The role based access to State NHM head for creation of consignee master, updation of health facility with detail of their in charges (to be used as part of OxyCare mobile app).			District Allocation: 68934 Consignee Mapping: 66658
Facility-in charge master for mobile app.	Allocation of OCs to their District and finalization of delivery points form ONGC.			Dispatch by ONGC: 37202 HF In charge: 217068
Problem reporting and its resolution by the Manufacturer	The interface allow the manufacture to view and resolve the problem reported related to their products and provide resolution at the earliest.			Problem Reported: 224 Problem Resolved: 38
Role based Dashboard for monitoring at each level	Role based dashboard for difference user such as PMO, Admin, ONGC, Ventilator, PSA plant, manufacturer, State/District and QR Code generator can be assigned to user for permissible menu options.			3540

User Manual, Helpline, Support and Tanning video for faster implementation.	The portal is enriched with latest video, manual and training videos to help the user for any doubts. An email based support mechanism (support-ocmis@nic.in) is also provided for detail queries and their resolution. WhatsApp group is also available to raise any issue.			30
Generalized solution for Centre-State Health supply- chain	The platform is further enhanced for tracking other medical devices such as ventilators and OCC.			OCs:74469 PSA Plant:1222 Ventilator: 87546

Implementation

The mobile apps and oxycare.gov.in portal have been developed for MoHFW for implementation in the whole country. All States/UTs of the Country are on-boarded and covers 2.15 lakhs health facilities with detail of their in charge as mobile app users.

The complete data is made available to all Stake holders in the form of various role-based dashboard and reports. The delivery channels of this project include:

- Smart phones for using the OxyCare and OxyCare engineer mobile apps.
- Apps can be downloaded from Android and iOS (Apple) play/app stores.
- SMS based delivery channel to authorities for any transaction.
- Web: The OC-MIS (<https://oxycare.gov.in>) 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 PMO, MoHFW, State, District, Health Facilities level Web Portal for backend operations
- ONGC: Receive Stock, PO wise,
- ONGC: Generate Secure QR for every serial number
- ONGC: Dispatch Stock to States/ Districts
- MoHFW: Allocate available Stock to States and Monitor Status
- State: Allocate Stock to Districts, Enter Consignee Address details
- District: Update Health Facility data
- District: Allocate Stock to Health Facility, Receive and Dispatch items
- Mobile app for front end receipt and functioning
- PoC: View allocated items, track and receive items
- PoC: Report daily functioning, problems if any.

Improvements / Enhancements

- OxyCare mobile app: The mobile app has been upgraded to include the secure QR code based scanning of items, raising problem/issue faced, installation

/functioning status, option to work offline and later auto sync on online mode and in charge mapping for more than one HF.

- PSA Plant Interface – IoT based data collection: The OC-MIS portal was further enhances to monitor the around 1500 PSA Plant installed under PM Cares across India and dashboard to check their functioning on real time basis through IoT based data reporting.
- Generalized solution for all health inventory: The platform is capable of maintain the complete supply-chain system of health inventory with its monitoring each level and can be replicated PAN India with minimum effort
- SSO Login for user authentication: To avoid any duplicity and faster implementation NIC two factor authentications Email-Id/Password and OTP based secured mechanism was used with user registration through their government official email is on .gov and NIC domain to avoid any misuse and log tracing.
- 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.
- Portal enhancements: The OxyCare portal has been enhanced over time to provide a number of reports/ excel data to Ministry/State/District health 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. This gives an idea about States which are lagging behind in conducting sufficient number of tests to identity Covid19 patients/ associated risks.
- Problem resolution through Manufacturer Engineer: a separate Oxy Care Engineer App to be used my manufacturer service engineer was also developed to report the OCs issue directly to concern service engineer and timely resolution its disposal through app.

Planned Functions

- Providing IoT based alert system to user whenever the reading is below prescribed critical level.
- Authentication and capturing of GIS coordinates through the ISP on the desktop.
- Shifting of OCs to effective location for better usage and demand-based allocation.
- Improving the GIS, with AI based demand zone based on positivity rate.

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 learning's are taking place every day. Vaccine is under trial in different countries and its effectiveness is yet to be proven.

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. EG3 group's responsibility is to provide ICT solutions during the pandemic.

DG NIC is a member of this Group and took initiative to develop OC-MIS generalized solution and planned and developed in a very short time by NIC Himachal Pradesh (just 20 days).

A standard comprehensive ICT solution, using existing LG Directory codes, email addresses of DM/DCs, Health officials was developed mobile apps and one web-portal.

To ensure standardization and continuity, the Cloud infrastructure has been planned in a manner to handle very high loads of Tests in India.

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 health in charge.

The Project is now running for last 4 months and no issues have been reported except some additional MIS reports 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:
- Social Media: The training video for use of the App was made available on <https://oxycare.gov.in> portal.

People

- Leadership support has been provided directly from the Hon'ble Prime Minister's office that has been monitoring the situation and reviewing progress from time to time.
- Secretary (Information Technology) MeitY, GoI, who is heading the EG3 group has been taking weekly meetings in the initial period of development and implementation for smooth roll-out in the country.
- Director General, NIC, Director General, 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. 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 as it was built on COVID19 Sample collection Management lines which was already replicated in all States/UTs and user were familiar and very well conversant with the flow. Of course, there was requirement of additional MIS, data download, fields, but these were provided in the Apps and portal simultaneously, mostly within 24 hours itself.
- Creation of users for Mobile Apps: The Registering the State/District/Health Facility/Wellness Centre was achieved through the portal. The mobile number of all health facility in charge with their name, email was done through an interface in the portal by providing initial data of around 2.15 lakhs master data already being used in National Health Portal to avoid any duplicity and to follow standardization for future integration. 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 on how to use the mobile apps, the video is in English and hosted at <https://oxycare.gov.in> Helpline section. Required User manuals, training videos, presentation were 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 with SSO 2-factor authentication 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.

Capacity Building

Under the project, was achieved through simple App and Portal interface. Training was imparted in first instance to the Government officials at NHRSC (Delhi), 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).

VALUE INDICATORS

Learnings for sharing

The OxyCare mobile apps with <https://oxycare.gov.in> portal have been developed in a very short time between, with collaboration among different teams of NIC at Shimla and New Delhi under the leadership of Director General NIC. She personally monitored the progress daily, round the clock and ensured that requisite expertise is made available for the project. The other learning are:

- **Mobile FIRST:** Everyone 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. 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. But quick development of apps and portal ensured their acceptance all over the countries and majority of the States implemented the solution in a very short time.
- **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.
- **Use existing facilities/ resources:** 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.

- 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. The portal takes care of MIS requirements of every set of stakeholders without burdening them with complicated user ids/passwords for additional requirements.
- Sharing of existing Master data: The process change has been achieved by providing and integrating the existing master data of health facility (2.15 Lakhs) and User id (5000 government official id) to avoid any duplicate entry effort at field offices. It further help in data standardization and sharing among different platform.

Digital Empowerment

The OxyCare and OxyCare Engineer mobile apps have been developed for country wide usage by Health Facility In charge. However, to address the issue of language in imparting training to State Users, all 746 District Informatics Officers and 37 State Informatics Officers have been trained. The State officers were imparted training for being master trainers to users at district level through VC in multiple sessions in coordination with NHRSC, New Delhi.

Key Stakeholders

The entire country is the Stakeholder as the items were procured and supplied to all States and their health facilities up to CHC/Health wellness center. The key stakeholders are given below:

- Ministry of Health and Family Welfare, Government of India for placing procurement order of OCs under various source of funding through ONGC, BEL, Receiving in the stock and allocation of these items to State for District and Health Facility wise allocation.
- ONGC/BEL: They will procure the items from different manufactures based on the ministry PO order, maintain the receipt and stock and further dispatch the items to State as per their allocation on mapped consignee points.
- Manufacture: Stock entry as per their PO order, resolution of reported problem from Health facility and generation of QR code for items and pasting them at the time of dispatch.
- State Health /NHM Heads in all 31 States/ UTs for entry of allocation of OCs to District, Consignee mapping receiving of the items and monitoring of supply chain of their States.
- District Health officials in all 31 States/ UTs for MIS for OCs allocation to Health facilities, updation and addition of health facilities and there in charge.
- PMO Interface: A separate role for PMO to view the progress and PAN Indian status report of the items dispatched received and their functional status.
- IoT based PSA Installation agencies: To map the PSA plant detail up to Health facility along with their IoT device detail and operate the PSA Dashboard for real-time automatic data reporting through IoT.

Government Email based login for State/District Administrators/ Health officials: In order to simplify the login into portal for Government officials so that they can map and update their State Health Facility master within charge details, the official Email based login 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. They could just login using their existing Government Email IDs and passwords. This not only fast forwarded the onboarding process but also empowered them to quickly use the software solution.

Green E-Governance

The entire concept of Oxy Care Mobile Apps and <https://oxycare.gov.in> portal is based on paperless data collection and transfer of data to centralized portal with separate role-based dashboard to users. Many features are in-built in the App and Portal to enable Green Governance, as given below:

- Supply chain with system generated electronic dispatch not, installation note, QR based item receiving, item Stock and allocation and finally the problem reporting and its resolution through mobile app.
- Mobile app enables local saving of data in mobile app of the health facility in charge.
- The complete help/ guidelines for mobile app and portal are in electronic format, saving Lakhs of pages, as given below:
 - o The User Manual is available in PDF format
 - o The Presentation is available in PDF format
 - o There is an extensive FAQ section for different set of users to assist them in resolving their queries
 - o An email-based help is provided on 24x7 basis users to resolve their queries timely.
 - o Item installation and operational training videos for user available in the portal (<https://oxycare.gov.in>)
- The onboarding process of user was done through the District Authorities by using their existing Government Email with authentication mechanism. No additional User ID or passwords were required. The mobile users can register their mobile number and other details against one and more health facility through portal.
- The training was imparted using web-tools for Video conference, savings crores of Rupees, if class- room based training was arranged.

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RT-PCR Mobile App and Covid19 Sample Collection Management System

National Informatics Centre, New Delhi & National Informatics Centre Himanchal Pradesh State Centre

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 (Functional & Geographical)

- 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.

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 35 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 crores app users become indirect stakeholders. The key stakeholders are given below:

- ICMR and Ministry of Health and Family Welfare.
- Research Institutes
- Arogya Setu
- State and District Administration

- State and District Health
- ICMR authorized Laboratories
- Collection Centres
- Sample Collector
- Public/ Patients.

Intended benefits

- Quick development of software solution to be offered to all States in a unified manner.
- Mobile First approach for data collection, to enable fast and easy roll-out in all States/UTs of India.
- Correct and standardized data collection of every Covid19 related sample being collected in the country.
- 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.
- It is a comprehensive and complete solution for the Covid19 samples.

Current Status

- Covid19cc.nic.in portal developed, security audited, hosted.
- Redundant cloud infrastructure created on NIC Cloud with primary site at Delhi and DR site at Hyderabad, to mitigate any disaster situation.
- Performance testing of solution done for 50,000 concurrent users.
- Comprehensive documentation, FAQs, movies for users to quickly implement the system.
- Solution implemented completely in 35 out of 37 States/ UTs of India.

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 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.
- Packages-integrated: APIs integrated to exchange data among this covid19cc software system and ICMR system (Maria DB), which are on different platforms.

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-empanelled agencies, M/S Secure Eye and Price Water Coopers respectively.

Disaster Recovery and Service Continuity

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.
- 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.

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
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.		Total SRF: 11,37,45,572	(11.37 Crore) Total SRF: 15,22,70,409
Rapid Antibody Test-patient data collection and entry of	A rapid Antibody Test detail 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		Total Test: 3,39,623 Total Result: 3,06,126	Total Test: 6,45,661 Total Result: 2,71,002

Result in RATI App	to the sample collector.			
Rapid Antigen Test-patient data collection and entry of result in RT-PCR App	The advantage of RAT is that the result is available in a short time without sending the sample to the Labs. The data in SRF format is collected of every person undergoing this test. The result is entered in the mobile app. The RT-PCR app was modified and made available to sample collectors immediately.		Rapid Antigen Test: 1,98,29,368	Rapid Antigen Test: 3,65,07,715
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 Arogya Setu mobile app uses this data of verified phone numbers to send alerts to other persons having the app.		OTP Verified: 2,22,61,253	OTP Verified: 2,31,38,580
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.		Result Received: 9,60,80,930 (including the RAT results)	Result Received: 12,74,10,857 (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, MoHFW on every Monday on the misuse of Patient Mobile Number by Labs/ Samples collectors.		36,523	19,719

RT-PCR Mobile App and Covid19 Sample Collection Management System

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.		2,68,191	2,24,835
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.		3,31,43,772 Check SRF ID through OTP verification	3,30,03,786 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. The reason is that initially there was lot of confusion that sample collector would be informed that he/she is allowed to use RT-PCR but in fact they would be white listed for RATI. And they were unable to login into the RT-PCR app.		Check whether Sample Collector is white listed (through OTP): 2,10,837	Check whether Sample Collector is white listed (through OTP): 1,11,521
Check Laboratory Registration, Collection Centre, Portal User Creators	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		Registered Labs: 7,491 Collection Centre: 18,418	Registered Labs: 1,721 Collection Centre: 4,587 Portal User

and Portal Users information	Antibody tests. Similarly, the number of collection centers and sample collectors has increased in equal proportions.		Portal User 2,243 Portal Lab Admin 946	2,243 Portal Lab Admin 364
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. Through this option, they can login into the covid19cc.nic.in portal and enter sample collector name, mobile for using the Apps for their field units.		Sample Collectors by Private Labs 15,129	Sample Collectors by Private Labs 6,510

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, 35 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, 35 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.

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:

- 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.
- Web: The Covid19cc portal is a comprehensive MIS/ Source of Information/ Help to all stakeholders.

Improvements / Enhancements

- Rapid Antigen Test inclusion: The RT-PCR mobile has been upgraded to include the Rapid Antigen Tests.
- Stopping misuse 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. 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.
- 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. Feature to save the SRF in Draft stage also made available for user flexibility to check the SRF data before final submission.
- Auto-SMS based warning to defaulting Sample Collectors/ Collection Centers/ 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: The App has been updated and categories can now be changed from back-end without resorting to App code modification. This has facilitated quick change in patient categories.
- Deleting the functionality for mandatory Doctor Prescription: 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. After Supreme Court orders, now this condition has been removed from the RT-PCR app. Any person can undergo the RT-PCR and/or Rapid Antigen Test now.
- Portal enhancements: The Covid19cc portal has been enhanced over time to provide a number of reports/ excel data to sample collectors, collection centers, laboratories and 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. The Covid19 pandemic happened and effected people all over the World. New learning's 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).

A standard comprehensive ICT solution, using existing LG Directory codes, email addresses of DM/DCs, Health officials on NIC servers, mobile phones of Laboratory/Collection Centre/ Phlebotomists, was developed with 2 mobile apps and one web-portal.

The stress was on using existing available data, wherever available. This ensured that location code 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 35 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.

To ensure standardization and continuity, the Cloud infrastructure has been planned in a manner to handle very high loads of Tests in India. The data is broken into 4 zones of the country so distribute work among different Database servers. 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 centers 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.

The patient/ public also has been enabled in the sense that they can download their SRF details, results in case of rapid antibody test using their own mobile number and OTP. The complete process is transparent. This also makes sure that the patients give their correct mobile number. SMS based alert giving information about the SRF ID and a link to download the report is given to every patient.

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:
- **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=CXTmT6JIXII&t=3s\(Version 1.2\)](https://www.youtube.com/watch?v=CXTmT6JIXII&t=3s(Version 1.2))
- [https://www.youtube.com/watch?v=pE4I176xFDI \(Version 1.1\)](https://www.youtube.com/watch?v=pE4I176xFDI (Version 1.1))
- [https://www.youtube.com/watch?v=5ZKQHnXXDFQ&t=23s \(Version 1.0\)](https://www.youtube.com/watch?v=5ZKQHnXXDFQ&t=23s (Version 1.0))

Mobile App: 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 efficient.

People

Leadership support has been provided directly from the Hon'ble Prime Minister's office, which 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 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 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 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 unimaginable 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.

During Covid19 pandemic, capacity building was the real challenge. 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 3rd point 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 security was achieved because this entry of mobile number by being done in the portal

through Government functionaries all over the country.

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.

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.

Capacity Building

Under the project, capacity 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.

VALUE INDICATORS

Learning's for sharing

The RT-PCR and Rati mobile apps with <https://covid19cc.nic.in> portal have been developed in a very short time, 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. The infrastructure was set up by NIC PFMS team who has also set up infra for eWayBill project 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. So the first learning is that with dedicated teams, you can achieve big results quickly. The other learning are:

- **Plan big:** In early April 2020, numbers 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. In another 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. Everyone 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. But quick development of apps and portal ensured their acceptance all over the countries and majority of the States implemented the solution in a very short time.
- **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.
- **Addressing the IPv6 only issue at Hosting platform:** 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.
- **Use existing facilities/ resources, if feasible, as far as viable:** This is a trade-off point in favor 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.
- **Provide MIS and data integration facility for all sets of Users:** 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.

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 centers. The ICMR authorized labs are on boarded by the ICMR only. The NIC officers were imparted training for being master trainers to users at district level through VC in multiple sessions on RT-PCR, RATI and Covid19cc.nic.in portal. In additional GIMS, Email and phone based help was provided to these set of officers.

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. They were also the front office for accepting queries and issues of the sample collectors and forwarding these to NIC HP team for quick resolution on 24x7 basis during the initial implementation period.

Stakeholders: The number and type of direct stakeholders is given below:

- 5,000 + Government officials at ICMR, MoHF, State, District level
- 9,500+ ICMR authorized laboratories
- 25,000+ Collection Centre
- 1,80,000+ Sample collectors
- 26.7 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, 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. They could just login using their existing Government Email IDs and passwords. This not only fast forwarded the onboarding process but also empowered them to quickly use the software solution.

OTP based login for sample collectors, collections centers and ICMR authorized Laboratories: As done for Government officials the sample collectors and collection centers 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.

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, and Laboratory without need for printed. Only the Laboratory report need to be printed, saving lots of papers 26.7 crores tests multiplied by 2 pages each of every SRF=53.4 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.
- 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 complete help/ guidelines for using RT-PCR, Rati and Covid19cc.nic.in portal are in electronic format, saving Lakhs of pages, as given below:
 - o RT-PCR movie to help sample collectors in understanding the mobile App. The short video movie has more than 70,982 views in NIC and NIC HP YouTube channels. The movie has been updated as per App enhancements from time to time.
 - o The User Manual is available in PDF format
 - o The Presentation is available in PDF format
 - o There is an extensive FAQ section for different set of users to assist them in

resolving their queries.

- o A marquee runs on the Home page of <https://covid19cc.nic.in> portal to inform users of any particular issues, app updations, connectivity problems etc.
- o A GIMS (Government Instant Messaging Group) based group for Covid19cc portal is available.
- o An email-based help is provided on 24x7 bases to sample collectors, labs other users to resolve their queries timely.

The on-boarding process of Collection Centers 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.

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Tribal Health & Nutrition Portal - ‘Swasthya’ Portal

Ministry of Tribal Affairs, Govt. of India

Naval Jit Kapoor

PROJECT OVERVIEW

Objective

- Creation of a consolidated data repository for tribal population.
- Providing data analytics support to facilitate evidence-based policy making and implementation strategies.
- Develop a dynamic and interactive National Tribal Portal which showcase evidences, innovations and best practices.
- Identification and documentation of successful models, best practices and innovative solutions for tribal communities in India.
- Creation of a platform for dissemination of knowledge and collaborate with experts, influencers and institutions.
- Development of a series of knowledge product(s), to be shared across platforms for wider outreach and information dissemination.

Scope

The portal seeks to bridge the existing gap in knowledge and data related to tribal health and nutrition. By making both data and information available, it looks to foster an environment of cross learning, collaboration and evidence-based policy making. It covers 177 tribal districts across India providing granular data for the same with an aim to bring significant positive impact in the lives of the tribal communities.

Key Stakeholders

As stated above, key stakeholders include policy makers, researchers, organizations working or interested to work in tribal areas and the public at large. Swasthya presents information for each of the stakeholder group to strengthen their work in the tribal areas, make informed decisions, design better interventions, bridge research gaps and design evidence backed and data-based policies.

In addition, Swasthya is unique as it brings together the Ministry of Health and Family Welfare and Ministry of Women and Child Development, as programmatic data from both the Ministries is presented in the Swasthya Portal. It adopts a convergence approach where the Ministries as well as other government agencies (such as the Registrar General of India, Tribal Research Institute, etc.) is brought to a single platform to present a comprehensive status on tribal health.

Further, the work of more than 40 organizations are showcased on Swasthya with detailed information of their work in the tribal districts. While the Ministry does not endorse these organizations and neither are they the official partners of the Ministry, Swasthya simply presents a platform to these organizations to showcase their work.

Hardware/Software

The Technology Stack consists of: NodeJS, Angular, Postgres SQL

Certification (Certifying Agency)

Yes, Proper security audit process has been completed from NICS empaneled agency for security audit certificate.

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Disaster Recovery and Service Continuity

Yes, as per the National Data Centre policy guidelines.

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
Tribal Compendium and District Factsheets	The compendium of the district health and nutrition factsheets for 177 tribal districts was created using the NFHS-4 data. For the first time, district-wise desegregated data has been presented for tribal health vis-a-vis health of the rest of the population. Data from the National Family Health Survey – 4 has been used for this purpose. It is a strong step towards generating nuanced evidence that will function as an authentic baseline to see the status as well as examine improvements over time in the tribal health status.		177 Tribal Dominated Districts	177 Tribal Dominated Districts
ALEKH	Release of quarterly e newsletter ALEKH focusing on tribal health and nutrition. 4 editions have been released till now, the last one being on Sick Cell Disease. The newsletter encourages all stakeholders to learn from each other, to keep themselves updated, thereby creating awareness and ensuring effective communication within and outside of MoTA. It also converges towards evidence-		Quarterly E-newsletter- 2 Volume	4 Volume

	based policy making.			
Knowledge Repository	The section showcases the best practices, reports, successful initiatives and collection of other knowledge products related to tribal health and nutrition.		87	187

Implementation

Swasthya has successfully achieved its objective of consolidating all information related to tribal health into a single platform. It is publicly available to anyone interested to work in the area of tribal health and encourages cross learning.

Improvements / Enhancements

It has been a year since the launch of Swasthya on 17th August 2021. Over the next few months, Swasthya will be enhanced through:

- API linkages with MIS systems of MoHFW and MoWCD for data sharing

ENABLER**Processes Re-engineered**

- Use of pre-existing as well as new infrastructure and manpower resources for implementation of diversified ICT implementation on the Ministry.
- Conceptualization of Portal and use of ideas across multiple think tanks (like MoHFW, and MoWCD, NIC, 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 attain a focused scope with involvement of existing technical manpower.
- Idea generation by involvement of other stakeholders like State Govt, NGOs, 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
- Application of data governance concept for data handling
- Holistic approach to integrate sub components of Ministry data and its processes in terms of monitoring & management.
- Use of interactive dashboard for monitoring of existing activities as well as policy making for future time.

Challenges faced in implementing Process changes

Like other e-Governance project, this project also required 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 towards methods 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 conceptualization, development & implementation of this project the Ministry has faced the following challenges:

- Integration of different sources of data at multiple level of Ministry through by adopting uniform method.
- Estimation of scalability and ICT resources in terms of volume and complexities.
- Completeness & consistency of data digitization 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., MoHFW, MoWCD, NGOs, etc.) into a single platform with regular integration and improvement
- Interactions and data exchange with external vendors/other government departments.
- Coping up with new tool / technologies specific to Data Analytics using Business Intelligence tool.
- Information security aspect implementation and awareness of same among other stakeholders.

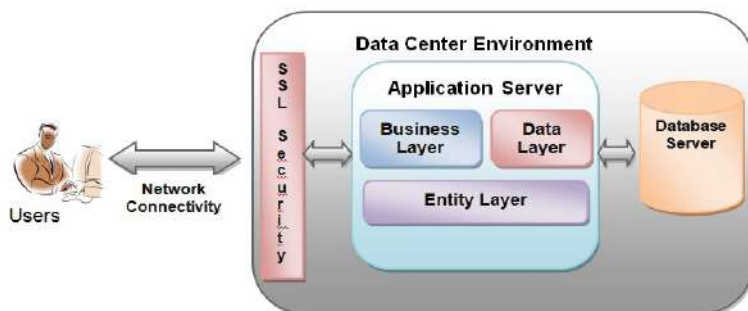
The Lessons learnt from the Process re-engineering exercise

During the process of conceptualization, development and implementation of this project in Ministry of Tribal Affairs, following learnings emerged:

- For any such type of multiple sources related 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 important to keep the manpower resources and relevant stakeholders updated about business requirements and technological know-how through capacity building program at multiple levels.
- It is important to have in depth understanding with proper documentation of all levels of information of project units by involvement of multiple stakeholders so that the dependence factors can be identified for further solution.
- Selection of the right tool / technologies by involvement of suitable agencies with high expertise for long term support and high efficiency.
- Need for active involvement of both technical as well as functional level teams in collaborative manner with involving implementation agency, if any.
- 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 incorporate new suggested operational process if applicable.

Technologies

The Technology Stack consists of: NodeJS, Angular, PostgreSQL



Data Analytics:

- In the project the major components are the implementation of interactive dashboard using Microsoft Business Intelligence tool over data collected from multiple sources. The features of the implemented Data Analytics solution are 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 variants of dashboard across multiple data sources like –Census, NFHS, programmatic data from MoHFW and MoWCD etc.).
- Regular update of Business intelligence tool versions for latest features and security.
- Proper handling of security aspects over Business Intelligence tool
- Identification of multiple use cases for advance analytics using R / Python machine learning language as future plan with integration of output with Dashboard.
- Selection of Business Intelligence tool with flexibility to cater more data sources with integration considering future need.
- Involvement of NIC having rich experience of analytics inside Government domain.
- Capacity building and grooming to existing technical team of NIC at Ministry level for long term sustainability with low cost.
- NITI Aayog in its recent report on Data Governance quality Index (DGQI), has ranked the Ministry of Tribal Affairs amongst Top 5 Ministries with respect to use of Technology. It is also the Top Ranker with 5/5 points with respect to Data Security & HR Capacity.

Technology related challenges faced: Major technological challenges faced are:

- Selection of right tool & technologies for data analytics
- Process of completion & correct data digitization with appropriate validation for high data quality
- Integration of multiple sources of data at single dashboard

- Maintenance of Business Intelligence tool over On-premise environment
- Parameterized application to cope up with rapid changing requirement
- Estimation and handling of data volume
- Setup up of disaster (off-location) recovery site
- Facility for Integration of other e-Governance projects / data
- Information Security and credential encryption
- Integration with other analytical software for Machine Learning activities
- 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 utilization of software at field level through capacity building program by involvement of appropriate authorities.
- In depth requirement understanding in term of collection and integration from multiple sources at the time of conceptualization and planning phase only with information flow.
- Proper due diligence and understanding of environ before finalization of Business Intelligence tool / Technologies under on-premise environment.
- Need for active involvement of both technical as well as functional level man-powers during planning and implementation phase of the project.
- Need for appropriate capacity building programs by involvement of technical & operational manpower through training / awareness program.
- Need of mindset to accept change process as well as capability to incorporate new suggested operational process if applicable.
- Phase wise implementation strategy will be the better option with proper PoC (Proof of Concept) of analytical capabilities and possibilities before final launch of project.
- There is a need to regularly update the tools and technologies with security implementation.

People

Capacity Building

Leadership support for capacity building, visibility of actions with current status

Leadership support from following levels:

- 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 – NICS (Centre of Excellence for Data Analytics)
- External stakeholders like – Piramal Swasthya

- Institute of Imminence like IIPS, CoE recognised by MoTA
- Hired Consultants from agencies

Change management and Capacity building strategy defined and status thereof

- Conceptualization of change process as per targeted goal
- Planning and identification of stakeholders for change process
- Process Re-Engineering as per the applicability and reviews at multiple level.
- Regular periodic meetings to get the feedback and improvements
- Sessions/guidelines to data workers

The Lessons learnt from Change Management and Capacity building exercise[s]

- Prioritize the issues in a targeted manner
- Using existing manpower and enhancing their capacities leads to better results
- Hands-on exposure to technology impacts positively
- Important to select the right candidate with right skillset for capacity building
- Need for consistent upgradation & refreshment of operational guidelines by trainings/sessions
- Awareness about importance of key factors and results is essential
- Need of business process uniformity before adoption of such projects is essential
- Involvement of functional knowledge experts leads to better impact
- Integration of implementer and end-users creates better impact
- Successful implementation of knowledge dissemination is an important factor; and for that workshop & conferences are very effective.

VALUE INDICATORS

Learnings for sharing

As the objective of Swasthya was to consolidate all existing knowledge, data and information on tribal health and nutrition, the biggest challenge faced by the Ministry was with respect to obtaining this information. For this purpose, the Ministry of Tribal Affairs had to work on several fronts which included:

- Aligning with partner Ministries of Health and Family Welfare and Women and Child Development. Every Ministry has its own data management and reporting system. The Ministry of Tribal Affairs had to undertake a series of meetings to align the partner Ministries to this objective and obtain the data.
- District Administrations of the high burden tribal districts, to incorporate the innovations which are being implemented on the ground to enhance tribal health. It is hoped that in addition to knowledge exchange, Swasthya will also provide an opportunity to the districts to showcase their work to larger national and international audiences interested in tribal health related work
- NGO partners who are implementing different projects funded by the Ministry of Tribal Affairs to improve health outcomes. The Ministry has partnered with several community-based organisations to implement health projects. These projects are currently being implemented across the country. The Ministry also reached out to them to collate all relevant materials. In addition, it reached out

to other partners of the Ministry- the Centre of Excellences and Tribal Research Institutes to create a rich knowledge section.

- Lastly, working with the larger development sector and within that, the organisations who work on tribal health and nutrition, to collate their on-ground interventions.

This large-scale coordination and stakeholder alignment took massive time and efforts of the Ministry. The coordination is ongoing and over the next 3 months, the Ministry intends to further enrich Swasthya with the intention of ensuring that all existing information on tribal health is indeed available in it.

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

In order to ensure broader dissemination, the project continuously engages with a number of not for profits and grassroot organizations to ensure that information is being disseminated to the community and the needs of the community are being addressed through project.

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.

I 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 characterized by distinct geographical and climatic features. Known as a cold desert. With reducing precipitation, increasing average temperatures, and reduced glaciers to water the villages any-more, 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.

The joint initiative of '1000 Springs Initiative' by MOTA and UNDP is an attempt demonstrate a localized 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. The project involves preparing an integrated development solution around springs, ranging from establishing piped-water supply infra-structure for drinking and irrigation purposes to rural tribal communities. This project is broadly implemented with the help of community support, training on para-hydrologists and Online Platform – GIS based Spring Atlas. 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 spring shed and watersheds.
- 1250 Acres of land in the catchment area treated under the spring shed/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/spring sheds 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.

MoTA utilizes the service of government authorized 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 tribal 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.

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8. Housing, Urban & Rural Development & Transport

CLSS Awas Portal (CLAP)

Ministry of Housing and Urban Affairs, Govt. of India

Surendra Kumar Bagde and Suvasish Das

PROJECT OVERVIEW

Objective:

PMAY (U) under MoHUA is implementing the 'Housing for All' scheme through four verticals Beneficiary-led Construction (BLC), Affordable Housing in Partnership (AHP), Credit Linked Subsidy Scheme (CLSS), and In-situ Slum Redevelopment (ISSR). Under CLSS addresses urban housing shortage among the EWS/LIG and MIG I & II (up to March 2021) categories where interest subsidy of 6.5%, 4%, and 3% on loan amount up to Rs. 6 Lakh, Rs. 9 Lakh, and Rs. 12 Lakh respectively is being provided to eligible beneficiaries. This is done through Primary Lending Institutions (PLIs) with Housing and Urban Development Corporation (HUDCO), National Housing Bank (NHB), and State Bank of India (SBI) as Central Nodal Agencies (CNAs) as channelizing and monitoring agencies.

Acting upon Hon'ble Prime Minister observations in the PRAGATI meeting held on 31st July 2019, MoHUA developed a web-based real-time monitoring system i.e., CLSS Awas Portal (CLAP) to address the following problems of the scheme at the ground level:

- Absence of provision for PLIs and beneficiaries to track application status for interest subsidy.
- Due to the processing of applications in bunches, subsidy release was delayed which resulted in more public grievances.
- There were the possibilities of the beneficiary and his /her spouse in availing benefits in CLSS as well as in other verticals of PMAY (U).
- Aadhaar validation and de-duplication were being done only after releasing of the subsidy.
- CLSS beneficiaries were not able to track the status of their subsidy application form processing to till transferring of the subsidy to the loan account.
- Ministries were receiving more grievances from CLSS beneficiaries on CPGRAMS, online and offline.

With the objective to bring able governance, increased transparency and ensure grievance redressal, CLAP was launched on 25th November 2019 to provide a robust real time web-based monitoring system for CLSS beneficiaries. CLAP is a common platform where all stakeholders i.e. Beneficiaries, Citizens, MoHUA, CNAs, and PLIs are integrated in one environment. The portal was developed with CLSS Tracker system for beneficiaries to track application status through unique ID starting from submission of application up to release of subsidy. Additionally, beneficiaries are able to receive application status through SMS alerts at different stages. The software works in tandem on a real time basis with the UIDAI, CNAs, PLIs and PMAY (U) MIS system for Aadhaar validation and de- duplication with other verticals of PMAY (U), along with Dashboard and reports to monitor the progress of CLSS vertical for various stakeholders

Process of CLAP

CLAP Portal consists of two processes i.e., Process 1 and Process 2. The brief on the flow of Process 1 and Process 2 is as under:

Process 1: Hosted at Ministry Server and all PLIs share application data for Aadhaar

demographic verification, de-duplication with other beneficiaries, and generation of Application ID.

Process 2: Starts from uploading of subsidy claim up to release of subsidy to PLI was hosted on servers of respective CNAs, and to share the status of all stages under process 2 to CLAP server on a daily basis in a real-time manner and thereafter the same information will be projected on PMAY(U) MIS system on a real-time basis. With the objective to bring able governance, increase transparency and ensure grievance redressal, CLAP was launched on 25th November 2019 to provide a robust real-time web-based monitoring system for CLSS beneficiaries. CLAP is a common platform where all stakeholders i.e., Beneficiaries, Citizens, MoHUA, CNAs, and PLIs are integrated into one environment. The portal was developed with a CLSS Tracker system for beneficiaries to track application status through unique ID starting from submission of application up to release of subsidy. Additionally, beneficiaries are able to receive application status through SMS alerts at different stages. The software works in tandem on a real-time basis with the UIDAI, CNAs, PLIs, and PMAY (U) MIS system for Aadhaar validation and de-duplication with other verticals of PMAY (U), along with Dashboard and reports to monitor the progress of CLSS vertical for various stakeholders.

Technology

CLSS Tracker is a system for CLSS beneficiaries to track their application status for receiving CLSS subsidy on home loan application after entering Application ID and an OTP code. There are 5 stages that have been incorporated in the CLSS tracker which are mentioned below: -

- Application ID generated
- Due diligence by PLI
- Claim uploaded on Central Nodal Agency Portal
- Subsidy claim approved
- Subsidy released to PLI

Key Stakeholders

All stakeholders as detailed above were able to access CLAP Portal with the URL <https://pmayuclap.gov.in>. MoHUA had given user-id and passwords to all concerned stakeholders like CNAs, PLIs, and States/ UTs in order to generate reports and perform tasks to ensure smooth and speedy disbursement of subsidy to beneficiaries.

Hardware/Software

Software

Asp.Net MVC 5, Web API 2.0, C# for backend, jQuery, JavaScript, Bootstrap.

Open XML for uploading Excel files, ITextSharp for creating PDF, Postman for checking APIs, JSON.

Database: Microsoft SQL Server 2019

Certification (Certifying Agency)

CLAP software has been audited by the Cyber Security division of NIC through the Cyber security Empaneled vendors latest cyber security certificate is attached.

AKS Information Technology Services Private Ltd. An ISO 9001:2015 & ISO 27001:2013 Certified company has issued Web Application Security Certificate on date 10th April 2021 Certificate No: AKSIT/2021-22/020.

CLAP has been audited by the Cyber Security Division and got the Cyber Security Certificate for safe hosting. In addition to that only necessary TCPIP ports are opened in Server. The server begins the firewall of NIC. The cloud team is taking regular backups on an incremental, whole, and daily basis. The entire application and the database are hosted in Government Domain (NIC cloud). NIC is taking precautions including cyber security and cyber security threats also. All the necessary security patches are updated on the server automatically. Vulnerability Assessment for removing vulnerabilities of the servers is done on regular basis. Role-based data authentication is enforced in the entire system. Users have been given read and write access only. Users are not permitted to delete any information.

Disaster Recovery and Service Continuity

NIC Data center backup, restore facilities, and the disaster recovery features with the NIC Datacenter are applicable to this application.

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
SMS	This service is used to interact with citizens, ULB's, State officials, and all stakeholders for managing their own PMAY user accounts.			
SMTP	This service is used to interact with all stakeholders			
Aadhaar demographic authentication	This service is used to verify the Aadhaar UIDAI server to authenticate the user name as per Aadhaar.			
Web services/ API	To Interact with other applications and to share (Pull and PUSH) and get information from other applications.			
Digital Signature	For generating digitally signed payment files for the payment to the beneficiaries			
Video conference	Training to the users			

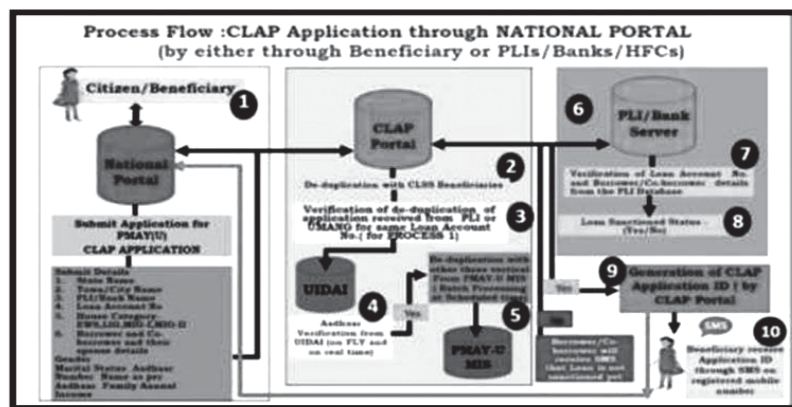
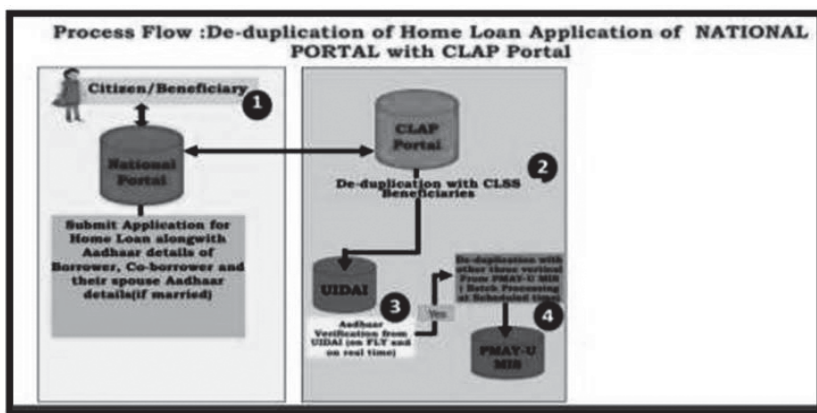
Implementation

A positive impact was generated due to technology solutions implemented by MoHUA with the objective to enable governance and citizen-centric transparency so far, around

16 lakh beneficiaries /Co-borrowers have received application status through SMS alerts, and 11.79 lakh applications have been received through CLAP, out of which 8.84 lakh applications have been cleared after Aadhaar verification and de-duplication, the same number of application IDs have been generated. Further, around 4 lakh beneficiaries have tracked their application status and 1.87 lakh beneficiaries have received subsidies after CLAP was implemented. The impact of the program has resulted in around 4 lakh beneficiaries have been able to track their application status through the CLSS tracker out of 1.87 lakh beneficiaries having completed all due diligence and having speedily availed benefits of interest subsidy.

Improvements/ Enhancements

- Implementation of Dynamic Queuing on CLSS Tracker
- Integration of National Portal with CLAP portal to onboard below-mentioned services is under progress: -
 - o De-duplication of Home Loan Application of national Portal with CLAP Portal
 - o CLAP Application through National Portal (by either through Beneficiary/PLIs/Banks/HFCs).



ENABLER**Processes Re-engineered**

Credit Linked Subsidy is a Central Sector Scheme under Pradhan Mantri Awas Yojana (Urban) wherein interest subsidy on a home loan is provided through Central Nodal Agencies (CNAs) and PLIs/Banks to the EWS / LIG/ MIG beneficiaries for purchase, construction, or enhancement of house. Aadhaar validation and de-duplication was being done only after the release of the subsidy. Earlier, data management for CLSS was difficult as there was no real-time integration between CNAs and PMAY. There was no information of the beneficiaries in PMAY (U) MIS who had applied in the bank to get the benefit of the scheme. There were manual data entries for the scheme in PMAY (U) MIS by NHB, HUDCO, and SBI after the release of subsidy which has resulted in the notice that there was no reference for PMAY (U) de-duplication before releasing of subsidy, beneficiary and his /her spouse availing benefits in CLSS as well as in other verticals of PMAY (U), beneficiaries Aadhaar were missing, beneficiary ID generated by GOI, MoHUA, post-release of subsidy. CNAs/PLIs were following a bunch system to process applications for subsidy claims if any beneficiary's application had an issue that holds back processing of other beneficiaries' applications as well. The whole bunch gets back to PLIs for rectification. Due to the processing of applications in bunches, subsidy release was delayed as it wasn't followed on a first come first serve basis which resulted in more public grievances. CLSS beneficiaries were not able to track the status of their subsidy application from p, processing to till transferring of the subsidy to the loan account. Manual task aligned as generation of Claim Scrutiny Form (CSF) and confirmation of balance fund availability. Ministry was receiving more grievances from CLSS beneficiaries on CPGRAMS, online and offline. Acting upon the PRAGATI meeting held on 31st July 2019, MoHUA developed a web-based real-time monitoring system i.e. CLSS Awas Portal (CLAP) to address these problems of the scheme at the ground level. A technical committee including members from the Ministry, NHB, HUDCO, SBI, PLIs, and NIC was formed by the Ministry to discuss, monitor, and oversee the development and implementation of the CLSS MIS system. Requirements and key challenges were identified through meetings, workshops, videoconferences with all types of stakeholders at the State/UT/City Level. Ministry of Housing and Urban Affairs, Government of India had launched CLSS Awas Portal (CLAP)<https://pmayuclap.gov.in> on 25 November 2019 which provides a robust web-based monitoring system and integrates all stakeholders i.e., MoHUA, Central Nodal Agencies (CNAs), Banks/PLIs, Citizens and Beneficiaries to one common platform. The software works in tandem on a real-time basis with the UIDAI, CNAs, PLIs, and PMAY (U) MIS system for Aadhaar validation and de-duplication with other verticals of PMAY (U). CLAP software will send the status of application of CLSS interest subsidy to both borrower and co-borrower on their mobile number as registered in the CLAP portal by PLIs. There are 6 application stages, where the CLAP application will send SMS alerts. SMS stages are mentioned below:

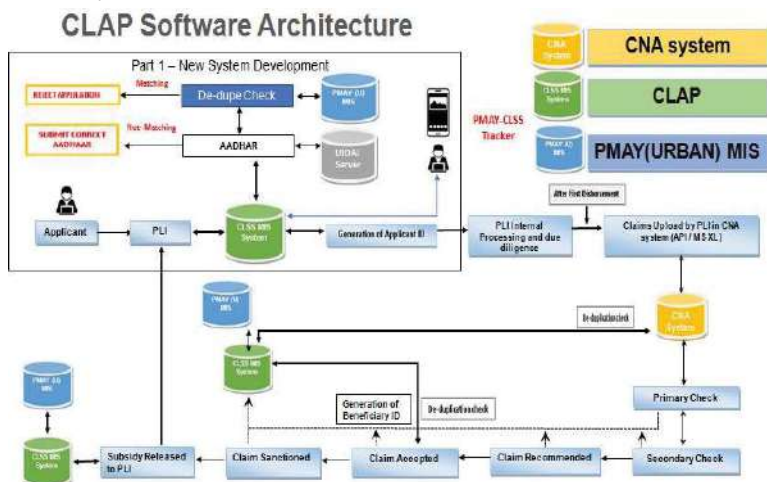
- After generation of Application ID
- After lodging of a claim by PLI to CNA's portal
- After generation of Beneficiary ID.
- For uploading photos, selfies, and videos of success stories from CLSS Beneficiaries.
- After subsidy refund by PLI to CNA.

- At the time of generation of OTP.

CLAP enables processing of the individual application, verification at the initial stage, timely release of subsidy, transparency, and minimizing grievances.

CLSS Tracker which is developed as part of CLAP to facilitate beneficiaries to track their application status at their convenience which has resulted in a substantial reduction of grievance. CLSS beneficiaries to track their application status for receiving CLSS subsidy on home loan application after entering Application ID and an OTP code. There are 5 stages that have been incorporated in the CLSS tracker which are mentioned below: -

- Application ID generated
- Due diligence by PLI
- Claim uploaded on Central Nodal Agency Portal
- Subsidy claim approved
- Subsidy released to PLI



CLSS tracker has also been incorporated in PMAY (U) mobile App and UMANG platform. Stakeholders integrated under CLAP server through Process 1 to Process 2, i.e., CLAP website are mentioned below:

- UIDAI Server
- PMAY (U) MIS Server
- PLIs Server
- NHB Server
- HUDCO Server
- SBI Server

All stakeholders as detailed above able to access CLAP Portal with the URL <https://pmayuclap.gov.in> MoHUA had given user-id and passwords to all concerned stakeholders like CNAs, PLIs, and States/ UTs in order to generate reports and perform

tasks to ensure smooth and speedy disbursement of subsidy to beneficiaries.

Establishment of new process under PMAY (U) MIS: Old Process vs. New Process (CLAP):

The table below displays the major enhancements incorporated in the CLAP application in comparison to old processes in the existing CLSS application.

S.No.	Old Process	New Process	Remarks
1	Aadhaar validation done post release of subsidy.	Aadhaar validation is scheduled before subsidy claim upload.	Effective implementation of provisions of GOI, MoHUA Notification dated 26th December 2018. The Mission has strengthened filtering system through Unique Identifier.
2	PMAY (U) de-duplication done post release of subsidy.	PMAY (U) de-duplication is scheduled at three stages, before release of subsidy.	Strengthened the process of de- duplication
3	No ID generated.	Application ID is scheduled to be generated before the claim upload.	Introduction of new process enables Applicant Beneficiary to obtain the status of the claim.
4	No Beneficiary Tracking System.	Beneficiary Tracking System (through Application ID) with the help of SMS communication and confirmation is scheduled.	Improved transparency to stakeholders and reduction in grievances.
5	Restriction of Single upload per claim per scheme at a time due to batch processing.	Multiple uploads have been Scheduled with Individual processing of records, subject to fortnight window for receipt of Utilization Certificates.	Strengthened processes through individual record processing avoids clubbing and delay.
6	Excel based upload of data	API/ Excel based upload of data	Introduction of new API upload enables PLIs to connect through system for more uploads.
7	On-line validation takes time for claim uploads.	Off-line validation receives the data first, then processes and displays the output on PLI's page.	Process reengineering overcomes the network limitations and time out errors.
8	Manage by Rules applied to all claims in a batch without segregation.	Manage by rules have been applied to individual records with segregation (Accepted,	Strengthened processes through individual record processing avoids clubbing and delay.

		Queried and Rejected).	
9	No reference for PMAY(U) de-duplication after claim upload	Reference made to CLAP for Applicant ID verification and PMAY (U) de-duplication.	Reduction in duplication, frauds, etc.
10	Manage by Exception applied Through Manual Intervention due to batch processing	System segregation through random sampling has been introduced for fresh records with fixed sample size of maximum 25 records per day per scheme. Uploaded certain groups of records, which were earlier Queried or Rejected need to be selected manually. Facility for additional sample MBE check by one more officer to do independent validation.	Strengthened processes and reduction in subjectivity.
11	Claim Application Form (CAF) generated through system was signed by Authorized Signatory and sent to NHB either by post or email.	CAF upload in pdf after signature of the Authorized Signatory, is facilitated.	Strengthened processes to avoid delay or follow-up.
12	Confirmation and Compliance Verification after comparing with CNA's record (UC, Refund, Inspection, etc.).	Confirmation and Compliance Verification after comparing with CNA's record (UC, Refund, Inspection, etc.).	No change.
13	Manual generation of Claim Scrutiny Form (CSF).	Generation of CSF is through system.	Process improvement.
14	Manual confirmation of balance fund availability.	Selection of eligible claims is based on fund availability, which is fed into the system manually.	Process improvement.
15	No reference for PMAY (U) de-duplication, before release of subsidy.	Reference made to CLAP for PMAY (U) de-duplication.	Reduction in duplication, frauds, etc.

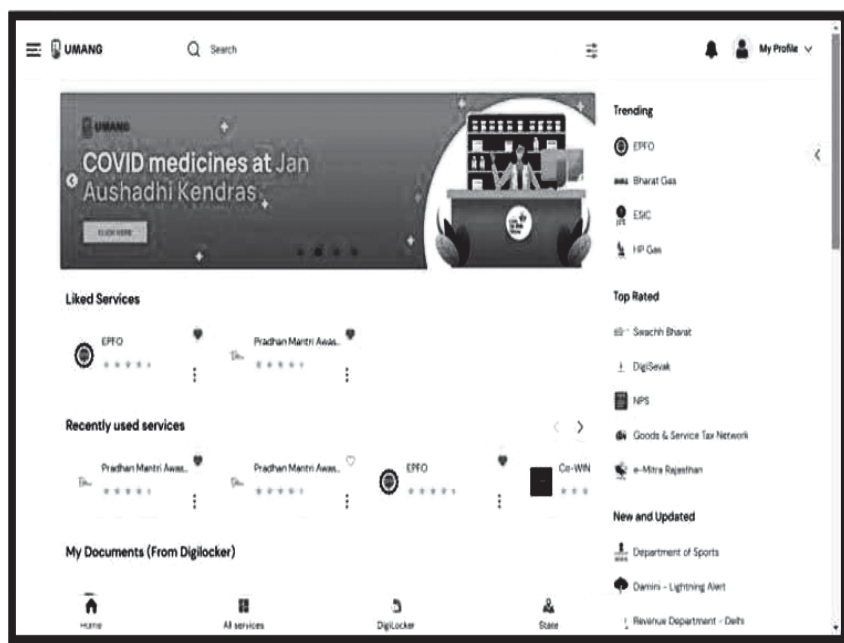
CLSS Awas Portal (CLAP)

16	Beneficiary ID Generated by GOI, MoHUA, Post release of subsidy.	Beneficiary ID is generated by GOI, MoHUA, prior to subsidy release.	Process improvement and reduction in duplication, frauds, etc.
17	No Claim Release Form(CRF) generated through system.	CRF generated by the system in pdf and updated on the portal page of the PLI.	Strengthened processes to avoid delay or follow-up.
18	Manual generation of Claim Sanction Form (CSF).	Generation of CSF is through system.	Process improvement.
19	Manual generation of RTGS Form for subsidy credit to PLI.	Generation of RTGS Form is through system for subsidy credit to PLI.	Process improvement.
20	Email communication of subsidy to PLI.	Subsidy communication to PLI is through updating the portal page of the PLI.	Process improvement.
21	Utilization Certificate (UC) based on batches and generated manually.	UC is generated through system for identified records.	Process improvement.
22	Refund Form generated through system based on download, feed and verification.	Refund Form is generated through system based on selection and feed.	Process improvement.
23	Data feed to PMAY (U) through manual monthly upload, after release.	Data feed to PMAY (U) through API on daily basis.	Process improvement.

Technologies

PMAY(U) Mission has already incorporated the following services/features/provisions on the UMANG Platform: -

- CLSS Tracker
- CLSS Subsidy Calculator
- Application Status Tracker for 3 verticals (i.e., BLC, AHP, and ISSR)
- Registration of the demand by the beneficiaries.
- Showing Progress of PMAY(U) through API About PMAY(U)
- Photo Gallery of PMAY(U) houses
- Beneficiaries' testimonials
- Linkage with PMAY(Urban) website and mobile application



People

Capacity Building

- Total PLIs/Banks/HFCs connected with CLAP:310
- Total Beneficiaries:16.34 Lakhs
- Handholding support to all States/UT staff
- Regional/ State level Workshops for all PLIs/Banks/Housing Finance Companies
- Video Tutorials
- Review meetings with CNAs/ PLIs/Banks/Housing Finance Companies from time to time to monitor the performance of CLSS vertical through CLAP
- Developed and disseminated the following modules.
- User Manuals
- Standard Operating Procedures
- Advisory Note for different modules
- Process Flow Charts
- Instructional Manual
- FAQs

Technical support via Phone calls, WhatsApp groups, emails, and letters.

Developed a detailed CLAP manual and video tutorials for better understanding.

VALUE INDICATORS

Learnings for sharing

Projects throw up challenges and opportunities for the teams involved in conceptualizing, planning, and executing/maintaining, / supporting the projects. Briefly

cover key learnings, best practices, from these aspects including any innovative/disruptive technologies, process changes that have been used.

CLAP enables processing of the individual application, verification at the initial stage, timely release of subsidy, transparency, and minimizing grievances.

Based on CLSS tracker observations, implementation of dynamic queuing system in CLSS tracker of CLAP is under progress for increasing the satisfactory level of CLSS applicants.

Digital Empowerment

- A committee including members from the Ministry, NHB, HUDCO, SBI, PLIs, and NIC was formed by the Ministry to discuss, monitor, and oversee the development and implementation of the CLSS MIS system.
- Problems faced by the CLSS beneficiaries and other stakeholders were examined in detail and accordingly finalized Process flow chart depicting the technical approach to bring all stakeholders On a common platform.
- Requirements and key challenges were identified through meetings, workshops, videoconferences with all types of stakeholders at the State/UT/City Level.
- Effective use of the online platforms to bring inefficiency in the system.
- Strengthened processes through individual record processing.
- Process reengineering to overcome the network limitations and timeout errors.
- Manage by Rules have been applied in CLAP to individual records with segregation (Accepted, Queried, and Rejected).
- Multiple uploads have been scheduled with individual processing of records, subject to fortnight window for receipt of Utilization Certificates.

Green e-Governance

Integration of CLSS tracker in PMAY(U) mobile application:

MoHUA has launched PMAY (U) mobile application on 14th Feb 2019 which allows beneficiaries of PMAY(U): (1) to capture and upload 02 high-resolution photographs of completed houses along with their families; (2) to capture and upload 02 selfies of the beneficiary, (3) to upload 1 video clip (30-60 seconds) where beneficiaries can share their stories of owning a house under PMAY (U). These stories would be an emotional recount of experiences such as increased self-esteem, a sense of pride and dignity, improved social status, safety and security for the family, a protected environment for the girl child, and children's education among others. The mobile application is available on Google Play Store and App Store.

Google Play Store Link for PM AY (U) Mobile Application

https://play.google.com/store/apps/details?id=com.pmay.app_s&hl=en App Store
<https://itunes.apple.com/in/app/pmay-urban/id1454478722?mt=8>

The PMAY(U) Mobile Application is integrated with PMAY(U) MIS, to validate beneficiaries' details in PMAY(U) MIS through the registered mobile number of beneficiaries. If the beneficiary enters the mobile number, the mobile application after validating the mobile number entered by the user will receive SMS based on cases:

(1) If a Mobile number exists in the same State, then the user will receive OTP. (2) If the Mobile number doesn't exist, then the user will receive SMS "To Kindly contact concerned ULB to update your mobile number in PMAY(U) MIS."



The application allows beneficiaries of all verticals of PMAY (U) i.e., Beneficiary Led Individual House Construction/Enhancement (BLC), Affordable Housing in Partnership (AHP), In-situ Slum Redevelopment (ISSR), and Credit Linked Subsidy Scheme (CLSS) to capture and upload photos and videos of completed houses along with testimonies. The photos, selfies, and video bank of beneficiaries' testimonies will be scrutinized at State and Central level through Content Management System (CMS).

CLSS Tracker in PMAY(U) Mobile application has also been integrated for borrower/co-borrower to track their application status of CLSS subsidy after entering valid Application ID generated through CLAP portal and an OTP code.

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Mr. Suvasish Das, Director (HFA-1), Ministry of Housing and Urban Affairs, Govt. of India, dirhfa1-mhupa@gov.in

Dynamic Integration of Property Registration and Urban Property Records using WEB-HALRIS

Revenue and Disaster Management Department, Govt. of Haryana & National Informatics Centre Haryana State Centre

Sanjeev Kaushal, Deepak Bansal and Gurpreet Singh Saini

PROJECT OVERVIEW

Department of Revenue and Disaster Management Haryana is responsible for maintaining and updating of revenue records on the basis of transactions by way of sale, mortgage, inheritance and consolidation of land holdings etc. About 6 lakh deeds are registered annually. The Director Land Records (DLR) is also the Inspector General of registration (IGR) of the State. Tehsildar heads the Tehsil office, which function as circle revenue officer (CRO) while dealing with revenue matters and functions as ex-officio Sub Registrar (SR) for registration of deeds.

Deed Registration and land records management is done using the web enabled solution known as WEB-HALRIS. WEB-HALRIS is implemented in all the 143 Tehsils/Sub-Tehsils of Haryana.

In July 2020 Haryana Government took the decision to enhance the deed registration by introducing the technology-based checks to curb the possible mal practices especially in the registration of deeds related to urban properties.

Major benefits of the initiative are:

- To check the pending dues and permissions at the time of booking the appointment.
- To stop the transactions involving the properties situated in the unauthorized colonies.
- To show the dues not paid by the builder/developer.
- To update the urban properties records as a result of registration of deeds.

Current Status

Deed appointment and deed registration system integrated with all the departments managing the urban property records.

Hardware/Software

Project developed using the dot.net and MS Sql server 2017 and layer of WEB APIs to integrate with the IT systems of the other departments. IT systems of the other departments are in heterogeneous environment.

Certification (Certifying Agency)

Security audit of system is done by the ISMO Haryana which is responsible for security audit of the e-governance applications developed for Haryana Govt. departments.

Disaster Recovery and Service Continuity

- Hosted in State data Centre which is managed by the State IT department.
- Application and database servers support the failure over clustering to switch the load from primary server to secondary server in case of some failure.
- Hourly transaction log back up
- Daily full backup
- Data also replicated to DR site at the end of the day.

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
Appointment for deed registration	Appointment for deed registration: • Appointment available online only, no need to visit the tehsil office • Property details and dues pending verified at the time of appointment only.	768393	840145	704552
Deed Registration	Deed registration service: • Details are fetched from the appointment. • Property details are verified using the APIs provided by the concerned department.	646755	679740	646755

Implementation

Geographically project implemented in all the tehsils and linkage achieved with all the ULBs, HSVP offices, DTP offices, HSIIDC across the State.

Project implementation achieved the following targeted goals

- Checking of dues such as house tax, development charges and fire tax etc.
- Checking of NOC given by Town country planning to stop the unauthorized plotting in peri urban areas.
- Checking of transfer permission from HSVP, HSIIDC and Housing board
- Prevention of sale of acquired lands under litigation.
- Prevention of sale of forest lands.
- Integration of Revenue court cases.

Improvements / Enhancements

Project rollout completed one year on 1st Sep 2021.

Improvements planned for next one year are:

- At present every urban department has their own id to locate the properties. Property id of the urban local bodies will be seeded to the property databases of the other departments to make the property id of the ULB as the principal identifier of the property.
- Digitization of MC areas is being done in collaboration with the Survey of India (SOI). Integration with the GIS data of MC will be used to identify the exact location of the property. This will help in applying the collector rates of the property on the basis of its location.

ENABLER

Processes Re-engineered

- Booking of appointment from Tehsil counter stopped, online mode is the only way to book the appointment for deed registration.
- Property tax data of all the urban local bodies across the State made online on centralized database.
- Mandatory online issuance of NOC for areas under section 7A declared by Town and Country planning department.
- Digitization of all the acquired lands and acquired lands under litigation.
- Marking of forest land khasra nos.
- Digitization of data of all the development licenses granted to private builders.
- Digitization of housing board properties.
- Digitization of shops of State agriculture marketing board.

Technologies

Restful API based architecture is used to design and develop the project. Most of the departments dealing with the urban property records have their own IT systems in place. To gel the WEB-HALRIS and IT systems of other departments Restful APIs becomes very handy. After the registration of deed data is posted back to concerned department to initiate the transfer of ownership process.

People

- Deed appointment completely redesigned making it more complex than earlier system. So, to train the general public video tutorials created to book the appointment and made available on the social media.
- Series of VC based trainings also conducted to train the Tehsil staff and officers.
- Urban local bodies launched the public portal to raise any objections to the data related to properties.
- Regular review meetings were conducted to manage the process level changes and to take the administrative decisions based on the feedbacks received from the citizens.

VALUE INDICATORS

Learning's for sharing

Following are the key learning:

- To implement this project proper coordination among the department is must for the success of the project.
- To integrate in fast mode, it is recommended that first take the departments whose IT systems are in place and data sharing is possible.
- Availability of unique property id to identify the urban properties will be of great help.
- Review of the project by senior officers for making any course correction based on the public feedback.

Digital Empowerment

- Efforts made to make the system easy to use so that persons with limited knowledge of IT can access and use the system.
- Provision to make the online payment of taxes provided to ULB.

Green e-Governance

- Appointment details are sent to the applicant through SMS also to stop the printing of appointment slip.

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Shri Deepak Bansal, *DDG & SIO, National Informatics Centre Haryana State Centre, deepak.bansal@nic.in, sio-hry@nic.in*

Shri Gurpreet Singh Saini, *Scientist-E, National Informatics Centre Haryana State Centre, saini.gs@nic.in*

e Dharti Geo Portal

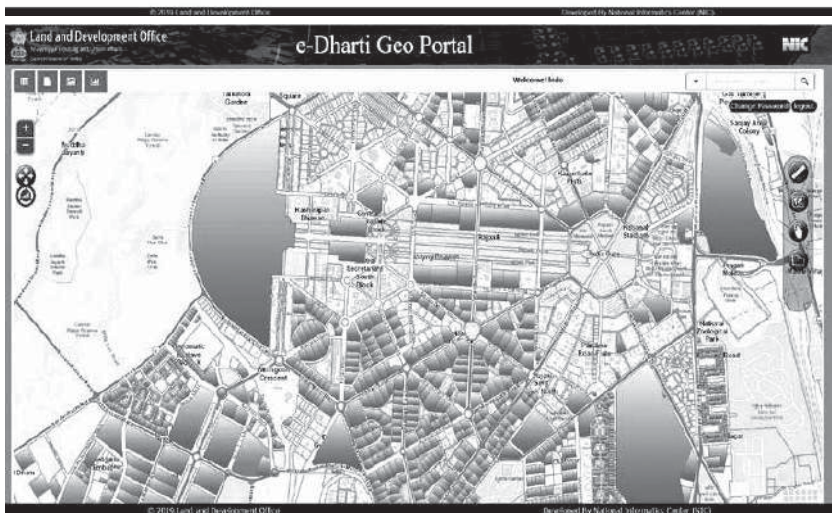
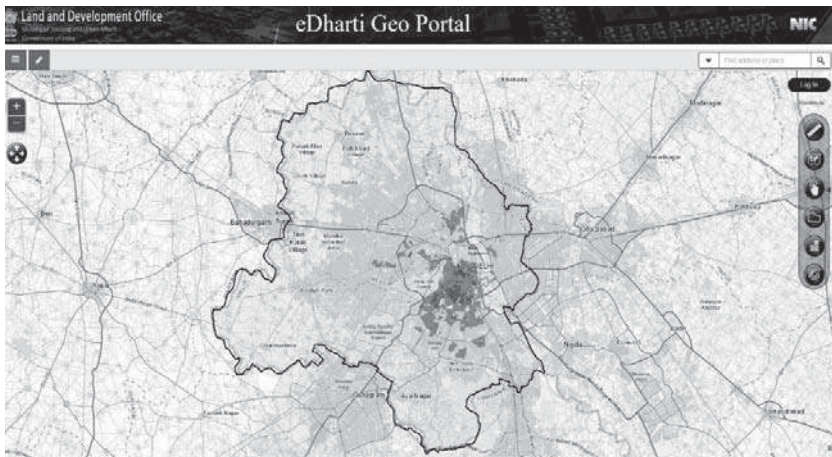
Ministry of Housing and Urban Affairs, Govt. of India & National Informatics Centre, New Delhi

Madhu Rani Teotia and Amit Bhargava

PROJECT OVERVIEW

Objective

The objective was to digitize the properties of Land and Building Office of MoHUA using the lease plans issued to them on large scale 1:1000 basemap and link the MIS of the organization with these properties to create a detailed Geo Portal. Apart from that a Mobile Application for the inspection for property was also developed. Public can give feedback on the properties and get property certificates online. Dash Board was prepared for the same with several indicators.



Ministry of Housing and Urban Affairs
Government of India



Land and Development Office
 11000 Highway 100, Suite 100, Houston, TX 77036
 Tel: 281.466.1000 Fax: 281.466.1001
 Email: info@landanddevelopment.com

NIE



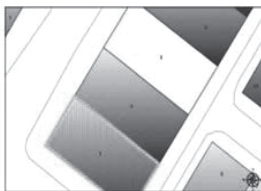
Ministry of Housing and Urban Affairs
Government of India



 Land and Development Office
Ministry of Housing, Communities and Local Government
Government of Wales

Property ID: 25570

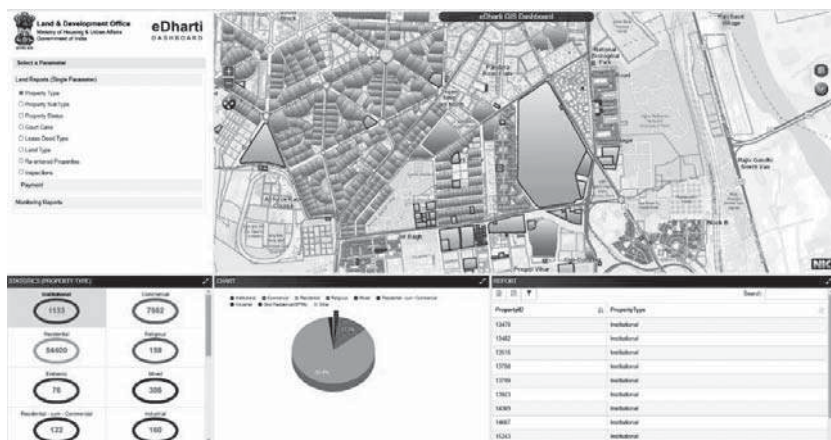
Property No: 10073			
Property Details			
Unit Type	APARTMENT	Property Status	LEASE HOLD
Accessories Type	COMMON	Accessories Sub Type	
Project of Lease Hold	ON REVESTMENT LEASE	Plot Area	0.00 SQ YARD
Units of Subdivision	00 per 0.00	Units of Total Subdivision	00 per 0.00
Property Address Details			
Plot No	Block No	EAST WEST ROAD	
N/2 WEST RATES ROAD			
Present Leases/Utilities		Ownership	
1. ELEC. PWR.		OWN	
2. WATER SUPPLY		OWN	
3. HOT/WATER		OWN	
Whether property is re-leased		Whether any court case pending	
		NO	
Remarks			



October 1, 2010

Note: The information provided is a per capita estimate made by the converted stream based on available records with them. It does not have any local authority or is verified by the Government Authority.

eMARG (electronic Maintenance of Rural Roads under PMGSY)



eDharti GeoTag Inspection Mobile App



Hardware/Software

GIS Server: - ArcGIS Server

GIS Database: - ArcSDE with Postgres SQL RDBMS

GIS Programming Language: - ArcGIS JavaScript API

Front End: - .NET

Note: Software Environment and application deployment architecture takes benefit of open source as well as state of the art OEM Technology to establish open standard service-oriented framework. Backend database and MIS is in open source as well as application is customized using Java Script whereas Geo Spatial Framework uses

ArcGIS (from ESRI). This framework is scalable and can further enhanced with more value-added attributes from MIS to generate spatial analytics as well as APIs can further be shared in workflows of any e-governance stakeholders working in Land Management Domain.

Certification (Certifying Agency)

Yes

Cyber Q Consulting Pvt. Limited

Disaster Recovery and Service Continuity

- Daily Backup on Cloud
- Tape back up

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 Certificate Service	Citizens can download the property certificate online. Citizens can check the status of their property	--NA--	03	20
Feedback Service	Citizens can give feed back	--NA--	02	26
Geo Inspection Application	Inspection can be done by Mobile Application and Geo tagging done	--NA--	Could not implemented due to COVID-19	Could not implemented due to COVID-19, now is being implemented shortly.

Efforts including wide publicity among the citizens, are being made to use the features made available on the portal.

Implementation

About 55000 properties have been done

Improvements / Enhancements

Property certificates with lease plan and MIS can be viewed online by the citizens. Complaint / feedback / redressal module was incorporated. The UI of the site was improved.

ENABLER

Processes Re-engineered

All properties lease plans were digitized with their actual dimensions on 1:1000 basemap prepared by NIC. Those which properties were difficult Trimble GPS Catalyst

were used to collect the points which came on the map. For Purposes of inspection a mobile application was prepared. Also, L&DO Staff and Surveyors have been equipped with State-of-the-Art Survey Equipment and Technology (viz. Catalyst from M/S Trimble) for Ground Truthing and Validation of legacy property maps. Further capacities and training have been given to them so that L&DO officials can adopt ICT as well as State of the Art GPS based survey technologies to update their geo spatial data as part of their work culture and processes.

Technologies

Technological Solution Adopted

GIS Server: - ArcGIS Server

GIS Database: - ArcSDE with Postgres SQL RDBMS

GIS Programming Language: - ArcGIS JavaScript API

Front End: - .NET

GPS Based Survey Technology & Equipment (For L&DO Surveyors & Staff) – Trimble Catalyst

People

Capacity Building

All the Map data was in form paper drawings almost a century old. Property Data had to be culled out and linked to MIS. This had to be checked by the organization. For this purpose, editing tool application was prepared and MIS reports for sections were done. Change is always a difficult process. It was because of the leadership of land and Building Officer this project was made possible. Moreover, legacy maps were needed ground correction and removal of dimensional errors. Necessary capacity has been built to support L&DO leadership, capacity of L&DO officers, surveyors and staff in change management using state of the art ICT, GIS, Mobile and GPS based survey technologies.

VALUE INDICATORS

Learnings for sharing

All data in one place on the Geo portal on a single click for a century old organization is quite a challenge. Control and Geo-referencing of old lease maps on 1:1000 basemap itself is a challenge. We used latest Catalyst Technology for control points where plot maps were not clear. Moreover, major learning is “Bringing Digital Transformation by Geo-Enabling Workflows of L&DO Land & Property Management System with desired capacities among people associated with the process so that system becomes self-sustainable on one end as well as citizens gets benefitted. This transformation has brought Ease of Doing Business for L&DO on one end as well as facilitated Ease of Service Delivery for citizens as they need not to visit L&DO to get their work done.”

Digital Empowerment

- Property details made available on the web portal.
- Every citizen especially senior citizen can access the property details on the portal 24x7 at their place, need not to visit L&DO office. Saves travel, time and money.
- COVID-19 like situations can be managed efficiently by providing property details on web portal.

- Ease of Doing Business and Service Delivery for L&DO as well as Citizens.

Green e-Governance

- Paperless Application for a property certificate through Online Application System.
- Property Certificate is being made available through email.

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eMARG (electronic Maintenance of Rural Roads under PMGSY)
*Ministry of Rural Development, Govt. of India & National Rural Infrastructure
Development Agency*

Alka Upadhyaya, Pradeep Agrawal and Ashish Kumar Goel

PROJECT OVERVIEW

Objective

Management and maintenance of rural roads in the Pradhan Mantri Gram Sadak Yojna (“PMGSY”) is a challenge due to its vast PAN-India spread. The conventional practice of maintenance of any asset, including roads, is the measurement of work done and making payment(s) as per contractual rates. This, by itself, is not sufficient to ensure perennial performance of assets. PMGSY, for the first time, introduced an innovative concept of Performance Based Maintenance Contract (“PBMC”) with a five year defects liability period. The contractor who constructs the road has to ensure performance of the road during this period on a nominal cost. The liability of the contractor to maintain the road for the next five years, and getting regular payments for it, compels him to ensure quality construction also. To ensure that roads are always maintained in good condition, PMGSY makes it incumbent upon contractors and engineers to keep a record of the conditions of the complete road infrastructure throughout the year.

Execution of PBMC through the existing manual system was a challenge and its efficiency and acceptability was low. PBMC, though a well-researched concept in asset maintenance, remained in nascent stages through its implementation in PMGSY. This called for a solution which unburdened engineers, made it truly evidence based, transparent, effective, and automated, in order to make it more objective and less labour intensive. To fulfil these objectives, the eMARG (Electronic Maintenance of Rural Roads under PMGSY) System was designed to bring in a simple yet effective solution to these problems. eMARG is conceptualized on PBMC, which took over from the earlier BOQ concept for payments and manual PBMC.

Maintenance of road assets is extremely critical from the point of view of citizen in particular and rural economy in general. Timely & routine maintenance of roads post construction is required to ensure this investment is safeguarded. Given the low-ticket & high-volume nature of maintenance activities, both district engineers & contractors are not incentivized to manage the payments in a routine manner and tend to lump up the maintenance activities till the end of the contract defeating the purpose of routine maintenance. Further, administrative burden to get small maintenance bills inspected & processed adds workload to already overburdened district engineers. Maintenance is a function of governance and fund availability. Ensuring funds without mechanism or tool for supervision of routine maintenance does not ensure good service quality of roads. Lethargy in inspection and measurement-based payments resulted in about 50% of expenditure.

eMARG solves all these problems as it reduces the friction of submitting bills for the contractors and makes it easy for administrators to verify work done based on the final performance of the road and saving systemic proof in terms of geo-tagged photographs for future scrutiny and process bills quickly by pressing a few buttons right from submission to payments. Even the processed bill amounts are calculated by the system

based on the marks given to the road thereby reducing discretion. By removing inputs and instead focusing outcomes, engineer doesn't need to wait for bills by the contractor but can instead inspect road every 2 months to record the performance. Also the digitization of the entire process also brings forth transparency and information flow allowing M&E, dashboards, data-driven reporting and use of nudges and notifications.

eMARG sets up a blue-print on how maintenance of infrastructure can be solved across government departments with smart IT & Contract Management. eMARG is an enterprise architecture which starts with creation of GIS based inventory of roads, contract details, online inspections, verification and grading of road conditions with pictures captured, submission of bills and payments. The grading and payment is governed by the 100 point marking under PBMC. eMARG is a fusion of innovative technologies Open Source, Remote Sensing, GIS, Cryptography, Mobile, Messaging & Mail

Innovative Features of eMARG are:

- Automation of the entire cycle of bill generation and payments for maintenance contracts
- eMARG Mobile app, to take geo-tagged photographs of the roads as part of routine inspections of roads. The photographs at random generated location ensure evidence based proof of road condition over frequent intervals of time during entire 5 year defect liability period.
- Descriptive Analytics and Dashboards for each bill against every rural road allowing a plethora of reports and dashboards for monitoring at various levels
- Usage of GIS technology to instantly see the pictures of road on google map, as clicked by district engineers and match them with the payments made against those roads to contractors for proper upkeep of assets.
- Automatic notifications for submitting the bill to contractor and in case of unsatisfactory grade obtained during inspection, and conducting bi-monthly inspections by engineers.

Current Status

While on-boarding of roads on eMARG is a continuous process, as on date 53,924 roads of 1,96,176 km have been onboarded to eMARG. In terms of direct system users, 1375 government engineers and 12,104 contractors are currently using eMARG in all states to perform inspections, generate and process e-bills and make payments, thus majorly easing out the manual and tedious tasks. Till date, and roughly in one year of operation, 5,63,938 no. of bills of routine maintenance have been submitted and a total amount of Rs. 592.15 crores have been released as performance based maintenance payments through eMARG. Maintenance expenditure in FY20-21 (eMARG) exceeded that of the previous year (non-eMARG) by 30% even with the pandemic inflicted lockdowns and periods of inactivity in the year of intervention. This acts as an irrefutable proof of the massive gains in efficiency brought forth by our GPR i.e. eMARG.

Hardware/Software

eMARG system has been designed and developed using scalable architecture of Open-Source Technologies. It is fusion of innovative technologies Open Source, Remote Sensing, GIS, Cryptography, Mobile, Messaging and Mail.

- Computing Platforms: MeghRaj Government of India Cloud.
- Application Development Technologies: Java, JSP, Servlet, Bootstrap Framework, JQuery, CSS.

- Development Frameworks: Spring MVC
- Development Environment: Eclipse IDE, Android Studio
- Database Platforms: Postgres SQL
- Mobile Platforms: Android, SQLite, Firebase
- Web Platforms: Tomcat, Network Load Balancer
- API Platforms: RESTful API using Jersey Framework
- Analytics: Canvas JavaScript Library Framework
- Security: SSL, DSC, Cryptography
- Reporting Platforms: Jasper Reporting Framework
- GIS Platforms: Google HRSI/Remote Sensing
- Digital Signing platform: NICD Sign

Certification (Certifying Agency)

YES, eMARG application has been awarded security clearance certificate by the empanelled agency Secure Eyes Techno Services Pvt. Ltd (www.secureeyes.net). Subsequently Cyber Security Group of NIC HQ approved the security clearance certificate and declared application safe for hosting at NIC cloud.

Disaster Recovery and Service Continuity

The application is hosted at NIC cloud infrastructure supported by load balancer. The database servers are being synchronized between DC-DR on real-time basis. Similar setup has been installed at NDC, NIC Hyderabad for Disaster Recovery as a business continuation plan

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
Contractors Registration	Contractors working on PMGSY Works/Packages need to register on the eMARG portal	7943	1957	1064
Roads Registration	Each Road under PMGSY Works must be registered on the portal through Road Registration service provided through Emarg Inspection App.	639	32508	12945
Routine Inspection (RI)	Routine Inspection must be carried out on through Mobile app on scheduled period of every two months to record road surface conditions along with	5368	255611	172509

	supporting GeoTagged two images at every KM			
Performance Evaluation (PE)	Based on input from RI, PE is conducted and marking is done on various performance parameters.Total marks are 100. Based on PE marks further payment will be processed.	1896	178145	128715
Online Bills Generated	Contractor having the facility to submit monthly routine bills on a single click. System dynamically calculates Bill Amount based on NIT rates, Road attributes such as Length, Carriage Way Width, and Traffic Density etc.	217318	191973	254279
Payment Disbursed (in Lakhs)	Payment being directly credited to Contractors bank account.	476	42051	38921

Implementation

- Geographical Spread
 - National level –
 - Total number of States and UTs 36
 - No of State(s) covered out of total States and UTs 36
 - Percentage of State covered out of total 100.00
 - State/UT level -
 - Total number of Districts- 737
 - No of District(s) covered out of total Districts- 737
 - Percentage of Districts covered out of total 100.00
 - District level –
 - Total number of Blocks-7210
 - No of Blocks covered out of total Blocks-7210
 - Percentage of Blocks covered out of total 100.00
- Demographic spread (percentage of population covered) level Absolute value
 - Percentage
 - Population projected to benefit- 592500190
 - Population Actually benefitted- 592500190 (100%)

Inspections are been conducted using Mobile App (eMARG Inspection App) available on Google Play Store.

Alert/ Notification/ OTP to all stake holders is through Notification App (eMARG NotificationApp) available on Google Play Store.

Improvements / Enhancements

Since the launch of eMARG in February 2019, a very comprehensive dashboard and a number of reports have been developed in last one year for effective monitoring of maintenance of PMGSY roads. One very unique feature that has been developed in eMARG is that one can walk through a particular road on google map and see the condition of road through photographs taken during the routine inspections. Also, a user level task sheet is provided to all the concerned users through which every user is made aware about the tasks pending at him on daily basis.

The following two features will be rolled out during the next year:

- Use of Artificial Intelligence (AI) to detect and flag the roads which condition is not good but the road gets higher marks during the performance evaluation.
- Integration with the “Meri Sadak App” with eMARG for better resolution of issues raised by citizen regarding maintenance of PMGSY roads.

Presently eMARG is developed for the maintenance of roads being carried out during the first five years of Defect Liability Period (DLP), but the design life of PMGSY roads is for 10 years and maintenance activities are carried out for post Defect Liability Period also. Development of Post DLP module and its implementation is targeted for FY 2022.

ENABLER

Processes Re-engineered

Under PMGSY, the contractor who constructs the roads is also required to maintain the road for a period of 5 years under the same contract. Core to the GPR, is the idea of Performance-Based Maintenance Contracts or PBMC as compared to Bill of Materials (BOM) method used earlier. Traditionally, payments are based on the inputs used while maintaining the roads, whereas PBMC uses outcomes-based monitoring to calculate payments. In the latter, the payments to contract are based on the final condition of the road and not on the number of potholes fixed by him or the quantities of bitumen or labour required. Given, the same contractor who built the road is provided the maintenance contract for 5 years, paying him based on outcomes incentivizes him to build road to such a quality that he doesn't need to spend money on maintenance but still get rewarded for the same. Secondly, it drastically reduces the administrative burden on the government staff, which now can visit a road to inspect its overall performance and capture evidence as compared to measuring the quantities utilized in maintaining the road. PBMC or similar outcomes monitoring contracts cannot be realized without robust IT systems and digitisation of the maintenance activities in itself brings forth multiple advantages:

Baseline process:

- Paper-based bills were generated manually by contractors for an amount which was based on the quantity of materials used for maintenance of road
- Routine Inspections of the road were triggered by the submission of bills by the contractor.
- Verification of bills and payments to contractors were done manually or offline.

The major drawback of this system was:

- Lacked transparency

- Labour intensive
- Chances of mismanaged and delayed payments
- Payments not performance based
- No evidence based process.
- No proof of maintenance.
- Voluminous record keeping.
- Asset deterioration

With introduction of eMARG, the following processes were re-engineered by digitizing the time-consuming manual activities, while ensuring the larger objective of effective rural road maintenance is achieved.

The workflow after GPR is as below:

- e-Bills are auto-generated and can be submitted in one-click by the contractor.
- De-linking of routine inspection of roads with submission of bills.
- Mobile app to carry out Routine Inspections every two months through eMARG mobile app with geo-tagged picture capturing on system generated random locations.
- GIS integration to verify the location of pictures taken is in fact on road considered.
- Performance Evaluation of the road every two months based on a scoring metric of 1-100 purely based on outcomes.
- Auto-generation of payable bill amount pro-rated by the marks received by the road in the 2 month period.
- Auto-generation of scrolls where 6 bills are available for payment.
- Bank linkage to make digital payments from the government to contractor's bank.

The major advantages of GPR are:

- Brings transparency
- User friendly, evidence based
- Timely payments
- Automatic notifications sent to the concerned personnel for pending activities
- The system records road condition for every month of the year and can be visualized on Google map with road condition viz-a-viz payments made and maintenance standards followed

With the introduction of eMARG, there has been an attempt to plug in the loopholes and complete the missing data flow links in the monitoring process. Since the process flow has been digitized end to end, the critical information on road maintenance now flows seamlessly and effectively into the system for monitoring at the State and National level, thereby enhancing the transparency provisioned.

Technologies

- All the stakeholders including state officials and contractors have been trained to onboard eMARG and make use of eMARG Inspection App and eMARG Notification App. eMARG Inspection App sends timely notifications to state officials to carry out bi-monthly routine inspections and performance evaluation of PMGSY roads. On similar lines, contractors get notifications to submit their monthly bills in time. Further, reminders are also sent via SMS to all field engineers and contractors to carry out maintenance activities in time.

- At present there are more than 30 reports available in eMARG for effective monitoring by state and Ministry. Some of the reports include:
 - o Package Verification, Contractor Registration, no. of DSC enrolled
 - o Status of Pending, cleared and paid bills
 - o Inspection Analysis of RIs and PEs conducted
 - o Bills with zero payments (less than 80 marks)
 - o Packages Pending for Payment for more than 6 months
 - o Liability projections for next Financial Years
 - o Dashboards and User Level Action Oriented Tasksheets
- There is a feature to see the condition of road through photographs taken during the routine inspections by having a virtual walkthrough on the road on google map
- eMARG training videos are available on YouTube for any time access to the intended user.

People

Capacity Building

Massive policy change from BOQ to PBMC required support from the highest levels in each state especially given that many field civil engineers are not very IT savvy. So multiple trainings were conducted by NRIDA and NIC Bhopal directly with field engineers. Training were conducted through Video Conferencing during the times of COVID pandemic. In total more than 300 hours of training have been imparted in last one year. Refresher trainings are also conducted for states from time to time.

Project Management Support:

- Dedicated Support Module built into the eMARG portal.
- Dedicated Mobile helpline number.
- Whatsapp Support Group
- Dedicated support through email.
- Two technical manpower dedicated for support.
- Regular meetings conducted by NRIDA to review the status of eMARG and suitably continue improvement is being made in the functionality & problem resolution.
- Detailed User Manual, presentations, videos and FAQs available for users.

Management of Change:

- eMARG takes care of joining, transfer, promotion of employees etc through its robust Admin module.
- eMARG takes care of work contract termination, demise of contractor etc

VALUE INDICATORS

Learnings for sharing

Conceptualization of such a large scale project which has a huge impact on not only the stakeholders but also the citizen of India was itself a herculean task. Many brainstorming sessions on planning of such project and its execution was conducted among NRIDA, Officials from states and NIC. The digital transformation in e-governance

brought forth by eMARG can be seen in the following ways:

- Maintenance of government assets is a global problem faced by developing and developed countries alike. It is a hard problem to solve given the low-ticket high-volume nature of maintenance and the incentives involved which promote new construction of assets over maintaining existing ones. This impacts roads, bridges, schools, health centers and countless other government infrastructure assets. eMARG provides a framework to tackle and disrupt maintenance activities across government assets. The eMARG model is a proven implementation of outcomes based monitoring which makes small ticket payments efficient and attractive. It can be scaled across asset categories by simply adapting the 100 point rubric used to evaluate the outcomes of the asset in question.
- eMARG is an example of how to combine multiple e-governance and emerging state of art open-source technologies under one roof: Open Source, Remote Sensing, GIS, Cryptography, Mobile, Messaging and Mail. It is not an example of using a particular technology but what all is possible when all technologies are combined in synergy.
- eMARG instead of increasing the burden on frontline staff and states is an example of bottom-up technology, centered solely around reducing administrative burden. This is very important given the context that our frontline staff is the face of governance and is tasked with increasing responsibilities.

Digital Empowerment

- Digital Empowerment through digital inclusion of Contractors nationwide by onboarding them into the system.
- Submission of Bills, Tracking of Bills by Contractors is a just a matter of click.
- Same set of PMGSY maintenance policy applied nationwide bridging the demographic differences if any.
- Seamless Integration using Restful Web service for Work details & Accounting has removed efforts & time towards data entry of Govt. Dept

Green e-Governance

- Paper based bill calculation and submission is completely replaced with robust bill computation module at eMARG.
- Paper based offline Inspection images replaced with digital Geo-Tagged images.
- Cloud based hosting environment helps in optimal use of ICT resources and thus minimizes wastage of resources, save electricity and lesser carbon footprint

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Haryana Real Estate Regulatory Authority

***Haryana Real Estate Regulatory Authority, Panchkula & National Informatics
Centre Haryana State Centre***

Rajan Gupta, Rajinder Pal Gupta and Deepak Bansal

PROJECT OVERVIEW

Objective

- Ensuring Transparency & Efficiency in real estate sector in regards to real estate project, sale of plot, apartment, building etc.
- Protecting the interest of consumers in real estate sector
- Establishing adjudicating mechanism for speedy dispute redressal
- Establishing Appellate Tribunal to hear appeals from the decisions, directions or orders of the Real Estate Regulatory Authority

Scope (Functional & Geographical)

- Ensuring Disclosures of Real Estate Projects by Promoters. This includes information regarding sanctioned plans, specifications approved by the competent authorities, access to stage-wise time schedule of completion of the project (including amenities) as agreed in the agreement for sale
- Real Estate Projects Registration & publishing of quarterly updates on the projects
- Real Estate Agents Registration
- Complaints Redressal against any promoter in case of any default
- Provide recommendations to appropriate Government in matters relating to the development & promotion of real estate sector
- Offer single window system of clearance for real estate projects
- Empower and protect the right of home
- Geographically, the Portal covers entire state of Haryana.

Key Stakeholders

Following are the key stakeholders in the HRERA portal:

- Buyer: Who is buying any real estate property in projects/plots in Haryana?
- Promoter: Who is developing any real estate property/project in Haryana, e.g., Registered Promoters/developers?
- Agent: Who is selling any real estate property/project?
- Public: An individual who uses the web portal to get public domain. Information about Projects/agents in entire Haryana.

Intended benefits

- Access: Complainants/Buyers/Promoters can file online complaint by paying nominal fees via integrated payment gateway system and track the complaint online.

It is made mandatory for each Promoters/Developers to register their ongoing/new projects by filling the designated A-H project registration form in the portal. Real time status of application can be tracked online. Moreover, any objection raised by HRERA Authority and compliance thereof by the concern promoter is also done through the portal.

- Paperless: It reduces the administrative overhead of HRERA Authority by minimizing the use of paper.
- Authenticity: System assigned complaint number makes it easier to validate the authenticity of complaint in the system. The system generated project registration number and filled in form, helps in clean and accurate information by the user and thereby accepting the relevant documents directly from the registered promoters/developers.
- Office Automation: The Workflow based backend automation of office activities helps in achieving SMART (Simple, Moral, responsible, Responsive and Transparent) governance.
- Dashboard: An exhaustive informative dashboard along with various monitoring reports helps higher authorities to take quick and firm decision for planning office activities. User Participation: The respondent and petitioner are well informed about the complaint or appeal filed by/against them by SMS and email system. An email/SMS is sent at each proceeding where by saving a lot of time and revenue.

Current Status

The system came into effect from October 2018 onwards.

In a span of approximately 03 years, as on date (17 Sep, 2021)

- Number of visitors to the portal is about 5 lakhs+.
- Total complaints registered in both authorities are 12296.
- Total projects registered at Panchkula & Gurugram is 748 and 1013 respectively.
- Total disposals of complaints at Panchkula & Gurugram are 2182 and 3326 respectively.

Hardware/Software

(Open Source Technology Stack)

Web Framework HTML, Bootstrap3.3.7

Web Server Apache

Programming Language PHP7.3.1 (Code Igniter Framework) Version-2.1.3

JavaScript Libraries Data Tables, JQuery3.3.1

Database PostgreSQL 10.1

SSL certificate from DigiCert via GeoTrust EV RSA CA 2018 (Extended Validation)

Payment gateway integration with ICICI and AXIS Banks

SMS and email gateway integration

Certification (Certifying Agency)

Yes, Cyber Security Audit performed before Production deployment of application as a pre-requisite to deployment in National data center (NDC), Delhi.

Audit performed by NICS I empaneled certifying agency (Cyber Q Consulting Pvt Ltd.)

Address: 59/15, Satyam House, Guru Ravi Das Marg, Kalkaji, New Delhi - 110019

E-mail: info@cyberqindia.com

Disaster Recovery and Service Continuity

The deployment is done at National Data Center (NDC, Delhi). The backup of database is taken on daily basis and is kept at remote site using NETVAULT AGENT so as to

retrieve the same in case of Disaster recovery and for service continuity

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-complaints registration	Online registration of Complaints by Buyers/Promoters in RERA	2773	2239	4863
e-project registration	Online registration of Projects by Promoters in RERA	133	542	2462
e-agent registration	Online registration of Agents in RERA by Rera Office	454	1152	1021
e-notices dispatch	Online dispatch of notices to respondents via SMS/email and also via hard copy presently	4263	2127	2470

Implementation

Achieved the targeted goals of providing G2C and G2G services in overall terms. The project is implemented in two HRERA Authorities of Haryana covering the entire state. The target of providing services of online Complain Registration with status tracking and online processing, Online Registration of Project Registration with option to view the project details for public, online processing of the Project Registration, Quarterly filling up of financial and physical achievement project, Online registration of Agents and processing etc. has been achieved.

Improvements / Enhancements

1. Display board system giving hearing status (Hearing going on/to be heard/already heard) for a cause list of the day.
2. Due to COVID pandemic, the physical hearings were discontinued and further hearing through Video Conferencing system was adopted as need of hour.

ENABLER

Processes Re-engineered

Automation of processes helped in achieving faster dissemination of information between the stake holders and the government entities. The SMS/email helped in removing the barrier of receiving of notices hard copy each and every time.

Standardization of process for Project registration by Promoters helped in putting all promoters in parlance with each other and getting same level platform to grow.

Simplification of process and workflow in offices helped in removing the delays happening in un-automated processes

Technologies

The portal is designed in such a way that it caters to all (02 authorities and 01 appellate tribunal) in entirety. There is a feature of MIS reports and dashboard as per the requirement which gives a data analytics view of the portal. The portal is mobile compliant. The presence of portal in social media (Web site) had helped achieving transparency and faster delivery of services to the citizens.

People

Capacity Building

Capacity building has been achieved by conducting training and awareness sessions with Promoters/Developers' and Advocates and Agents to get maximum results out of the system.

VALUE INDICATORS

Learnings for sharing

Challenges were faced in training and convincing the developers and promoters to put all the details online so that transparency can be maintained at each level.

Direct online services to each stakeholder helped in removing the middle men who use to hide information with them.

The above challenges were converted to opportunities by designing the portal after planning according to RERA act, 2016.

Best practices from other sources and portals were incorporated in the portal to make the system user friendly and accessible in nature.

Digital Empowerment

The portal is so designed that a layman can also file a complaint. A person having cultural difference is also comfortable in filing of complaint online.

Also, online services delivery has made the demographic distances very small.

A standard fee is charged for services which is paid at portal by payment gateways and eliminated the role of middle men for filing of services.

All details of a case like Next hearing date or Judgment Order are readily available at portal so that the citizen or litigant is fully benefitted from e-Governance initiative.

Green e-Governance

The RERA authority is thinking of going green by stop sending the notices/replies to the respondents in hard copy. This will help in saving exchequer and also nature.

Instead, the RERA act will be amended where SMS/email notices will be treated as delivered to the respondent.

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Shri Rajinder Pal Gupta, *Executive Director, Haryana Real Estate Regulatory Authority, Panchkula, hrerapkl-hry@gov.in*

Shri Deepak Bansal, *Deputy Director General & State Informatics Officer, National Informatics Centre Haryana State Centre, deepak.bansal@nic.in*

mParivahan

Ministry of Road Transport and Highways, Govt. of India & National Informatics Centre, New Delhi

Piyush Jain and Joydeep Shome

PROJECT OVERVIEW

mParivahan is a mobile based citizen-centric transport solution, launched in 2017 by MoRTH with the technical support of NIC. With more than 5.5 Crore downloads, it is one of the most popular Government apps and is available in both Android and IOS versions.

This product enables anytime, anywhere access to driving license, vehicle registration and other related information/services. It is integrated with Vahan, Sarathi, eChallan and other relevant repositories to facilitate seamless data exchange. Major functionalities include Virtual DL (Driving License) and Virtual RC (Vehicle Registration Certificate), which are accepted as verifiable and legally valid paper-less alternative to physical documents. As a result, the verification/inspection/offence filing process has become paperless. There is also option to search any DL and RC which provide comprehensive and upto-date status with respect to validity, tax, permit, fitness, insurance, PUC, challan history and other information.

Transport services like online payment of tax, reporting of traffic violation, etc. have also been incorporated in the app for state-specific implementation.

Key Features:

- Map based guide for nearest/desired RTO and PUCC locations
- Offline verification of encrypted Virtual RC, DL details using QR code
- Facility for virtual sharing of RC with driver/ friend/ relative in controlled manner
- Provision to search challan by RC/DL number
- Option for Multi lingual interface
- Location based Emergency Services - Call Ambulance, Notify Contacts
- Available in both Android and iOS platforms
- Mock Test for DL (for Android App)
- Collection of Tax
- Vehicle Blacklisted status
- Security feature Implementation
- Dynamic MoRTH Notification

Hardware/Software

- DB: PostgreSQL
- Operating System: Android, iOS

Certification (Certifying Agency)

Yes,

Disaster Recovery and Service Continuity

- A Disaster Recovery Site is in place in a different seismic zone than the Data Centre.

- DC- NIC, Shastri Park
- DR- NIC, Bhubaneswar
- Service continuity is ensured by replicating critical databases in multiple instances, including DR site.

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
Virtual DL/ RC	No need to carry physical copies of RC, DL. Digital/ Virtual copies created in mParivahan app are legally valid.	18,58,574	86,02,861	1,67,27,366
Application downloads	Number of downloads of the mobile app	45,38,412	1,63,77,394	2,53,72,011
No. of registrations	Number of actual registrations in the app, after download, so as to benefit from anytime, anywhere access through app usage	18,25,048	58,39,850	1,37,60,850

Implementation

- mParivahan app is universally relevant – addresses requirement of all DL & RC holders across the country.
- The app has seen an exponential growth, and its performance/ implementation progress has been exceptional.
- The number of downloads of the app by the citizens, has already gone past 5.5 crores.
- The app is easily available for download from the Google Play store as well as Apple Store.

Improvements / Enhancements

Recent improvements/enhancements rolled out in the app are as follows:

- Collection of Tax through mParivahan
- Multi Language support
- Mobile number registration in mParivahan
- Virtual RC and DL
- Traffic Challan details
- Emergency Profile (notifying ambulance and emergency contacts)
- Document (RC & DL) Impound Status
- Vehicle Blacklisted status
- Security feature Implementation
- DL Mock Test

- Check Your Nearest Pollution Centre
- Locate Nearest RTO
- Dynamic MoRTH Notification.
- Module for sharing Virtual Document

Improvements/enhancements planned to be rolled out during next one year:

- Onboarding all the 100+ transport services on the app
- Enablement of state specific services on the app, using geofencing
- Feature for reporting of Traffic Violation & Road Accident by citizens (Citizen Sentinel)
- Shape up the app as an integrated platform, wherein the services related to NHAI, FASTag, Virtual Court, and other external ecosystem would also be facilitated to the citizens
- Vehicle Tow Away notification
- More digital payment options
- Monetisation of accumulated data through payment based specific/repeat/urgent, etc. services
- Emergency Services provisioning through the app

ENABLER

Processes Re-engineered

The mParivahan was envisaged primarily in cognizance of the lacunae in provisioning of DL, RC related services in terms of simplification, automation, convenient processes as well as awareness.

- A key achievement has been to do away with the requirement of carrying physical copies of DL & RC documents, at all times by the citizens. A detailed study and analysis, followed by necessary process reengineering has led to the availability of Virtual DL & RC as the preferred alternative to physical copies. This feature, which is both tamper proof and convenient, has been an instant hit among the citizens, saving them from the hassle of carrying documents.
- These Virtual DL & RC documents are encrypted with QR code. The QR code is readable only by eChallan enforcement agencies, and this is a unique platform to transmit real time data in offline mode.
- RC can now be shared with a third person through the mobile app, for convenience as well as compliance. E.g., A person sharing the vehicle RC with his driver.
- To ensure comprehensive coverage of citizens, the app has been made available in both Android and iOS versions
- Further, advent of citizen sentinel feature in the app will enable crowdsourcing of citizen inputs through reporting of traffic violations and road accidents. Road Accident Analytics can be one offshoot of this feature and can be further incorporated for on-the spot decision and forecasting based on a particular area, road condition, driving speed, etc. parameters.

Technologies

- The mobile based solution for various RC, DL services has been instrumental in giving the joy and power of anytime, anywhere access in the hands of citizens.
- Its API based integration with eChallan enforcement solution, Vahan and Sarathi

databases, has created a seamless, always in-sync ecosystem. Further, external services like FASTag, NHAI, Virtual Court, etc. shall also be integrated with the app through API mechanism.

- QR code-based encryption of Virtual DL, RC, for offline verification, has created a tamper proof mechanism, while ensuring convenience to citizens, and efficiency for enforcement agencies.
- It's available in Android (open source) as well as proprietary OS like iOS, which are the two most prevalent OS versions used in the mobile phones. So, the majority of the audience is served.
- Data analytics for facilitating on-the-go, facts-based decision making, for citizens and other stakeholders
- Geofencing technology shall be incorporated to provide state specific services through the app.
- In app feedback system to be enabled through AI based chatbot.
- Enhanced user interface and experience through utilization of best-in-class customer experience platforms.

People

Capacity Building

mParivahan mobile app has been a refreshing addition to the already comprehensive solution portfolio of eTransport MMP. The various features and functionalities offered by the app have been well received by the citizens across the country. There has been little to zero resistance, which can primarily be attributed to:

- Penetration of smart phones to every nook and corner of the country, coupled with improved network connectivity.
- The earlier system being completely manual, i.e., physical documents related to RC, DL, had to be produced mandatorily by citizens to the enforcement officers (traffic police/ transport department officials).
- The app is high on user friendliness quotient, requiring minimal guidance/training on usage of various features.
- The implementation of this project had ensured a 180-degree shift to an online and on-the-go system to its users, through various features like Virtual DL/RC, sharing of RC, location of nearest PUCC/RTO, among others.
- The documents are now acceptable in digital form, which can be produced from the mobile app, either in online mode or using the QR code technique in offline mode.
- Linkage with e challan, Vahan and Sarathi, creating an integrated, seamless environment
- Availability on both the major OS platforms: Android and iOS

Additionally, through:

- Support and timely intervention from departments, Ministry and various senior officials
- Dedication and perseverance from the team, for time bound implementation of the project,

Most of the people specific challenges and changes have been effectively dealt with. Consequently, the app is one of the highest rated government apps, with the total downloads crossing 5.5 crores, a feat achieved very few.

VALUE INDICATORS

Learnings for sharing

- A major challenge was requirement of carrying along Physical DL, RC documents. The app has addressed this challenge by completely doing away with physical document requirement - legally valid Virtual DL/ RC can be created and stored/downloaded in an online manner through the app
- Services like Pay your Tax, NoC, change of address, Duplicate RC, Fitness, etc. are provided to the citizens in on-the-go mode (request basis: if already requested by his/her state). User is not required to visit the Parivahan Portal for accessing these services.
- Provisioning of various informational services related to RC, DL, namely address change, trade certificate, ownership transfer, permanent/ learner's DL, duplicate DL, addition of class, etc. in the mobile app.
- In the near future, participatory governance shall also be realized through the app, by enabling citizens in real time reporting of traffic violations and road accidents, i.e., introduction of citizen sentinel functionality.

Digital Empowerment

- The app is available free of cost on popular platforms and covers the entire strata of society. Understandably, it is a hugely popular app of Government of India - the number of downloads has crossed 5.5 crores, in a reasonably short time span, and the reach is further expanding in an exponential manner.
- It operates in complete sync with the Vahan (RC) and Sarathi (DL) web applications, to facilitate on-the-go availability of services in real time. Physical visits are minimal, and most of the tasks can be done online, anytime-anywhere.
- As an immediate impact of the app, physical documents are no more required to be carried by the citizens. The digital versions of the RC and DL documents, available in virtual mode in the app, are legally valid documents and accepted by all the enforcement agencies, whenever required.

Green e-Governance

- The mobile app has been indeed created to enable an on-the-go, paperless channel for DL, RC service delivery - through Virtual DL, RC, shareable DL, RC, etc. features
- The mobile app relies/needs very less dedicated infrastructure - it is integrated with other key eTransport databases (eChallan, Vahan, Sarathi) for sharing/receiving data through APIs.
- It has facilitated substantial reduction in paper-work – availability of various information, services, processes, notifications, advisories, etc., in an online manner, with minimum need of supporting/external physical documentation.

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PMAY (U) MIS System

Ministry of Housing and Urban Affairs, Govt. of India

Surendra Kumar Bagde and Suvasish Das

PROJECT OVERVIEW

Objective

Stakeholders and Outreach of MIS -There are thirteen actors/stakeholders in the entire MIS system. The stakeholders are namely Citizen, Central HFA Monitoring Unit, CSMC Unit, PMU, Appraisal Unit, SLNA, ULB, District, Release Sections (Maker), Release section (Checker), State Financial User, Agency, and Signatories. The role of each stakeholder is different from the other. More than 4,041+ statutory towns' users 17,966 planning area users, 697 district users, and 36 states and Union territories are using role-based access. More than 50,000 citizens access the PMAY (U) on regular basis for applying as well as to get their status.

Key Stakeholder

The different stakeholders are

- Citizen
- City/ULB
- State
- District
- PMU
- Appraisal agencies
- Central
- Signatories (First and Second)
- Admin

Scope (Functional &Geographical)

The scope and horizon of the PMAY(U) MIS has been enhanced through its integration with other websites, Dashboards, mobile applications, MIS systems of other stakeholders like PRAYAS PMO PORTAL, NITI AAYOG, UMANG Platform, UIDAI, PFMS, CLSS Awas Portal (CLAP), DBT Mission Portal, NRSC/ BhuvanHFA mobile application and web portal, PMAY(U) MobileApplication, BharatHFA, MyGov, Ministry Dashboard, MIS of PMAY(Grameen), P (National Infrastructure in Pipeline), etc. for the following:

- To showcase the performance of the Mission, including geotagged images.
- To accept applications from citizens/beneficiaries through the platform of other stakeholders.
- To share projects/beneficiaries' data to capture further desired information from the platform of other stakeholders.

Prayas PMO Portal, Niti Aayog, Umang Platform, Uidai, Pfms, Class Awas Portal (Clap), Debt Mission Portal, Nrsc / BhuvanHFA Mobile Application and Web Portal, Pmay(U) Mobile Application, BharatHFA, MyGoV, Ministry Dashboard, Mis of Pmay (Grameen), Nip (National Infrastructure in Pipeline)

Hardware/Software

Software Environment Asp .Net 4.0 (web forms) Web API 2.0

C# for backend jQuery JavaScript Bootstrap

Third-party tools used (Open Source) Open XML for uploading Excel files ITextSharp for creating PDF

Postman for checking API's

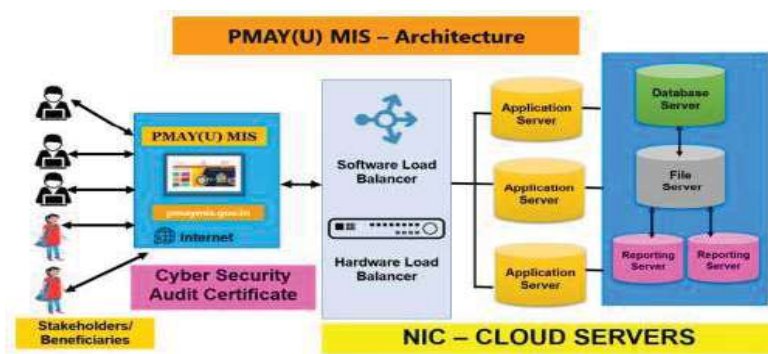
JSON

Database

MySQL Server 2016 Enterprise edition

Certification (Certifying Agency)

PMAY MIS has been audited twice by the Cyber Security division of NIC through the Cyber security Empaneled vendors latest cyber security certificate is attached. MIS System has been audited by the Cyber Security Division and got the Cyber Security Certificate for safe hosting. In addition to that only necessary TCPIP ports are opened in Server. The server begins the firewall of NIC. NIC Cloud team is taking regular backups on an incremental, whole, and daily basis. The entire application and the database are hosted in Government Domain (NIC cloud). Users are not permitted to delete any information. The personal details of beneficiaries are encrypted and stored securely with the SHA-256 Algorithm. Moreover, beneficiaries' consent is also being taken for sharing their personnel details in MIS. Aadhaar is authenticated through demographic, OTP, biometric authentication in a secured way with UIDAI.



Disaster Recovery and Service Continuity

NIC Data center backup, restore facilities, and the disaster recovery features with the NIC Datacenter are applicable to this application.

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
SMS	This service is used to interact with citizens, ULB's, State officials, and all stakeholders. For			

	managing their own PMAY user accounts.			
SMTP	This service is used to interact with all stakeholders			
Aadhaar demographic authentication	This service is used to verify the Aadhaar with the UIDAI server to authenticate the user name as per Aadhaar.	33,91,120	15,89,888	16,95,122
E-sign through Aadhaar Biometric and OTP authentication	This service is used in the generation of allotment letters to the correct/concerned citizen			
Web services/API	To Interact with other applications and to share (Pull and PUSH) and to get pieces of information from other applications.			
Digital Signature	For generating digitally signed payment files for the payment to the beneficiaries			
Geo Tagging	Monitoring the construction progress of the houses/projects	30,44,159	38,90,539	32,68,849
Video conference	Training to the user			
Mobile Apps	To know the status of houses			
Demand for PMAY(U) Houses		27,41,545	27,44,141	27,33,362
Projects		6,616	5,756	3,352
Beneficiary		19,30,054	16,98,753	16,60,251

Implementation

Pmay Mis is implemented up to the root level (Citizen) Citizens can apply directly

through the portal and they can get the status of the application through the portal. It is implemented in all statutory towns (4041+). This MIS is implemented in all bulbs and in their Planning areas. It is fully achieved when it is compared with the target. This is implemented in the entire nation.

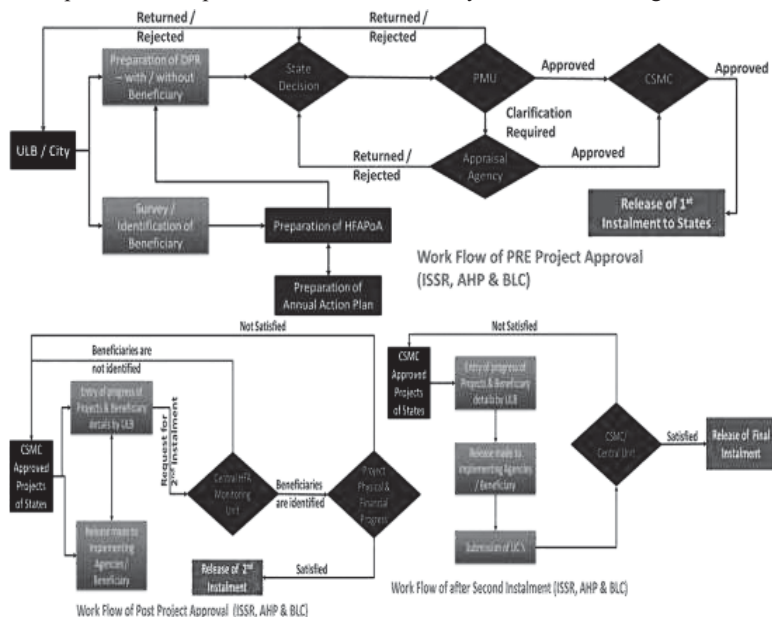
Following processes/modules incorporated in PMAY (U) MIS: -

- Demand Survey - Submission of application i.e. Demand Survey from Citizen/Beneficiaries/ULB/Urban Development Authorities.
- Validation of demand survey from ULB/ Urban Development Authorities
- Tracking of application status by Beneficiaries/ULB/ Urban Development Authorities
- Digitization of all project DPR entries
- Attachment of beneficiaries with projects along with on-fly demographic authentication of Aadhaar UIDAI.
- Uploading of RERA details of AHP and ISSR projects.
- Monthly submission of Physical status on each approved project by ULB.
- Monthly submission of Financial Status of each approved project by ULB. i.e., the total expenditure made to beneficiaries and implementing Agencies through Central Share, State Share, ULB Share, and Beneficiary share (if any).
- Uploading of a work order issued to contractors/Implementing Agencies for AHP/ISSR projects.
- Generation of Allotment letter to beneficiaries under AHP/ISSR vertical (either through bio-metric or OTP-based authentication).
- Generation of sanction order for releasing Central Assistance from Ministry to States/UTs.
- Submission of Utilization Certificates by States/UTs in r/o of Central Assistance released.
- Moderation of geo-tagged images of AHP/ISSR projects from ULB and State Login.
- Capturing details of a legal heir in case of death of beneficiaries.
- Generation of drill-down reports from National - State - City up to beneficiary level.

The scope and horizon of the PMAY(U) MIS has been enhanced through its integration with other websites, Dashboards, mobile applications, MIS systems of other stakeholders like PRAYAS PMO PORTAL, NITI AAYOG, UMANG Platform, UIDAI, PFMS, CLSS Awas Portal (CLAP), DBT Mission Portal, NRSC/ BhuvanHFA mobile application and web portal, PMAY(U) Mobile Application, BharatHFA, My Gov, Ministry Dashboard, MIS of PMAY(Grameen), NIP (National Infrastructure in Pipeline), etc. for the following:

- To showcase the performance of the Mission, including geotagged images.
- To accept applications from citizens/beneficiaries through the platform of other stakeholders.
- To share projects/beneficiaries' data to capture further desired information from the platform of other stakeholders.
- To validate beneficiaries before allowing them to access their information from different platforms.
- To accept reverse MIS information from other stakeholders.

- To perform de-duplication of the beneficiary with other housing schemes.



Improvements/ Enhancements

PFMS Implementation and e-finance Module: Public Financial Management System (PFMS) is a real-time online integrated financial management system used as a comprehensive payment, receipt, and accounting system of Controller General of Account, Government of India. PFMS has an active interface with banks, India Post, NPCI, and RBI to provide a common platform to all the stakeholders viz. Ministries, States, UTs, ULBs, and other Implementing agencies to carry out all types of financial transactions including DBT payments to the validated beneficiaries/Implementing agencies. E-finance Module in PMAY (Urban) MIS and integration with PFMS: To maintain this benchmark for coming years and provide a unique platform to generate and track funds' disbursement, an e-finance module has been developed recently within PMAY (U) MIS and its integration with the centralized Public Financial Management System. After a successful implementation system, it will automatically generate a Utilization Certificate and alert management to monitor the parking of funds at various levels which will lead to more prudent financial management. The E-finance module will provide a unique platform to all stakeholders (States/UTs/ULBs/ Implementing Agencies) for disbursement of DBT payment to validated beneficiaries directly from the PMAY (Urban) MIS system. e-finance module has been integrated with all modules of the PMAY (Urban) MIS system like a beneficiary, project, DBT, Monthly Progress Report (MPR) i.e., Physical and Financial progress, Sanction and Utilization Certificate in order to provide ONE SOLUTION to all stakeholder to have complete monitoring Starting from approval to the implementation of the project, DBT Expenditure and up to the parking of funds at various level. Major validations have been imposed in the MIS system to generate payment file-based only after the construction stage geo-tagged

through BhuvanHFA mobile application. It will be a Flexible Solution for all State/UT will be able to set rules and processes of their payment in the module.

ENABLER

Processes Re-engineered

A modest beginning was enabling Citizen Demand for House module in MIS software to help citizens directly submit their demand for houses through online registration without any cost and visiting Government establishment. The next important and logical step was to integrate with the UIDAI server via API mode to perform on fly-demographic authentication of the Aadhaar information of the citizen as per registration form with the Aadhaar information available in UIDAI database before final submission. Aadhaar was also kept as a unique identifier to perform de-duplication checks of beneficiaries among all verticals of the Mission and with PMAY(Grameen). 1.65 Cr demand for houses was obtained directly from the citizen and out of which 1. 12 Cr demand has been successfully validated through ULB/State/UT in the MIS system. The next challenge was to maintain the information of more than 22,000 projects along with their signed documents of statutory approvals (SLAC, SLSMC, CSMC) at commonplace i.e., PMAY(Urban) MIS which can be accessed 24X7 from anywhere by all concerned stakeholders for faster decision making. ULBs/Cities submit details related to Implementing Agency, Total Dwelling Units, Project Cost, Project Area, Total Central Assistance Sanctioned, State/ULB Share, Beneficiary Share, etc. Category-wise and Gender wise break of dwelling units to be allotted to the beneficiaries in the project was developed in the MIS module. Monitoring progress on each approved project in PMAY (Urban) along with tracking of fund disbursement to beneficiaries through Central share, State share, or ULB share thus became easier. Details of beneficiaries are captured in the MIS system, and the same data has been linked with their other information fetched from different modules and mobile applications like their spouse details, family details, geotagged images of constructions stage, payment status, benefits transfer to the beneficiaries and allotment details. Real-time, 24x7 access to reports & dashboards is provided to all stakeholders. One can drill down reports to track individual beneficiaries as well. Provision for customized reporting is also enabled across multiple dimensions. The evolution of the holistic decision support system took a quantum leap with the integration of National Remote Sensing Centre (NRSC) based space technology through the Bhavan HFA mobile application. Which envisaged tracking the progress in the construction of individual houses under Beneficiary Led Construction (BLC) houses through geotagged photographs of five stages captured as 'Not Started', 'Foundation', 'Lintel', 'Roof' and 'Completed' along with the comments of the surveyor. This data usually consists of latitude and longitude coordinates, though they can also include altitude, bearing, distance, accuracy data, and place names, and perhaps a time stamp. In order to enable geotagging functionality, the Bhavan HFA web server had been integrated with PMAY(U) MIS server via web-services API on daily basis. After getting geo-tagged information in PMAY(Urban) MIS, the system integrated such information in other modules which played a major validation in MIS software related to releasing funds. For each BLC house constructed under PMAY (U), beneficiary ID had been generated in PMAY (U) MIS and the same had been shared with Bhavan for geo-tagging. The detail of the house and beneficiary is essential as it solely describes the house type, quality, and descriptive location of the house. Thus, 35,000 surveyors identified 60 Lakhs BLC houses house through geotagging at various construction stages. To ensure transparency, accountability, and good governance, all moderated geo-

tagged photographs for both BLC houses and AHP/ISSR projects were made available in the public domain. With accumulated experiences and learning, the MIS continued to grow. The latest addition was aimed at doing away with manual offline processing, generation of sanction and release order, and in turn development of “Sanction and Release Module” within the MIS system. Now it is easier to generate sanction orders online based on MIS compliances and beneficiary data. The sanction and Release Module was linked with the project and beneficiary module.

To provide ONE SOLUTION to all stakeholders to have complete monitoring Starting from approval to the implementation of the project, DBT Expenditure, and up to the parking of funds at various levels. For working faster, new branding experience, and better personalization, PMAY (Urban) Mobile application was developed. PMAY (U) Mobile App is available in Android Play Store and IOS App Store respectively. The app allows beneficiaries of PMAY (U) to upload photos/selfies of houses and videos of their stories/testimonies and experiences of owning a house under PMAY (U) along with Geo-attributes. Moreover, all the personal data uploaded in the mobile app is with the consent of PMAY (U) beneficiaries. This mobile app also allows CLSS beneficiaries to track the status of their application through the CLSS tracker. One of the largest ongoing campaigns through the IT platform by the mission was launched aptly called ANGIKAAR. The ANGIKAAR Module in PMAY(U) Mobile App. was integrated in a real-time basis with PMAY(Urban) MIS to store need assessment survey details along with geo-tagged photos of the beneficiary in the PMAY(Urban) website. The module was also integrated with the Ayushman Bharat Scheme and Ujjwal Scheme for eligibility check and application of Ayushman Bharat Card or Ujjwal Scheme for PMAY (U) beneficiaries. Through this campaign, more than 18,000 ARPs conducted around 18,00,000 Need Assessments across States/UTs. Credit Linked Subsidy one the verticals under Pradhan Mantri Awas Yojana (Urban) where interest subsidy on a home loan is provided through Central Nodal Agencies (CNAs) and PLIs/Banks to the EWS / LIG/ MIG beneficiaries for purchase, construction, or enhancement of house. To provide ease in the processing of the individual application, verification at the initial stage, timely release of subsidy, transparency, and minimizing grievances a web-based real-time monitoring system i.e., CLSS Awas Portal (CLAP) was developed. CLAP integrates all stakeholders i.e., MoHUA, Central Nodal Agencies (CNAs), Banks/PLIs, Citizens, and Beneficiaries to one common platform. The software works in tandem on a real-time basis with the UIDAI, CNAs, PLIs, and PMAY (U) MIS system for Aadhaar validation and de-duplication with other verticals of PMAY (U). And inbuilt CLSS Tracker tracks application status at their convenience which has resulted in a substantial reduction of grievance. PRAYAS PMO PORTAL, NITI AAYOG, UMANG Platform, UIDAI, PFMS, CLSS Awas Portal (CLAP), DBT Mission Portal, NRSC/ BhuvanHFA mobile application and webportal, PMAY(U)Mobile application, BharatHFA, MyGoV, Ministry Dashboard, MIS of PMAY(Grameen), NIP (National Infrastructure in Pipeline) are such platform. In an evaluation done by DBT Mission under Cabinet Secretariat, the Ministry of Housing and Urban Affairs was ranked as the 'best overall performing Government Department' in implementing Direct Benefit Transfer (DBT) for FY April 2019- March 2020. And the PMAY (U) is the only DBT Scheme in the Ministry till then. PMAY U MIS did play a pivotal role in the implementation of mission goals. In fact, program MIS is increasingly viewed as a central plank that holds together various components of 4 verticals and it is key to ensure efficient and reliable implementation of programs, as well as to enhancing transparency and good governance. In fact, several functionalities of like convergence with other portals of the government further helps in achieving mission objectives.

Technologies

Many citizen-centric IT solutions have been designed, developed, and deployed for PMAY(Urban) by the Ministry of Housing and Urban Affairs (MoHUA) for transparent dissemination of information to Citizens/Beneficiaries and facilitating States / UTs / ULBs / Implementing agencies to digitize their work processes and monitoring the progress of implementation of PMAY(Urban) through MIS, Mobile Application, Geo-Tagging, Website, Dashboards, etc. Apart from PMAY-U MIS, Mission intends to incorporate emerging technologies, Machine Learning, Artificial Intelligence, Blockchain, Internet of Things (IoT), Robotic Process Automation (RPA), Big Data analytics, etc.

People

- Total Staff at State/City level Deployed for MIS Entry:2400
- Total ARPs registered to capture Need Assessment:17,776
- Total Surveyors and Supervisors Registered:26,000
- Handholding support to all States/UT staff
- Conducted National, Regional, State Level/City Level Training workshops to all ground level staff with respect to all ICT-enabled tools like MIS, website, Content Management systems, Mobile Applications, Geo-tagging.
- Developed and disseminated the following modules
 - o Standard Operating Procedures
 - o Advisory Note for different modules
 - o Process Flow Charts
 - o Instructional Manual
 - o FAQs
 - o Video Tutorials
 - o User Manuals

Technical support via Phone calls, WhatsApp groups, emails, and letters.

VALUE INDICATORS

Learnings for sharing

Challenges

- Physical monitoring /routine inspections by State/City Level officers caused delay and was a difficult exercise to monitor the progress of implementation of PMAY (U) on the ground.
- To develop a state-of-the-art fully computerized Management Information System on the PMAY(Urban) Scheme of the Ministry.
- To integrate MIS with various systems such as UIDAI, DBT Mission, UMANG, etc.
- Dynamic addition of demand, projects, beneficiaries, funds.

Constraints

- To handle data transmission efficiency and in a secure manner

- Internet connectivity

Best Practices

Technology solutions such as Aadhaar integration, demographic authentication, e-gn, bio-metric authentication, etc. were used to make the platform robust. To validate the authenticity of the beneficiaries, the MIS system captures unique ID information, i.e., the Aadhaar Number of the beneficiary. Before submitting information in the database, MIS mandatorily performs demographic verification of Aadhaar details of the beneficiary from the Unique Identification Authority of India (UIDAI) server on the fly. Later, a de-duplication process has been implemented in the software to allow the beneficiary to avail benefit in only one vertical of the scheme. Classification of data is State Wise, City Wise, Implementing Agency wise, Project Wise, Beneficiary Wise. Usage of mobile phones of the beneficiaries to validate their identity.

Use of Mobile App & Geospatial Technology

The PMAY(U) MIS is equipped with Geo-tagging features and integrated with the BHUVAN Portal of National Remote Sensing Centre (NRSC) and BHARAT MAP of National Informatics Centre (NIC) for monitoring the progress stage-wise construction through geo-referenced photographs of houses/projects under BLC and AHP/ISSR verticals using space technology. BhuvanHFA Mobile Application – Geo-referenced photographs of five stages ('Not Started', 'Foundation', 'Lintel', 'Roof' and 'Completed') of houses being constructed under the BLC Component. BharatHFA Mobile Application- Geo-referenced photographs of AHP / ISSR projects (Location-wise, construction technology-wise, block-wise, construction stage-wise). 8 types of construction technologies have been incorporated which enable a surveyor to tag construction technology of each block of the AHP/ISSR project. Further, necessary validations have been incorporated in the MIS system for States/UTs to release funds to the beneficiaries. based on the construction stages geo-tagged. More than 60 Lakhs houses were geotagged at various stages to show the performance in real-time. The geo-tagged phases of the projects have provided accurate information to the decision-makers to manage effectively. Geo-spatial technology helped in providing locational intelligence for the PMAY program. The project & project financial were integrated with locations for visualization. Choropleth maps were used for effective display and drill down to the project location. The geo-spatial dashboard provided visual status progress. PMAY-U services were also integrated with other platforms such as UMANG, CSC to provide real-time information about the status to the citizens. PMAY(U) Mobile Application: Further, PMAY (U) Mobile application has been integrated with PMAY (U) MIS system to bring beneficiaries, citizens, and other stakeholders directly in contact with the Mission. The application allows beneficiaries to upload photos/selfies of the house and videos of their stories/testimonies and experiences of owning a pucca house under the Mission. The Mobile application allows beneficiaries to upload information only after their on-fly validation from PMAY (U) MIS based on their registered mobile number. Only after successful validation, mobile application displays information of the beneficiary as available in the MIS system. Therefore, this integration has been proved to avoid any fraud in data usage. OTP, Biometric, and digital signature-based authentication have been implemented in the system to authorize the users. Beneficiaries can also track their application status through CLSS Tracker inbuilt in-app. The mobile application has been designed with the objective to provide zero expenditure for the User, the city, and the State and Central Government. This exercise would previously incur costs for Center, State, and City level staff who would

have to travel to each beneficiary house for the purpose of audio-visual documentation. The Angikaar Module in the mobile application has been linked with the MIS system to capture the Need Assessment of PMAY (U) beneficiaries to check their eligibility and provide the benefits from the other social sector schemes in a real-time environment. This avoids manual intervention and time consumed in helping beneficiaries to avail benefits of other schemes. PMAY (U) mobile app works in tandem in real-time with the Ayushman Bharat and Ujjwal schemes to check eligibility and provide benefits under the scheme to PMAY (U) beneficiaries. PMAY(U) website www.pmay-urban.gov is a platform for reporting of progress on different dimensions of the program. Different types of reports are configured for different stakeholders on the basis of their roles & responsibilities. Almost real-time, 24x7 access to reports & dashboard is provided to all stakeholders. All the photographs and videos captured via the mobile app are available in the PMAY (U) web portal. All the magazines, compendiums, and testimonials of the beneficiaries using the PMAY (U) Mobile App and CMS will be shown under SLNA login in the CMS portal for its moderation.

Digital Empowerment

- Paperless system
- Cost reduction due to paperless and cashless system
- Reduction of cost/time in IEC activities
- Digitization of end-to-end workflow has saved resource cost, as monitoring has been automated.
- Time in the manual generation of reports has been drastically reduced.
- Time to take the approval of authorities like ULB/State/Center has been reduced. The entire MIS system has been designed in a workflow manner to escalate/forward data from ULB to State and Then from State to Center User for their approvals.
- Citizens can submit their demands in the MIS system without login and without any fees.
- Citizen can track their application status by entering Assessment ID.
- Online reporting on the progress of the scheme by all stakeholders
- More accurate and speedy on reporting
- Individual beneficiaries can be tracked
- Less time-taking and less error-prone
- Approval/moderation of data movement from ULB to State to Centre in MIS only.
- Improved monitoring made area-specific planning and decision-making possible.
- Increased transparency due to accurate data, which made the program effective and efficient.
- Can generate reports based on multiple criteria
- Option to select the output of the report in tabular form
- Provision to export the reports to MS Excel.
- Used by Center, States, and Cities, PMU, Appraisal Agency CSMC for monitoring progress

- 24 x 7 online access to the Portal for all the stakeholders.

Green e-Governance

Angikaar Module in PMAY(Urban) Application and Application convergence with various schemes like PMJAY for Ayushman Card, Ujjwal Objective of the Initiative. The objective of the campaign is to create awareness on best practices of water & energy conservation, sanitation, and waste management, through behavior change and convergence with other schemes of the Government through need assessment and door-to-door awareness. Some of these social change requirements are detailed below:

- Adapting to the shift from a kutchha house to a pucca/ apartment lifestyle:
- Acclimatizing to closed private spaces and comfort within the house:
- Appropriate use of common areas and open spaces:
- Use of infrastructure facilities inside and outside the house (lift, bedroom, kitchen slab/sink, shelves, lofts, cistern, etc.)
- Converge for uptake of services from schemes of Urban Missions and other Ministries.

Technological Solution the implementation of the initiative

Usage of IT platform for need assessment and other activities under the campaign were deliberated to drive the implementation by various States/ UTs/ ULBs, through their active participation right from its conception. Accordingly, a mobile app has been developed for both Android and IOS users. The mobile app served two aspects of the campaign components of Need Assessment for convergence i.e., Ayushman Bharat and Ujjwal and Door to Door awareness for PMAY (U) Beneficiaries through Angikaar Resource Persons (ARPs). The need assessments presented a clear picture of the required areas convergence and further necessary action. Video e. tutorial on the process of conducting Need Assessment by ARPs has been developed for wide usage by States/UTs for the purpose of capacity building and State and City level. This helped ARPs to understand the process and enter data accurately through PMAY (U) Mobile Application.

The positive impact generated due to the technological solution implemented availability database maintained for beneficiaries and their contact details helped in taking a decision to launch the successful campaign to create awareness on best practices of water & energy conservation, sanitation, and waste management, through behaviour change.

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PMGSY III | Process Re-engineering and Use of Emerging Technologies for the Planning of Rural Roads

Ministry of Rural Development, Govt. of India & National Rural Infrastructure Development Agency

Alka Upadhyaya, Bharat Pradhan and Ashish Kumar Goel

PROJECT OVERVIEW

At key the Project is the question:

“How do you select 1,25,000 km out of India’s 40,00,000 km rural road network which best meet policy objectives of access to schools, hospitals and markets while ensuring special-interests don’t hold undue influence on the process but democratic voices are considered.”

For baseline and comparison, we can take PMGSY-II, the scheme that preceded PMGSY-III (our case).

At the technical level the Project can be divided into the following sub-interventions:

- Digitizing 2.5 mil km road and 1 mil Habitations on GIS
- Geo-tagging of more than 7, 7 lac + rural facilities (high schools, warehouses, CHCs etc) with photos.
- Modularizing and digitizing the entire process on OMMAS – with validations, freezing, maker-checker & automated priority list generation etc.
- Trace Maps: A sophisticated multi-objective transport planning algorithm which identifies the routes used by habitations to access their nearest high school, hospital etc (All 22 basic destinations facilities as identified by policy). For every habitation these 22 basic routes are identified (~22 mil routes for 1 mil habitations) and the information is broken down at the road level to identify the importance of each part of India’s rural road network weighted by the importance of destinations facilities and source population. This information is converted into user-friendly block level maps where roads are colour-coded & ranked by importance.
- Road Surface Classification Model: A ResNet34 based deep learning model trained in-house to classify images as good or poor which has 92% accuracy. It is used to identify road proposals which are majority in good condition but still being proposed.
- Anomaly Detection Model: An ensemble of expert domain rules and unsupervised anomaly detection algorithms to identify proposals which have abnormal cost and design such they can be verified in detail by central team.
- GeoSADAK: A GIS-ERP which allows PIUs to draw alignments of roads to be proposed directly online and for SRRDA to verify and accept them and submit to NRIDA for further verification and sanction. The website allows looking at proposed alignment on various basemaps (OSM, Bhuvan, Google) and hosts 14 additional layers such as forests, water bodies etc to help conduct “Planning Audits”.
- Introduction of “Planning Audit” stage: High-level audit stage where proposals are verified for utility and equity using GIS, remote sensing and other algorithms.

Hardware/Software

There are multiple tech-components in the Project:

- OMMAS – Main MIS: OMMAS system has been designed and developed using MVC architecture using Microsoft Technology.
 - o Computing Platforms: Dedicated Physical Server as a hosting infrastructure.
 - o Application Development Technologies: .NET Framework 4.5 with MVC architecture.
 - o SSRS, Bootstrap Query, CSS.
 - o Development Frameworks: Entity Framework with MVC architecture
 - o Development Environment: Visual Studio, Android Studio
 - o Database Platforms: Microsoft SQL Server
 - o Mobile Platforms: Android, SQLite, Firebase, Ionic
 - o Web Platforms: IIS, Network Load Balancer
 - o API Platforms: Restful API and SOAP
 - o Analytics: Microsoft Power-BI and highcharts
 - o Security: SSL, DSC, Cryptography
 - o Reporting Platforms: SSRS
- Trace Maps: PyQGIS, Python, GRASS (Network Analysis) and QGIS 2.7+
- SADAK-AI: ResNet34 architecture deep network in Python (PyTorch)
- Anomaly Detection Tool: PowerBI + Custom Rules
- GeoSADAK: WebGIS, Spring Framework, (OSM, Bhuvan, .NET CORE, OpenLayers]

Certification (Certifying Agency)

Yes

Disaster Recovery and Service Continuity

OMMAS application has been awarded security clearance certificate by the empanelled agency Subsequently Cyber Security Group of NIC.HQ approved the security clearance certificate and declared application safe for hosting at NIC 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
		Cumulative Aug 2018-2021
Length Sanctioned	Total kilometer of roads sanctioned under PMGSY-III.	62,968 out of 1,25,000 km target till 2025
Length Awarded	Total Length Awarded (Tendered) online through GepNIC	51,653 km out of 62,968 km

Length Constructed	Total number of length constructed under PMGSY-III	15,581 km out of 51,653 km
Number of Trace Maps Generated	Total Trace Maps Generated Block-wise	6613 Trace Maps
Number of Candidate Roads Identified	Total Candidate Roads Identified Across the Country	1,41,308 Candidate Roads
Number of Proposals Drawn on GeoSADAK	Number of Prospective Proposals Drawn on GeoSADAK (GIS alignment)	6636 (51,608 km)
Number of Roads Flagged by Anomaly Detection Tool	Total number of road proposals flagged by Anomaly Detection Tool for Further Cost Scrutiny.	1213 Proposals
Number of Geo-Tagged PCI Pictures Uploaded	Pictures uploaded twice per kilometer to validate the condition of the road.	20,87,811 geo-tagged pictures
Number of Proposals Flagged by SADAK-AI	Number of Proposals Flagged by SADAK-AI to be potentially ineligible or candidates of cost economy based on parsing photographs by AI	242 Proposals
Number of Facilities Geo-Tagged	Total rural facilities geo-tagged across the country to aid planning of rural roads	7,90,000 facilities
Number of Habitations Geo-Tagged	Total number of habitations digitized on GIS.	9,90,000 habitations
Length of Rural Road Network Digitized on GeoSADAK	Total length of rural road network digitized on GIS.	28,96,933 km
Number of CUCPL Generated	Number of System Generated Priority Lists (Block wise, Batch-wise).	6269 System-Generated Priority Lists.
Number of Roads Pushed to GepNIC from OMMAS	Number of Roads Pushed from OMMAS to GepNIC through API for centralized online tendering and tracking.	8008 works
Digital Payments Made to Contractors through PFMS	Total Payment Initiated to Contractors Under PMGSY-III through PFMS.	7802 Cr
Digital Signatures	Number of Digital Signatures Registered to Conduct Online Payments.	1300

Implementation

PMGSY-III is a national scheme which will be rolled out in all states and UTs in the country by 2025 given they meet the eligibility criteria (i.e. complete PMGSY-II etc).

- Trace Maps Generated in 6613 Blocks out of 6816 Rural Blocks.
- Priority Lists Generated in 6269 Blocks out of 6613 Blocks where Trace Maps generated.
- 68% of the Roads Sanctioned has Top-15 Roads recommended by the Trace Map.
- 62,968 km out of the total target of 1,25,000 km has already been sanctioned since the launch of the scheme in August, 2018 even with the new extensive processes and COVID related lockdowns
- 51,608 km GIS alignments of the proposed roads have been drawn on GeoSADAK.
- 51,653 km out of 62,968 km has been awarded/tendered to contractors using online tendering system.
- 8008 works have been pushed to GEPNIC (central online tendering system) through OMMAS through API.
- 7802 Cr expenditure made against PMGSY-III roads where construction has started.

Improvements / Enhancements

- All improvements mentioned in the Proposal have been released/enhanced in approximately in last 1 year.

Planned Functions

- Integration with SADAK-AI directly with OMMAS to create sample lists automatically. Currently it needs to be run offline and requires expertise. Further, improve the accuracy of the SADAK-AI v1 model.
- Add more heuristics to the Anomaly Detection tool to improve precision in sampling for higher cost and bad design roads.
- Improving speed of certain modules which is time taking.
- Further develop Project Management Information System modules with better analytics and finer graphics.
- Releasing PMGSY facilities, habitations and DRRP GIS data for wider use in the country by academia, start-ups and other government departments.
- Improve Trace Maps algorithm will be improved to consider habitations which are outside of the block and score inter-block roads more fairly.

ENABLER

Processes Re-engineered

For baseline we will consider the process in PMGSY-II, scheme preceding PMGSY-III with similar policy but target of only 50,000 km.

Brief Baseline Process for Selection of Roads [PMGSY-II]:

- Each District (PIU) had to first begin with a tabular inventory of all habitations, roads and rural facilities in the District.

- PIU would identified 5-10 routes ie "Candidate Roads" (created out of a pool of say 100 roads in the block) which they believed best met the policy objective.
- "Utility Value" of only these routes will be calculated on the basis of habitations that lay on the route, their population and the rural facilities they have. PIU tagged these benefitted habitations manually.
- As only roads with poor condition were permitted i.e. <2 PCI index, the District Engineer would also do a text entry for the PCI of each "Candidate Road".
- Eligible Candidate Roads are then proposed in order of decreasing Utility Values till the target for the block is saturated.
- The entire process from inventory to calculation of utility values was done offline in a single excel workbook and the final results were uploaded on the national MIS in one-go.
- NRIDA will then call a random number of Detailed Project Reports to scrutinize the design and cost of proposals and provide feedback to state.
- Post compliance the roads will be sanctioned by an Empowered Committee.

Problems with earlier process:

- Inventory was tabular whereas roads, habitations and facilities are inherently spatial.
- Selection of 5-10 routes which are considered as "Candidate Routes" and "Benefitted Habitations" was completely left to PIU. If one can select who participates in a race - one can virtually script the results of the race. This amidst powerful vested interest in which road should be selected.
- No large scale independent rural road usage/traffic data
- Easy manipulation of "benefitted habitations" or "facilities" till desired priority of roads is generated.

New Re-engineered Process:

- Before – the rural road inventory and habitation list were tabular and data entry based but now more than 2.4 mil km of rural roads and 1 mil habitations are on GIS.
- Before –rural facilities data was prone to manipulation but now it is replaced with mobile app based geo-tagged survey with audits
- Before – the process was largely offline and manually administered through spreadsheets but now it was in-situ, modularized, online and packed with validations, maker-checker checks etc.
- Before – the selection of a candidate routes was subjective and limited to 3-4 candidates/block but now the top-15 roads as recommended by the "Trace Map" algorithm had to be considered as part of the candidate routes. This ensures there is fair competition between the roads and the PIU cannot cherry pick candidate roads to get desired result. More than 66% of the roads selected to date are in Trace Map's Top-15 recommendations.
- Before - manual mapping of benefitted habitations for utility calculation; now auto-fetched from GIS
- Before – the DPR scrutinized by the central team were identified randomly but now the sample is decided with anomaly algorithm.

- Before Sanctioned Proposals were tendered online on GepNIC website but there was no link between OMMAS and GepNIC; now Packages are pushed to GepNIC through OMMAS allowing for micro-monitoring stage-wise for each stage of tendering.

Technologies

Trace Map Algorithm: A key limitation of the existing process was that one can cherry-pick the candidate roads to get the desired outcome. If an engineer is interested in a particular route to be selected, he or she can identify 3-4 other routes with predictably lower utility value and enter all of them together in the system. This way the final results or sorting can be premeditated. There could be in theory other probable high scoring candidate routes in the block which weren't considered by the engineer and hence weren't scored. This problem can be solved if there were a way to ensure that candidate roads selected were competitive and represented roads which best fit our policy within a block. This is a difficult task to do because there can be unlimited candidate routes possible (combinations) within a block and there is no third party data on the usage of roads within a block which makes us rely only on the District Engineer. The algorithm iterates through every habitation within a block to identify the nearest facility each among 23 kinds of facilities as listed by the policy (bedded hospital, degree colleges etc). For a habitation, you'll get a maximum of 23 such routes. Once all the shortest routes have been identified, the algorithm iterates through each of the roads identified as part of various habitation-facility shortest routes and sums population relying on the road weighed by the policy prescribed importance of the facility. The total weighted population benefiting from each road is then used to rank all the roads in descending order of priority order.

The algorithm operates at block level and ranks each road within the block. A user friendly A1 sized PDF map is generated which displays the entire map of the block along with rural facilities and habitations. Additionally, the roads are colour coded from green to red and have varying thickness based on the population depending on them as per the algorithm.

Now in the case of cherry-picking, even if the District Engineer identifies 4-5 candidates scoring lower than his or her preferred route, the mandate to add the top-15 roads recommended by the Trace Map will possibly prevent the rigging by ensure the completion is fair with the assumption that Trace Map rank roads also eventually do good at Utility Value.

To check if our assumption held true, we can identify the number of roads which eventually get proposed and whether they contained any of the Trace Map's recommended roads. For a road to be proposed, not only does it have to have a higher Utility Value within the Block as compared to other candidate roads, it also has to not get eliminated by one of the many eligibility requirements (poor condition, out of contractual warranty etc).

Overall, the entire process re-engineering has made the process more evidence and data based.

People

- Any initiative that is using new technology should be followed with intensive capacity building and increases of resources otherwise the introduction of technology can be counter-productive and existing duties of the staff will be adversely affected.

- Resources
 - C-DAC manages the existing MIS under PMGSY. Pre-empting the IT intensive nature of PMGSY-III, the manpower agreement between NRIDA and C-DAC was modified to increase the staffing by more than 30%.
 - NRIDA created a position and hired in-house Data Scientist & GIS Specialist to lead the algorithmic and GIS intervention envisaged under PMGSY-III
 - SRRDA (state counterparts) were provided with funding to setup GIS Cells in their headquarters. This included hiring GIS analysts and the purchasing the necessary hardware for efficiently running GIS software.

Capacity Building

- NRIDA created a practical GIS curriculum to train road civil engineers the practical concepts of GIS with examples and exercises based on PMGSY. All interested officers in SRRDA were provided this training over a period of 7 days.
- Continuous Trainings were provided (initially in-person, and eventually through video conferencing) to all officers involved in the PMGSY-III pipeline. Earlier, usually a single training was provided to the states (PMGSY-II). Now, 3-5 trainings were provided to each state with refreshers courses, practical's etc on just the PMGSY-III planning process. Each module separately had its own stakeholders and trainings. Eg. There were trainings for Geo-SADAK for the GIS Nodal Officers, trainings for the new PMIS module for the Data Entry Operators and the M&E officers etc. In total, in the last year more than 500 hours of trainings would have been provided across the country just pertaining to the technical aspects of PMGSY-III.

Leadership Support

- Such leap-frogging changes in high-stakes situation require significant leadership support. From ensuring the new process was enshrined in the policy document, facing backlash to acting on the fraud/anomalies detected by the use of technology. NRIDA, CDAC, SRRDA and MORD were all on the same-page pertaining to the reforms to be instituted under PMGSY-III.

Management of Change

- Selection of roads is political and high-stakes situation. Many high-level meetings were had with elected representatives both at the centre and at the state to get acceptance for the new and improved process of selection of roads.

VALUE INDICATORS

Learning's for sharing

- Investment in Data and Infrastructure: Most of the work was dependent on the digitization of the rural road network and habitation data. This is a massive exercise and couldn't have been completed from scratch had it been initiated with the launch of PMGSY-III. In fact, the digitization exercise was initiated in the year 2015, much before PMGSY-III or its policy was even envisaged. It is necessary for departments to invest in such strategic infrastructures even before its precise usage can be envisaged as these exercises take significant time.
- Data Quality is linked to State Capacity: Algorithmic or data-driven interventions commonly require data to be in a clean and structured format. For example, the

Trace Map algorithm requires the data for all the roads and habitation to be digitized on GIS even if most of the smaller tracks/links which are added to complete the network have little chance of being taken under the program, they still nonetheless contribute to the network and help in identifying other important routes. The states with poor data will be further punished by poor algorithmic results (assuming the algorithm is net positive). One can argue, the state most in need of welfare support will require more time to meet algorithmic or data prerequisites, thereby delaying welfare even more.

- **Even Simple Algorithms have assumptions which can adversely impact certain sections of the society:** There is growing research on how AI/ML systems should be made fair, accountable and transparent. In many cases, algorithms don't impact different subsets of people in the same manner. During the design of the algorithm, there are many abstractions and assumptions made about the domain. It matters then what we consider as the start of the habitation from the road perspective.
- **Building In-house capacities for Emerging Technologies:** It is important to inject necessary capacities to the eco-system before introducing technologies which are non-traditional or even extensive. The Trace Map algorithm was developed in-house by the Data Scientist and GIS Specialist employed at NRIDA. Creating a custom algorithm with so many adoptions commercially would have been an expensive and long-drawn process which wouldn't have been able to meet the necessary timelines. Similarly, the states were provided funding and support to setup GIS Cells within their rural road departments so that they can lead the GIS related pre-requisites for PMGSY-III. Depending on existing staff for the same wouldn't have been practical and even counter-productive to existing duties of the staff. To address the added requirements, the agreement with C-DAC i.e., the technical service provider in charge of the MIS, was also updated to add additional resources to the team to be able support all the new requirements without harming the maintenance of the existing modules.
- **Relying on Free and Open Source Technologies:** The entire algorithm and the digitization effort were centered on QGIS which is free and open source GIS software. Essentially the cost of developing the algorithm was limited to the salaries paid to the Data Scientist and the GIS specialist. Depending on open-source software also made it easy to incorporate modifications quickly and also disseminate the software to every state without depending on purchasing extra user licenses etc.
- **Balancing Human Discretion is Vital:** The re-engineering of the Trace Map algorithms recommendation doesn't take away from the existing mechanism of incorporating democratic and citizen voices in the selection of roads. In PMGSY-II and in PMGSY-III, at various stages elected representatives are asked to provide feedback on the DRRP etc. In particular, when identifying candidate roads, the PIU has to specifically request the MPs and MLAs of the region for recommendations. The roads recommended by the elected representatives along with the roads recommended by Trace Map are together submitted into the system. The final scoring and prioritization is based on Utility Value which is the same in PMGSY-II.
- **Using Old Media Technologies:** The deliberating designed the Trace Map tool to generate an user-friendly A1 size PDF which can be printed. An alternative

would be to create a digital, interactive and online map which our engineers can login and use. As earlier discussed, the engineering staff on the ground is not very IT-savvy and they spend most of their time on the field i.e. away from the computer. The ground staff already uses paper maps and is comfortable with them. Also, paper holds special value in government (8).

Digital Empowerment

- A key concern of using emerging technologies in traditional settings is that it may make it difficult for the existing government staff to work if they weren't up skilled. While measures to build capacity were taken at all steps, that was not enough. Even various steps were taken in design to make it more user-friendly. For example, the ground staffs already use paper maps and are comfortable with them. Also, paper holds special value in government. This helped us embed the outcome of the algorithmic in the existing values of government. Even the design of the Trace Map in-terms of extensive use of color-coding etc was done so that it's easily usable irrespective of tech-literacy.
- As reported by PIUs on the field, the new process empowered them to rely on the system to be able to defend selection of optimal routes against roads recommended by special interests. In the earlier system, as it was largely offline and prone to manipulation, the District Engineers (PIUs) would sometimes submit to pressure-groups and select roads not always optimal to the policy. But with the new system, they could rely on its robustness and objectivity, and could use it as a way to deflect special interests.

Green e-Governance

- This is not relevant directly to re-engineering as PMGSY didn't lead to any additional hardware to be purchased and consequently the need to dispose didn't arise.
- The earlier process was extremely paper intensive right from DRRP inventory, facility survey, candidate road selection and priority generation. These processes were digitized completely and there was no need to separately manage these paper-documents offline.
- Further, GIS was used to identify proposed roads which were closer to coal and steel plants such that the slag from these plants could be recycled for construction of roads and therefore reduce the need for further quarrying and also reducing costs.

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SVAMITVA Dashboard (Survey of Villages Abadi and Mapping with Improvised Technology in Village Areas)

Ministry of Panchayati Raj, Govt. of India & National Informatics Centre, New Delhi

Alok Prem Nagar, Vishnu Chandra, V Uday Kumar, Jayanta Kumar Mishra and
Dhrubajyoti Sarma

PROJECT OVERVIEW

Objective

Online Monitoring and reporting dashboard of SVAMITVA scheme.

Scope (Functional &Geographical)

- Integration of important KPIs
- Integration of Property Card Prepared and Recipients data from State System
- Role based configuration in cascading manner viz.
 - o Central NIC administrator will create Ministry of Panchayati Raj Users, State Nodal officer, and State -SoI nodal Officer login credentials, based on registered Mobile number
 - o State Admin will act as State Administrator for creation of login credentials of District level and Gram Panchayat level officers based on their registered mobile number
- GIS Map based reports.
- Various statistical Report.
- Various analytical Report.
- Role based dashboard reports.
- Data entry forms and reporting forms at various login.
- User Management Module.
- Content management module.
- Onboarding State in Phase Manners where Drone Flying activity will start.
- Update the content through Content Management System.
- Integration of APIs from State Nodal department.
- 24 X 7 online access of Portal for all the stake holders.

Key Stakeholders

Following are the key stakeholders in the SVAMITVA Dashboard:

- Ministry of Panchayat Raj -
- National Informatics Centre
- Survey of India
- State Governments officers at various level

Hardware/Software

Operating System: Linux

Front End: Open Source (Spring Boot Java)

Web Server: Apache Tomcat

Back End: RDBMS (PostgreSQL)

The application is hosted on NIC Cloud Meghraj.

Certification (Certifying Agency)

Yes, Website <https://svamitva.nic.in> been provided with cyber security certificate from NIC and been periodically scanned for security issues.

Disaster Recovery and Service Continuity

Following Strategy are in place:

- Load Balancer with two active web servers are used to maintain continuous access to the application.
- The application hosted on a national cloud for ease of access and security.
- 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 e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
Digilocker	Integration of SVAMITVA Property Card with digilocker		6 States on boarded	On boarding of remaining States
Integration of drone survey activities related services	Integration of village level data for the drone survey activities viz. Drone survey, maps handed over to State, maps handed over to inquiry process etc.		9 States data was integrated	Integration of remaining States on boarded on Scheme in this financial year
Property Card related data	Property Card holder is integrated with Dashboard		6 States data was integrated	Integration of remaining States on boarded on Scheme in this financial year

Implementation

- Local Government Code Directory is used
- Function and Stored Procedure are created in Postgres
- APIs from 9 states are integrated

Improvements / Enhancements

During the last one year, Dashboard visualization module was developed. Modular Approach was used in designing the application. User management module with role-based activities completed. SMSs module to property card recipients to download the property card from Digilocker.

In next one year, following activities are planned:

- Module for member of parliament and member of the legislative assembly to visualization of activities
- Integration of SMSs to MP and MLAs about the Drone Survey. Mobile application for data visualization and upload.

ENABLER

Processes Re-engineered

The Manual process for of keeping records of each household information and providing the paper printout is completely automated.

There are APIs for Drone related activates from SOI and 2 APIs from each on boarding states for Property Cards. The APIs are scheduled and triggered automatically.

Technologies

Architecture – all services have independent tables. The application is hosted on NIC cloud.

People

Capacity Building

Training was provided to state revenue board and gram panchayat officials across 9 states tutorial of drone survey activities and Svamitva Framework are made available.

Leadership Support

The application is receiving guidance and support from highest authorities in the ministry:

- Sunil Kumar, Secretary, Ministry of Panchayat Raj
- Alok Prem Nagar, Joint Secretary, Ministry of Panchayat Raj
- Vishnu Chandra, Deputy Director General & Head of Group, NIC Training

VALUE INDICATORS

Learnings for sharing

The application has been planned as a stand-alone application with data entry modules for entering the data. However due to fast paced scheme progression and involvement of various organization at various stages, it has been decided to get APIs from key organizations – SOI and State Governments and integrate the data into the application.

Digital Empowerment

Svamitva scheme is a unique effort to empower household owners in the village Aabadi area to have property rights conferred on them and property boundaries capture using drone which gives milli meter accuracy of the boundary on ground.

This application sends SMS to the beneficiary who are receiving information about his Property Card with a link to his property card. The property card has been integrated with Digi-locker so that the beneficiary can share his details with Banks and other lending institutions.

The two measures of SMS access to property card and Digi-locker integration goes a long way in empowering beneficiaries and a great measure towards financial inclusion.

Green e-Governance

An important green computing practice is minimum requirement of hardcopies. The Svamitva dashboard have many Statistical and analytical Reports that generated through the application and view in the client Monitor.

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9. Law, Judiciary & Police

BADP-OMS

Department of Border Management, Ministry of Home Affairs, Govt. of India & National Informatics Centre, New Delhi

Sunil Kumar Barnwal, Manoj Jha and Deepak Kumar

PROJECT OVERVIEW

Objective

BADP-OMS is a comprehensive framework for complete life cycle of the BADP. It covers from planning and selection of the right schemes for development program to physical and financial monitoring of the schemes for their timely completion. Keeping in view the need of infrastructure in various villages of the border districts, OMS has been integrated with Mission Antyodaya. Mission Antyodaya provides the comprehensive infrastructure data, updated annually for the border villages. Districts submit their annual action plan online. There is a provision for geo-tagging of the each proposed works in the BADPOMS. All necessary documents related to Annual Action Plan are uploaded online by the districts. Then the States after verifying this action plan, recommends the plan to MHA on the BADP-OMS for approval. Online approval is granted on the proposed action plan by the MHA. BADP-OMS has enabled paperless submission, faster approval, and monitoring process of proposed plans and makes it paperless. Following are the different modules of OMS.

- Planning and Selection of Schemes
- Submission of Proposals
- Scrutinizing and approval
- Previous Legacy Data convergence and scrutiny
- Submission and monitoring of quarterly progress report
- Monitoring Dashboard
- Feedback System.

Planning and Selection of Schemes: Planning and Selection of the right schemes is done by the District Collectors with the help of dashboard having the facility to view all existing schemes habitation wise, inclusion of the habitation wise infrastructure data and gap analysis data of Mission Antyodaya. There is a complete drill down facility on the dashboard to see the detailed information.

Submission of Proposals: Submission of Proposals is four layered processes.

- Each proposal is entered as per format.
- Geo Location and Geo Tagged photographs of the site are captured through Mobile App
- All relevant documents are uploaded
- Forwarded to State with a unique ID.

Examples of various validations are as follows:

- Proposals are allowed to be submitted within specified dates
- Sectors and Sub Sectors can be selected from drop down list
- Habitations List should be within 0-10 Km distance from International Border as

per BADP Guidelines.

- Scope of Work should be within the predefined boundary values of respective sub sector.
- Geo Tagging of the scheme site and geo tagged photographs are mandatory to be submitted.
- All necessary documents are mandatory to be submitted.

Scrutiny and Approval: Scrutiny and Approval is done digitally. After submission from various districts, Annual Action Plan comes to the State digitally. It is scrutinized at the State level and then after considerations in State/UT level Screening Committee, it is forwarded to MHA for approval. MHA does the scrutiny of all proposals as per BADP Guidelines, one by one through a single screen, verifies all necessary documents and grant the approval digitally.

Previous Legacy Data Convergence and Scrutiny: All legacy data since FY 2014-15 was uploaded, converged, and validated by concerned districts. A previous data verification and discrepancy monitoring dashboard provided to districts, states and MHA for timely completion of the process. Red Colour area is the highest pendency area in the screen.

Submission and Monitoring of Quarterly Progress Report: Status of Quarterly/ Yearly Physical and Financial Progress is submitted by District Authorities followed by the geo tagged site photographs through Mobile App. It is also monitored at District Level, State Level and MHA Level. Pending submission is also visible on the Dashboard.

Monitoring Dashboard: Physical and Financial Monitoring is done at district level, state level and MHA level through the access-based dashboard. Dashboard also depicts various insights of the data up to the last level which enables various levels in effective governance. It gives the data insights for Physical Progress, Financial Progress, Quarterly Progress Review for Physical and Financial Progress, Sector and Sub Sector wise data insight etc. Through the dashboard, one can go to the last level of monitoring.

Submission and Monitoring of Quarterly Progress Report: Status of Quarterly/ Yearly Physical and Financial Progress is submitted by District Authorities followed by the geo tagged site photographs through Mobile App. It is also monitored at District Level, State Level and MHA Level. Pending submission is also visible on the Dashboard.

Hardware/Software

Technology & Framework	ASP.Net MVC
Operating System	Windows Server
Database	PostgreSQL
Email	SMTP
Web Server	IIS
Script	JavaScript, HTML, JQuery

Certification (Certifying Agency)

Yes

Name of Agency: AKS IT Services Pvt. Ltd.

Disaster Recovery and Service Continuity

Cloud storage media has replica of the system. In addition, separate disaster recovery set up is available at different location. In case of any kind of disaster, the system will get immediate response from recovery setup.

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-Planning	Planning and Selection of the right schemes is done by the District Collectors with the help of dashboard having the facility to view all existing schemes habitation wise, inclusion of the habitation wise infrastructure data and gap analysis data of Mission Antyodaya. There is a complete drill down facility on the dashboard to see the detailed information.			
eProposal's	Submission of Proposals is four layered processes. • each proposal is entered as per format. • Geo Location and Geo Tagged photographs of the site are captured through Mobile App • All relevant documents are uploaded • Forwarded to State with a unique ID. Examples of various validations are as follows: • Proposals are allowed to be submitted within specified dates • Sectors and Sub Sectors can be selected from drop down list • Habitations List should be within 0-10 Km distance from International Border as per BADP Guidelines. • Scope of Work should be within the predefined boundary values of respective sub sector. • Geo Tagging of the scheme site and geo tagged photographs are mandatory to be submitted. • All necessary documents are mandatory to be submitted.			

eApproval	Scrutiny and Approval is done digitally. After submission from various districts, Annual Action Plan comes to the State digitally. It is scrutinized at the State level and then after considerations in State/UT level Screening Committee, it is forwarded to MHA for approval. MHA does the scrutiny of all proposals as per BADP Guidelines, one by one through a single screen, verifies all necessary documents and grant the approval digitally.			
Previous Legacy Data Convergence and Scrutiny	Previous Legacy Data Convergence and Scrutiny All legacy data since FY 2014-15 was uploaded, converged, and validated by concerned districts. A previous data verification and discrepancy monitoring dashboard provided to districts, states and MHA for timely completion of the process.			
eQPR	Status of Quarterly/ Yearly Physical and Financial Progress is submitted by District Authorities followed by the geo tagged site photographs through Mobile App. It is also monitored at District Level, State Level and MHA Level. Pending submission is also visible on the Dashboard.			
e-Monitoring	Physical and Financial Monitoring is done at district level, state level and MHA level through the access-based dashboard. Dashboard also depicts various insights of the data up to the last level which enables various levels in effective governance. It gives the data insights for Physical Progress, Financial Progress, Quarterly Progress Review for Physical and Financial Progress, Sector and Sub Sector wise data insight etc. Through the dashboard, one can go to the last level of monitoring.			

e-Feedback	Annual Social Audit of the works completed in the border areas is carried out by local bodies of border districts/representatives of BGF concerned. Prabhari Officers are nominated for different districts for independent feedback on the development works undertaken in the border areas. The Prabhari Officers for the above purpose submit a report. Similarly Border Guarding Forces submit scheme wise feedback after site visit.			
e-Communication	All communication in various categories like Guidelines, Allocation Letters, DO Letters are being sent online to all States/UTs			

Implementation

- Developed a centralized system which is used by Border Districts, Border States, Department of Border Management, Ministry of Home Affairs, District Field Officers, Prabhari Officers, Border Guarding Forces to enter/approve/feedback of scheme status etc.
- Submission of Quarterly Physical and Financial Progress of the schemes, online submission of proposals, submission of Geo Location and geo tagged photograph are being entered regularly.
- Offline communication has been stopped by the department.

Category of stockholders are: Border Districts, Border States, Department of Border Management, Ministry of Home Affairs, District Field Officers, Prabhari Officers, Border Guarding Forces

Improvements / Enhancements

- The entire system is redesigned a redeveloped from January 2021 onwards.
- Inclusion of a system which can facilitate progress review of each scheme on GIS map.
- Integration of BADP-OMS with Public Financial Management System (PFMS).

ENABLER

Processes Re-engineered

BADP-OMS is enabling paperless G2G communication between Central Government, State Government, various border districts, Prabhari Officers, Border Guarding Forces etc. This enables a quick decision-making process of Government. In addition, it also helps in following way:

Data Generation: BADP-OMS has enabled the department to exhaustively capture data on its inputs, outputs, and outcomes at different levels i.e., District Level, State Level and MHA Level. Granular, unit level and high-frequency, real-time data is being generated with minimal manual intervention. Mobile App is used for submitting accurate Latitude and

Longitude of the project site, Geo Tagged Photographs.

Data Quality:

It covers processes of scientifically and statistically evaluating data to ensure that it meets the required quality benchmarks.

It endeavours for quality-at-entry by collecting verification checkpoints (e.g., location, photographs etc.) along with programmatic data using technology with minimal manual intervention.

Developed a robust design for data pipeline, in order to avoid duplication and redundancy of data.

Integration of datasets and cross-dataset consistency checks.

Regular and automated profiling/filtering of data at its primary processing level.

Technologies

The project is developed using open-source technology/platform. It has complete workflow-based architecture.

People

Capacity Building

Management of Change: After getting changes in requirement, impact analysis has to be done.

VALUE INDICATORS

Learnings for sharing

To make the centralized system, input was taken for conceptualizing the system. After development, feedback was taken from every stakeholder. Changes suggested by any stakeholder has been consolidated and after a feasibility study, implemented everywhere to make the system user friendly.

Digital Empowerment

The system is user-friendly so any user with least knowledge of computer can use system.

Green e-Governance

After developing this system, thousands of papers were saved in department due to online process. As the system is hosted on cloud, so approx. 80% of power saving in comparison with private hosting. Above few things to help green environment using this system.

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eDaakhil (Consumer Complaints Online Filing in Consumer Commissions)

National Informatics Centre, New Delhi

Amarnath Mishra and Ravindra Kumar

PROJECT OVERVIEW

Objective

Confonet scheme is running as a sub-scheme under the Central Sector Umbrella Scheme “CONSUMER PROTECTION” of Department of Consumer Affairs, Govt of India. One of the major activities under the project is to develop and implement an E-filing module at NCDRC & various states. As per the new Consumer Protection Act, a Web application for E-filing named “edaakhil.nic.in” has been developed by NIC to file a new Consumer Complaint (CC) online from anywhere. Now consumer needs not visit the consumer commission to file a complaint about the redressal. This eDaakhil software also provides a facility to pay the complaint filing fees online and upload documents.

Scope (Functional & Geographical)

Indicator(s)	Achievement till now
Total States/UTs covered after implementation in NCDRC	21
Total Locations Covered	500
No of the user registered on the eDaakhil portal.	31162
No. of Consumer complaints filed online through the eDaakhil portal.	7086
No. of successful Online payment transactions for complaint fees submission.	837

Hardware/Software

Virtual Machine	OS	SAN Storage
4	RHEL 7	4.0 TB

Sr No	Parameter	Description
1	Hardware	VM Machine hosted at NDCSP Cloud
2	OS	RHEL 7.0
3	Database	PostgreSQL 12.x
4	Application Server	Tomcat 9.x.x
5	Web Server	Tomcat 9.x.x
6	Programming Language	Java
7	Runtime Version	OpenJDK 13.x.x
8	UI Framework	JSF 2.3, Primefaces 7.x

9	Beck end business logic	Spring 5.x, Hibernate 5.xApache PDF Box, JasperSoft, Jettison, Jackson

Certification (Certifying Agency)

Cyber Security Clearance Certificate has been obtained from NIC (National Informatics Centre) Cyber Security Division.

Disaster Recovery and Service Continuity

Tape Backup is being taken up for the database folder, case document, application server directory by the backup service of NDC – SP (National Data Centre- Shastri Park). Restoration of backup is being tested from time to time.

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 Filing of Consumer Complaints along with Online Payment	Facilitated consumer/Advocates for electronically filing of consumer complaints and online payment of fee, which saves the time of visiting consumer commissions and filing the complaint at his owncomfort.	NA	NA	7086
Online Payment	eDaakhil application is integrated with Bharat-kosh, SBI ePay, GRAS System of State Treasury			21 States / UTs
Auto generated reports / alerts	SMS / Emails are being sent by the syst em to the commissions and consumers.			Approx 2K / DaySMS & Emails disseminated.
Training of the endUser	e-Learning session foreDaakhil			Session – 55 Participants - 2802

Implementation

Commission Type	Counts
NCDRC – National Consumer Dispute Redressal Commission	1
SCDRC - State Consumer Dispute Redressal Commission	21
DCDRC - District Consumer Dispute Redressal Commission	478

Improvements/ Enhancements

- 150+ Locations being targeted to be covered in the upcoming year(s)
- Development of Applications for Mediation Center Service.
- VC Hearing Applications for Consumer Commission.
- Android / iOS version of eDaakhil application

ENABLER

Processes Re-engineered

- Now citizens can file their complaints Electronically (On-Line Mode).
- Citizens can also pay case filing fees through Digital Payment.
- Copy of the Original Petition, Casefile, Order of Judgment is also kept available on the server for subsequent use in hearings, filing of appeals, etc.
- Scrutiny of case details and documents management has now become cost & time-effective and convenient.
- Case related information is shared with another stakeholder of cases online.

Technologies

- API First approach: Modern web development approach adopted while architecting the application to reuse the codebase.
- Statistical Analysis: disseminated through eDaakhil Dashboard.
- AI-Powered Chatbot: Confonet – VANI
- Video Tutorials: Video tutorials explain modules/workflow of the application in Hindi & English. 23 TB+ worth of content has been downloaded/viewed from across the country.

Man advocates/activists reused/referred to the video's tutorials in their post on various social media platforms like YouTube, Facebook, Instagram, etc.

- https://www.youtube.com/watch?v=cL_QOeWVC2U
- <https://www.youtube.com/watch?v=38eiNGYX2jE>
- <https://www.youtube.com/watch?v=pM2q3rgYbdM>
- <https://www.youtube.com/watch?v=sM7-23H33x0>
- <https://www.instagram.com/p/CMAHvDSDRGk/>

People

Capacity Building

Time to time capacity building program has been conducted for various levels of users. 55 e-Learning session for eDaakhil - Participants - 2802

Management of Change: Project has changed the working of Consumer Commissions and is in way of Paperless offices.

VALUE INDICATORS

Learnings for sharing

- During the lockdown period the normal day-to-day activities of the commission were badly impacted across the country. Before the formal launching of eDaakhil for citizens in September 2020, the NCDRC started using the application for

digitizing the old cases by scanning and uploading the case document from May 2020 enabling NCDRC to hear the cases on video conferencing from home and to share the case document among the Hon'ble Resident & Members, Court Masters, Complainants, Respondent, and advocates.

- Hon. Judge of Supreme Court, Chief Minister of States, Dy Chief Minister, Minister of Department, Secretary launched the eDaakhil for different States.
- On the auspicious day of National Consumer Day (24th December 2020), the following 9 States have launched NIC-developed Consumer eFiling software 'eDaakhil' in their States/UT.
- Ms. Leena Nandan, Secretary (Consumer Affairs) announce the names of States/UT adopting the eDaakhil platform in the virtual event celebrating National Consumer Day 2020. The hon'ble minister for Consumer Affairs, Food & Public Distribution, Shri Piyush Goyal has endorsed the efforts taken by States/UTs and all stakeholders.

Digital Empowerment

- Integration of eDaakhil with CSC (Common Service Center) Portal: for hand-holding at village level for consumers of Rural Areas.
- 3.5 Lacs VLE (Village Level Entrepreneur) across India are allowed to use the eDaakhil platform for facilitating its services.
- <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1701028>
- <https://twitter.com/PiyushGoyal/status/1365313897779974150>

Green e-Governance

Limiting Printing of Paper: eDaakhil project aims to reduce the paper requirement for the filing of consumer complaints during filing and hearing activities of consumer commissions across the country.

Data Center & Virtual Machines: In this project shared cloud infrastructure is being used to host a single instance of the application.

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10. Revenue, Finance & Audit

Audit Process and other Services in the Department of Cooperation Madhya Pradesh

**Department of Cooperation, Govt. of Madhya Pradesh & National Informatics
Centre Madhya Pradesh State Centre**

Musharraf Sultan

PROJECT OVERVIEW

Objective

To transform the systems for the benefit of the citizens and ease of business

Application For Empanelment of Chartered Accountants for Audit of Cooperative Societies in Madhya Pradesh Under Section 58(1)(a) and (b) of M.P. Cooperative Societies Act, 1960

Workflow based system for Chartered Accountant Empanelment

Operational for 2016-2017

- Chartered Accountants are empaneled by RCS for conducting audit of the societies
- The manual process was cumbersome and forms were too lengthy
- The process of Chartered Accountants empanelment has been re-engineered
- On the basis of the eligibility criteria Chartered Accountants are categorized as A, B and C
- CA whose headquarter is in Madhya Pradesh can apply online for auditing of the cooperative societies of Madhya Pradesh.
- Three types of applicants: Partnership Firm/Proprietary Firm/Individual Practicing F.C.A.
- For applying, the CA has to fulfil some criteria in accordance to their firm which is calculated by the system. User get acknowledgement after filling up the form.
- Chartered Inspectors (CI) has the rights to approve or reject the application. Under Section 58(1)(a) and (b) of M.P. Cooperative Societies Act, 1960
- SMS alert to the applicant.

MP-CAMS is a unique attempt made by the department for allotment of auditors from the department to carry out the audit of 41000+ cooperative societies in Madhya Pradesh. It is first kind of system in the country especially in cooperative sectors. Objective of the department is to assign the auditors to societies through system such that same auditors are not repeated as last year. Allotment is Pro Rata based. Types of Societies are also allocated on Pro Rata basis. System is totally transparent. Allotment done through system hence before allotment nobody knows which society to be audited by which auditors.

Following services have been provided in MP-CAMS:

- Data of Auditors extracted from Service Book of employee. Service book of all the employee of the department is maintained
- Data of Societies extracted from Societies Database. All the societies database is maintained in the system with liquidation and de registration of the societies
- Auditors of Previous Five years entry District wise (One Time Entry)

- Pre-Audit Data of Societies (Yearly updation of data Society wise)
 - Randomization and Allotment of Auditors to Societies on Pro Rata Basis
Allotment of Auditors done for
 - o HO level societies
 - o Division Level societies
 - o District level societies
- Transfer of auditors
- o HO level societies
 - o Division Level societies
 - o District level societies

Audit levy Monitoring System

- Audit Officers has to submit Financial Sheets
 - o RD (Receipt Disbursement)
 - o Trading Statement
 - o Profit & Loss Account
 - o Balance sheet

Audit Fee Levied are monitored through this system

RTI Application Tracking System

This Module is designed and developed for RTI applications. It has three kinds of RTI registrations

- Registration
- First Appeal
- Second Appeal

After Registration of application if Applicant not satisfy to the disposal. it has right to go for first appeal and second appeal.

User can download its disposal from public domain and also can see the position of its request from public domain.

Complaint Monitoring System

This System is designed and developed for Complaints come to Hon'ble Minister and CM and Section level complaint. complaint can be registered from PA login and department login both and after that it can be forwarded to particular section who can resolve this complaint.

Then particular department resolve the issue and dispose the request.

Key Stakeholders

- Citizens
- Over 15 million members are associated with the Cooperative Societies
- Department of Cooperation
- Over 2000 Employees are working in the department of Cooperation, M.P
- DCCBs
- Apex Bank

- Societies
- Researcher/Scholars
- NGO

Scope- functional and geographical coverage (Entire Madhya Pradesh)

- Department Of Cooperation, Head office
- 20 Sections of Department of Cooperation Madhya Pradesh
- All 10 Divisional offices
- All 51 districts offices
- Apex Bank & 38 DCCBs (District Central Credit Cooperative Banks)
- 57000+ Cooperative Societies
- citizen- for public interface

Hardware/Software

- Prototype Model had been adopted
- Database - MS SQL Server
- SSRS, IIS
- ASP.NET 4.0
- JavaScript
- CSS
- Windows OS
- DHTML
- JQuery
- RESTful Web Services
- C-DAC Push SMS Services

Certification (Certifying Agency)

Yes. Digital Age Strategies Pvt Ltd Bangalore

Again, Applied for Application Re Audit for all the systems which By 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 e-Services	Brief service description with benefits	Volume (Nos) of Services year wise		
		2018-19	2019-20	2020-21
MP-CAMS	DISTRICT ALLOTMENT	51,034	50,160	50,106
	HO ALLOTMENT	104	105	104
	DIVISION	223		

CA Empanelment	Total no. of Applications	359	393	492
	Finally submitted Applications	278	327	443
	Partially submitted Applications	81	66	49
	Approved Applications	241	303	414
	Rejected Applications	34	22	28
Audit levy Monitoring System	Form1			51049/44927/6
	Form2			128
	Form3			50629/40606/10037
	Form 4			50629/23823/26819
				50629/23455/27241
RTI Application	Registration/Disposal			

Implementation

M.P Cooperative Audit Allotment System (MP-CAMS)

DISTRICT ALLOTMENT for the year-2020-2021 -50,106

HO ALLOTMENT-104

DIVISION-

CA Empanelment- for the year 2020-2021

Total no. of Applications -492

Finally submitted Applications-443

Partially submitted Applications-49

Approved Applications-414

Rejected Applications-28

Improvements / Enhancements

Interface have made user-friendly

Interactive

Roadmap

Aadhar based eSign

e-Challan Integration

App based Audit Work

ENABLER

Processes Re-engineered

AS IS process of Audit Allotment Re engineered

AS IS process CA empanelment Re engineered

Technologies

Through WhatsApp Group, Facebook, Twitter Account and dedicated email account for the project we were able to resolve the difficulties and valuable suggestions from the stake holders.

People

Capacity building

- Various workshops held in Bhopal where all 51 districts officers 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 district offices and other stakeholders
- System is supported by all the top management officers in the department, Quick decision making done

VALUE INDICATORS

Learnings for sharing

Earlier in Manual system, it was difficult to keep the track of each and every cases. Manually process require lots of documentation, communication channels (Telephonic, Post etc.) and record keeping (register entries).

Challenges faced in implementing Process:

- Communication gap
- Unstructured Data
- Several modes of operations (head office, division office, district office)
- Unwillingness of the user to change the system
- Delay in information gathering and dissemination
- Less computer savvy staffs
- Inconsistency in the data
- Training to old age staff is difficult

Lesson learning:

While design, development and implementation phase, various new thoughts came up against the challenges came. Department is in planning to made such changes in the system so that project can be implemented more efficiently and in very less time.

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

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

Mr. Musharraf Sultan, *Technical Director, National Informatics Centre Madhya Pradesh State Centre, sultan.m@nic.in*

Comprehensive Financial Management Systems (CFMS) – An e-governance initiative to reform the Public Financial Management Landscape

Department of Finance, Govt. of Bihar

S. Siddharth

PROJECT OVERVIEW

Efficient and effective Public Financial Management (PFM) with adequate financial control had gained prominence in Bihar in the early 2000s and was always an aspiration of the Government of Bihar. The State embarked on this reform journey and demonstrated its commitment towards reforms in the past which included multiple initiatives such as adoption of a “Computerized Treasury Management Information System (CTMIS)” in the year 2005-06, enactment of “Bihar Financial Rules, 2005”, “Bihar Treasury Code, 2011” etc. to name a few. Despite all the efforts made, the State Government was facing numerous challenges related to effective PFM, owing to:

- Inadequate fiscal controls,
- Non-utilization of idle cash to the tune of 6-8% of the State’s Budget,
- Delays in payment and receipt reconciliation,
- Unrealistic budget estimates including delayed preparation of estimates,
- Multiple sources of data entry,
- Complexity of PFM processes leading to lack of transparency in service delivery etc.

In order to strengthen its foundation for ‘Good Governance’, transform the PFM operations in the state and address the issues mentioned above, Finance Department envisioned the following: *“To digitalize the public financial operations and go-paperless, encourage electronic and cashless financial transactions, bring in accountability and transparency in operations, ensure single source of truth, provision for effective financial control, monitoring and reliability in financial reporting and recalibration of the regulatory & institutional framework”*. In line with the overall vision, Finance Department, Government of Bihar introduced Comprehensive Financial Management System (CFMS). CFMS is an advanced and innovative financial management system which provides for a more transparent, secure and scalable system for the management and execution of the state’s day-to-day financial operations.

Functional Coverage

Finance Department (FD), Government of Bihar has embarked upon a major PFM transformation in the state through implementation of Comprehensive Financial Management System (CFMS). CFMS is a mission mode project of the Bihar Government which adopts to national and international good practices for managing of its PFM operations. CFMS was operationalized on 01.04.2019 and has since completed one year of successful run and has benefited the state in its regular operations by reducing the time taken in budget preparation, and budget distribution. Efficiency in expenditure management has also improved with the implementation of on-line direct payments and availability of real time dashboards. The coverage of the functions and activities is as under:

- Budget Management

- o On-line Budget Preparation and Distribution
- o Budget Monitoring and Control
- o Special Budgetary approvals & releases including supplementary budget and re-appropriation
- o Online and auto surrender of budgets
- Expenditure management
 - o On-line bill preparation and payment processing
 - o Document Management and audit trails
 - o NPS/ GPF management
- Employee Management
 - o Employee database management
 - o On-Line processing of pay-bill, personnel claims and reimbursements
 - o Management of transfers, pay revisions, loan settlements etc.
- Pension Management
 - o On-line recording of PPO (Pension payment order) Regular pension bill processing
 - o Life certificate management
 - o Revisions to Pension status (Service to family pension etc.)
- Deposit Account Management
 - o On-line Deposit Account creation
 - o Ledger management and Hierarchy creation
 - o On-line processing of payments/ receipts routed through treasury
 - o Compilations and generation of on-line accounts, plus minus memo reports etc.
- Revenue Management
 - o Recording and reconciliation of revenue challans and bank scroll entry
 - o Integration with o-Gras system for input on revenue collected by the state
 - o Online processing of refunds against revenue deposits
 - o Revenue accounting and on-line reconciliation
- Accounts Closure and Management
 - o Real time availability of accounting data
 - o Online compilation and reconciliation of monthly treasury accounts
 - o Direct on-line submission of Treasury accounts to AG
- Integrated with RBI's e-Kuber Payment Platform for direct and electronic payment to the Payees (Beneficiaries) of the state. The following types of payments are processed on-line through the integrated system.
 - o Disbursements of payments to Government employees and Pensioners (Salary, Pension, Personnel claims etc.)
 - o Disbursements of payments for services to Organizations, Vendors/ Suppliers etc. for their services.
 - o Direct benefit transfers of funds/ grants against schemes to individual

beneficiaries, line departments, autonomous bodies etc.

- Integration with NSDL and e-GPF for timely transfer of employee contributions and availability of on-line reconciled statements.
- Regular Interface with o-Gras for recording of revenue collected supporting with on-line reconciliation and scheduled account compilation.
- AG interface module - AG is provided direct and seamless accessibility to the transactional data and accounting reports through an independent replica of the CFMS database deployed at the AG Office.
- Additional Functionalities – In order to improve the functional capability and enhance the management and reporting efficiency of the CFMS application the Finance Department has implemented/ in the process of implementing the following implementation in the state which will interface with the CFMS application and aid in attaining a 360-degree coverage of expenditure management in the state.
 - Works & Accounts Management Information System (WAMIS) [Pilot Run] - It is aimed at increasing the efficiency of Operations & Management of Works Management in the system while increasing the transparency.
 - Human Resource Management System (HRMS) [Pilot Run] - It is meant to increase the efficiency of manpower planning, recruitments, Postings, Promotion, Transfer based on employee skill set of around 3.5 lacs government employees.
 - e-Labharthi [Implemented] - It is an entryway to deal with the benefits frameworks of the state like Old Age Benefits, Vidhwa Pension, and differently-abled individual annuity. This will help in efficient management of beneficiaries and better service delivery
 - Integration with Public Financial Management System (PFMS) [Implemented] - It is a platform for scheme management and & payment to beneficiaries through Direct Benefit Transfer (DBT)/ Non DBT payments for both Aadhar based & non-Aadhar based bank accounts through e-kuber. Linkages will enable better management of finances & public service delivery.
 - Integration with Aadhar e-KYC for seamless verification and management of beneficiaries [Implemented]
 - Integration with NPCI for bank account verification of beneficiaries [Pilot Run].

Geographical Coverage

The overall geographical coverage for this initiative was the entire State and all the offices across the State. More than 10000+ offices across the State were covered under this initiative.

Benefits and Outcomes:

“Comprehensive Financial Management System (CFMS)” is a web-based workflow driven application that enhances the ability of the Departments and Treasuries to oversee and govern its budget effectively, carry out treasury functions, provide for consolidated and consistent information of expenditures and revenues of the state, enforce control, quality and improved timeliness in budget preparation, allocations, execution & accounting. The initiative:

- Supports paperless transactions by enabling online processing of bills and ECS Payment to Beneficiary
- Enables online exchange of data with encryption & digital signature to provide legal validity to transaction
- Is integrated with external agencies system (RBI, AG, NSDL, o-GRAS etc.) for seamless data exchange.

Apart from the afore stated, the intent of implementing CFMS in the state was to offer several other benefits like:

- Effective and disciplined financial management - CFMS brings out effective financial discipline in terms of more accurate budget preparation and effective expenditure control, effective tracking of scheme-wise and project-wise expenditure, better management of receipt and expenditure, better cash flow management, etc.
- Single Source of Truth – CFMS enables capturing of the data at the source of origin (i.e., at the office level) and eliminate data redundancy & duplication of efforts in entry of the same data multiple times in different forms.
- Speed and Certainty in Service Delivery – CFMS is capable of speedy and transparent delivery of services such as faster payment of invoices/ claims of vendors/ employee's salary, speedy refund, computerized acknowledgement etc.
- MIS reports and Dashboards – Aids in Real time decision support system, improving accuracy and timeliness in fiscal reporting.
- Robust Audit Trail - Trail of every action, data created/ modified/ deleted, records are maintained in the application to know who did what and when.

Hardware/Software

The application has been primarily built on open-source tools. This has been developed by keeping in mind that the Government of Bihar does not have any vendor lock-in in future, and all the tools which are deployed here are transferable to Finance Department at any point of time. Below is the technology stack which has been used in building the CFMS application.

Name of the Application	Bihar CFMS Application (e-NIDHI)
Basic Application platform	Redhat LINUX at the server side
	Accessed through latest version of Google Chrome, Mozilla, Firefox and Microsoft IE/Edge on Windows based client system.
Key Components	Web server (apache)
	Application Server (Jboss)
	Database (Postgre SQL)
List the Interface with External systems	RBI e-KUBER
	NSDL
	Digital Signature (Dongle/Crypto Token based signing and AADHAR based e-sign with CDAC, which was done earlier, however not in use now)

Development Language	Java
	PL/SQL

Certification (Certifying Agency)

The security audit of the application has been undertaken by CERT-IN empanelled vendor (M/s Price water house coopers Private Limited) higher layers.

Disaster Recovery and Service Continuity

DR shall be located in NDC. The following are available at the NDC:

- Rack space
- Power
- Bandwidth
- Civil infrastructure like cooling etc.

Backup site shall be in BRAIN data center located in Patna. The backup site will be a storage site only for data replication in synchronous mode with the SDC. The SI is required to maintain RPO zero for zero data loss. The following are available at BRAIN DC:

- Floor space
- Power
- Bandwidth
- Civil infrastructure like cooling etc.

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
Annual Budget Preparation	Reduction in overall budget preparation time from 3-4 months to Approximately 1 month.		7000+	7000+
Budget Allotment to all the offices	Budget distribution to all the offices in the state has been made online. Timely Budget Allotment as the budget is available for allotment/ sub-allotment on the 1 st day of the Financial Year.		1,00,000+	1,00,000+
Bills Submission and Claims Processing	Claims processing time reduced from 30-45 days to 3 days.		More than 25 Lakhs	More than 30 Lakhs

Direct Benefit Transfers	DBT to the authorized and verified beneficiary has been the hallmark of this initiative.		More than 1 Crore beneficiaries	More than 1 Crore beneficiaries
Online Monthly Civil Accounts submission	Monthly accounts compiled and submitted within 1 working day whereas earlier it used to take at least 2-3 weeks to compile.		1000+	1000+

Implementation

CFMS Implementation had a statewide impact in terms of efficiency and effectiveness which has been brought into the financial processes. The project has touched each and every stakeholder in the government who has a role in public financial management. The state has achieved most of the goal set out in terms of implementation and rollout and the application has been running successfully for last 2 years now.

Improvements / Enhancements

- Despite the COVID-19 Pandemic and lock-down, the treasury function remained unaffected. The officials of Bihar state were able to timely process grants and expenditure necessitated to fight COVID-19 in the state, including disbursement of employee salary, Pension and Beneficiary payments.
- A total of approx. 25 Lakh and 30 lakhs claims have been processed online for the period April'2019 – March'20 and April, 20, amounting to Rs. 1.5 Lakh crores of on-line transactions through e-Kuber.
- Integration with RBI's e-Kuber has reduced processing time for payments by direct transfer to the bank account of the beneficiary/ payee, eliminating the need for frequent treasury visits- savings on time, cost and efforts
- System enabled calculation & cross validation, minimizes errors and limits the need of manual
- The claims processing time has reduced from 30-45 days to 3 days
- All government accounts are progressively brought under Treasury's control resulting in minimal idle cash including deposit of idle cash to the tune of INR 6000 crores.
- On-line budget preparation and authorization of the budget estimates has effectively reduced the budget preparation time from 3-4 months to approximately 1 month.
- Facilitates timely Budget Allotment as the budget is available for allotment/ sub-allotment on the 1st day of the Financial Year.
- Availability of online reports eliminates the need for maintenance of multiple physical registers i.e., Allotment register, Expenditure register, Payment register etc.
- On-Line rendering of Treasury Accounts to AG, for paperless submission of monthly accounts.
- Paper-less operations through CFMS has resulted in significant savings on paper consumption and printing cost.

- Aided in identification of ghost employees/ pensioners due to the controls and checks introduced in the application.
- Audit Trail of every action, data created/ modified/ deleted, records or details modification, note sheets or remarks entered/ modified, documents uploaded or removed, etc. is maintained in the application
- Online auto surrender of budgets at the end of the financial year.

ENABLER

Processes Re-engineered

Some of the key innovative ideas adopted and implemented to meet stakeholder's requirement are:

- Innovative approach for conceptualization of CFMS: Department challenged the traditional approach of CFMS design based on age-old DDO concept which resulted in artificiality of operation. CFMS was re-designed based on the "Office" concept which was unique across India but was in line with international good practices.
- Key innovative process improvements adopted: Some of the key process improvements adopted includes (a) Online allotment to be done mandatorily and enforced for bill preparation, (b) Administrative Department to have budget re-appropriation powers, (c) System validations for fund availability, Office – HOA mapping, use of object codes, etc., (d) Delegation of Financial Power Rules (DFPR) to monitor and control the authority for sanction, expenditure etc., (e) Online sanction mandatory without which bills cannot be processed, (f) Scanned and digitally signed vouchers and sub-vouchers to be submitted for online bill processing, (g) Letter of Credit (LoC) and Cheque system replaced with regular budget allotment system, (h) Scheme-wise ledger for Deposit Account will be created to view and manage scheme-wise balance etc.
- Innovative and unique features implemented in CFMS: Some of the key USP of CFMS are as follows: (a) Data entry at source only with audit trails resulting in single source of truth for all concerned stakeholders, (b) Implemented digital signature and Aadhar based e- signature to provide legal validity to the online transactions across 7000+ offices, (c) Supports paperless transactions by enabling online processing of bills and ECS Payment to Beneficiary, (d) Enables online exchange of data with encryption across all stakeholders to support secured paperless transaction, (e) Automated shadow budget to minimize budget preparation time and make it more realistic, (f) Integrated with an external agencies system (RBI, AG, NSDL, GeM Portal, Aadhar based e-KYC, oGRAS, e-GPF etc.) for seamless data exchange.
- Innovative approach to institutional reforms and capacity building: Efforts made to effect organizational behavioural change such as User Sensitization training, Focused group workshops held for finalization of CFMS requirements, Identified nodal officers and core team at Department level etc. Some of the innovative strategy adopted for capacity building included identification and mobilization of Treasury resources as master trainers and lead the trainings at Divisional Levels, User Manuals, Training Videos available at centralized location for quick access, Refresher Training scheduled intermittently after CFMS launch etc.
- State-of-the-Art Technological choices: Some of the key State-of-the-Art

technological choices adopted for achieving the Vision of the state through this implementation are: (a) A Service Oriented Architecture approach to ease interoperability with other departmental applications (b) A modular approach ensuring scalability to cater to any future requirements in terms of addition of new services/features/functions etc., (c) Highly secure feature considering the sensitive nature of data to be handled (Finances of the State), (d) Multi-channel delivery capabilities (like mobile, e-mail, web portal), (e) Data warehousing capabilities, (f) Advance web related features (like caching services, database management etc.), (g) Provision of single source of information, (h) Advanced security features at the level of application, database and portal (like multi level user authentication, user registration and administration, etc.) etc.

- Bringing perceptible improvements in processes /systems and building institutions: The state benefited in its endeavor for 'Good governance' and in bringing the following improvements: (i) Reorganization of organizational hierarchy and DDO office rationalization (from 12000 DDO's to 7000), (ii) Recalibrated the regulatory and institutional framework (rules, procedures and processes etc.) focusing on service provision in CFMS for process execution, creating the highest level of transparency and accountability in government finances and to ensure operational efficiency, (iii) Enabled the entire financial operations of the state 'Online'. Although the Expenditure and Payment Management System was robust in the past, with CFMS 'all bills/ claims' including 'payment processing' and 'Accounts compilation' is rendered entirely online, with no physical touchpoints to treasury, vendors/pensioners, AG etc. Bihar is the first and only state to achieve this in real-time and not on pilot basis, (iv) Improved the technical and institutional capacity (in areas of financial management, controlling, accounting etc.) of the officials in executive positions for transformation to the new way of working in a virtual/ 'on-line' mode by arranging special need/ tailor made training programs, (v) Implementation of the on-line CFMS application eased the on-boarding of the state AG as an external stakeholder for on-line rendering and acceptance of Treasury Accounts. The technical capability of CFMS provided with direct and seamless accessibility of the transactional data and accounting reports to the AG office. The access is made available through an independent replica of the CFMS database, deployed at the premises of the Principal AG Office and is co-hosted with the AG VLC system to provide for functional linkage and aid in Monthly Civil Accounts (MCA) preparation, (vi) Implementation of CFMS application has contributed actively in the promotion of PFM reforms especially in financial management and controlling such as Imposing FIFO for claims/bills processing, Eliminating discretion at the level of senior executives/ treasury officers etc. in decision making, No discretion at AG in acceptance of treasury accounts and MCA preparation etc.

Technologies

The overall enterprise architecture provides the building blocks of the CFMS solution catering to the requirements of both internal and external stakeholder of the Finance Department. Some of the key State-of-the-Art technological choices adopted for achieving the Vision of the state through this implementation are:

- A Service Oriented Architecture approach to ease interoperability with other departmental applications.

- A modular approach ensuring scalability to cater to any future requirements in terms of addition of new services/features/functions etc.
- Highly secure feature considering the sensitive nature of data to be handled (Finances of the State),
- Multi-channel delivery capabilities (like mobile, e-mail, web portal).
- Data warehousing capabilities.
- Advance web related features (like caching services, database management etc.).
- Provision of single source of information,
- Advanced security features at the level of application, database and portal (like multi-level user authentication, user registration and administration, etc.) etc.

People

Efforts made to effect organizational behavioural change such as User Sensitization training, Focused group workshops held for finalization of CFMS requirements, Identified nodal officers and core team at Department level etc. Some of the innovative strategy adopted for capacity building included identification and mobilization of Treasury resources as master trainers and lead the trainings at Divisional Levels, User Manuals, Training Videos available at centralized location for quick access, Refresher Training scheduled intermittently after CFMS launch etc. The training was planned in 3 phases for duration of 6 months where-in classroom training, hands-on training and web-based training was provided to nearly 30000 application users in the state. The key focus areas included were:

- Sensitization workshops to increase awareness related to automation; also, address change management issues like finalizing the roles/responsibilities based authorization matrix.
- Organized learning workshops for training on cross-cutting process in PFM, 'Master' data entry, accounts closure etc.
- Conducted centralized workshops to monitor the entry/ creation of critical master data in CFMS to limit incorrect/ garbage and redundant data in the system.
- Adopted the 'Train the master' approach for imparting training to more than 30,000+ users on the CFMS application.

VALUE INDICATORS

Learning for sharing

Some of the key innovative ideas adopted and implemented to meet stakeholder's requirements are:

- Innovative approach for conceptualization of CFMS: Department challenged the traditional approach of CFMS design based on age-old DDO concept which resulted in artificiality of operation. CFMS was re-designed based on the "Office" concept which was unique across India but was in line with international good practices,
- Key innovative process improvements adopted: Some of the key process improvements adopted includes (a) Online allotment to be done mandatorily and enforced for bill preparation, (b) Administrative Department to have budget re-appropriation powers, (c) System validations for fund availability, Office – HOA

mapping, use of object codes, etc., (d) Delegation of Financial Power Rules (DFPR) to monitor and control the authority for sanction, expenditure etc., (e) Online sanction mandatory without which bills cannot be processed, (f) Scanned and digitally signed vouchers and sub-vouchers to be submitted for online bill processing, (g) Letter of Credit (LoC) and Cheque system replaced with regular budget allotment system, (h) Scheme-wise ledger for Deposit Account will be created to view and manage scheme-wise balance etc.

- Innovative and unique features implemented in CFMS: Some of the key USP of CFMS are as follows: (a) Data entry at source only with audit trails resulting in single source of truth for all concerned stakeholders, (b) Implemented digital signature and Aadhar based e- signature to provide legal validity to the online transactions across 7000+ offices, (c) Supports paperless transactions by enabling online processing of bills and ECS Payment to Beneficiary, (d) Enables online exchange of data with encryption across all stakeholders to support secured paperless transaction, (e) Automated shadow budget to minimize budget preparation time and make it more realistic, (f) Integrated with an external agencies system (RBI, AG, NSDL, GeM Portal, Aadhar based e-KYC, oGRAS, e-GPF etc.) for seamless data exchange.
- Innovative approach to institutional reforms and capacity building: Efforts made to effect organizational behavioral change such as User Sensitization training, Focused group workshops held for finalization of CFMS requirements, Identified nodal officers and core team at Department level etc. Some of the innovative strategy adopted for capacity building included identification and mobilization of Treasury resources as master trainers and lead the trainings at Divisional Levels, User Manuals, Training Videos available at centralized location for quick access, Refresher Training scheduled intermittently after CFMS launch etc.
- Innovative approach to regulatory reforms: A group of committed staff was engaged to research the regulatory structure and processes of other better performing countries and undertake detailed discussions with multiple stakeholders as part of the consultative process. These meetings and discussions represented a novel approach to regulatory reform that ensured participation and ownership by key agencies.
- State-of-the-Art Technological choices: Some of the key State-of-the-Art technological choices adopted for achieving the Vision of the state through this implementation are: (a) A Service Oriented Architecture approach to ease interoperability with other departmental applications (b) A modular approach ensuring scalability to cater to any future requirements in terms of addition of new services/features/functions etc., (c) Highly secure feature considering the sensitive nature of data to be handled (Finances of the State), (d) Multi-channel delivery capabilities (like mobile, e-mail, web portal), (e) Data warehousing capabilities, (f) Advance web related features (like caching services, database management etc.), (g) Provision of single source of information, (h) Advanced security features at the level of application, database and portal (like multi-level user authentication, user registration and administration, etc.) etc.
- Innovation in public service delivery and transparency: Some of the key innovation in public service delivery enabling transparency and effectiveness are Seamless integrated services across agencies or jurisdictions, Services available in real time from online and mobile platforms, making financial transactions

electronic and cashless, dedicated service desk and online platform to record and resolve queries, real time tracking and reporting on various services etc.

Digital Empowerment

CFMS have been able to bring together more inclusion in the delivery of government services across the state:

- 77 treasuries located across 38 districts across the entire state of Bihar have been able to process the various bills online and submit the accounts to AG online.
- More than 3 Lakhs employees of the state government have been able to get their salary directly getting credited to their bank accounts online.
- More than 1000+ vendors including MSMEs across the various projects in all the sectors of the state have been receiving payments for their work online.
- More than 1 Crore plus beneficiary benefitted through this initiative as this platform enabled online transfer of money to the beneficiary bank accounts District Health officials in all 31 States/ UTs for MIS for OCs allocation to Health facilities, updation and addition of health facilities and there in charge.

Green e-Governance

CFMS have been a transformational project which has the following key achievements of CFMS and its impacts on 'Green & Good Governance' are as follows:

- Bihar is the only state which has endeavored and has been successful in its attempt to roll-out CFMS across 44 departments and 76 treasuries in the state in one go.
- Application training imparted to more than 25000+ users and stakeholders of CFMS application.
- All bills/ claims are necessarily processed online. Only state in the country to go paper- less in processing the claims with no physical touch points for vendors, pensioners etc.
- Inbuilt system validations for checking fund availability, budget ceilings imposed etc., thus limiting excess withdrawals.
- Online sanction for 'Budgeted' HOA and claims has been made mandatory without which bill cannot be processed.
- Use of digital signature by Treasury Officer for authorizing each claim processed by the treasury.
- Successful Integration with RBI (E-Kuber) and NSDL for direct transfers of Payments and contributions without any manual intervention.
- On-Line rendering of Treasury Accounts to AG, for paperless submission of monthly accounts, a feat which no other state has achieved.
- Single source of Truth eliminates multiple sources/ levels of entries.
- Provision to maintain the DDO-HoA mapping, use of Bill type and HOA mapping, Bill Type-Attachment type mapping, Treasury and Office Mapping etc., for automatic work distribution in Treasury and to ensure paperless and seamless flow of bills/claims for approvals through the DDO and Treasury.
- Document management system implemented for viewing the Scanned and digitally signed vouchers and sub vouchers uploaded to the bill. Physical sub vouchers are maintained by the DDOs for further scrutiny during audit.

- Audit Trail of every action, data created/ modified/ deleted, records or details modification, note sheets or remarks entered/ modified, documents uploaded or removed, etc. is maintained in the application
- Use of LOC (Letter of Credit) for works & forest payments and Cheque payments has been abolished in the state.
- Online auto surrender of budgets at the end of the financial year
- User Task lists and Customizable dashboards, MIS Reports are enabled for real-time tracking of records/ transaction (i) Approval Status and (ii) Payment Status
- An online 'Issue Tracking Tool' is developed and implemented (after the operationalization of the CFMS application effective 02nd April'19). The tool enables the recording and resolution of Citizen Feedback, queries and issues.

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Direct Benefit Transfer Platform of Government of Karnataka

Department of Personal and Administrative Reforms (e-Governance) & National Informatics Centre Karnataka State Centre

Rajeev Chawla, Srivatsa M N, Jayanthi S and Hanumanta Raju

PROJECT OVERVIEW

Objective

The overall objective is to transfer the benefit (Cash transfer) in a most efficient and effective manner. DBT platform transfers the benefits directly to the Aadhaar seeded bank accounts of identified beneficiary. Main objective of DBT platform is

- To reduce the timeline for delivery of benefit
- Elimination of pilferage
- Elimination of duplicates and ghost entries
- Bring about transparency by eliminating subjectivity in the whole transfer process.

The DBT platform is a federated architecture where it facilitates departments to own its own application but at the same time ensures the good principles that needs to be followed for direct benefit transfer is not violated. The application architecture of the DBT platform is as under.

Scope (Functional &Geographical)

The major functionalities implemented in the platform include User Identity Management, Beneficiary identity validation functionality for ensuring that that the Aadhaar is rightly seeded with the beneficiary details, financial address validation, process for approval of payments to beneficiaries, Connects with payment gateways such as State Treasury's Financial Management system or Bank.

Direct Benefit Transfer is a major reform initiative to re-engineer the benefit delivery processes of the Government using Aadhaar as a financial address.

Scope included development of a comprehensive platform which validates the Beneficiary details from Government departmental application for identity validation and also validates payment business rules set under each of the scheme before making payment to the beneficiary, processing of the files and return the response to the respective departmental applications. To identify farmer uniquely and ensuring benefit is given to a right person Farmer database of all the 70 lakh farmers have been consolidated in FRUITS. These departments use the FRUITS system for implementing the schemes. The FRUITS connects to DBT platform for identity validation and payment process), Scholarship portal (common portal for all Scholarship schemes of all departments), Seva Sindhu (Single widow system for all schemes of the Government), SUVIDHA (Suvidha is a unified beneficiary management system in which multiple departments can onboard their schemes and implement instead of creating their own IT system) etc.

The DBT platform caters to all State Government Departments / Boards & Corporations / Societies spread across 30 Districts 227 Talukas covering all Gram Panchayats and Villages in the State.

The functionalities of DBT platform are explained in detail below:

- ID validation service: The beneficiary management systems (Department application) send the details of the beneficiary such as Aadhaar number, name of the beneficiary as in Aadhaar and name of the beneficiary as in the Beneficiary Management System. The details are used to perform the following actions:
 - Aadhaar Demographic Authentication: The Aadhaar number and Name of the beneficiary is sent to CIDR and validation is carried out. If the response is Yes. Then it means the Aadhaar number and Name belongs to the same person.
 - Name Match: The Name comparison between Name as per Scheme and Name as per Aadhaar is done. This comparison will provide the Name match score which indicates the closeness of the two names. The greater the score indicates that the Aadhaar number indeed belongs to the beneficiary and has been rightly seeded.
 - Beneficiary's Aadhaar seeding status in bank: This validation provides input as to whether a given Aadhaar is seeded to a bank account or not. Department can send only those beneficiaries' details for payment, whose Aadhaar is seeded hence payment failures due to non-seeding can be avoided.
 - The result of the service i.e., result of demographic authentication (Yes /No), name match score and the status of the bank seeding is shared with the beneficiary management system. As per the UIDAI guidelines only Global AUA can store Aadhaar in an encrypted manner in Aadhaar data vault and only reference number should be stored in the Beneficiary Management System.
- Aadhaar as a Service: The above-mentioned process of Identity validation and payment are adopted for all beneficiary management systems which had the Aadhaar seeded to the database prior to the implementation of DBT platform.

Further, setting up of authentication service requires the department to have Hardware Security Module and maintain Aadhaar vault as per the Aadhaar act mandate.
- Payment module: Once the beneficiaries are successfully passed through the ID validation process, Vault reference ID is generated for those beneficiaries where Demo authentication and Name match is successful. After this process, a payment XML file is generated for those beneficiaries, for whom the vault reference IDs is generated.
- Financial Address validation: In case of Aadhaar based payment, it is the responsibility of the Aadhaar holder to seed his Aadhaar to a bank account for availing Government benefits. It has been observed that in few cases due to the lack of knowledge of the banking staff the seeding to a bank account is not completed.
- Payment to Institution on behalf the beneficiary: As per the Government of India DBT Mission guidelines, the benefit is categorized into two types (1) Direct Cash Transfer (2) In Kind Transfer of benefits. Further In Kind is classified as (1) On behalf payment and (2) Material benefit. In case of on behalf payment, the beneficiary is identified through Aadhaar but the cash is transferred to the Agency who has given the benefit to the beneficiary. .
- Subsidy Management System: This module has been developed for those departments who do not have a computerized / IT system for beneficiary data

management. This provides a simple front end for beneficiary registration and creates a database of the beneficiaries. This module has 2 components i.e., ID validation and generation of payment file. The ID validation is done using the Aadhaar as a Service.

- Integration module: This module defines certain protocols for setting up the DBT platform to be integrated with department application on one side and integration with Khajane 2 (State Treasury's Financial Management System) /Bank for payment on the other side.

Key Stakeholders

- Centre for e-Governance.
- All Government departments/entities who are operating beneficiary-oriented payments.
- UIDAI.
- Centre of Development of Advanced Computing (CDAC) who have developed tool for matching of names.
- Beneficiaries (Farmers, Students, Milk pourers, Labourers, Asha Workers etc).
- Khajane 2 – State Treasury's Financial Management.
- State Bank of India (Sponsoring Bank).
- National Payment Corporation of India– For verification of seeding information and payment through NACH.
- All banks who are accepting payment from DBT platform under NACH mode.

Intended benefits

- The benefits transferred to the same person whose identity and entitlement for a benefit is established.
- Direct benefit transfer to Beneficiary ensures no loss during transfer.
- For Government and Beneficiary – it eliminates opportunity cost, Cost of cash and logistical expenses.
- Greatly reduces time.
- As Aadhaar is used, it eliminates duplicates and resolves wrong inclusion and wrong exclusion of beneficiary.
- Helps in cleansing of department data over a period of time by eliminating ghosts and duplicates.
- Increased credibility of Government.
- Single platform for all government departments for transfer of benefits.
- This platform will act as a beneficiary registry which is part of the social registry being created by the State Government.

Current Status

- DBT is currently integrated with 17 applications belonging to 26 departments which indicates the comprehensiveness and robustness with which the platform has been developed and also the federated approach which enables departments to develop and manage its own applications, thus resulting in ownership of the application by the departments.

Department Applications integrated with DBT	No of schemes
FRUITS	41
SUVIDHA	32
DBT-Subsidy Management System	21
Rajiv Gandhi Housing Corporation Limited	21
State Scholarship Portal for Post matric students	13
State Scholarship Portal for pre matric students	11
Seva Sindhu	11
Backward Classes Department - Post matric	5
Students Achievement Tracking System	3
Chief Minister Maathrushree	1
Crop Survey Application	1
Milk Subsidy Management	1
Navodaya	1
Price Deficiency Payment System	1
Social Welfare Departmental Application	1
Tribal Welfare Department Application	1

- 166 schemes of various Government departments are on boarded belonging to various sectors. List of schemes is provided as an Annexure.

Sectors	No of Schemes
Agriculture	49
Backward/Minority/Social welfare schemes	40
Students/Education Sector	34
Housing Sector	21
Covid related schemes	14
Others	8

- Nearly Rs 14,500 Crores has been disbursed since inception in 2018.

Hardware/Software

The software is developed using .NET technologies. The software is deployed on High end Servers which are running Windows Operating System. Internet Information Server (IIS) is used for deployment of the web application. Microsoft SQL server Database is used as the RDBMS and one server providing Secure File Transfer Protocol service is used for exchange of data between the departmental applications and the DBT server. Hardware Security Module is used for storing Aadhaar.

Integrations:

- The platform receives requests for Identity validations from the Beneficiary Management Systems (Department application) for which DBT uses the services of UIDAI, KRDH and NPCI.
- The DBT platform integrates with the Beneficiary Management Systems on one end to receive payment files and integrates with Treasury and Banks for payment.
- The DBT platform also integrates with the HSM/SafeNet Token Manager to obtain reference numbers for the Aadhaar numbers of beneficiaries and vice-versa.

Hardware & Software

- All the servers required for DBT Project are commissioned in Karnataka State Data Center. Web application servers are interfaced to internet through load balancing module. This ensures high availability and ensures easy scale out depending on the load on the server.
- Always On - High availability of database is ensured with multiple database server's groups. The DBT s/w leverages the availability of Read only instance of the database to improve the performance and provide greater throughput. This in turn provides better experience to the users. The read only instance is also used for reporting.
- Hardware Security Module is installed in High Availability mode with 2 HSMs. These help in storing the encryption keys in a secured store thus complying with the UIDAI guidelines on storage of encryption keys.
- SafeNet Token Manager Hardware Security Module provides a system for generation of Reference number and builds the Aadhaar Data Vault for DBT Platform. The SafeNet Token Manager stores the encrypted Aadhaar in the Aadhaar data vault with the encryption keys in HSM.
- SFTP server is provided by KSDC for the secure file exchange between DBT platform and departments. Standard Operating Procedure for sending the request files and reading response files to/from the DBT platform is being followed.

External Tools:

- UIDAI provides Aadhaar Demographic Authentication, eKyc & OTP services. These services are accessed through AUA - KRDH. KRDH also provides Name Match tool developed from CDAC for matching two names and gets a result as a score between 0-100.
- NPCI provides a service for checking the Aadhaar - Bank Account seeding status.

Certification (Certifying Agency)

M/s PwC has carried out the security Audit of the DBT Web Application and Security Audit Clearance Certificate is obtained. DBT platform is hosted in Karnataka State Data Center (KSDC), therefore all the certifications related to Cyber Security of KSDC will be applicable to DBT platform as well. Karnataka State Data Centre has following certifications:

- ISO 27001
- ISO 20000

Disaster Recovery and Service Continuity

DBT Platform is hosted in KSDC. KSDC has defined the Business Continuity (BCP) Plan therefore the BCP of KSDC will be applicable to DBT platform as well.

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
DBT Payments	Payment to beneficiaries under various schemes of Government belonging to various Departments.	No of schemes – 14	No of schemes – 37	No of schemes – 57
		No of transactions - 41,93,843 Nos	No of transactions - 2,01,86,324 Nos	No of transactions - 1,88,37,746 Nos
		Amount disbursed - Rs 562.83 Cr	Amount disbursed - Rs 4271.05 Cr	Amount disbursed – Rs 7961.68 Cr

Implementation

DBT platform was envisaged/ planned to be a comprehensive platform for delivery of benefit which would bring about (a) reduction in the timeline for delivery of benefit (b) elimination of pilferage (c) elimination of duplicates and ghost entries (d) bring about transparency by eliminating subjectivity in the whole transfer process.

It was developed with a federated approach concept i.e., to integrate with wide variety of applications belonging to various departments.

Further, DBT with its unique features like ID validation has strengthened departments core applications i.e., departments use Aadhaar as a Service/ID validation of DBT as a core component in their work flow.

- 166 schemes from 27 departments are onboarded on to DBT, these schemes belong to various sectors like Education, Social Welfare, Agriculture, Housing etc.
- 17 departmental applications are integrated with DBT
- Nearly 5 Crores – No of transactions are done through DBT platform with total disbursement of Rs 14,500 Crores since inception

Prior to DBT, taking Scholarship as an example, the students used to get their Scholarships by the end of academic year, however by using DBT now departments are able to disburse the benefits within the defined timelines.

Improvements / Enhancements

- Government had announced various financial assistance packages to various sectors which were impacted due to COVID. DBT platform due to its robust design was able to quickly respond to the exigency and onboard all these schemes and provide financial assistance directly to beneficiaries under various

Direct Benefit Transfer Platform of Government of Karnataka

schemes announced by the Government. Following COVID related schemes were on boarded during last 1 year.

Scheme Name	No. of Beneficiaries	Amount Paid
Auto Drivers Welfare Scheme	218997	1739486000
Nekar Samman Scheme	47045	186648000
One Time Financial Assistance to Power loom Workers	64997	298373000
One time Assistance to Barbers and washer men	215557	1027954000
Financial Assistance to Artists during second wave of Corona	18730	56190000
Covid special package to Chammaras	12600	25200000
Honorarium to ASHA Workers	93483	373932000
DAY NULM - Assistance to registered Street Vendors due to COVID – 19	162016	324032000
COVID 19 Financial Assistance to the PeshImams, Mouzzins and Muallim's	12456	37368000
Covid compensation for Tourist Guides	332	1660000
Covid Special Package to unaided school staffs	90483	452415000
Grand Total	936696	4523258000

- Aadhaar as a Service: It is not worthwhile for departments to put in place a infrastructure like HSM/Aadhaar Vault and its management to comply with Aadhaar Act. In order to resolve this issue, DBT platform provides Aadhaar authentication service for departments to comply with Aadhaar Act.
- Subsidy Management System: This module was developed for those departments which do not have their beneficiary management system or IT application of their own.
- Financial Address Verification: In case if the Aadhaar bank account seeding related issues could not be resolved even after repeated tries, then department can opt for payment to be made to the bank account of the beneficiary. For this, financial address verification process where the account number of beneficiary is validated and name match is done to ascertain that indeed the account belongs to the beneficiary itself.
- Institution based payment: For certain scheme that utilize various agencies for providing services such as drip irrigation subsidy component is paid to the institutions that provide this service. Another example is payment of fees component to education institutions for students who are eligible for fee waiver, to enable Payment to institutions on behalf of the beneficiaries, First the beneficiaries are validated to ascertain the genuine beneficiaries and then payment is made to respective agency/institutes account number on behalf of the beneficiaries.
- Mobile app for DBT: Using this app, the beneficiaries can know the status of

Aadhaar Seeding and the payment details and status. The beneficiary can know his benefit paid details along with the bank account to which the amount has been credited.

ENABLER

Processes Re-engineered

The prevalent process of payment of beneficiaries involved receiving applications from applicants, scrutiny of these to ensure eligibility and then also obtaining the bank a/c details and making payment to the beneficiary's bank account. The processes in the department were automated / semi – automated. The procedure was not standardized across departments.

To ensure that all the departments follow a standard procedure, Aadhaar Enable Payment System was mandated by the Government. The procedure adopted is indicated as follows:

Identification of beneficiaries

- ID Validation process ensures authentication of a person based on the Aadhaar and comparison of Aadhaar name versus name as per scheme in department ensures identification of right beneficiary, this resolves the problem of wrong inclusion and wrong exclusion of beneficiary.
- NPCI check during ID validation provides input on the seeding status of Aadhaar i.e., if Aadhaar is seeded with a bank account or not. This will eliminate payment failures and rework for the Government staff. The check of seeding status will also facilitate the beneficiary to get his account seeded in case it is not been seeded.
- Direct benefit transfer to the Aadhaar linked bank account of the beneficiary ensure that at payment is not done to a wrong account. In case of NEFT transfer payment is done based on the account number shared to the bank and does not verify the name.
- DBT has enabled bulk processing of payments when compared to earlier method of payment where in State Treasury used to create individual recipient ID for making payment. This has greatly reduced the time for processing payment to beneficiaries. The State Treasury accepts all the records sent from DBT within a scheme and creates a single file. This file is used for making payment instead of the earlier concept of creating IDs for each of the beneficiaries.
- Common HSM and Aadhaar as a Service – As per the UIDAI guidelines Aadhaar can be stored by Global AUA and it can be stored only in the Aadhaar Data Vault in a encrypted manner. It is economically not viable for the departments to procure and maintain HSM and also becoming AUA.
- DBT has also ensured that best practices are adopted by the departments. DBT provides Aadhaar as a Service, which becomes the core functionality ensuring validation of their respective beneficiary's right at the beginning at the time of registration.

Technologies

Protocols and Standards used for data exchange:

- The data exchange happens through industry standard XML files. All the

different integrations are well documented with pre-defined xml format. Since XML files can be validated easily using an XSD. It has enabled DBT platform to identify erroneous data at the earliest possible time and take corrective measures, thereby enabling seamless integration for departments with DBT Platform.

- The file exchange in DBT platform is through SFTP. This SFTP protocol provides the highest possible security available for any file transfer protocol. Since the data exchange is predominantly financial and personal data, the highest available security measures are basic requirement for any system, and sftp has provided the same for the DBT Platform.
- DBT integrates with K2 / SBI as payment channels, both these integrations are through digitally signed XML files. The digitally signed files ensure authentication, integrity, and non-repudiation of the data that is sent / received. Both these channels make use of SFTP for the file transfer, providing high security for the data exchange between systems.
- The Mobile application developed empowers the citizens to know the status of the bank seeding and also payment details.

People

The DBT platform is administered by the Steering Committee headed by Additional Chief Secretary to Government, Finance Department as Mission Director and Additional Chief Secretary to Government, DPAR (e-Governance) as Co-mission Director. The Steering Committee has 3 groups as (1) Operational Group (2) Technical Group (3) Financial Management Group.

The Operational group handles all policy related matter, Financial Management group provides input on financial matters and technical group handles the technical issues. The Steering Committee is facilitated by an Advisory Committee under the chairmanship of Chief Secretary to Government and the implementing departmental Secretaries are the members of this Committee.

A Project Monitoring Unit has been set up in Centre for e-Governance which is part of the Technical Group. This PMU oversees the DBT platform activities. The PMU is headed by a Project Director along with Technical Staff such as Process Consultant, Database Administrator, System Administrator, Solution Architects, Android Developer, Help Desk engineers.

As and when the department/scheme is being on boarded on to the DBT platform, the

As per the guidelines of Government of India, Aadhaar can be mandated only if the scheme comes under the purview of Section 7 of the Central Aadhaar Act and the same is notified by the State Government. To identify the scheme that would be covered under Section 7 and also inclusion of Aadhaar in service delivery a detailed guidelines has been issued by the Chief Secretary.

VALUE INDICATORS

Learning's for sharing

- Some of the challenges encountered were
 - Aadhaar seeding with bank account – Some of the beneficiaries who had Aadhaar was not seeded with any bank account. Hence the payment used to fail as no bank account was linked.

- Name as per Aadhaar was different from name as per the department – this led to difficulty in identification of the beneficiary. In order to address the above, the following was developed:
- ID Validation service which includes Aadhaar demo authentication, Name Match tool and NPCI check ensures only the clean records are stored and unsuccessful records are marked back to department for verification.
- Aadhaar act requires a department to set up Aadhaar Vault and follow certain security protocols while using Aadhaar. However, most departments are unaware of the implication of storing and managing Aadhaar of their beneficiaries in routine departmental activities. In order address this, HSM/ Aadhaar as a Service was developed, HSM/Aadhaar as a service ensures compliance to Aadhaar act and department need not worry about storing or maintaining of Aadhaar locally or in their DB.

Technical Challenges faced and mitigated

- The analysis of the turnaround time for a payment - request & response was done and DBT platform learnt that the generation of response file for payment requests on a file-to-file basis is a bottle neck, and when the same is generated at record-to-record basis it decreases the turnaround time significantly.
- The format & frequency of response shared with departments was modified to keep turnaround time to minimum possible for every record. The possibility of records being rejected / discarded at multiple junctures in the process pipeline, required that the same reaches the department at the earliest so that dept can take corrective measure and send such record again for payment after rectification.
- The throughput of the system during peak times was unacceptably low, largely due to the dependence on external services for ID Validation/ Payment process. On further analysis of the bottleneck, certain activities such as Demo Authentication with UIDAI and Name Match could be done in parallel. This led to multi process calls for the external services and led to an increase in the throughput by a good measure and also increases the fault tolerance of the system.
- It was observed that in some of the schemes, inorganic Aadhaar seeding done (Aadhaar was seeded in to the department database without authentication or even Verhoef Algorithm about the correctness of Aadhaar was also not checked). When Aadhaar was sent to DBT platform for ID validation, the Aadhaar authentication would fail, thus resulting in delay in the payment process. In order to overcome this Aadhaar authentication has been enabled using Aadhaar as a Service at the time of registration itself.

Digital Empowerment

By enabling Direct Benefit Transfer, financial inclusion has been established for all sections of society. Once the approval of the beneficiary is done by establishing the eligibility in the departmental application, the integration with Direct Benefit Transfer platform ensures that payments cannot be delayed. Timely payment not only reduces the anxiety of beneficiary, it also ensures effective utilization of the time of the Government Machinery as the numbers of grievances have reduced.

Providing a mobile application, sending SMS etc has empowered the citizens and has bridged the divide between the rural and urban populace. By excluding ineligible beneficiaries, it is possible to ensure that eligible beneficiaries are not deprived of the

benefit.

Departmental application need not connect to multiple financial management system or sponsoring bank. Department need not bother about the payment processes and integration methods for connecting to these systems. The DBT platform connects to the State Financial Management System, Public Financial Management System (PFMS) of Government of India and also sponsoring bank.

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. There are several dimensions to green e-Governance in this project and prominent among these relate to Power and Paper consumption.

- System is End to End online: DBT platform is online and connects to the department application on one side and Khajane 2/ Bank on the other side. Hence there is no paper involved in any of the transactions in DBT portal.
- Less paper-work for departments thus contributing to green initiative
- No need to validate beneficiaries again and again, it is one-time validation of beneficiaries by departments. Hence less computing.
- DBT is on shared platform in KSDC, uses virtualization on servers and other computing resources hence contributing to green initiative.
- The platform is Web based and can be operated using the existing infrastructure available with the department. Therefore, there is no need for procuring additional IT infrastructure by the departments for connecting to the DBT platform.

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PROJECT OVERVIEW

In a first of its kind, on 10th June 2020, the Government of Odisha launched the disaster Assistance Payment to provide online payment of assistance to the next of kin/disaster victims immediately after the incident has occurred in the places of occurrences of Odisha.

Objective

The objectives and principles underlying the Disaster Assistance Monitoring & Payment System (DAMPS) system include the following:

- Payment of ex-Gratia to citizens account caused due delay in getting the financial assistance
- Providing a mobile app-based solution to the field level revenue officials to report the preliminary Information (PIR) as soon as possible.
- Reduce citizens' involvement and hassle to get First Information Report (FIR) copy from police station for availing the ex-gratia assistance by building trust and assurance on quality by the government. This is expected to deliver saving of cost & labour to get a FIR copy due to integration of CCTNs portal for online attachment of FIR report.
- Dashboard based monitoring and analysis, spatial linkage to the data using GIS, Performance management after fixation of roles & responsibilities to tahsildars, sub-collectors and collectors in the respective domain, Reporting with quality graphs & charts.
- Equitable, sustainable and people-centric service provision with focus on the rural poor who are the most vulnerable and for whom getting such assistance is cumbersome.

Scope (Functional & Geographical)

- The functional scope of the project is to establish a dashboard-based management system to provide and monitor immediate assistances provided by Govt. of Odisha, through a web enabled system and to provide analytical models & data visualization for quick decision making and resolution of citizen service-related problems.
- Scope of the project covers entire Odisha having 30 districts, 58 sub-divisions, 317 tahsils and more than 2250 Revenue Inspector (RI) Circles serving a wide range of people of the state.

Key Stakeholders

- Citizens: 4.7 Crore populations
- Revenue Circles: 2250+ no. of Revenue Inspectors (RIs)
- Tahsil Administrators: Tahasildars & Additional Tahasildars of 317 tahasils
- Sub-Collectors: Sub-Collectors in 58 Sub-Divisions

- District Administration: Collectors, Additional District Magistrates, Emergency Officers of 30 Districts

Intended benefits

The following six different sub-systems have been deployed, each targeting a separate set of outcomes for the various stakeholders such as

- Immediate Reporting on Preliminary Information on Incident due to Disaster (G2G): Timely and immediate preliminary information on casualty/injury/missing person is vital to assess and take immediate action on the disaster situation for both top and field administration. Mobile apps have become a tool in the hand of 2250+ Revenue Inspectors (RIs) of the state to pass on immediate preliminary information on disaster to SRC and Collector. This mobile app acts as a last mile connectivity of the DAMPS system to the place of incident.
- Hassle free Direct Account Transfer through Integrate Finance Management System (IFMS): Any issues related to disbursement of assistance to the affected person (or NOK) has to be made simple, timely, accountable and transparent as the DAMPS system can be linked the online Integrated Financial Management System (IFMS) which helps not just in disbursement of ex-gratia payment but which is responsible to raise all sorts of objections for any kind of wrong, incomplete, redundant, untimely sent data to the IFMS and then allows immediately resolved remotely, ensuring quality of service to the citizens.
- Spatial visualization of disaster occurrences using GIS: Spatial integration of places of occurrences of disasters 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 analysis.
- 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 performance, identification of incident occurrence sites, reduction of pendency period for cases, effective measures in focused areas.

Hardware/Software

Server OS: WINDOWS (Microsoft base)

Server Service: IIS (HTTP Server)

Database: SQL Server 2014

Application: ASP.Net with C#, Javascript, JQuery, CSS, JSon, REST API

Design Environment: Bootstrap, VS Reporting Tools

For Mobile Application: Android, Java with jdk1.8, JSON, REST API

Library: volley, HTTP

Design Environment: XML, View Components

Third Party Web Application: Google MAP

Certification (Certifying Agency)

The application has been Audited by an empaneled auditor of National Informatics Centre, Government of India.

Disaster Recovery and Service Continuity

The design methodology & development of the "Disaster Assistance Monitoring &

Payment System for Odisha state” 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.

- In addition to the online web enabled system, Mobile apps act as an alternate channel of sending the relevant disaster preliminary information report (PIR) by the Revenue Inspectors (RIs).
- 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 at the state and the tahsils.
- Regular back-ups are scheduled and taken offline in different locations. Backup server in National Data Centre (NDC) and NIC has been put to use for a disaster recovery mechanism.
- Since NDC provides a scalable infrastructure extension to infrastructure, platform, storage, processor etc can be availed without affecting the performance of the system.

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 framework. Adequate equipment are deployed. Field level employees were trained in handling the data transfer during and after the disaster situation.

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
Immediate Reporting of Preliminary Information (PIR) from field (G2C) (G2G)	Immediate Reporting of preliminary information about the disaster from field using mobile apps could help the higher administrators in assessing the situation and taking instant decisions	Nil PIRs registered within 24 hours of the incident Nil PIRs registered within 7 days of the incident *Earlier all are manually controlled	8 No of PIRs (Up to 10.06.20) + 402 Nos PIRs = 410 No of PIRs 27 No of PIRs (Up to 10.06.20) + 1463 Nos PIRs = 1490 No of PIRs within 7 days *Digital forms are introduced	590 No PIRs within 24 hours of the incident 1033 No PIRs within 7 days of the incident *Using Mobile app& Web

	Decreased Response Time using handheld systems has accelerated response time considerably.	1 day to 7 days Response through telephone and field visits	Few days, through digitized forms or messaging	Few seconds, automatic through mobile app
	Last Mile Connectivity through mobile app has enabled the Government now to reach to the public and geo tag the location along with incident details in a hassle-free manner. This has increased the public satisfaction in availing the disaster assistance service.	Time lag due to preparation of PIR manually and inputting redundant information	Only few information are required. Most of the information is taken automatically from the system	Instant reporting is possible now.
Initiation of ex-Gratia case at Tahasils (G2G)	Online initiation of case by automatic case no generation attached with the digitally managed documents have reduced the improper organisation of files and records at tahasil level.	No Digital Records/files Manual verification made the process slower	1837 no of cases initiated through online systems, 1764 cases verified by sub collector and forwarded	417 no of cases initiated and 328 no cases verified and forwarded to collector for sanction
	Digital Order Sheet has enhanced the workflow with noting and comment maintained in a sequence. A lot of physical space, missing of files and records, illegible noting, untraceable signatures etc are pertinent issues in earlier system	Manually Order sheets piled up in a record room	Digital Order sheets have consumed a few MB of memory space	Digital Order sheets are maintained in cloud
Easy & transparent access to related information	Provision has been given to the public for accessing the stage and status of financial assistance from time	Nil - no of RI circles covered under	1208 no of RI Circles	827 no of RI Circles till date

, reduction of cost & complexities in getting essential documents(G2C) (G2G)	to time through their mobiles to provide easy access.	DAMPS (631 RI circles having backlog data are inputted)		
	SMS based status message to the NOKs for any objection/ successful payment	No public interface available for status.	SMS provision has been initiated	More than 1000 SMS have been sent so far.
	All information pertaining to the assistance is transparent public as well as departmental staff. Information is also available in web.	No public interface available for status.	43 hits from outside to know the status	32 hits from NOKs
Online integration to CCTNS portal	Online integration to CCTNS portal has helped the tahasil administration to verify the police records efficiently and timely	Nil	2087 FIRs have been linked through CCTNS portal	587 FIRs till date have been linked till date
Reduction in Pendency at each level of administration (G2G)	Reduction of pendency through performance measurement has been successful. Report have been generated RI Circle wise, Tahasil wise, Subdivision wise and district wise depicting the pending days	Nil	Average pending days RI Circle = 13 Tahasil = 27 At sub-division = 18 At District = 19 At State = 3 At IFMS = 2	Average pending days RI Circle = 19 Tahasil = 35 At sub-division = 17 At District = 9 At State = 0 At IFMS = 2
Performance Rating of administrative domains	Ratings based on Disposal of cases in the concerned level, Disbursement of cases for the concerned domain, and measurable parameters to take corrective action for performance	No system available	Average disposal performance of cases at RI Circle = 71% Tahasil = 66%	Average disposal performance of cases at RI Circle = 80% Tahasil= 87% At sub-division

			At sub-division = 70% At District = 80% At State = 99% At IFMS=92% Average disbursal performance of cases at RI Circle= 47% Tahasil = 60% At sub-division = 88% At District = 91% At State= 98% At IFMS=92%	= 96% At District = 94% At State = 99.2% At IFMS =99.1% Average disbursal performance of cases at RI Circle= 51% Tahasil = 66% At sub-division = 79% At District = 84% At State= 94% At IFMS=92%
Disbursement of ex-Gratia payment	Targeted ex-Gratia payment based on the type of disaster and type of incident such as death/missing/injury	44.3 Crore	61.45 Crore	7.4 Crore till date
	Disbursed Amount of ex-Gratia to disaster victims	44.3 Crore	61.45 Crore	7.3 Crore till date
	Disbursement within 7 days of PIR submission	Nil	Nil	10
	Disbursement amount within 7 days of PIR Submission	Nil	Nil	36.5 lakhs
	Disbursement within 3 months of PIR	Nil	33 no of NOKs	115 no of NOKs

	submission			
	Disbursement amount within 3 months of PIR Submission	Nil	120.54 lakhs	390.43 Lakhs
Disbursement of cases other than Odisha		Nil	Nil	7 cases

Implementation

In FY2020-21 the project had a target completion of ex-gratia payment to

- Families of deceased persons,
- Ex-gratia payment for loss of limb and eye,
- Grievous injury requiring hospitalization covering entire state.

The remaining assistances are expected to be covered in FY 2021-22. All the assistances will be covered by financial year 2022-24. Implementation of the project has been carried out and made 100% functional by taking all the districts of Odisha.

Detailed Coverage of application with respect to target and achievements have been shown in the following table:

Implementation Strategy	Target (FY 2020-21)	Achievement (FY 2020-21)
Design, Development & hosting of DAMPS System for monitoring of ex-Gratia cases	Procurement of infrastructure, platform, storage, processor, server etc from National Data Centre (NDC). Hosting of application in NIC's cloud (Meghraj)	Site is created with URL: https://dampsodisha.nic.in with the intended functionalities for the project stakeholders.
Backlog data entry of cases under process since 01.04.2015	Backlog data entry forms created and data entry of cases since 01.04.2015.	Data entry, verification and checking completed by Aug, 2020.
Mobile app connectivity towards immediate submission of Preliminary Information Report (PIR).	2297 Revenue Inspectors under all the 317 tahsils of Odisha to be provided access to mobile app and web enabled system to submit PIR.	100% achieved by keeping android based PIR mobile app in google play store providing link in the web enabled system. Online user manual provided in the web site
Cyber Audit of Mobile Apps, Applications, WebAPIs and compliance	To be taken up by certain agencies	Cyber audit has been complete in all aspects.

Ensuring RIs to submit PIR electronically within 24 hours of the incident	Replacement of manual PIR form with online forms.	95% of PIRs submitted using mobile app and 5% through web-based system Manual PIR submission cases are rejected.
Replacement of old papers and document related to ex-Gratia cases, damages, Maintenance of case records, police documents, inquiry reports, RoR copies etc.	All 317 tahasildars and RIs to upload and link digital documents instead of hard copies.	100% covered Now, all relevant documents are available in the cloud.
Electronic Noting and document attachment	All tahsildars are trained to use <i>digital order sheet</i> and scanned documents for moving the file to next authority.	100% implemented. Till date 3860 order sheets have been maintained in DAMPS Manual mode of order sheet has been stopped.
Sanctioning of ex-gratia cases	All cases pending at District level have been identified for online sanction.	3177 out of 3660(87%) cases have been sanctioned till date and sent for SRC's approval. 11% cases have been rejected by Collector.
Examination of Cases and approval by SRC	Approval through online mode.	3105 cases out of 3177 (98%) cases have been approved for disbursement. Total NOK's: 3556 Nos.

Improvements / Enhancements

Improvements/ enhancements specifically rolled out during the last one year

- Disaster Assistance Monitoring & Payment module was completed last year
- Secured Authentication and Role based authorization was added as an enhancement.
- Android based mobile apps have been designed to serve the last mile connectivity to the place of incident.
- Data Analysis and reporting have been enhanced.

Improvements/ enhancements to be rolled out during next one year

- Up scaling of the other category financial assistance during disaster situation
- Integration of Birth & Death Registration portal towards online death certificate
- Linking of Bhulekh, Odisha site for RoR data verification
- Continued Training and Capacity Building of RIs & Tahasildars.

ENABLER

Processes Re-engineered

The Government of Odisha has adopted 5T (transformation, transparency, teamwork, technology and timeliness) which focuses a standard service delivery mechanism for each service prioritizing the citizen convenience. The Disaster Assistance Monitoring & Payment System was conceived under this 5T Mission of the state to provide ex-Gratia payments to citizens.

Earlier, the prevailing ex-Gratia 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 in the files 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 e-Governance & m-Governance, which has become a medium of automated, fast and accurate data collection and storage, enabling the Disaster administration and other associated departments 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 workflow enabled governance through web enabled systems and mobile apps and integration with CCTNS portal and IFMS system. They are:

- Improved consumer focus and experience: By making use of Integrated Finance Management System interface for payment to the account holder in conjunction with a suitable web-enabled data driven application, we have been able to provide higher quality of response to citizens (direct payment of ex-Gratia to NOK's account, immediate response, SMS based status updation) as a part of service delivery. Due easy access to CCTNS portal for Police FIR & postmortem report through automation, services became more responsive to the needs of the disaster affected families.
- 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 process simplification and delivering the service with minimum human effort. For example, Roles have been defined for each stakeholder to work on web enabled system with introduction of digital order sheet.
- Better Trouble Shooting & Redressal: Now, identifying a problem and resolving the issues related to any troubles have become easy as the status of the case record is maintained for each stage. A core group with dedicated manpower is working for Application and Server related problem. Issues pertaining to tahasils/district are resolved remotely. In time alerts to the concerned officer for any kind of trouble in form of SMS has reduced the response time to few hours instead of months. 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 and status of service request to citizens and administration.

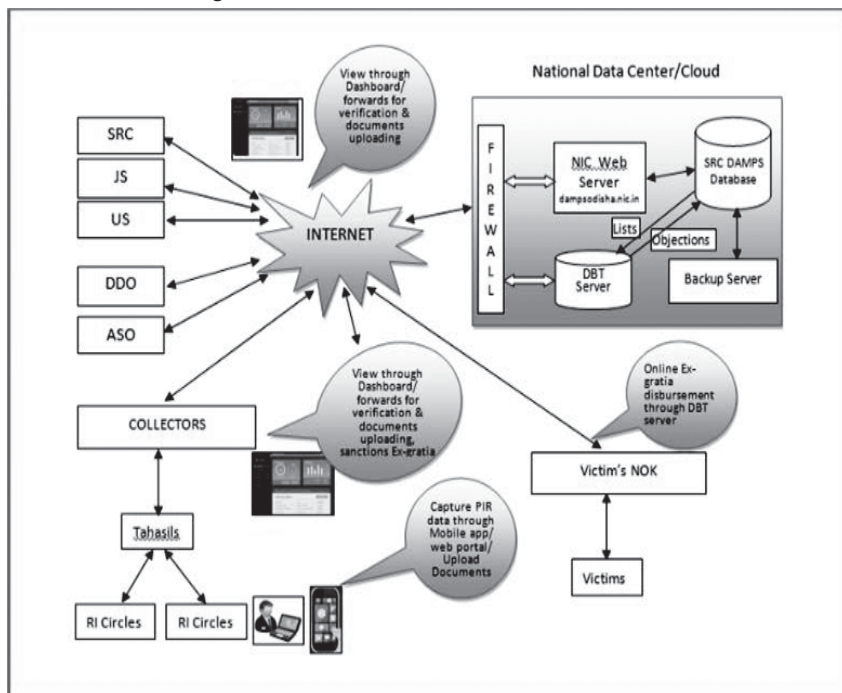
Technologies

Architecture of the system

Main architecture of the system is a three-tier system with

- User interfaces through Desktops connected to internet & Mobile apps/Responsive apps through android based app based mobile devices,
- Web server located at NIC's Cloud platform (Meghraj). The server is connected to the
- DAMPS Databases server and other sub systems like DBT server, CCTNS server etc

The data from the field officials come through mobile apps and web forms for monitoring & analysis and are stored in National Data Centre of NIC by the help of APIs/ web enabled system. The Web enabled system make use of Geographic Information system (GIS) for identification and tracking of place of incidence. The broad architecture diagram is shown below:



Data analytics

Visualizing Analytics data with Dashboard: Entire scenario of the disaster incident, victim and the payment status details are available in the form of maps, statistical dashboards, reports where in support and monitoring activities can be done. Disaster monitoring & payment related parameters can be analytically viewed with the dashboard.

Analytics on Disbursement of ex-Gratia Assistance: Data collected from various stages of process hierarchy through different channels are collected, accumulated and monitored in payment of ex-Gratia to the citizens. Some Data visualization and analytics in each stage is depicted in terms of graphs and charts.

Knowledge Management

Rule-based 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 and from NIC's Cloud periodically and functionality wise as defined in each stage of the operations in the system. The data is pushed through different application interfaces & pages were made available to the stakeholders.
- Formulation of Case Number, Sanction Number & Computation of Performance rating.

People

Challenges faced & Solutions developed

Leadership: This aspirational and ambitious mission to provide disaster assistance to the affected persons family within a small time 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 Special Relief Commissioner, Home and Finance Department of Govt. of Odisha and the technological support by NIC, Odisha, Govt. of India.

Change Management: This was a key enabler as it was the first computerization/ e-Governance initiative undertaken by SRC. Process reengineering was addressed to the extent feasible and resistance of field staff was addressed with user interaction, training and handholding towards addressing digital divide. The change management arising out of lack of knowledge & resistance from field level 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.

Backlog Data & Policy of Assistance: The challenge initially was with the changing policy on financial assistance, backlog data and data under process. This was overcome by taking a cutoff date i.e. 1st January 2015 for all 317 tahasils of the state. Provisions are made to capture the data since 2015 with the respective assistance policy. Cases under manual process were scanned and digitally uploaded to the system and updated till the latest status as in manual state.

VALUE INDICATORS

Learnings for sharing

- One of the key learning was the role of a champion who would own, steer and de-bottleneck various difficulties faced during the tenure of the project. In this project, there was a core group from administration, technology and finance who were more or less at some ranks and thus there was no single point of ownership/responsibility or speedy & timely advice, facilitation & redressal of difficulties.

- The change management arising out of lack of sufficient training during COVID-19 & resistance from operational staff also initially hindered the progress of the project. This was addressed with the NIC's Video Conference based training throughout the state in different phases with the support from Senior Officials from SRC. Training at Districts by District Emergency officers and District Informatics Officers (DIOs) helped the DAMPS application to be made operation throughout the state on a single day.
- In our project we tried to kill the alternate manual modes of operation in order to ensure that the only option left for the user was to use the computerized application. This ensured the utilization of the set of minimal functionalities provided to the user. But a large number of additional functionalities provided the application were either infrequently used or never used. The usage of these functionalities were observed whenever there was continuing demand & pressure from senior officials from SRC to do so.

Digital Empowerment

- To overcome the barrier of language or digital literacy, the mission was focused towards-Administration reaching to the public in places public coming to the offices. RIs undertook the responsibility to bridge the gap between the affected victim and the administration.
- DBT based payment to citizens account directly through IFMS integration and access to CCTNS portal for police FIR has overcome the barriers of financial obstructions (banking knowledge of digitally disconnected people).

Green e-Governance

One of the key areas of green computing applied in this project was around development of all process making everything paperless (in terms of PIR input by RIs from fields, Linking the online police FIR and postmortem reports through CCTNS portal, Digital Order sheet movement, Digital cashbook for DDO). In addition, proper recycling policies and use of ecofriendly 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.

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e-Abkari Project

Department of Tax, Excise & Narcotics, Govt. of Arunachal Pradesh & National Informatics Centre Arunachal Pradesh State Centre

Kanki Darang, Debasish Nath and Teli Ngomdir

PROJECT OVERVIEW

Objective

Excise Department is one of the major revenues earning departments of the Government of Arunachal Pradesh. The operations of the Excise include License management of various categories of Excise Licenses and enforcement of State Excise laws by regulating the manufacture, import, transport, distribution and sale of liquor. All these activities were being done in the State manually, without and IT interventions.

So, to leverage the benefits of IT intervention, it was decided at the highest level to go for automation of the Excise Department with required business re-engineering to meet the goals and objectives of the department while abiding by the Excise Acts and Rules in force in the State.

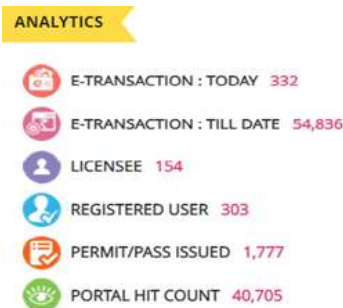
Scope (Functional & Geographical)

- Issuance of Permits for Import/Transport of Bulk Spirit & Packaged Liquor.
- Registration of Labels for Packaged Liquor.
- Re-validation of Import Permit.
- Hassle free and secure collection of State Excise fees etc through Integration of e-Payment Gateway.
- Digitization of inventory of the Licensees.
- Real-time notifications through SMS and Email.
- Digital archiving of documents and information and easy and error free record maintenance and data retrievable.

Key Stakeholders

- Excise Department & Licensees of the State.
- Excise Authorities of other State and UTs.
- Enforcement Agencies.

Current Status



Hardware/Software

Resources required for hosting e-Abkari project in the state:

- VMs:2Nos. One for Application Server and another for DB Server.
- Minimum Resource required for each VM: 4 VCPU, 64/128 GB RAM, 100 GB SAN, MS Windows 2012 R2 Standard.
- Provisioning of VPN or Remote Desktop Connection facility.
- Database: Microsoft SQL Server Enterprise 2014.
- Software Environment: Microsoft IIS 7.0 as Web Server, Microsoft ASP.NET 4.5 Framework.

Certification (Certifying Agency)

Yes. Application security audited by CERT-In empanelled auditor.

Disaster Recovery and Service Continuity

Disaster Recovery facility with DR site located in NIC, 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
Import Permit	It facilitates the Licensees to apply for Import Permit online along with online payment of the Fee etc.			2284
Transport Permit	It facilitates the Licensees to apply for Transport Permit online. This permit is required for intra-state movement of liquor from the Bonded Warehouse/Bottling Plants.			901
Label Registration	Label on Liquor bottles need to be registered with the Excise Department. This module facilitates online registration of Labels.			426
Revalidation of Import Permit	Renewal of Import Permit is allowed for a stipulated time before expiry of validity.			05

Implementation

The project running successfully in the state, covering all districts, since 31st March, 2021 after the project was officially launched by the Hon'ble Chief Minister of Arunachal Pradesh.

Phase-1: This phase of the project includes, official website of the Excise Branch along with three services namely, Import Permit for Packaged Foreign Liquor, Transport Permit and Label Registration.

Phase-2: In this phase, by the end of August, 2021 two more services have been made Live namely, Import Permit (Bulk Spirit), Re-validation of Import Permit. Export Permit is in development stage and likely to be deployed for testing soon.

Improvements / Enhancements

- Services of the department have become online.
- e-Abkari has helped in achieving transparency, accountability and efficiency in the Excise Department of Arunachal Pradesh.
- Better monitoring and control towards comprehensive transformation of State Excise ecosystem.
- The integration of Email and SMS in e-Abkari has ensured that the Licensees and the departmental stakeholder are well informed.
- The find Permit toll of e-Abkari is a unique facility that can be used to check authenticity of Permit etc issued by the Excise Department.
- Enhanced revenue collection.
- Rolled Out: Import Permit for Packaged Foreign Liquor, Transport Permit, Label Registration, Import Permit (Bulk Spirit), Re-validation of Import Permit
- Plan for 2021: Export Permit

ENABLER

Processes Re-engineered

- In general, the introduction of ICT tools re-engineered the department's manual processes in following ways:
- Verification of Permits: QR Code included. The portal also enables other States/UT enforcement agency to cross check the permits by using Find permit module.
- Simplification of issuance of permit: Now with the implementation of e-Abkari portal, dedicated officials are allotted a specific role that enables quick disbursal of the requests.
- Facility to know status of the application: The portal enables the licensees and other stakeholder(s) to know the status about their application(s) through SMS and Email.
- Reduction in paperwork.
- Real-time availability of data enables the department to have a clear picture of services that are live.
- e-Payment Integration has enabled the licensees to make payments securely at the click of a button. This not only helps in speeding up the process but also helps the department to track the revenue collection figures.

Technologies

The use of various social media platforms like, Facebook, Twitter etc. helps in having a wider outreach which in turn helps in attracting more business houses to invest in the

State thus leading to more revenue generation.

People

- Leadership support for capacity building, visibility of actions with current status: The project is being implemented under the able guidance of Shri Kanki Darang, Commissioner (Tax Excise and Narcotics Department) and Government of Arunachal Pradesh and spearheaded by Shri. Teli Ngomdir, Assistant Commissioner, Arunachal Pradesh. Considering the reach and extent of the re-engineering initiative a separate Helpdesk has been created in the Excise Directorate in the year 2020 which is being headed by an officer of the rank of Assistant Excise Commissioner. Also, the top administration was sensitized and trained in the initial stages of project implementation and given defined roles for co-ordination with the stakeholders. The Helpdesk can be reached over telephone and e-mail 24x7.
- Change management and Capacity building strategy defined and status thereof
 - o Support services are made available to all stakeholders round the clock.
 - o Resource personnel identified at all levels – including State and District Levels – and trained under the TOT model.
 - o Training sessions are organized at the Civil Secretariat and also through Video Conferencing for the Department Officers/Officials and Licensees.
 - o District level orientation and training exercises with all stakeholders conducted at regular intervals.
 - o Hands on support facilities made available by hiring support personnel.

VALUE INDICATORS

Learnings for sharing

Change Management:

In order to have sustainable e-Governance initiatives, the challenge before Excise Department was in bringing a paradigm shift in providing services to the stakeholders of the department. This necessitated attitudinal change, technological skill enhancement, adaptability to respond to stakeholder requirements in ever demanding scenario and commitment to provide superlative services.

The major challenges in change management before deployment of e-Abkari were (a) Processes were not streamlined – different processes in different offices (b) IT awareness (c) Risk of IT system replacing manpower (d) Fear of using system and working on system (e) e-services awareness (f) Risk of information loss (g) Process simplification and re-Engineering – communication.

Capacity Building Challenges

Imparting training and capacity building was a major challenge for the department owing to Covid-19, geographical distance and other issues. Department Officers/Officials were used to the manual way of working and resistance to accept ICT processes especially for the employees who were nearing their superannuation. Skill sets required to handle IT systems were limited.

- The Lessons learnt from Change Management and Capacity build in exercise
 - o Motivation plays an important role in bringing about change in mind-sets and accepting change.

- Peer learning is important and goes a long way in bringing about change.
- Selecting the right team leaders is essential for driving change.
- Appraising the benefits to all stakeholders, especially the end users, is important before process re-engineering.
- Initiative and perseverance of the top management is necessary to bring about major process changes.
- Training has to be a continuous exercise with hands-on workshops.

In the Phase-1 of the project, the State Government had given a very limited time to complete/implement the project. This gave chance to the NIC team to learn how to work under pressure with a crunch timeline.

Digital Empowerment

- The application is hosted in public domain which makes access universal, anytime and from anywhere. Practically anyone with basic computer hardware and an internet connection can access the services.
- Efforts have been made to make the interface user friendly with online user manuals available for each process re-engineered.

Green e-Governance

- The project has been designed for achieving the goal of paper-less office.
- Electronic Information Management System has ensured easy retrieval of data at any time and hence obviated the need for taking print outs.
- The Electronic Inventory Management at business premises has reduced the need for physical visits to such premises vehicles by officers which in turn has reduced fuel usage by stakeholders' vehicles.

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GST Prime - NIC GST Analytical System

*Commercial Taxes Department, Govt. of Karnataka & National Informatics Centre
Karnataka State Centre*

C. Shikha, B. V. Murali Krishna and P. V. Bhat

PROJECT OVERVIEW

Objective

GST Prime, though initially developed for Commercial Taxes Department, Karnataka, its success and usefulness has attracted interest from other state GST departments and same has been deployed in 15 other states, implementation is in progress in 5 more states and is extended to Bengaluru Zone of CBIC officers also, on request.

It is an Analytical tool for the GST officers to monitor the tax compliance, to identify and initiate appropriate actions against the non-filers of returns, identify and highlight the possible fraudulent activities carried out by tax payers in order to evade taxes, identify and reverse ineligible Input Tax Credit claims. The application is based on the data synched from external systems like GSTN System and E Way Bill System on daily basis, processes the data to provide the intelligent information to the officers at fingertips. Pre-processing of the data and persisting the same makes the application highly responsive even with large amount of data.

The application has various reports to provide above critical information to the tax officers, at all levels, for their day-to-day discharge of duties w.r.t. to tax collections.

All the related data from various returns filed by the tax payers and other activities such as E Way Bills are taken together to bring forth the list of non-filers as well as those likely to be following illegal practices to evade taxes. Thus, the insights are supported by relevant supporting information for the tax officers to tackle the case, moreover, the data is synched with external systems and systematically and frequently hence the officers are equipped with near real time data.

A feature called Tax Payer Profile provides the complete 360o view of a tax payer. This helps the tax officer to completely understand the tax payer at one place for various activities like inspections, audit, dealing with non-compliances etc.

The application provides role-based access to the officers so that only the required data is visible to the officer based on the login.

In the absence of such a system, it would have been herculean task to identify the big defaulters and big tax evasions. To simplify the identification of fit cases to be taken up, the popular ABC analysis is followed. Tax payers are grouped in to 3 categories based on the tax played by them in previous financial year and defaulters or tax evaders in the respective groups could be easily taken up for further actions by the officer.

Hardware/Software

Software:

- Database Server: RadHat Linux
- PostgreSQL RDBMS
- Application Server: Microsoft Windows Server
- Microsoft .NET web application (C#)
- Microsoft .NET console application (C#)
- Others

- Responsive (using Bootstrap and jQuery)
- Charts and Graphs

Hardware:

- Physical Servers
- Database Server: CPU- 24 Cores; RAM- 256GB; Storage- 4TB;
- Application Server: CPU- 16 Cores; RAM- 128GB; Storage- 6TB;

Certification (Certifying Agency)

Yes

Application is audited for security by M/s Secure Eyes Techno Services Pvt. Ltd., Bengaluru

Disaster Recovery and Service Continuity

- Near DR for DB is in place
- DR setup at other location is in progress
- Regular data backups are taken at the Data Centre

RESULTS INDICATOR

Implementation

- It is an online browser-based application.
- The application is used by all the officers of the department who are looking after the tax collection, vigilance and intelligence activities, across the state. Used by management to take informed decision to increase tax compliance.
- Analytics for detecting the tax defaulters.
- Analytics on the filings to detect tax evasion / suppressions.
- Analytics to detect fraudulent activities like illegitimate input tax credit claims, bill trading, circular trading etc.

Improvements / Enhancements

- The application has been improved continuously in terms of new analytics, user experience, security etc. Following are some of the new features:
 - o fraud detection through matching data from various statements,
 - o invoice verification against the ITC claims,
 - o detection of circular trading,
 - o supply chain,
 - o analysis of top tax payers of the jurisdiction of the officer,
 - o much improved tax payer profile with in-depth analysis on tax payer,
 - o details and returns filed by tax payers of other states,
 - o improved user experience,
 - o prediction of tax collection using AI
 - o improved tax payer search
- Future plan is to enhance fraud detection and improve upon future predictions on tax collection.

ENABLER

Processes Re-engineered

- Since inception, GST system is an online system. But the online activities such as registration, filing of returns, payments etc. take place at the GST Common Portal. The data is made available to the respective states either through GST online portal, SFTP dump or API. SFTP dump is made available once in a month, consolidated for the state. Then someone has to segregate the data office wise and distribute further. By the time data reaches the concerned officer, it would have lost its importance.
- GST Prime pulls the data through API in near real time (at the most a delay of a day), processes the data and makes it available online to all officers in the form of useful analytics. Data synchronization from GST Common Portal and E Way Bill system is automated through scheduled console application. The issues while pulling the data are systematically logged and the same are visible to the concerned in-charge through reports.
- The format and nature of data received from GST Common Portal and E Way Bill System is standard across the states and hence same applications could be easily replicated.
- Multiple related data is available at one place for the officers to avoid manual compilation of data to draw inferences.
- Simple user interface is in focus so that the officers can start using the application without much need of a formal training.
- Reports can be exported to Excel format and further processed, if required

Technologies

- GST Prime is a browser based online application. It is responsive and hence can be used on mobile devices.
- The console applications can be scheduled to run on specific time and hence data synchronization activity is automated.
- Scripts written using Selenium are run daily to check the data consistency across the application, monitor the data synchronization activity, usage of the application by the officers etc.
- Data analytics is based on the database queries. AI is used for prediction of tax collection.
- JavaScript based Charts and graphs provide appealing and meaningful outcomes.
- Tabular data can be searched, sorted, exported as per requirement.

People

The application is in use by tax officers of all levels right from the Commissioner of Commercial Taxes to tax inspector in 15 states. In Karnataka, where it is deployed first, as per the requirement and guidance, is extended to CBIC Bangalore Zone where officers at all levels from Principal Chief Commissioner to tax inspector use the system. Put together, more than 6500 accounts have been created and on an average 1200 user's login in to the system daily in Karnataka. The Commissioner, Commercial Taxes reviews the activities of the offices and officers regularly using the GST Prime application itself and no other statistics in any form are being used / referred.

States where implemented:

Karnataka, Assam, Bihar, Chandigarh, Chhattisgarh, Goa, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Kerala, Madhya Pradesh, Maharashtra, Tripura, Uttarakhand, West Bengal & Bengaluru Zone of Central GST

Few other states are in different stages of implementation like Delhi, Manipur, Meghalaya etc.

The interested states are first given demo of the live application so that they can take a decision on adapting the application. After implementation, detailed training is imparted to the master trainers including the senior officials. Master trainers in-turn train the other officials. Additional training sessions conducted by technical team as and when required. The resources who are in-charge of data synchronization and application management are given in-depth training on those activities and enabled for local troubleshooting and error reporting etc.

VALUE INDICATORS

Learnings for sharing

- **ABC Analysis:** Grouping of the tax payers in to 'Top', 'Middle' and 'Other' category based on the tax paid by them in last financial year helps the officers to identify and concentrate on big defaulters and can focus the efforts very effectively.
- **Sectoral Analysis:** Identifying the sectors in which the tax payers have been carrying out business based on the previous year filings helps in sector wise analysis. This in turn helps in making informed policy decision.
- **Circular Trading:** Some tax payers tend to show business in a closed group resulting in circular pattern to claim false input tax credits. Identification of such patterns will help the officers in further investigation to detect the frauds in illegitimate input tax credit claims.
- **Supply Chain:** Supply chain helps the officers to identify the suppliers and recipients for different number of levels of transactions. If one fraudster is identified, the feature helps in identifying the suppliers and recipients of that tax payer and check authenticity of their business records. This will help in finding all the tax payers involved in the fraud.
- **Prediction:** Artificial Intelligence based prediction of future tax collections helps the management plan the activities based on the outcome. The past data and the seasonal variations etc. are considered while predicting the collections.
- **Risk Based Analysis:** Various Key Risk Indicators (KRI) are identified for the filers and non-filers of the returns. Based on these KRIs, the tax payers list is shown to the officers with the details of the risks involved. This will help the officer to investigate further.

Digital Empowerment

The application is for internal use by the GST officers. The application focusses on simple navigation, better user experience and easy to understand terminologies are used. Hence there is not much need for training without which most of the officers can start using the application. Help for all the reports are available online using which the officers can get more clarity on the outcomes.

Green e-Governance

- GST System as such an ICT driven system.
- GST Prime is an online analytical system where all the analytics can be viewed online in the required format without any need for taking any prints etc.
- All the related data is presented in same place and hence no need for further manual compilation. The required information is visible quickly. Hence less time spent on the system.
- The application is responsive and hence can be accessed from smaller devices.
- Help is provided along with the reports itself and hence there is no need for printing a separate help /user manual.

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Online Bill Preparation and Payment System (Pay Manager)

Treasuries & Accounts, Govt. of Rajasthan & National Informatics Centre Rajasthan State Centre

Bhupesh Mathur, Amita Sharma and I. D. Variyani

PROJECT OVERVIEW

Objective

The Online Bill Preparation & Payment System (Paymanager) is the one-stop solution for departments and offices of the Government of Rajasthan which facilitates the preparation of all types of bills, payments to beneficiaries, and Employees through electronic funds transfer using Digital Signature and e-Account submission. It provides the common and integrated platform to prepare various types of bills that includes the generation of Salary Bills, DA Arrear, Bonus, Leaves Encashment, Overtime, Arrears, Scholarship, Pension, and Fully Vouched Contingent Bills, Works Bills, etc. The system facilitates complete automation of salary bills from generation of Bills to authentication to payments in Employees' accounts without human intervention through a single server certificate. The continuous re-engineering of existing processes and innovation is an integral part of the system. The software is being used by all (29,000) Drawing & Disbursing Officers covering around 7.50 Lacs Employees, Scholarship holders, Anganwari members, contractors, and Third Parties. The unique features of the software include automation of the salary processes through paperless bills without human intervention, e-Account submission, digital use of bills, auto-generation of bills, electronic payments through the thee-Kuber platform using a digital signature. It provides various reports which are helpful for administration. It uses a unique codification pattern for Allowances and Deductions for the whole state. A Web-based interface for the employees has also been provided. Paymanager application is handling a large volume of transactions that include electronic payments of over Rupees 2 lakh Cr covering more than 13 Cr beneficiaries by generating 24 lakhs bills per year.

Finance Department
Government of Rajasthan

PayManager
Version 5.14.12.20

PayManager is the Pay Bill Preparation System which means for the Employees of the Government of Rajasthan State. It provides the common and integrated platform to prepare the pay bills of the employee. The Software not only provides the facilities for Pay bill Preparation but also Preparation of DA Arrear, Bonus, Arrears and Leave encashment Bills.

Latest News

Current Circulars

For GPF the stoppage of deductions would be from three months before the date of RETIREMENT of the employee concerned

For GPF the stoppage of deductions would be from three months before the date of RETIREMENT of the employee concerned

PayManager

Enter User Name

Enter Password

Enter Captcha

☐ Digital

Login

Best Application II Best Security II Best Service II Best Innovation
100% Secure
Total Hits: 27199119

For DDO/Employee Login
Alternate URL: [Paymanager.nic.in/Main.do.html](#)

About DDO **About Bank** **About Employees** **About Department**

The State Government of Rajasthan is committed to placing a high premium on ensuring efficiency, transparency, timely disbursement, and accountability in government financial Transactions. The Objective of the project was:

Online Bill Preparation and Payment System (Pay Manager)

- Single payment Gateway for Payments/DBT through treasuries.
- Automation of Financial and Accounting processes.
- Efficient processing of bills and their payments.
- Paperless E-Account Submission.
- Integration with Departments and Banks.
- Provide better access to information for transparency and public accountability.
- Effective Planning and monitoring.
- Electronic Payments.
- Robust MIS as a tool for a better Decision Support system.
- Hassle-free & timely payments.

The application is operational across the state and is being used extensively for Bill Preparation, Payments, and e-Account Submission. It is well integrated with the e-Kuber of RBI, Departmental Application, and Banks.

Key Stakeholder

- Drawing & Disbursing Officer (29,000)
- Treasuries & Sub-treasuries (41 & 239)
- Departments (179)
- Employees (7.50 Lakhs)
- RBI/Banks (345 Branches)
- Third Parties (Service Providers/Vendors/Beneficiaries) (Approx. 1 Cr)

Scope (Functional / Geographical)

Paymanager application is running across the State in every office functioning on Treasury Route as well as in Treasuries. It is handling large volume of transactions that include electronic payments of over Rupees 2 lakh Cr covering more than 13 Cr beneficiaries by generating 24 lakhs bills per Year.

Intended benefits

Salient Features

- Payment Gateway for the State Treasury Payments.
- Automation of the salary processes through paperless bills without human intervention.
- e-Account submission.
- Auto-generation of bills.
- Electronic payments through the e-Kuber platform using a digital signature.
- Integrated with various Departmental applications that include Agriculture, Social Justice & Empowerment, Scholarships, ICDS, Works Department, Excise, Commercial Tax, IGRS, SIPF, and Rajkosh Applications.
- Role-Based system
- Work Flow-based Application
- 24 by 7 accessible

- Handling a large volume of Transactions.
- Being used across the State

Current Status

The application is in use across the State. The Application is being used extensively for Bill Preparation, Electronic Payments, e-Account Submission, and Payment Gateway for the State.

Hardware/Software

Application has been deployed at State Data Centers where rack servers are installed.
OS – Windows Server 2012

Database– SQL server 2017 Web Server – IIS

Application deployed in dot Net Technology.

Certification (Certifying Agency)

Yes, the application has gone under security audit by CERT-IN empaneled agency “CyberQ Consulting Pvt. Ltd.”

Disaster Recovery and Service Continuity

Presently Application is hosted at NIC State Data Centre. Software-oriented database backup and redundancy are in place. DR plan is under 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
Bill Preparation	It facilitates the generation of bills and their processing	37,97,144	33,06,422	33,00,024
Electronic Payments/ DBT	It facilitates Electronic Payments and DBT to beneficiaries.	40,47,881 Rs. 24346 Cr.	12,47,74,054 Rs. 1,25,439 Cr.	13,59,55,017 Rs. 1,37,792 Cr.
e-Account Document Services	It facilitates document services for e-Account submission	2,05,200	72,00,000	2,76,00,000
Employee services	It facilitates Employees in getting bills status, Pays Slips and Medical/TA bill Generation	85,24,250	91,75,131	95,18,700

Size of Stakeholders

- Drawing & Disbursing Officer (29,000)
- Treasuries & Sub-treasuries (41 & 239)
- Departments (179)
- Employees (7.50 Lakhs)

- RBI/Banks (345 Branches)
- Third Parties (Service Providers/Vendors/Beneficiaries) (Approx. 1 Cr)

Geographical Area Spread

PayManager application is running across the State in every office functioning on Treasury Route as well as in Treasuries. It is handling a large volume of transactions that include electronic payments of over Rupees 2 lakh Cr covering more than 13 Cr beneficiaries by generating 24 lakhs bills per Year.

Improvements/ Enhancements

The major activities which were extended during last one year include:

- Automation of Complete Cycle of Salary bills without human intervention that includes Auto Bill Allotment, Preparation, Authentication, and Digital Payments.
- Paperless Bills Movement from Office to Treasuries to AG Office.
- E-Account Submission to AG Office.
- Centralized Payments for Social Security Pension.
- Electronic Payments and Reconciliation through RBI E-kuber Platform.
- SMS Services on Bill Processing and Payments.
- OTP based Authentication.
- Auto Ceiling Processes.
- Integration with Department the al Applications of Agriculture, Education, IGRS, and SIPF.

The Major outcomes and achievements of the project are:

- Being used as a Payment Gateway for the State Treasury Payments.
- Reduced time by Automation of the salary processes through paperless submission without human intervention.
- Green Governance by Paperless Submission of Accounts and Bills.
- Paper and Time Savings through Electronic payments.
- Reduced Duplication of works by Integration of Departmental Applications.
- Timely disbursement of Payments.
- Availability of Consolidated database for Decision Making.
- Reduced Physical Movement by making the availability of information and services online to Employees e.g., Pay Slip, submission of Medical/TA Bills online.
- Keep informed by using SMS services about status of Bills and Payments.
- Considerable saving in Manpower efforts by automation of Bill Preparation Processes and integration with Applications.
- Streamlined processes by Business process re-engineering.

Innovative Ideas

- Automation of Salary Bills.
- Paperless E-Account Submission.
- Single DDO-Single Treasury for Payment process and disbursement of Social

Security Pension.

- Authentication by Single Server Certificate.
- Electronic Payments and Reconciliation.
- SThe interface services.
- Unification of Various bill formats.

Impact Parameters	Before Implementation	After implementation
Improvement in delivery time of services		
Treasury Functions - Bill passing	3 days- Treasuries were required to feed all the information related to Bills.	Same day – Data entry at the level of Treasuries/Sub-Treasuries has been reduced. Data are retrieved directly from the Pay manager fed by DDOs.
Payment of salary bills	Generally, 1 st to 5 th of the month	It can be credited on the same day. 80-90% Salary is credited on the first of each month.
Better Beneficiaries feedback		
Employee Information	Decentralized and not available at single place	Available at Single Place and accessible to each employee.
Electronic payment	Manual payment through cheques	Electronic payment saves time and energy
Online Bill Processing	Offline bill submission and no Budget Control	Online submission of bills and implemented Budget control.
Online payment by banks and intimation to the treasury. Online account scroll	Banks were making payments based on the cheque details and sending physical scrolls to Treasuries	Electronic payments and online scrolls are received.
Interfacing with AG and Banks	Manual Data Exchange	The interface has been provided for electronic data Exchange.
Improvement In Measurable Indicators		
Improved treasury system	Treasuries were required to feed all details and there were reasonable chances of misclassification	Online web-based system for all Treasury functions effectively implemented in all Treasuries and Sub Treasuries
Ensure adequate controls to	Manual practices involved	Electronic payment directly into the beneficiaries' accounts, Effective

minimize the risk of fraud and malpractices		control, and validations in the system to avoid fraud and malpractices.
Provide better Interface to Stakeholders i.e., Employees, Departments, Vendors, Service Providers, and Third Parties	Could not view their relevant information	7.50 lakhs Employee can view their salary details, pay slip, and GA-55 on the system. Vendors/Service Providers/Third Parties may view their bills payment status. Department may download relevant data.

ENABLER

Processes Re-engineered

To implement the Paymanager System in a sustainable manner various Government Orders were issued and reforms were carried out.

- Bulky different bills of format were replaced with common formats.
- Automation of Bill preparation processes that include automation of salary without human intervention.
- Paperless submission of Bills and Accounts.
- Electronic Payments with the integration of RBI e-Kuber Platform.
- Data Exchange methodologies were introduced to make data available with different stakeholders.
- Single DDO-Single Treasury Formula was adopted for pension processing and payment disbursement.
- Rules were made compatible according to the need of online system.
- Streamlined Reconciliation processes.

Business Process Re-engineering (BPR) process has made tremendous effect on the working of the functionaries as well as cost saving. Automation processes are saving lots of manpower efforts by automizing repetitive processes. For Example, automation of salary bill processing and payments without human intervention have saved almost 50 % of time. Electronic Payments have saved lots of Paper and physical movement of staff between offices and Banks. For Example, Rs 300 Cr. Per Year are saved by implementing electronic payments in single scheme of social security pension. Digitizations of bills have saved lots of cost and time by eliminating the requirement of submission of paper bills at treasuries. Paperless submissions of Bills and Accounts have encouraged Green Governance as well as cutting in carbon emission. Various formats of the bills have also been changed to make it unique across the State and it has reduced the ambiguity among the various formats.

Technologies

Complete application is web based and role based. The standard technology protocol has been used while exchanging the information with other systems. The new technologically innovative ideas which were added during the last one year include:

- Authentication with Single Server Certificate.

- Digital Signature on Bills.
- OTP based Login credentials.
- SMS Services during bill and Payment Process.
- Integration with RBI's e-Kuber Platform for Electronic Payments.
- Integration with Departmental Applications.
- E-Account Processes.
- Online Capacity building Programs using VC, YouTube, WebEx etc.

Mobile App is also in place for Employees and DDOs.

People

Change Management

User department requests NIC for any change in requirements. NIC team undertakes the job, designs and modifies the software as per the new requirements and then asks the department to perform acceptance testing and report feedback. Refresher Training sessions for master trainers are also organized in case of major changes.

Capacity Building

Various training programs and workshops are organized to train and sensitize the workforce. Initially master trainers taking 4 persons from each treasury are imparted training and declared as master trainers to impart further training at their respective locations to rest of the users. Online training modes are also being used extensively for capacity building which include VC, YouTube, WebEx etc. Project Financials/Sustainability at Office Level: No Manpower was provided. Existing Man Power was trained to use the software. Hence the software did not put any burden on the offices. At Treasury Level: No Additional manpower was provided. Existing Treasury Staff were imparted training to use the software. To ensure sustainability of the project following procedure were adopted:

- Online bill preparation was made mandatory at office level and treasuries were directed to entertain only online bills.
- Proper trainings were organized.
- Proper Technical support was provided to Treasuries and offices.
- Refresher training programs are being organized time to time.
- Video conferencing sessions are being held with the users.
- Review meetings for the progress are also being held.
- Help Desk was established for day-to-day problem solving.

VALUE INDICATORS

Learnings for sharing

Key Challenges - The major constraints and challenges were identified during the field study and the steps to overcome these challenges were suggested and it was tried to re-engineer them at the possible extents. The major Challenges are as under:

- DDOs were using various Different types of formats to prepare the same type of bill across the State. To make uniformity in formats was a major challenge. Common formats were designed incorporating majority of suggestions received

during the study.

- Paymanager is the pioneer application in the State where Online Electronic Payments was initiated. To exchange electronic payment information with different agency bank with their format was a big challenge. Different formats both for ECS as well as NEFT were designed as per the need of the agency banks to deal with this issue. However later on, single format was adopted for RBI's e-Kuber Platform.
- Security issue is the most concern while dealing with banks especially in financial transactions. This issue was taken care by developing Signer & De-Signer utility and involving Digital Signature based authentication and encryption.
- Printing of over sixteen lakhs of cheques in a year was a prioritized challenge. Electronic Payments was initiated to overcome this challenge.
- Delay in the payments to beneficiaries and data accuracy was a huge challenge as cheques were not being submitted timely to banks by DDOs. This has been taken care by electronic data Exchange with RBI/banks.
- Reconciliation of Deductions made in the bills was an area where departments were facing huge problem.
- At some places, Agency banks were far away and submitting cheques in such a case was also an issue.
- Reconciliation of Paid cheques and corresponding bills was a huge time-consuming task.
- Employees were completely dependent on the DDOs for getting their Pay Slips and other reports. Offices not having Drawing & disbursing powers were required to visit another office for such reports.

Key learning from the project

- It was assumed that the Project is concerned to Employees & DDOs so it will be implemented with the minimal efforts but this theory did not apply. The lesson learnt from the project was that any Project should not be taken in a light way for the purpose of implementation strategy. Developing a project is not as difficult as implementing it in masses.
- Use of the right technology in the right place with appropriate administrative decision benefits the masses.
- Top management support is the key to success the project.
- High authority's keen involvement in executing the project is a panacea for the success of the project.
- Training and workshops play a major role in implementation of the project.
- Extended facilities would always be welcomed by masses.
- User convenience should be the utmost priority especially to Citizen Centric Project.
- Security is a major concern in exchanging the information between different entities.
- Coordination between different entities play major role in smooth functioning of the application.

- Proper training and availability of Documents to user is a major issue in the success of the project.
- Proper monitoring at all the levels of the stakeholders is a panacea for the success of the project.
- Proper and sufficient time should be allotted in the System Study. As incomplete or poor system study would ruin the complete project and would cause delay in implementation of the project. Proper system study would reduce the implementation and development efforts.
- Proper Help Desk facility should be established at least initial period of the project till it establishes.
- Change Management process should be followed for the changes/improvement to be carried out time to time.
- System should be tested thoroughly before deployment.

Key Achievements -Application is being used across the State in all the offices, itself is a big achievement. The Major outcomes and achievements of the project are:

- Being used as a Payment Gateway for the State Treasury Payments.
- Reduced time by Automation of the salary processes through paperless submission without human intervention.
- Green Governance by Paperless Submission of Accounts and Bills.
- Paper and Time Savings through Electronic payments.
- Reduced Duplication of works by Integration of Departmental Applications.
- Timely disbursement of Payments.
- Availability of Consolidated database for Decision Making.
- Reduced Physical Movement by making availability of information and services online to Employees e.g., Pay Slip, submission of Medical/TA Bills online.
- Keep informed by using SMS services about status of Bills and Payments.
- Considerable saving in Manpower efforts by automation of Bill Preparation Processes and integration with Applications.
- Streamlined processes by Business process re-engineering.

Innovative Ideas and Best Practices

- Automation of Salary Bills.
- Paperless E-Account Submission.
- Single DDO-Single Treasury for Payment process and disbursement of Social Security Pension.
- Authentication by Single Server Certificate.
- Electronic Payments and Reconciliation.
- SMS and OTP services.
- Unification of Various bill formats.

Digital Empowerment

- Financial Inclusion- Majority of the payment is done electronically.
- Training and Capacity Building - Various workshops and training programs were

organized to empower the stakeholders to make use of this system. Help desk facility has also been established to sort out grievances. Local language was given importance while imparting the training.

- SMS Services – System has been made enabled to send SMS to intimate beneficiaries about their payment and status.
- Audio/Visual Aids – Audio and Video aids for training were introduced and training material were also made available on social media/YouTube.
- Help Desk – Help Desk facilities were established to directly interact with stakeholders.

Green e-Governance

Various processes were introduced to encourage Green Governance and cut carbon footprints. It includes:

- Paperless submission of Bills save paper printing and hence Carbon footprints.
- Electronic Payments enabled Green Governance by eliminating cheque printing.
- Automation of Salary Bill processing would save Electricity by scheduled processes and thus carbon emission.
- E-Account submission saves papers for printing of copies of bills as well as reports and hence encourages Green Governance.
- Use of Existing Data Centre Resources also helps in reduction of carbon footprints.

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RAJ-ERP

Department of Information Technology & Communication, Govt. of Rajasthan

Alok Gupta and Umesh Chand Joshi

PROJECT OVERVIEW

Objective

To simplify the work in operations and standardize the routine work so that productivity of the organization resources can be increased.

Scope (Functional & Geographical)

To implement the ERP modules for HR, Material Management, Accounting, Works and project monitoring for various PSUs of GoR. The project is geography independent and implemented throughout the organization and can be used from anywhere through a web-based application.

Key Stakeholders

All the PSUs/ Departments where this is implemented, there authorities, RISL, DoIT&C, and the third parties who all are involved in this.

Intended benefits

To reduce organizational operational cost. Reduce manpower doing the operational work manually and simply the working.

Current Status

The project is implemented largely in following PSUs of Rajasthan and is working live:

- Phase – I for 5 PSUs (RSMML, JMRC, RISL, AU-K, RFC)
- Implementation under Phase – II for 5 PSUs (JVVNL, AVVNL, JdVVNL, RVUNL, RRVPNL)

The standard modules of RajERP solution can be customized and configured as per the requirements of the PSU/ department and implemented in a short span of time.

Hardware/Software

Particulars		Technology
Web Portal	Web server	IIS 8
	Security	CUSTOM
	UI/UX	Dot Net Framework MVC HTML5
	Build tools	Visual Studio 15
	API Management	CUSTOM
Application Layer	Business Logic	Asp.Net MVC 4.0, Entity Framework 6.0, .Net Framework 4.5, JQuery
	Micro services/Web Services	Asp.Net MVC 4.0, Entity Framework 6.0, .Net Framework 4.5, JQuery
	Integration	REST Services
	Workflow Management	CUSTOM
Database	RDBMS	IBM DB2 10.5.8

Build and Release Management	Build Tools	Jenkins
	Version Control	SVN
	Application Testing	Jmeter

Certification (Certifying Agency)

The solution is hosted at RSDC P-4 which is a Tier-IV data center with all security compliances with a 24*7 SOC. Formal security audit certificate was issued by the SOC before hosing the solution.

Disaster Recovery and Service Continuity

The Application is running on load balancer, also it has its instance at DR site of RSDC (i.e., Jodhpur).

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
Salary	Disbursement of salary to employees of various PSUs	499784	849423	373307
Sales Module	Dispatch	252704	230191	153996
	Loading Advice	24125	22135	26610
	Invoice	22951	22134	26591
	Receipt	5484	4745	3528
	CRO	4284	4216	3270
	PO	548	555	406
Finance & Accounts Income	Vouchers	108194	1818555	1069871
	Purchase invoice	9149	9951	8314
	Advise	2073	1186	187
Raj Payment	Salary and other payments are being performed by using the service.	3000	9951	8314

Implementation

- Each process implemented at the last level of organization hierarchy.
- Each employee salary is being prepared by the Application only.
- ESS (Employee self-services) and MSS (Managerial self-services) are implemented and uses by the respective users.
- Material Management, Financial and Integrated accounting and Works and Project Management are being catered through the application only.

Improvements / Enhancements

During last one year: Successfully implemented the Material Management including Requisition of Material, Store Management and Scrape Management at n level of store

hierarchy.

Next One year:

- Salary of whole organization employees can be disbursed at single location with single payment. (Average employee is 15000 for an Organization).
- Tracking of all undergoing works and projects can be monitored through the application including estimation, approval and payments

ENABLER

Processes Re-engineered

- The approval and workflow channel of the processes being standardized during the implementation of the application which simplify the execution of the processes/ tasks.
- Rules and regulations are being standardized through which the decision and execution of the processes are generalized.
- Managing the privileges with roles and rights on user basis, so that the power of competent authority cannot be compromised.
- The channel of the processes is being managed through the privileges assigned to the respective users, so that each user can use their rights and responsibilities.

Technologies

- The reports and MIS generated through the software helping organization to get relevant and realistic information on time to make decision at strategic level.
- Created a Help Portal which contain all the information related to the application and processes, so that each user can get help on “How to use the application”.
- Whatsapp helped organization to share the information related to the application improvements and suggestion at ground level within no time.
- Automated Email and SMS services helped organization to provide the relevant information to the employees in bulk.

People

- Changes are always hard to implement especially with in the Govt. Organization where the users are habitual to their manual work and not much technology friendly.
- The end users of the application have been trained through multiple training programs. The hands-on training has been conducted for role-based training and for various other common modules. The training programs are followed by trainee evaluation and feedback.
- For effective implementation and change management various meetings have been conducted by senior management through Video Conferences to ensure that the application is used at the ground level.

VALUE INDICATORS

Learnings for sharing

The RajERP solution is an ERP solution specifically designed for government PSUs and departments. Therefore, it brings significant cost savings as compared to various

implementation of COTS solution available in market. As this is generic solution owned by the State government, it can be customized and configured as per the requirement of the respective PSUs/ department at lower costs.

Digital Empowerment

The main difference which effected the e-governance initiatives is the people not technological friendly. During the implementation of the application, we have also educated on technology to the user. Multi language application is already filling the gaps of language differences.

Green e-Governance

By using the online application to manage the operational work of Govt. organization the paperwork is reduces to less paper in the process which are managed in the application. Also, the uses of printer machines and related equipment's are being reduced which helps to fulfilling the green governance initiatives.

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TreasuryNet Manipur

Directorate of Treasuries and Accounts, Finance Department, Govt. of Manipur & National Informatics Centre Manipur State Centre

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PROJECT OVERVIEW

Objective

Treasury Net Manipur is a web based application which enables automation of Payment and Receipt processes. Manual registers such as Bill Receipt Register and Dispatch Registers were totally removed. The implementation of it has avoided misappropriation and overdraw of funds by DDO and put a complete check on Treasury system. Thereby increasing the internal efficiency of Treasury.

The system was completely integrated with e-Kuber Payment System of Reserve Bank of India since 11th February 2020. The earlier system of making payments via link banks has been done away with the complete integration of TreasuryNet with e-Kuber Payment System of RBI.

Scope (Functional & Geographical)

The computerized system process records bills prepared by DDO/Departments through Budget Estimation, Allocation and Monitoring System (BEAMS) and CMIS (Payroll System) and electronically process the bills using authentic User ID and password. It has enabled effective budget control, proper classification of Head of A/Cs as well as generation of comprehensive reports on State's revenue and receipts. Subsequently, it has eased the overloading and helps in the consolidation of government fund balances. Various reports such as no. of Bills passed and Pending bills, detailed report on Receipts, DDO-wise expenditures, Scheme-wise expenditures are made available.

Hardware/Software

(PHP Version 7.3.10)

Apache/2.4.41 (UNIX) OpenSSL/1.0.2k-fips PHP/7.3.10

RBI eKuber Standardized ePayments Model 2.7 for State Governments & Central Government Departments OS: Red Hat Enterprise Linux Server 7 (Maipo) Database: PostgreSQL 12.1

Certification (Certifying Agency)

Yes, formal certification was obtained from AKS Information Technology Services Private Ltd. Govt. of India, CERT-In Empaneled Company on 15th January 2021.

Certificate No: AKSIT/2020-21/Cert./168

Disaster Recovery and Service Continuity

Main site at National Data Centre Shastri Park and DR site at NIC Manipur 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
Electronic Bill receipt		1,21,476	1,22,460	1,28,234
ePayment Advice to eKuber (eKuber e-Payment was integrated from 11th February 2020)		-	23964	123390
Challan Receipt		15033	15240	14049

Implementation

100% coverage of all Treasuries and Sub-Treasuries in Manipur. e-Kuber payment system of RBI was integrated with the existing Treasury Net system in all Treasuries and Sub-Treasuries under the State Government and have replaced the earlier system of making Government payments through various links banks with effect from 11th February 2020. Routing of CDA (Cheque Drawal Authority) payments of Engineering and Forest Departments through Treasuries.

ENABLER

Processes Re-engineered

The earlier Treasury system involved payments through link banks after bills were passed by the concerned Treasuries. Such payment system had many shortcomings, including delay in fund transfer to the payee's account, delay in receiving scrolls and therefore delay in accounting due to multiple stakeholders involved and difficulties in cash flow management of the Government. The Government has rolled out the e-Kuber payment system of RBI by integrating Treasury Net with e-Kuber platform of RBI. It has resolved the shortcomings faced by the Government when payments used to be made through link banks.

Technologies

RBI eKuber Standardized ePayments Model 2.7 is integrated with the Treasury Net System. Integration of BEAMS and CMIS with Treasury Net enabling electronic receipt of all bills. Various Web services are enabled to check the real time status of the salary bills from CMIS portal.

People

The commitment of Finance Department, Government of Manipur and the dedicated technical support from NIC Manipur during the migration of Online Treasury Net and integration of e-Kuber e-Payment system could make the system come into a reality

VALUE INDICATORS

Learnings for sharing

The major challenge was in the integration of all treasuries to the common online system despite the poor network connectivity in some of the treasuries of Manipur. Another challenge was in the integration of BEAMS and CMIS which concern over 1300 DDOs with TreasuryNet and also with Pension Payment System.

Digital Empowerment

TreasuryNet Manipur is used in all the Treasuries under the Government of Manipur.

Green e-Governance

TreasuryNet Manipur project is purely a software based solution. The application does not generate e-Waste. The Server is maintained in a cloud data Centre.

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11. Others

APSBCL – Sale Management & Monitoring System
Andhra Pradesh State Beverages Corporation Ltd. & APT Online Ltd.
D Vasudeva Reddy and Bodgari Balakishore

PROJECT OVERVIEW

Objective

- 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 wants 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 (Functional & Geographical)

Functional

- Admin Module – This module consists of the following
 - o Material Management Section:
 - APSBCL Outlet
 - Create new outlet
 - Activation & Deactivation
 - 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
 - o Depot Module:
 - Monitoring of stock sent to Outlet
 - Cash remittance
 - Sales management
 - Reconciliation
 - Transportation

- Theft /misappropriation
- Physical verification
- o Retailer Module:
 - Authentication to collect the goods from the Depot
 - Transport & Tracking through GPS
 - Receiving of Goods/products & reconciliation
 - Sale to the Customers
 - Depositing the cash with department
 - Bill generation
 - Sale proceedings
 - Reports
 - Development of Mobile Apps with all above features
- o Finance Module:
 - Reconciliation of all sales and cash deposits at BCL Outlets
 - Monitoring Issue Price:
 - Supplier Cost
 - Excise Duty
 - Addl. Payment on Excise duty
 - VAT
 - Remuneration to the Corporation
 - 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
 - Daily
 - Weekly
 - Calculation of penalties on non-moving stocks
 - Calculation of Breakage charges (form 3, 4 and shortage)
 - Handling of CC/DC payments @Retail outlets
- o 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

- Daily
- Weekly
- Calculation of penalties on non-moving stocks
- o Vigilance & Monitoring:
 - Development of mobile apps for effective monitoring
 - Checking of seals and QR codes
 - Retrieving the required information from central server
 - Registration of complaint & forwarding to appropriate authorities
 - Web based solution with above features
- o Issue Tracking System
 - Web based solution for stakeholders to log their issues
 - Forwarding to maintenance team & closure of the issue
- o 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
- o Integration with CFMS
 - Cash Management @Retail Outlets
 - Generation of challan for transfer of deposited cash to various head of accounts including APSBCL
 - operational charges of finance/revenue department directly
 - Success/ failure confirmation from CFMS to department server
 - Processing of this information and updation in department server
 - Web based solution with above features
- o Issue Tracking System
 - Web based solution for stakeholders to log their issues
 - Forwarding to maintenance team & closure of the issue
- o 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

Geographical: Andhra Pradesh

Key Stakeholders

- Citizens
- Andhra Pradesh State Beverage Corporation Ltd.,
- Commissioner of Prohibition and Excise
- State Finance Department

- Suppliers of Liquor

Hardware/Software

Software Environment: C#, asp.net &, Microsoft SQL Server Database

Tools: Microsoft Visual studio

Application Server: IIS

Hardware: VM Hosting

Mobility:

Software Environment: java, realm database

Tools: Android Studio

Certification (Certifying Agency)

Yes, 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 Data center. Since this data centre hosts almost all the flagship IT applications of AP govt, it is fairly safe and the agency maintaining this data centre 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	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	NA	18,40,76,168 bottles sold	82,25,63,443 bottles sold

	improved revenue & minimizes inventory obsolescence • Timely closure of day end Sale			
Mobile apps for physical verification, sales & enforcement	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	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 workload on reconciliation of funds.	NA		Transaction Count: 27,41,81 814 Amount: Rs. 18,026.31 crores

Implementation

- 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 retail 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
 - o Indent Management
 - o Scanning of bottles
 - o Supplier Payment
 - o Stock Reconciliation
 - o 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

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 label 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 3120 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 place it was very difficult to get the connectivity required for execution of this service. To overcome this challenge, APOne 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, APOne 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. This is expected by end of this year.

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 equipment's etc used in hosting) along with in house IT equipment's at its offices, depot in a very judicious manner helping in extending their life. So, through the efficient use of IT equipment's, department is achieving green e-Governance.

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E-Manec (E-Marketing Network of Chhattisgarh)

Chhattisgarh State Industrial Development Corporation Ltd.

Soloman Mathew Silah, Subas Bhagat and Ashok Maurya

PROJECT OVERVIEW

Objective

- To facilitate government department purchasing through Rate Contract System and to promote procurement from local manufacturers and stimulate manufacturing and entrepreneurship in the state.

Scope

Functional

- Publishing of Rate Contracts of the Suppliers online through which Buyers(Government Departments) can purchase products and services, Publishing of Product Specifications, images and rate online by department, Issuance of Supply Order by Buyers to Suppliers, Physical Inspection and Report Generation by empanelled Third-Party Agencies, Delivery Challan Preparation and Signed Copy Uploading by Supplier after successful delivery of order, Buyer Acceptance Certificate Issuance for Quality Control, Supplier Invoice Generation, Grievance Redressals Module, General and Personal User Notifications Module, HSN and GST Mapping Module Online MIS reports available at every level for real time monitoring and control, Import as Excel feature for every Report, Miscellaneous Graphical Reports at Home Page and User Dashboards, Specialized Dashboards for every user type.

Geographical

- All Government Bodies, Offices, Institutions, Colleges and Schools, Suppliers, Empanelled Inspection Agencies of the Chhattisgarh state.

Key Stakeholders

- Head Of Departments (216), Buyers (1,352), Suppliers (615), Inspection Agencies (5)

Intended benefits

For Administration

- Promote local manufacturers and entrepreneurship.
- Uniformity in purchase rate of goods.
- Promote ease of access to the purchaser (government departments).
- Maintain transparency in the system.
- Transparent on-line purchasing process.
- Single Window System for Purchase Order and Supply Order.
- Quality Assurance of Goods through inspection through independent agency at seller factory/unit.
- Promote livelihood opportunities in Chhattisgarh.

For Suppliers

- Easily get featured online and Government departments can directly purchase

from Suppliers.

- No supplier can get the order over and above registered annual production capacity as mentioned in Production Certificate.
- Prepare Invoice after delivery and forward to DDO (Payment Officers) for Treasury Payments.

Hardware/Software

- SERVERS – Application Server (Windows), Web Server (Windows), Storage Server (Windows)
- Front End Framework – Angular 10
- Back End Framework – C# and .NET Core 3.1
- DATABASE – MariaDB

Certification (Certifying Agency)

- Website security audited by cert –in empanelled vendor – AAA Technologies Ltd
- SSL certificate, Digital signature Token

Disaster Recovery and Service Continuity

Server and Near DR is maintained in NKN Raipur. But Cloud base is under 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	
		2019-20	2020-21
Total Demand notes Prepared	Demand Note is a Draft Order which Contains cart details and Receiver details	5958	7083
Total Supply Orders Issued	Supply Orders Digitally Signed by Buyers and issued to Supplier	4593	5526
Total Supply Order Value in Crore Rupees	Total Values of Supply Orders which are Valid in Status	Rs. 406.00 cr	Rs. 456.8 cr
Total Inspection Reports Generated	Inspection Reports are generated by Inspection Agencies after physical verification of goods	3136	3625
Total Delivery Challans Prepared	Suppliers prepare Delivery Challan which contain the Receiver information and quantity of goods	2133	3044

Total Buyer Acceptance Certificates Generated	Buyers give Acceptance Certificate to Sellers after they are satisfied with the delivery and quality of goods	1718	2751

Implementation

- The purchasing procedure was offline before onset of E-Manec portal. Now, all purchasing process is online, and used by every government department in Chhattisgarh.
- Till now, 2 years have passed and total of Rs. 862.85 worth crores of business have been done through E-Manec, which speaks for itself.

Improvements / Enhancements

- Continuous feedback from stakeholders and simplifying the user interface accordingly.
- Training to all stakeholders through User Manuals and Physical meetings and presentations to Department Officers

ENABLER

Processes Re-engineered

- Online purchasing process instead of Offline Purchasing process.
- Transparency level is at the highest level.
- Uniformity in Rate of Products and Services through Rate Contracts.
- Digitally signed Supply Orders for added authenticity.
- Payment to Suppliers through Treasury and Bank Integration (Future Aspect).
- SMS alert to the concerned Users in each level.
- Captcha is used for added security

These are the modules in this system, which is executing the work through Automation, standardization, Simplification as follows:

Administrative Department Module

- Online verification of government department registrations and supplier registrations.
- Online Publishing of Rate Contracts, Products specifications and product images.
- Approval of various Updation requests like profile change, GST etc.
- Send general/personal notifications to users.
- Upload Circulars for important updates.

Head of Department Module (HOD)

- Create Office and officer entries.
- Assign roles to officers in the offices for purchasing, receiving and payments.
- Monitor the work done by Secondary officers.

Buyer Module-

- Create Demand notes, digitally sign and issue Supply orders to the sellers.
- Issue the acceptance Certificates to Suppliers after the delivery is completed.
- Forward the Seller Invoices to Treasury for payment.

Supplier Module

- Receive and Accept the Supply orders.
- Getting the materials ready and call for Inspection.
- After Inspection, prepare the Delivery Challans and complete the delivery.
- Prepare Bills after Acceptance Certificate is issued by Buyer.

Inspection Agency Module

- Complete the physical Inspection after getting call from Suppliers.
- Generate the Inspection reports and also upload signed copies for the same.

NIC Technical Admin Module

- Monitor the error logs for removal of errors faced by users.
- Upload User Manuals for the users for ease of system use.

Grievance Redressal Module

- Users can submit their grievances online and also upload screenshots/letters stating the problem in more details.
- Complaints are forwarded to Grievance Officers/ NIC Technical Team for problem solving. Timely solutions of problems

Technologies

- The E-Manec portal is based on REST architecture, which ensures no client information is stored between get requests and each request is separate and unconnected, thus improving the security aspects.
- Use of digital signature for publishing Supply Orders and Bills makes the documents authentic for stakeholders.
- PUSH SMS alert, E-Mail & notification alerts for stakeholder's awareness and convenience.
- Captcha is used while login and other places for increased security.
- Salt hashing is used for better security in passwords.
- Use of Parichay login, token-based API authentication & authorization and password encryption for added security features
- Treasury & bank Integration for direct and timely payment to sellers.
- Specialized Dashboards for every user type.
- Auto-allotment of Inspection agencies to the Supply Orders for avoiding of any unfair means.
- Auto Delivery Period Expiration module after expiration of delivery period for improvement of delivery system by sellers.
- Order Status Tracking: The order status can be tracked and all events in the order can see at one place.

- Complaint Box for all users for fast grievance redressals.
- Multiple real time graphs for data monitoring
- User Manuals section for help on all user processes.
- Separate 'Downloads' section for all useful downloads at one place.
- Bilingual content wherever possible is implemented.
- Search functionality, and Excel report downloads feature are the features available at website to make the execution of E-Manec system user-friendly, easily accessible, optimized and responsive.
- Grievance management System for easy and faster problem solving.

People

Capacity Building

- Administrative support from Executive Director, Chhattisgarh State Industrial Development Corporation Ltd. (CSIDC) and Team
- Technical Support from Senior Technical Director, NIC and Team

VALUE INDICATORS

Learnings for sharing

- One of the learnings from this initiative is to involve every stake holder from the concept stage. The department has conducted many consultative workshops to design the system which actually helped all the stake holders own the system.
- The buyers (government departments) were sceptical at first for adopting Online purchasing system. But due to its simplicity and ease of use, the system has been adopted and is in use vastly across Chhattisgarh.
- Training to departmental officials for taking action in different modules has been done to facilitate the processes.

Digital Empowerment

e-Governance- Reforming Government through Technology

- Delivering government services digitally
- Digital signing of Documents
- All documents are digitally available, and QR code can be scanned for authentication.
- Bilingual website

Information for All

- Track Rate Contract Details and status
- Track Supply Order status
- Grievance facility (3-way communication between user, NIC Technical Team and Grievance Officers).
- Messaging and emails to users on Supply order movement and further processing.

Green e-Governance

This project includes all functionalities with Paperless Digital Processing for all stakeholders. All the documents are generated online and can be downloaded and viewed. Alerts to the users and departments are sent in form of SMS and emails, not through letters to save the paper.

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Vimal Kumar Setia and Anil Katiyar

PROJECT OVERVIEW

Objective

- Citizens have access to every Government entity.
- Panic Button in term of emergency Police help.
- Rating of Department Services.
- Grievance/Suggestion to various department in District.
- Timeline of grievance with / or without identity disclosure.
- COVID related precious Information.
- Broadcast Notification of District Admin/department to individual Citizen's Mobile
- Easy access to Popular Government Schemes

Hardware/Software

- Open-Source Data Base- MariaDB
- Database is used with PHP
- Mobile App in Flutter

Certification (Certifying Agency)

Security Audit Undergoing: Request ID for audit request is 17424

Disaster Recovery and Service Continuity

Disaster recovery is well in placed as the Application database is hosted in Mini Cloud. And replicated in 2 more servers. Above this weekly database is backup and store in hard disk and local District Data Server too.

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
Covid-19 Response Service	Address, Contact of Vaccination Canters/Testing Canters, Dashboard for actual Statics of Covid in District, Request for medicine, food service for covid patients	NA	NA	15236
Ghar Rojgar	Service to provide employment to unemployed Youths.	NA	NA	2320

Panic Button	Emergency Police help to Citizens in Danger.	NA	NA	104
One Stop Center	Services to females for any help	NA	NA	534
Volunteer Enrolled	Volunteers willing to work with District Administration for covid enrolment.	NA	NA	1287
Complaints/Suggestions/Feedback	Service to put Complaints /Suggestions/Feedback related to Government Offices/Betterment of District.	NA	NA	734
Department Services Rating	Service to rate and rank various government department services	NA	NA	1311

Implementation

Mobile App is widely used in Urban Areas. Since Faridkot falls in rural belt of Punjab and Mobile app is launched just 3 months back, its slowly picking up, now it is reaching to rural Areas too.

Improvements / Enhancements

In Covid-19 need of relevant & on click information sharing is very much required, real time information on bed/Oxygen availability is added along with restriction placed by Government are broadcasted to avoid fake news. In Future Jan Bhagidari concept will be more widened to include provision of online PP model project from citizens, volunteer enrolment, Donations & discussion forum for Citizen to discuss immediate requirements in district

ENABLER**Processes Re-engineered**

Automation & simplification of processes are the key concept incorporated to enable citizens in tuff time of pandemic. Direct access to nodal officers with a provision to call/msg or even WhatsApp to have clarification on services offered. Direct query system for covid 19 vaccination/testing/bed availability/oxygen supply has reduced the panic among citizens in high times. Just clicking a button to get immediate police help has almost automated the process. Just clicking image with no user identity capturing have made citizen fearless. It has reduced long waiting queues outside offices.

Technologies

Geolocation based location tracking with IoT used in Jan-bhagidhari has automated the things. Police help reaches automatically to the location where panic button is clicked. IoT has ease out the analysis part in Jan-bhagidhari to decide easily the key areas where District Admin should work

People**Capacity Building**

Now almost everyone is handy with the use of Mobile. Not much of capacity building is required for citizens but for Admin Module series of training and workshops has been

done to make all district officials handy toward mobile app usage. Capacity building is done in every department falling in district starting from Police Department, health DSSO, DDPO etc to District Collector Office.

VALUE INDICATORS

Learnings for sharing

Biggest challenge was to cover each and everything required by citizen from Government. Every Scheme/office have their own flow. Requirement for Covid-19 were also different and changing very frequently. Minimum common flow has been designed to have a standard flow and real-time updatable solution with centralized database was designed. Since Now mobile are with everyone and is available 24*7 so a mobile App has been designed with open-source technologies to have no financial burden.

Digital Empowerment

Student, women's, girls even anyone who can hardly access Deputy Commissioner Office and personally meet such citizens can now access Deputy Commissioner directly, in time of harness direct police help is available in just a mobile click and that too automated. This mobile app has broken all such blockages like belonging from remote village, demographic differences etc with just a single click. Now Whole Government is at a door place of citizens.

Green e-Governance

With implementation of this Mobile App no paper, no transportation, no physical presence, no long waiting in queues to meet district authorities all such things have abolished. It has saved Trees, Fuel, Time and also helped inflowing Covid Appropriate behaviour by providing a bridge of citizen with Govt Officials while sitting at home itself. When Offices were closed and citizen were forced to be at home this has proved to be excellent solution to carryon direct communication between citizen and government.

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OPTiMUM (Online Pass for Transit of Minerals in UP Mines)

**Department of Geology & Mining, Govt. of Uttar Pradesh & National Informatics
Centre Uttar Pradesh State Centre**

Roshan Jacob, Ritesh Behari and Arnita Srivastava

PROJECT OVERVIEW

Objective

OPTiMUM is an innovative & ambitious initiative by the Directorate of Geology and Mining in the area of e-Governance. It is a common gateway for all citizen-centric mining services, marking a step forward to a cleaner and greener mining ecosystem. Using the services of OPTiMUM, the Directorate has launched MINE-MITRA to integrate all mining processes into an end-to-end solution for mineral management.

The portal also facilitates the following:

- G2B service, which reduces the visits of contractors to government offices and speeds up the monitoring approval system.
- Curb illegal mining practices through real-time data surveillance and reports.
- Mineral wise/ number wise leases with leaseholder details,
- Issuing of online e-Transit Passes (EMM-11) to the leaseholders (Lessee),
- Accounting of royalties and provides monitoring reports.

New Modules are added for eFormC, ISTP, working agencies, Online Payment, Instalment's creation and integration with up mineral mart portal through API Modules of the project are as follows:

- *Online generation of Inter-State Transit Pass:*

It is a new module added in the eMM11 project, in this module Transporter pays royalty as per transportation of minerals, which is coming from Other State to U.P or Via U.P to Other State. As a web portal, the transporter firstly registered himself and get the login id and password on their mobile number. Using these login IDs and password transporter generates eChallan with fix of regulating fees Rs.50 as per the quantity of mineral. After generating Inter-state Transit Pass (I.ST. P) against eChallan, which is submitted by transporter as royalty.

- *Online generation of Form-C:*

It is a new module added in eMM11 project, in this module bulk collection of eMM11 for each quantity of mineral and these collections of eMM11 with the sum of quantity as per mineral hold by License to retailing of minerals as per demand. As a web portal, District Mining Officer fill master data entry for the License holder to generate login-id and password. Using these Login Id and password license holder collect and apply for no of eMM11 at the fixed quantity after that no of eMM11 verified by District Mining Officer and they allow only valid eMM11. Using these collections of verified eMM11 by DMO License generate Form-c as per demand.

- *Working Organization:*

It is a new module added in eMM11 project, this module is used for verification of all types of valid eMM11, OSTP (Other State Transit Pass) with ISTP and e-form-C transit pass at a different level. Firstly, the admin generates (HOD) head of the department login id and password at the State level. After that HOD generates the

Division login id and password at the division level again division generates sub division login id and password at the subdivision level. These levels of logins are allowed to check the validity of eMM1, ISTP and eFormC-c transit pass. If any discrepancy finds in an amount at the time of verification of eMM11, OSTP and form-c transit pass then the holder of the transit pass has to pay six-time royalty against a particular discrepancy in amount. Online generation of Transit Pass for Transportation of Minerals - eMM11 project is the first such portal to provide electronic transit slips for transportation of minerals. As a web portal, the lessee is no longer dependent on the office for generating the slip. He can apply for the ETP 247 via the internet. The application also maintains a Standardized Master data management of minerals (plot-wise rate of minerals, as well as, of Lessee including the period of validation) secured by using DSC. The website provides login for Lessee and Online payment of Royalty by Lessee through Net banking /Debit/ Credit cards in integration with RAJKOSH - UP Treasury. The lessee login is OTP based (on registered mobile no. of Lessee), thus secure and enabling automatic eMM11 generation. The applications eliminate the need for manual maintenance of mineral records. The website simplifies automatic maintenance of the balance quantity of minerals. eMM11 also facilitates online verification using Barcode, QR Code and mobile scanners.

Scope (Functional & Geographical)

- State-level administrators to maintain lessee, mineral-related information, and other administrative works with DSC.
- Solution for management of mines and transportation of minerals. Tracking and checking of transit pass through Mobile using QR Code. Online methodology for deposition of royalty through eChallan.
- OTP-based verification of eMM11 via SMS and Email. Authentication through Digital Signature.
- Automatic maintenance of balance quantity of minerals against the lease. No. of eMM11 generated is approx. 190 Lakhs.
- The royalty of Rs. 6324 crores approx. submitted through online banking using Rajkosh gateway. The re-allotment process to generate eMM11.
- Centralized workflow-based web application, accessible on the Internet to all-around 8972 leaseholders, 11000 transporter, 850 retailers, 54000 around the registered vehicle with MINE Tag, 28 Government Department, 58 brick kiln and 3000 around its divisional and sub-divisional part for verification of electronic transit pass number increasing day by day in 75 districts and 10 CHECKGATES for monitoring all transportation of minerals with the registered vehicle of Uttar Pradesh state.
- It is accessible in all urban and rural cities across India but specially designed according to Uttar Pradesh State Geology and Mining rules.
- All Inter-State Transit Pass from different States for the transportation of minerals in UP are checked via State API
- No. of ISTP generated is approx. 29 Lakhs.
- ISTP Regulation fee of Rs. 303 crores approx. submitted through online banking using Rajkosh gateway.
- Brick kiln Regulation fee of Rs. 270 lakhs approx. submitted through online

banking using Rajkosh gateway.

- No. of eFormC generated is approx. 8.42 Lakhs
- Empower and protect the right of the home
- Geographically, the Portal covers the entire state of Haryana.

The web portal is innovative in many aspects. It is the first such portal to provide electronic transit slips for the transportation of minerals. Being a web-portal, lessees, transporters and retailers are no longer dependent on the office for generating the slip. He can apply for the ETP 24*7 via the internet. The application also maintains a Standardized Master data management of minerals (plot-wise rate of minerals, as well as, of Lessee including the period of validation) secured by using DSC. The website provides unique login for Lessee, transporter, brick kiln, retailers and Online payment of Royalty by Lessee, transporter, brick kiln through Net banking /Debit/ Credit cards in integration with RAJKOSH - UP Treasury. All login is OTP based (on registered mobile no. of holders), thus secure and enabling automatic electronic transit generation. The application eliminates the need for manual maintenance of mineral records. The website simplifies automatic maintenance of the balance quantity of minerals. All type of electronic pass is also facilitating online verification using Barcode, QR Code, and mobile. Before the generation of eMM-11, some steps are mandatory:

- The vehicle is checked by Weighbridge to know the actual weight of the loaded quantity.
- The vehicle is registered with MINE Tag. These MINE Tag are verified at CHECKGATES by an RFID scanner to allow for transportation.
- All Mining Officer Check the mentioned details in eMM-11 is valid or not via Mobile App or QR code scanner.
- All CHECKGATES contain RFID Scanner, ANPR camera and Focal camera to get the actual quantity, Number plate of vehicle with MINE Tag status.

Features of the Portal:

- Citizen Services Portal is available on Internet 24 x7 anytime from anywhere.
- The bilingual interface provided.
- Content personalization features for a specific audience.
- The interface is Responsive (layout adapts to different screen sizes)
- Alert mechanism (Email, SMS, etc.) for the users
- Website policies as per GIGW formulated (copyright, hyperlinking, privacy, terms of use, content review, content approval, content archival)

The web portal has become an easy tool for senior officers to assess actual mineral production and prevented thousands of crores of revenue loss. The web portal has also indirectly contributed to regulating the delicate geological system of mining areas. This is a specific G2B service, which minimizes visits of contractors to government offices and speeds up the monitored approval system. The online e-Transit Pass having QR Code etc. eliminates chances of issuance of invalid pass. eMM11 web portal has minimized government and maximized governance in a true sense.

Key Stakeholders

- Software Vendor: NIC, UPDESCO
- Testing Agency: NIC

Intended benefits

- G2B service, which reduces the visits of contractors to government offices and speeds up the monitoring approval system.
- Curb illegal mining practices through real-time data surveillance and reports.
- Mineral wise/ number wise leases with leaseholder details,
- Issuing of online e-Transit Passes (EMM-11) to the leaseholders (Lessee),
- Accounting of royalties and provides monitoring reports.
- New Modules are added for eFormC, ISTP, working agencies, Online Payment, Instalment's creation and integration with up mineral mart portal through API Modules of the project.

Hardware/Software

- Microsoft SQL SERVER 2012 R2, IIS 7.0 Web Server, Visual Studio 2015, .NET Framework 4.5, Windows Server 2012 R2, SQL Server VPN, Fiber Cable Network, Intel® Xenon® CPU X5650@2.67 GHz
- Virtual Machine 1- 4 LP 16 GB RAM,
- Virtual Machine2 -4 LP 16 GB RAM,
- Virtual Machine 3-4 LP 16 GB RAM,
- Virtual mm-24 GB each),
- Client - Windows 10 and above
- Browser - All browser
- Microsoft SQL SERVER 2008 R2,
- IIS Web Server,
- Visual Studio 2015,
- .NET framework 3.5
- Windows Server 2012 R2,
- Data Centre at SDC (State Data Centre),
- VPN for hosting operations by the department.
- Backup Data Centre at State Data Centre & Regular backup is taken in Tape Library and hard drive.
- AI/IOT/ML
- MVC Framework Architecture
- Laravel Framework v 7.2
- Geo-Mapping
- Editor/Android Studio
- JAVA
- Edge Computing
- Natural Learning Processing for Algorithms
- Data Science
- ANPR Camera
- Varifocal Camera
- RFID UHF Tags
- RFID Reader & Antenna
- ISP
- IR illuminator
- Solar Panel
- RFID Handheld Reader
- PTZ Camera
- Weighbridge System VTS

- Gantry
- MINE Tag

Certification (Certifying Agency)

SECURITY AUDIT AGENCY-1 (CERT-IN Empaneled)

- AKS Group | AKS Information Technology Services Pvt. Ltd. | Haltdos.com Pvt. Ltd.
- AKS Institute of Cyber Technology | AKASH Memorial Charitable Trust
- www.aksitservices.co.in
- Corporate Office: Noida, B-21, Sector-59, Noida-201309, India
- Tel:0120-4545-911
- Mobile: +91-9889308203

SECURITY AUDIT AGENCY-2 (CERT-IN Empaneled)

- Allied Boston Consultants India Pvt. Ltd.
- www.alliedboston.com
- Corporate Office: 2205, Express Trade Towers 2, Sector - 132, Noida - 201301, India
- Tel: 0120 4113528
- Mobile: +91-9899589111

Disaster Recovery and Service Continuity

- Disaster Recovery (DR) & Service Continuity Strategic plan:
- Daily backup store in Tape library
- Datacenter hard drive
- Physical hard drive.
- Replica of the database is available on staging and production servers as well.
- A web application is available on staging and production servers as well

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
eMM-11(Electronic Transit Pass)	eMM11 is furnished by the Lessee to the vehicles carrying mineral out of the Mining Area. The vehicle driver has to carry a printed copy of the form during his journey to the destination. The delivery has to happen within the the time stated in the eMM11 form	No of eMM-11:54 lakhs	No of eMM-11: 35 lakhs	No of eMM-11:43 lakhs
		Used Quantity: 57802429 m ³	Used Quantity: 45926261 m ³	Used Quantity: 58990900 m ³
		Transaction of amount:	Transaction of amount: 1895 crore	Transaction of amount:

		2579 crore		1218 crore
eFormC	EFormC is generated by the Licensee for delivery of minerals picked from a Stockiest. This is generated by the stockiest. The vehicle driver needs to carry the reforms during his journey to the destination	No of eFormC: 3.5 Lakh Used quantity in eFormC: 4834257 m ³		
ISTP (Inter-State Transit Pass)	All vehicles bringing Mineral into the state need to procure an Inter-State Transit Pass (ISTP). To acquire the pass, they first need to register. After registration, they can log in and pay the regulating fees to generate Transit Pass	No of ISTP: 54 thousand	No of ISTP: 17.5 Lakh	
		Used quantity in ISTP: 1125739 m ³	Used quantity in ISTP: 35879149 m ³	
		Transaction of amount: 6.7 crore	Transaction of amount: 182 crores	
Working Organization	All generated electronic transit passes are verified by different working organizations to prevent the reuse of electronic transit passes by other content bodies. They may be retailers, leaseholders and Government sector etc. Working organizations are government bodies. It is a big deal to verify all generated electronic transit pass so that working organization contain divisional part and sub-divisional part for proper verification of transit pass time to time.	No of verified electronic transit passes: 4.5 Lakh		
		Used quantity in verified transit pass: 4073634 m ³		
Brick kiln	There are two types of brick kiln one is zig-zag and the second is simple.	No of Brick Kiln: 1418		

	These types depend on the district-wise area and paya like measurement on that base regulating fees is decided for each holder of the brick kiln.	Total challan amount submitted	
		against regulating fees:270 Lakh	

Implementation

Department of Geology and Mining carries out geological and mineral surveys and detailed exploration of mineral deposits. It processes prospecting/mining lease applications, carries out in sections and demarcation of mining areas, monitors mineral revenue. Leases for a mineral found within the state are granted as per the provisions of Uttar Pradesh Minor Mineral Concession rules 1963. Transportation of minerals from sanctioned leased out mine area is carried out against a transit pass called MM-11. Till 01/08/2017 a standard format eMM-11 was printed in the government printing press and distributed to districts as per demand raised by District Magistrate. Government Order No 1407/86-2017-107/2017 dated 11/07/2017 made provision for generation of eMM-11 through the electronic medium at mine end by the owner of

- Lease i.e., leaseholder.
- Objective of eMM-11
- Environment protection by reducing the use of paper
- Ease the process of generating eMM-11
- Ease of monitoring
- Maintenance of electronic records.
- Reduce misuse of printed MM-11

To facilitate the generation of eMM-11 a portal has been developed by NIC (National Informatics Centre). Portal has been working effectively since its incorporation. To date, 1.8 crore eMM-11 has been issued through the portal. Payment of due royalty of mineral is paid in installment by the leaseholder through an online payment. It has made the process of eMM-11 generation simple, easier, and enhanced e-governance through the G2B model. Since its deployment of eMM-11, Portal has been modified, changed, and restructured to meet the evolving demand of the department. Various modules and functionalities have been added to eMM-11 with time to enhance openness, transparency, and accountability in Department's process and procedure. Currently, apart from being a portal for generating eMM-11, it is hosting various modules to cater to various stakeholders like Stockholder, Transporters and Government Department.

Modules Added to eMM-11(upmines.upsdc.gov.in) Portal:

- *ISTP (Inter-State Transit Pass)*: A regulating fee of Rupees 50 per cubic meter has been imposed upon the incoming mineral-bearing vehicle from leases of states other than Uttar Pradesh as per the Government Order No 05/2020/336/86-2020-51/2019 dated 24.02.2020. The module has been developed on eMM-11 portal upmines.upsdc.gov.in for the generation of ISTP transit pass. A transporter willing to transport the mineral to districts within the State of Uttar Pradesh can register themselves on the ISTP module by filling in the basic details like name, mobile number, email id, etc. A default login password is sent to their registered mobile number and email id. After logging they can make a recharge of the

amount corresponding to the anticipated transported mineral quantity as per their business requirement through the use of a portal by Rajkosh Payment Gateway. The module has been working successfully without any major technical glitches, till date Rs. 303 Crore has been collected as regulating fees in the departmental head.

- *E-Form C*: Monsoon season is a non-mining period for sand/ morrum leases as per the Sustainable Sand Mining Guidelines -2016. The monsoon Period for Uttar Pradesh is from 1 July to 31 September. To meet the demand for minerals during the monsoon period, provisions have been made in U.P. Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules, 2018 to grant a license for storage of minerals. The Licensee stocks the mineral against valid eMM-11. Transportation of minerals from stocks is carried out by issuing a Printed Form C. Vide Government order no 450/M1 A233 (Bhandara)/18 dated 30.06.2020 provision for issuance of electronically generated FormC have been made on the Portal. E-Form C module has been operational since 1 July 2020. The licensed stockholder of mineral gets registered by their respective District Mines officer. District Mines Officer provides stockholder their default login password which can be utilized by the stockholder to generate e-Form C against their sanctioned storage capacity, till date 8.42 lakh eFormC have been issued through the eFormC module. Module for Verification of transit pass by Government Department. A large quantity of minerals is utilized in various government departments for development and construction works. Payment to the contractor by a government department is made against valid transit pass produced by contractors. Earlier to check the validity of the transit pass the Government Department was required to send the Transit pass produced by the contractor for verification to the District Mines officer. So Far 28-government departments have been registered fore-verification of transit passes.
- *Module for collection of regulating fee from Brick Kiln*: Operational Brick kiln owners have been mandated to deposit regulating fees in the mining head of the department. Regulating fee is an annual fee that is paid by brick kiln owners for a brick kiln year (1 Oct to 30Sept). Determination of regulating fee is done based on the number of Paya, Type of Brick Kiln (Simple/Zigzag) and Category of the district. For determination of regulating fee, Districts in Uttar Pradesh have been categorized as A, B, and C as per the Government Order No 46/2020/1882/86-2020- 1(216)/93 dated 26.10.2020. Module for online collection of regulating fee has been developed by NIC as per the demand of Department. The module seeks to ease the process of collection of regulating fees for department and brick kiln owners. Regulating fees can be directly paid to the department head by using the Rajkosh Payment Gateway provided in the module. Modules will enhance governance in Department processes and procedures.

The Main Functions of this web portal are:

- Solution for management of mines and transportation of minerals. Tracking and checking of transit pass through Mobile using QR Code. Online methodology for deposition of royalty through eChallan.
- Web-services have been used extensively for double verification of transactions and the status of each transaction.
- State-level administrators to maintain lessee, mineral-related information, and other administrative works with DSC.

- OTP-based verification of eMM11 via SMS and Email. Authentication through Digital Signature.
- Automatic maintenance of balance quantity of minerals against the lease. No. of eMM11 generated is approx. 190 Lakhs.
- The royalty of Rs. 6324 crores approx. submitted through online banking using Rajkosh gateway. The reallocation process to generate eMM11.
- All Inter-State Transit Pass from different States for the transportation of minerals in UP are checked via State API
- No. of ISTP generated is approx. 29 Lakhs.
- ISTP Regulation fee of Rs. 303 crores approx. submitted through online banking using Rajkosh gateway.
- State Level-
- Number of District covered – 75 districts of Uttar Pradesh
- District Level-
- Number of tehsils covered - 358 tehsils of Uttar Pradesh
- National Level –
- Number of State covered - One (Uttar Pradesh)
- Other State Transit Pass from different States for the transportation of minerals in UP are verified by working Organization via State API
- Verification of electronic transit pass of State covered-6 (Uttar Pradesh, Madhya Pradesh, Haryana, Bihar, Rajasthan, Uttarakhand, and Jharkhand).
- Only Madhya Pradesh, Haryana electronic transit pass verified via Web Services and remains are checked manually.

Improvements / Enhancements

- All generated electronic transit passes are checked for a valid period duration to go its destination with a valid quantity via only QR code. Currently, all electronic transit passes are verified at different CHECKGATES available in Mining areas. All CHECKGATES contains cameras and scanner to identify the vehicle with valid transportation.
- With API for proper verification and checking of ISTP and OSTP.
- Registration of vehicle is big deal because only Mine Tag attached vehicle will allow for transportation but it is a difficult task to attach MINE Tag on each vehicle in sense of waste of money. In next year all vehicles will be checked any time anywhere via
- Transport Department provided API.

ENABLER

Processes Re-engineered

- The web portal has become an easy tool for all stakeholders and departments in many ways.
- The following point shows all manual works in respect of government process re-engineering for the easy and secure way of vehicle transportation and payment

transaction are.

- All master entries related to leaseholders, license holders, transporters, working organizations with full details like Gate number, district, village, tehsil, area, allotted date, expiry date, state, holder name, address, mobile no, etc. are available at one shot of click.
- Trace all reallocation of the holder according to one year whenever a period of the license is not expired.
- All entries are authorized and authenticated by role with department finance and nodal officer digital signature.
- All generated electronic transit pass authenticates with OTP with full of date-wise history.
- All generated e-challan history for each transaction is easily available at both
- Vehicles are checked by weighbridge to know the actual weight of quantity is loaded before the generation of electronic transit pass.
- The vehicle is registered with MINE Tag. These MINE Tag are verified at CHECKGATES
- by an RFID scanner to allow vehicle.
- All CHECKGATES are equipped with RFID Scanner, ANPR camera, and varifocal camera to get the actual quantity, Number plate of the vehicle with MINE Tag status.

Technologies

- Digital Signature for all master entries and updating using SignalR concept. SignalR is the browser-independent method to digitally sign from client to server.
- web-services are called when reading QR code paste on all electronic transit pass through any mobile scanner or Mobile App to get actual live data of transportation of vehicle from source to destination with the valid period.
- Integration with Payment gateway (<https://rajkosh.up.nic.in>) to generate an e-challan to make each transaction secure.
- OTP and email base authentication to generate each electronic transit pass.
- Graphical representation of all types of transit pass with district and state wise
- Accessibility (Time Window) - Services in offices 10 AM to 5 PM leaseholders/ stockiest/ transporters apply for the ETP and e-challan 24*7 via the internet.
- Generated electronic transit pass and e-challan Tracking – anytime anywhere.
- Web Applications have been security audited by Third Party ‘CyberQ Consulting Private Limited’
- Efforts to make proper, efficient, and effective use of the limited Human resources
- Efforts to reduce Paper consumption and to move towards a paperless office.
- Android App for District Mining Officer for checking actual loaded mineral quantity, vehicle information from source to destination with valid period however the complete site is fully responsive.

People

- Leadership support for the initiative, visibility of actions with the current status
- Regular weekly meetings/ discussion with review committee under the chairmanship of Commissioner, Department of Geology, and Mineral Department.
- One steering committee under the chairmanship of Chief Secretary UP has been formed for discussing the pros & cons of finalizing any automation under MMP before its implementation.
- While the Department has an IT System in place for its business operations, it has not stopped at this stage. With the continuous support of senior leadership of the state at all levels, it has ambitious plans for taking its e-governance initiative much ahead and providing better and effective services to both working organizations and stakeholders.

Primary Stakeholders:

- Leaseholder
- Transporter
- Stockiest
- Brickkiln
- Geology and Mining Department, Government of Uttar Pradesh

Secondary Stakeholders

- Treasuries
- District Mining Officer at the district level
- Geology and Mining Directorate/ Department of other State Governments in India
- Department of Information & Technology, Govt. of Uttar Pradesh
- Department of Finance Controller, Geology and Mining Department of Uttar Pradesh

Key Stakeholders

- Software Vendor: NIC, UPDESCO
- Testing Agency: NIC

Reduction in human intervention in day-to-day minerals transportation operations to the extent possible Support Services for various IT Components for the smooth running of operations. The Department has its big building is situated at the prime location of HazratGanj Raja Ram Mohan Rai Marg, Lucknow. The Department sitting rooms and training hall are composed of air-conditioned and about 50 other rooms for the officers, for the staff to provide flexibility in movement and communication.

- There is a well-equipped computer lab. Having 10 Systems for the development and maintenance of software.
- 5 Check gates to monitor all transported and loaded vehicles with mineral quantity. Each CHECKGATES have two or more person for supervision of all type of mining transportation work
- Expansion of e-Services:

- Expanding the Tracking of electronic transit passes and e-challan for payment.
- Creation of e-CHECKGATES for proper monitoring
- Expansion of weighbridge to know the actual weight of quantity is loaded.
- Expansion of registration of Vehicle with MINE Tag. This MINE Tag is verified at CHECKGATES by an RFID scanner to allow for transportation.
- Reduction in human intervention in day-to-day minerals transportation operations to the extent possible. Support Services for various IT Components for the smooth running of operations

VALUE INDICATORS

Learnings for sharing

The project is a web portal, implemented with a URL (<https://upmines.upsdc.gov.in>).

- Digital Signature for all master entries and updating using SignalR concept. SignalR is the browser-independent method to digitally sign from client to server.
- Web-services are called when reading QR code paste on all electronic transit pass through any mobile scanner or Mobile App to get actual live data of transportation of vehicle from source to destination with the valid period.
- Integration with Payment gateway (<https://rajkosh.up.nic.in>) to generate an e-challan to make each transaction secure.
- OTP and email base authentication to generate each electronic transit pass.
- Graphical representation of all types of transit pass with district and state wise
- The use of QR codes in printed form prohibits the tampering of data to a large extent.

Digital Empowerment

- Digital Signature for all master entries and updating using SignalR concept. SignalR is the browser-independent method to digitally sign from client to server.
- SignalR concept is used for proper digital signature for all registration and master form entries and updating. SignalR has no dependency on the browser. Direct work on the client to server concepts like chatting.
- All stakeholders as login & respective passwords are required for authentication & authorization as features in s/w based on its provided role.
- The geology and Mining portal has been made bilingual with support for English and Hindi Language.
- Online availability of various MIS reports for effective monitoring.
- Almost 180-degree work of the Department functionality has been automated so overall system proves to be efficient, time-saving, better management and analysis of digital data collected from the web portal.

Green e-Governance

- ETP is one of its kind automations for the Department, Uttar Pradesh to generate online transit pass in a format that includes all relevant mandatory fields with secure vehicle transportation of minerals is new that has been incorporated in the system. This solution was widely accepted and secure transportation of minerals

could be a success in real-time.

- Unique transit pass No. generation via OTP has been appreciated as the best innovations in the monitoring of transportation of minerals from one place to another place with registered vehicles to check with valid time duration and transparency.
- Online notice issued by District Mining Officer if any discrepancy finds in electronic transit pass in respect of overloading or unregistered vehicle.
- Online availability of Royalty amount/Rules/Notification/Orders/Tax Rate/Commodity Codes etc.
- Online payment of allotted quantity in installment monthly wise for all holders.
- Department statistical reports and formats related to departments available on the system through MIS.
- All leaseholders, stockiest, working organization, transporter, and brick kiln records are available on the system.
- All transaction of amount detail as per transportation of minerals is available on the system
- All electronic transit pass detail available on the portal.

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Digital Governance For Digital Society

Selected eGovernance Initiatives-2021

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", RT-PCR etc. have been designed & developed in emergent situation and were successfully implemented Pan India.

This compendium "Digital Governance For Digital Society: Selected eGovernance Initiatives-2021" 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.



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