

Inclusive Growth through e-Governance

This is a selection of the major e-Governance initiatives at the state, district, department and project levels, including those of the Central Government, which competed for the coveted CSI-Nihilent e-Governance awards for the year 2011–12. The awards to winners were presented by the Computer Society of India's Special Interest Group on e-Governance (CSI-SIGeGov) during the 47th Annual Convention of the Computer Society of India held at Kolkata on 2 December 2012.

—*Editors*

Inclusive Growth through e-Governance

Selected e-Governance Initiatives in India

Surendra Kapoor

Prabhu Gollamudi

Nityesh Bhatt

Harish P Iyer



Universities Press



Special Interest Group
on e-Governance



Computer Society of India

UNIVERSITIES PRESS (INDIA) PRIVATE LIMITED

Registered Office

3-6-747/1/A & 3-6-754/1, Himayatnagar,
Hyderabad 500 029 (A.P.), India
e-mail: info@universitiespress.com

Distributed by

Orient Blackswan Private Limited

Registered Office

3-6-752 Himayatnagar, Hyderabad 500 029 (A.P.) India

Other Offices

Bangalore / Bhopal / Bhubaneswar / Chennai
Ernakulam / Guwahati / Hyderabad / Jaipur / Kolkata
Lucknow / Mumbai / New Delhi / Noida / Patna

© CSI-SIGeGov 2012

Cover and book design

© Universities Press (India) Private Limited 2012

ISBN 978 81 7371 839 7

All rights reserved. No part of the material may be reproduced or utilized in any form, or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without written permission from the copyright owner.

Typeset in ZapfEllipt 10/12 by

OSDATA, Hyderabad 500 029

Printed at

Graphica Printers
Hyderabad 500 013

Published by

Universities Press (India) Private Limited
3-6-747/1/A & 3-6-754/1, Himayatnagar
Hyderabad 500 029 (A.P.), India

About CSI



Computer Society of India

Formed in 1965, the Computer Society of Indian (CSI) has been instrumental in guiding the Indian IT industry on the right path since its formative years. CSI has 71 chapters all over India, 418 student branches, and more than 90,000 members, including India's most famous IT industry leaders, brilliant scientists and dedicated academicians.

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.

For more information, please visit www.csi-india.org

About Nihilent



Nihilent is a global consulting and solutions integration company with a holistic and systems approach to problem solving. Headquartered in Pune, India, Nihilent has extensive experience in international consulting, IT outsourcing and IT services. Nihilent's operations span North America, Europe, Africa and Asia. Nihilent's mission "Change for Performance" encapsulates its commitment to make change happen systemically in terms of people, process, technology and knowledge for achieving sustained performance for its clients.

For more information, please visit www.nihilent.com

About the Editors

Surendra Kapoor is Fellow of CSI and Convener, CSI–Nihilent e-Governance Awards 2011-12. He has more than four decades of experience in the field of IT. He began his career in computers in 1964 at IIT Kanpur, where he was closely involved with the enhancement of operating system and language features of IBM systems. He was Senior Systems Programmer and Operations Manager at the time he left IIT Kanpur to join CMC Ltd. in 1977. He has had a long, 23-year journey with CMC Ltd., where as Head, R&D and as Executive Director, System Integration SBU, he managed several teams working in the e-governance area.

He was deputed to Mauritius for two years as the MD of State Informatics Ltd. for setting up the Software Application Development Centre of the Government of Mauritius. And until recently, he was mentoring India Operations, Bling Technology, a US-based company in mobile tools and applications. He continues to be professionally active with his association with academic institutions, CSI and SIGeGov. He lives in Hyderabad, India.

Mr Kapoor holds a Masters degree in Mathematics from Agra University, Advanced Diploma from University of California, Santa Cruz, USA, and Advanced Management Program, ASCI, Hyderabad.

Contact: *kapoorsurendra@yahoo.com*

* * *

Prabhu Gollamudi works with the Capacity Building and Knowledge Management Team of the National Institute for Smart Government (NISG) as a senior consultant. His current areas of interest include content development, e-learning and reviewing case studies in the area of e-governance.

He has extensive experience in the IT Industry, working for most part of his career with the IT major, CMC Ltd., now a TCS subsidiary, and closely worked on several e-governance projects, from concept to creation. He had also worked on system integration projects in the sectors of power, transport, banking and defense. He was associated with Indian Railways Freight Operations Management System in the early stages of its planning.

During his tenure with CMC Ltd., he had the opportunity of initiating many e-governance projects with active support from the Ministry of Information Technology. This association, which involved interaction with several Government officials at various levels, enabled him to understand the Government processes for building appropriate IT solutions. He has worked in CMC Informatics, UK, as Vice President (Business Development). He also been associated with several quality initiatives and talent management activities of the company in the later part of his career.

A key member of the Computer Society of India's Special Interest Group on e-Governance, he has supported many of its professional activities.

Mr Prabhu holds a Master's degree in Applied Mathematics from Government Engineering College, Jabalpur. He is keen to engage himself in content development and research activities related to capacity building in organisations and application of emerging ICT technologies.

Contact: gsnprabhu@yahoo.com

* * *

Dr Nityesh Bhatt is Senior Associate Professor and Chairperson, MBA Program and the Information Management, Institute of Management, Nirma University (IMNU), Ahmedabad, India. He teaches management information systems (MIS), enterprise resource planning (ERP) and IT strategy for businesses (ITSB) subjects. Since June 2007 he has been a part of various committees of IMNU, including Admissions Committee, Website Committee, Placement Committee and Doctoral Program Committee. He was also Chairperson, 4th Nirma International Conference on Management (NICOM), held during 6–8 January 2011. He was Program Chair, 8th International Conference on e-Governance (ICEG), jointly organised by the Department of Science and Technology, Government of Gujarat, Special Interest Group on eGovernance (SIGeGov) of the Computer Society of India and IMNU, held during 17–18 October 2011.

Out of his more than 14 years of experience in the fields of academics, corporate training and research, the first nine were in association with NIIT, First Computers, and Pacific Institute of Management, Udaipur. In 1998 he was awarded the best faculty of NIIT in North India. Dr Bhatt holds MBA and PhD (e-Governance) degrees from M. L. Sukhadia University, Udaipur. He has also completed a four-month Faculty Development Programme (FDP) at IIM-Ahmedabad in 2006. In the same year, he completed the four- months Online Internet Governance Capacity Building Programme of DiploFoundation, Malta. For excellent academic performance in this programme, he was invited to participate in the First Internet Governance Forum (IGF) meet, jointly organised by United Nations-IGF Secretariat and the Government of Greece, Athens, in 2006.

Credited with 30 research papers and management cases, he has also co-edited six books in the area of technology and management. Two of his students have been awarded their doctorates by M. L. Sukhadia University, Udaipur. Currently, two of his students are pursuing their PhD under his guidance, one from Nirma University and the other from CEPT University, Ahmedabad. He has delivered lectures in more than 200 management development programs of leading public and public sector companies like ONGC, BPCL, BOSCH, HZL, Reliance Energy, Sterlite, Hindustan Zinc Ltd, Alstom Power, Kalpataru Power Transmission Ltd, J.K. Cement, Parle, Zydus, Torrent Pharma, GMDC, Inspiron, SBI, Bank of Baroda, ICAR,

Income Tax, Sales Tax, Indian Air Force, Western Zone Railway Training Centre, etc. He has also conducted a large number of faculty development programs (FDPs).

Dr Bhatt is also a research consultant at Indian Space Research Organisation (ISRO), Ahmedabad, in the area of ICT. He was awarded the 'Best Teacher of Information Technology' award of the 17th B-School Affaire & Devang Mehta B-School for the year 2009. He is on the editorial boards of few international journals as well as conferences. He has visited Greece, South Korea, China and Hong Kong in the last six years on various academic assignments.

Since 2007, Dr Bhatt has been a member of the National Executive Committee of the Special Interest Group on eGovernance (SIGeGov) set up by the Computer Society of India. He is also a co-convener of the CSI-Nihilent Awards 2011-12.

Contact: *nityeshb@gmail.com*

* * *

Harish P. Iyer holds a Masters degree in management and is a Fellow Member of the Institute of Chartered Accountants of India. He has held various senior positions in an associate company of IBM in Singapore and Australia.

Iyer was a Consultant Professor at T. A. Pai Management Institute, Manipal (TAPMI), from 2004 to 2009. He continues to be a member of the academia and is invited to teach courses at IIM and IIT.

Iyer's first introduction to computerisation of Government processes dates back to 1988. He has been actively associated with the domain of e-governance since then. He was the coordinator of the first full time, one-year executive management program offered in India on e-governance—an initiative of NISG (National Institute for Smart Government) backed by the Department of Electronics and Information Technology [DeitY] of the Government of India. He is currently a Core Committee member of the Computer Society of India's Special Interest Group on e-Governance, and is also associated with a few other e-governance related DeitY initiatives.

Iyer also serves as a board member in a few companies in India and abroad.

Contact: *pharishiyer@gmail.com*

Contents

<i>Acknowledgements</i>	<i>xiii</i>
<i>Foreword, President, CSI</i>	<i>xv</i>
<i>Message, President and CEO, Nihilent Technologies</i>	<i>xvii</i>
<i>Message, Chairperson, CSI-SIGeGov</i>	<i>xxi</i>
<i>Preface</i>	<i>xxv</i>

Section I: Invited Papers

Enabling Public Cloud Computing: Challenges and the Way Forward <i>Renu Budhiraja, Virender Kaushik and Rahul Purohit</i>	3
e-Governance in Germany: A German City as a Best Practice Case of e-Government <i>Jörg Himmelreich</i>	10
Smarter Cities for Better Urban Governance <i>Sreenath P Venkatesan</i>	18
Social Media and e-Governance: An Indian Perspective <i>Harish P Iyer and Mithila Harish</i>	26
Thirty Years of e-Governance in CSI <i>D V R Vithal, R K Bagga and K S Vijaya Sekhar</i>	39

Section II: e-Governance Success Stories—State Level Initiatives

Recognising State Level Initiatives for CSI–Nihilent State Category of Awards: A Brief Note on the Approach Adopted <i>Harish P Iyer</i>	53

Section III: e-Governance Success Stories—Department Initiatives

SWARNIM-RTO: A New Service Paradigm, Government of Gujarat <i>J P Gupta and D H Shah</i>	59
Sevana Civil Registration Application Suite, Government of Kerala <i>M Samsuddin</i>	69
Forest Department, Government of Maharashtra <i>R R Sahay</i>	84
Commercial Taxes Department, Government of Madhya Pradesh <i>Amit Rathore and Dharmpal Sharma</i>	93
Treasuries and Accounts, Government of Rajasthan <i>Veerbala Joshi and I D Variyani</i>	105

Section IV: e-Governance Success Stories—District Initiatives

e-Governance Initiatives in Jabalpur District, Government of Madhya Pradesh <i>Gulshan Bamra and Madhu Mishra</i>	127
e-Governance in Jhalawar District, Government of Rajasthan <i>Rohit Gupta, Badal Agarwal and S D Mathur</i>	137

Section V: e-Governance Success Stories—G2B and G2G Initiatives

e-Uparjan Project, Government of Madhya Pradesh <i>Anthony De Sa and Subash Kendurkar</i>	149
Community Managed Sustainable Agriculture, Government of Andhra Pradesh <i>D V Raidu and Venkat Trinath</i>	159
Bihar Infrastructure Mapping: Geomatics-Oriented Application Model, Government of Bihar <i>Arun Kumar Singh and Santosh Kumar</i>	168
Chhattisgarh Geographic Information System, Government of Chhattisgarh <i>A M Parial and K Harish Kumar</i>	186
Dharnaksh: Goa Web GIS, Government of Goa <i>R Mihir Vardhan and Saneet Naik</i>	196
Poll Monitoring System, Government of Goa <i>R Mihir Vardhan and Anant Yende</i>	203
Manav Sampada: A Green Governance Tool for Human Resource Management, Government of Himachal Pradesh <i>Saurabh Gupta</i>	212
MGNREGS Audit and Financial Management System, Government of Madhya Pradesh <i>Neeraj Mandloi and Preeti Tiwari</i>	237
End-to-End Delivery of Digitally Signed Certificates, Government of Rajasthan <i>Sanjay Malhotra and R K Sharma</i>	242
Online Social Security Pension System, Government of Rajasthan <i>Veerbala Joshi and I D Variyani</i>	255
Indian National Data Centre for Long Range Identification and Tracking, Government of India <i>S K Shukla and K H Mehta</i>	265

Section VI: e-Governance Success Stories—G2C Initiatives

Mee Seva: A Citizen-Friendly G2C Delivery System, Government of Andhra Pradesh <i>Sanjay Jaju</i>	281
COREPDS (Centralised Online Real time Electronic PDS), Government of Chhattisgarh <i>Vikas Sheel and A K Somasekhar</i>	304
m-Governance: An Efficient Way to Meet Citizen's Expectations, RMC, Government of Gujarat <i>Ajay Bhadoo and Mahesh Gohel</i>	315
Using Technology for Strengthening Targeted Public Distribution System, Government of Gujarat <i>Raj Kumar and Kiran Oza</i>	335
Dynamic Integration of Property Registration, Land Records and Cadastral Maps, Government of Haryana <i>Ashok Khemka, Ghan Shyam Bansal and Gurpreet Singh Saini</i>	346
Financial Inclusion in Haryana: Remittance of Social Security Benefits Using Electronic Benefits Transfer, Government of Haryana <i>A K Yadav and G S Bansal</i>	359
Loka Mitra Kendra Project Citizen Service Centre, Government of Himachal Pradesh <i>Subhasish Panda and Anil Semwal</i>	371
e-District, Government of Kerala <i>C Jayasankar Prasad and K P Noufal</i>	387
Passport Seva Project <i>Muktesh Kumar Pardeshi and Golok Kumar Simli</i>	395
Intelligent Advisory System for Farmers, Government of India <i>Zia Saquib and Ranjan Yengkhom</i>	417
Rice Knowledge Management Portal, Government of India <i>B C Viraktamath and Shaik N Meera</i>	427

Section VII: About CSI SIGeGov

A Note on CSI Special Interest Group on e-Governance (CSI-SIGeGov) <i>K S Vijaya Sekhar and R K Bagga</i>	445
<i>List of Acronyms and Abbreviations</i>	449
<i>Author Index</i>	455

Acknowledgements

I am very happy and honoured to be associated with the CSI–Nihilent e-Governance Awards, which is now into a decade of recognising e-governance initiatives in the country. This is a momentous and satisfying time for all of us closely engaged with this initiative for the past many years.

I take this opportunity to acknowledge and appreciate the efforts of several people behind the nominations that showcase the success stories of e-governance at work. The team members of the awards committee was excited to observe, during their field visits and over other interactions they had with the nominees, the positive outcomes of the various e-governance initiatives and the perceptible change in the attitude of the proud practitioners. I and my team at the e-Governance Special Interest Group (SIG) are delighted that the owners of these success stories took time out from their busy schedule to file their nominations and to present their work during our field visits and for making the ‘Finalists’ presentations on receiving invitations.

Buoyed by the enthusiasm of the nominees, the SIGeGov team members are driving the award process year after year with passion, excitement and dedication.

Nihilent Technologies, Pune, has been our partner in this initiative since the year 2002. Their continued support is highly encouraging and is truly appreciated. CSI–Nihilent e-Governance Awards is now a well-awaited-for event by the e-governance fraternity. A big thank you, Mr L C Singh, for your continued support for our activities.

Year after year, CSI and its presidents have provided unstinted support to the awards activity. This tenth anniversary year of the awards is very special to us as a member of our selection committee has become the President of CSI. Thank you, Mr Satish Babu, for standing by us and for your active participation in the process over all these years.

I would like to express my sincere gratitude to the Chair, Special Interest Group (SIGeGov) of Computer Society of India (CSI), Dr R K Bagga, for providing me and my team members guidance and opportunity for handling the CSI–Nihilent e-Governance Awards, and for publication of selected nominations in the form a book.

This year the award process began in mid April, and the members, Professor Ashok Agarwal, Dr R K Bagga, Professor Harish Iyer, Mr GSN Prabhu, Ms A Sridevi and Mr Piyush Gupta (a past convener), got involved and provided active support at each stage of the awards process. My sincere thanks to each one of them for their commitment and sustained enthusiasm.

Professor G R Sahu, past Co-convener and the initiator of the AHP model, helped again in re-casting the evaluation tables. I thank him for his enthusiastic involvement and support.

Last year, it was decided to introduce a new award for ‘sustainability’, to recognise awardees of the previous years who have sustained their commitment to projects and to assess their current status. For this purpose, the Project Category Award recipients of 2006-07 were individually assessed. Mr Vijay Sekhar, with guidance from Professor Ashok Agarwal, did a commendable job in identifying the projects that have not only sustained but enhanced their operations over the last five years.

During field visits, we received very good support from local Chapters of CSI and other professionals. I convey my sincere thanks to all those who helped us.

I also want to put on record the support received from other Selection Committee members, viz. Shri Ajay Sawhney, Mr Mohan Datar, Professor Bipin Mehta, Professor M L Sai Kumar, Shri Mahesh Chandra, Shri D K Dwivedi, Prof M P Gupta, Shri Lalit Sawhney and Professor Sanjiv Vaidya, who contributed at various stages in many ways. My sincere thanks to each of them!

Our thanks are due to Mr Ravi Teja, Mr Nischal Jain and in particular, Mr. Himanil Bose of Nihilent Technologies, for coordinating and supporting the entire activity and handling the logistics.

Section I of the book comprises invited papers. We are indebted to the authors, Ms Renu Budhiraja, Mr Virender Kashik, Mr Rahul Purohit, Dr Jörg Himmelreich, Mr Sreenath P Venkatesan, Professor Harish P Iyer, Mr D V R Vithal, Dr R K Bagga, Mr K S Vijaya Sekhar, and Mr Piyush Gupta for readily agreeing to share their knowledge and experience in the vital domain of e-governance with us.

I also wish to acknowledge the great support received from Professor Harish Iyer for the entire process, and in particular for taking on the responsibility for transforming the ‘Book’ into a wonderful edition for the e-governance fraternity. A very special thanks is also due to my two co-conveners, Mr Prabhu Gollamudi and Professor Nityesh Bhatt, for holding my hand and making a success of the awards process.

Mr Vijay of the SIG Secretariat team played the crucial role in coordinating the activities and ensured that the interaction with all the nominees and other selection committee members/guests went smoothly. I convey my thanks to him and to his energetic team of student volunteers.

I wish to thank the members of our web site team, eParivartan, who ensured that the nominees had a good experience while using the awards web site. I also thank the team of editors at Universities Press, the publishers of the book, for bringing out the book in time.

Surendra Kapoor

Convenor, CSI-Nihilent e-Governance Awards 2011-12
kapoorsurendra@yahoo.com

Foreword

It is indeed my privilege to acknowledge in this special decennial year of the CSI-Nihilent e-Governance Awards, the compendium that is brought out each year by the CSI's Special Interest Group (SIG) on e-Governance. At this time, I must commend the very productive partnership that CSI has been sharing with Nihilent Technologies over these ten years, which has resulted in sustaining these prestigious awards. I would also like to congratulate the team led by Shri. Surendra Kapoor, Gen. R K Bagga, Dr Ashok Agarwal, Shri Prabhu Gollamudi, the Steering Committee that provided leadership to the awards, the support team in Hyderabad, and also the volunteers who assisted with the field visits in different parts of the country during this year's awards.

The discipline of e-governance has seen significant—almost explosive—growth in the last decade, in India as well as around the world. Citizens' expectations on aspects such as responsiveness and flexibility, as well as the good-governance aspects of transparency, service orientation and citizen centricity, are now well-recognized factors in the e-governance matrix. Business process reengineering based on these principles and the application of a broad range of ICTs, have demonstrated the benefits that can accrue to citizens.

This year's compendium of short listed projects, entitled *Inclusive Growth through e-Governance*, brings together cases from a diverse set of e-governance projects from practitioners around the country. This volume is, as the case of the other volumes in the series, certainly a collectors' item, going by the rich variety of information that it offers to the reader.

The Section on invited expert papers offers a snapshot of the current status of developments in technology related to e-governance. This is an important perspective, as one of the criticisms leveled against e-governance is that, at times, insufficient attention is paid to understanding technology trajectories which leads to the projects becoming unsustainable over a period of time. Therefore this perspective provides valuable information and guidelines for practitioners.

I have great pleasure, on behalf of CSI, to offer this volume to various stake holders of e-governance in the country: Governments, the technical and engineering community, policy makers and administrators, corporates and citizens who are the ultimate users.

Once again, my hearty congratulations to all the team members (particularly the editors, Surendra, Prabhu, Nityesh and Harish) whose inspired work has resulted in this volume.

Jai Hind!

Satish Babu
President, CSI

Message

President and CEO, Nihilent Technologies

THE PLEASURE OF PAIN, THE SUCCESS OF FAILURE

... Therefore, all progress depends on the unreasonable man.

—George Bernard Shaw

Milestones represent opportunities to celebrate. They also represent opportunities to reflect and introspect. For missionaries, milestones represent opportunities to reaffirm their faith; opportunities to thank whichever power greater than them that they believe in—for bestowing on them the fortune of being chosen for the role to fulfil the mission; supporting them through difficult times; providing succour; sharing pleasure and pain; providing purpose, and fulfilment.

This year, as we commemorate the completion of a decade of the CSI–Nihilent e-Governance Awards, it is fulfilling to note that like many initiatives that are designed for and result in far-reaching and long-lasting impact, this initiative, too, has provided all of us who have participated in this decade-long journey, several opportunities to celebrate and to introspect and several occasions that have reaffirmed our faith.

While talking of e-governance, honourable Chief Minister of Gujarat, Shri Narendra Modi, once said, “It is government’s job to come to people, not the other way around”. In the process of administration, whether public or private, the basic elements are efficiency, economy, and effectiveness. These can be achieved only through good governance. If good governance is the end, e-governance is a means to achieve it.

Since its institution over a decade back, the primary objective of CSI–Nihilent e-Governance Awards has been to unearth and showcase the efforts that have been made by state and central Government establishments, departments, district authorities and their many undertakings, and research establishments towards making material difference to the lives of thousands of citizens. The CSI–Nihilent e-Governance Awards have today grown from merely felicitating e-governance initiatives to greatly helping in encouraging the efforts of states and organizations in the implementation and development of indigenously developed practices and software in the area of e-governance, and while this is certainly a cause of celebration, it also reaffirms our faith in this endeavour.

As we complete the first decade of this initiative, these celebrations and reflections lead naturally to reaffirmation of our faith in this initiative and the resolve to sustain it, improve it, deepen its impact and spread it further.

Though Internet penetration in India remains relatively low, yet social media is swelling as ever greater numbers of people flock to social media to network and voice their opinion. The power of social media is best exemplified by the entire Anna Hazare fight against corruption campaign. Internet and Social Media sites was abuzz with articles / messages showing support for Anna Hazare's fight against corruption and support for Jan Lokpal Bill, ultimately catapulting the campaign into a global phenomenon.

E-governance has been around for more than a decade now in India and is yet to gain widespread acceptance. While there is much to be desired still in the e-governance space in India, it is important to expand the awareness of the baby steps the government is taking in the field. Some of the winning projects over the past decade felicitated in CSI-Nihilent e-Governance Awards have certainly illustrated the vital role IT can play to mitigate crises and benefit the masses. The use of social media to highlight the importance of each project to people will certainly help strengthen its impact and, hopefully, inspire even better performance.

As we complete a decade, it would also help immensely if we recognise a truth that is antithetical to today's dominant global belief in and culture of 'instant gratification', namely that, all through the history of the universe, the earth and humankind, all endeavour-led changes (as opposed to accidental changes, say, such as those caused by a large meteor crashing on to the earth) that led to significant, visible impact have happened over decades, centuries and millennia. Be it natural phenomena or man-made, be it the Grand Canyon or the Himalayas, be it the Pyramids of Egypt or the Great Wall of China, be it the British Empire or an independent India—all required centuries and millennia of effort by the endeavouring in the pursuit of a cause and an objective—to realise them in a form that we see them today. In many cases, these efforts continue forever, say, for example, nation-building.

Unlike today's technology that is often planned for rapid obsolescence to aid commercial objectives, the human initiatives among these were set to achieve objectives whose fulfilment may happen only beyond typical human lifespan and whose effects then were meant to last beyond several lifetimes, if not planned for 'eternity'. Those who set these objectives, those who planned for their achievement, were visionaries, or, in GB Shaw's eternal words—'unreasonable' men and women—who refuse to be reasonable and adapt themselves to the world. Instead, they persisted in trying to adapt the world to their ideas, persisted in asking 'why not?'

Similarly, institution-building and movement-building does not happen in a day, a few weeks, a few months or even a few years. If we believe that the CSI–Nihilent e-Governance Awards are a tool to facilitate long-lasting, deep-impacting systemic change for the better, we need to also believe that this initiative must carry on, and on and on. My fellow humans, fellow citizens, I beseech you all to join us to carry this initiative forward—into the next decade and several beyond that.

L C Singh
President and CEO
Nihilent Technologies

Message

Chairperson, CSI SIGeGov

Computer Society of India (CSI) has been encouraging various sectors of ICT industry by offering a number of awards, since its inception, with a view to encourage use of computers for society. However, in the government domain, commencing from the year 2002, serious efforts were made to consolidate e-governance nominations of major initiatives in the country on a yearly basis. Mr L C Singh from Nihilent Technologies came forward to support this important initiative. We are now celebrating a decade of popular CSI Nihilent e-Governance Awards. Though Deepak Shikarpur (the then Executive Director) was instrumental in giving concrete shape to the idea, this was later formalised by Dr Ashok Agarwal and the Conveners of the CSI-Nihilent e-Governance Award series. With a view to consolidate and share the first CSI e-governance case studies, a book was published by Dr Ashok Agarwal with Universities Press, compiling all the nominations received for the year 2005–2006 awards. Since then, we have the following six publications for knowledge sharing of e-governance initiatives in the country:

1. *Widening e-Governance Canvas: Selected e-Governance Initiatives in India* edited by Surendra Kapoor, Prabhu Gollamudi and Nityesh Bhatt and published by ICFAI University Press (2011).
2. *Enablers of Change: Selected e-Governance Initiatives in India* edited by Piyush Gupta, R K Bagga and Ayaluri Sridevi and published by ICFAI University Press (2010).
3. *Fostering e-Governance: Compendium of Selected Indian Initiatives* edited by Piyush Gupta, R K Bagga and Ayaluri Sridevi and published by ICFAI University Press (2009).
4. *Transforming Government: e-Governance Initiatives in India* edited by Dr R K Bagga and Piyush Gupta and published by ICFAI University Press (2008).
5. *Compendium of e-Governance Initiatives in India* edited by Dr R K Bagga and Piyush Gupta and published by Universities Press (2007).
6. *e-Governance Case Studies* edited by Dr Ashok Agarwal and published by Universities Press (2006).

These books have also been placed on www.cis-sigegov.org website for free download by all stake holders. One of the major benefits of these efforts was the widespread utilisation of e-governance best practices amongst states, departments and districts, as experienced during three Knowledge Sharing Summits (KSS) organised in 2009 at Hyderabad, 2010 in Bhopal and 2011 at Ahmedabad. This year's KSS-2012 was scheduled at Raipur on

November 5–6, 2012, and was inaugurated by the Hon'ble Chief Minister of Chhattisgarh.

With the formation of CSI Special Interest Group in e-Governance (CSI-SIGeGOV) in 2007, a specialised pool of senior professionals were enlisted to ensure high quality evaluation process using analytic hierarchical process (AHP) after the much needed field visits. Professor M P Gupta from IIT Delhi and Dr G P Sahu from MNNIT, Allahabad made major contributions. Mr Piyush Gupta further strengthened the framework and redesigned the results and enabler model based on his pioneering research. Professor Harish P Iyer helped us to incorporate value indicators in the previous two years evaluation process where e-inclusion and green-IT have become an essential part of the evaluation. All the professionals from CSI made major contributions in ensuring high quality evaluation which resulted in the government sector accepting these awards as a very special recognition of their ICT initiatives. We look for many more professionals from CSI to join our SIGeGov and contribute towards various activities for encouraging e-governance initiatives in the country. The linking of the Awards ceremony to the CSI Annual Convention since 2005 enriched the CSI standing as the pioneer professional body of computer professionals, even in the government sector.

During the last few years, apart from CSI, major private and government agencies have launched their own initiatives of recognising government agencies for using ICT and improving their performance. In fact, some of the new journals and magazines (*eGovNow*, *eIndia*) etc regularly target the government agencies for their various activities and give awards. The Department of Administrative Reforms and Public Grievances (DARPG), Government of India as well as some state governments have launched their own initiatives to encourage government sector initiatives, as well, in collaboration with private agencies. The Centre for Innovations in Public Systems (CIPS) in the Administrative Staff College of India (ASCI) has been entrusted with the specific responsibility for identifying extraordinary and innovative work done by the officers of the central and state governments by recognizing 'Prime Minister's Awards for Excellence in Public Administration'. *Times of India's* Social Impact Awards and Skoch are giving awards every year which includes e-governance initiatives in the country. CSI being a pioneer in this area has reason to be proud of its timely efforts in recognising e-governance in India.

I am grateful to all the conveners of the previous year's CSI Nihilent e-Governance Awards, who have made major efforts in their own time to benefit the society, with this rich content on e-governance. The present publication by Surendra Kapoor, Prabhu Gollamudi, Harish P Iyer and Nityesh Bhatt has further improved the quality of documentation for the finalists of CSI Nihilent e-Governance Awards for the year 2011–12. It required enormous efforts to collect, compile, edit and include the latest

trends in e-governance to make the present volume extremely useful. I am sure all stake holders including researchers of e-governance and common citizens will find the details provided in various chapters very useful for their activities, thereby spreading the much needed awareness of the e-governance initiatives in the country, at present.

As Chairman of SIGeGov, I will be failing in my duties, if I do not record our appreciation of Shri L C Singh, CEO, Nihilent Technologies and Shri Satish Babu, President, CSI, who have made the present book possible by their support and contributions. I am personally indebted to Professor Rajeev Sangal, Director, IIIT, Hyderabad, for permitting me to undertake this societal task for CSI and allowing the use of some of the facilities for conducting evaluation process for these awards in IIIT-H campus.

Congratulations to all the award winners for their efforts.

October 2012

R K Bagga

*Chairperson, CSI Special Interest Group
on e-Governance (CSI-SIGeGov)*

Preface

The term ‘inclusive growth’ was made popular by the India Development Policy Review 2006, titled *Inclusive Growth and Service Delivery: Building on India’s Success*^[1]. It focused on two major challenges India faced: improving the delivery of core public services, and maintaining a rapid growth while spreading the benefits of this growth more widely.

In a larger economic perspective, ‘inclusive growth’ addresses the inclusiveness of communities that are at the bottom of the pyramid (BoP), i.e., the ‘poorest socio-economic groups’. It also means, ‘broad-based growth, shared growth, and pro-poor growth’. Professor C K Prahalad^[2], in his article, *Fortune at the Bottom of the Pyramid* (2004), proposed that businesses, governments, and donor agencies should see the segments of people at the BoP as resilient and creative entrepreneurs as well as value-demanding consumers, or, as some other researchers presented^[3], business partners and innovators.

It is widely accepted and proven that ICT and ICT tools can play a significant role in evolving business models/ solutions that address this ‘inclusive growth’ aspect and work towards adding value in this respect.

Identifying critical success factors that address the objective of inclusive growth, either directly or indirectly, would be a project in itself, which could be taken up by academic and research institutions. Instead, we at Computer Society of India’s Special Interest group on e-Governance, focused our efforts on improving the processes that could help in bringing up those aspects of ICT which could be drivers for the change either by design, or by sheer success of sustained delivery over a long period of time.

One example that often comes up as a representative of technology enabling the cause is the inclusive-growth story of microcredit markets in South Asia, particularly in Bangladesh, and to some extent in India. Success stories from this domain, showcased at many forums, have demonstrated how technology, being relatively cheaper and easily available, has made an impact on the delivery of services, making them more efficient and reliable.

The scope of ICT penetration for increased ‘inclusive growth’ is enormous, and its potential cuts across sectors and the creative deployment of solutions, mostly driven by small time, young entrepreneurs. The benefits that would accrue rapidly and significantly include: geographical spread of ICT/BPO companies to smaller towns/cities, the spread and integration of banking sector services, digital schools to spread knowledge, improved healthcare through technology, increased safety with the use of state-of-the-art solutions, increase in prosperity through more use of technology for risk mitigation and intelligent information delivery, predictive analysis to increase systems reliability and optimising performance, SaaS-based

learning options to reduce the costs and increase the reach, sustainable incomes through community farming aided by technology, product innovations, and many more.

Another aspect of 'inclusive growth' relates to new economic opportunities. For many reasons, certain sections of the society have constraints in availing many of the new opportunities. Governments are formulating policies and programs that facilitate the participation of these less well-off individuals in the new economic opportunities, so that everyone has an equal access to the available opportunities.

Entering in to the 10th year of our CSI– Nihilent Awards 2011–12 journey, we were pretty certain that ICT has been enabling this transition, but not so confident that the success stories, assuming they are sustained, has resulted in all the stake holders benefiting equally. Successful roll out does not conclusively prove that the needs of all players have been addressed equally. Hence, 'inclusive growth' needs to be addressed both at the policy stage and the development stage. Although consensus on how to define or measure inclusive growth is difficult to reach, we recognise that the issue is important for practitioners and researchers in the e-governance domain.

As a part of the process of refining our short-listing process and gathering information on 'digital inclusion', we had introduced a new section called 'Value Indicators' last year. This was our first step in collecting information on this parameter critical to our plan objective, and assigning some value to this important parameter has been built into our short-listing process.

The information provided by respondents is an interesting mix. It includes emphasis on multi-lingual support, extensive training in the usage of deployed systems, alternate modes of delivery of service (e.g., the Kiosk Network of Rajasthan for end-to-end delivery of certificates), integrating services with other systems (e.g., eGram by Motor Vehicles Department, Gujarat), integration with payment gateways (e.g., Financial Inclusion System of the Government of Haryana), bringing women into the fold of operations (e.g., employing women as kiosk operators, Rajasthan), making every panchayat a part of the 'e-Society' (e.g., E-District project of Kerala by having one CSC under each panchayat), use of technology to reach larger sections of stake holders (mobile technologies for sending vaccination message alerts, Rajkot Municipal Corporation), making portals all-informative and transactions-enabled, monitoring of system usage by different age groups (Goa Dharnaksh GIS), improving last-mile connectivity (bringing village level entrepreneurs into the system at CSC level), etc.

For evaluating inclusive growth, the team at CSI SIG looked at the nominations from two angles: the benefits the systems brought to the broader segment of communities and the ability shown by individuals within these communities to participate in the new economic opportunities.

One significant parameter of our assessment has been, ‘what efforts have been made on capacity building?’ since capacity building implies confidence building. The use of ICT by States to improve and expand the delivery of services and empower citizens is in itself a part of the inclusive agenda.

Realising the value of ‘inclusivity while planning’, the CSI-Nihilent e-Governance Awards, anchored by the Special Interest Group on e-Governance (SIGeGov), has also focused on finding out which projects were sustained over time and which continued to deliver services year after year, adding functionality, improving technology and innovating processes. We believe that our efforts as a society working for the cause of e-governance are in the right direction.

This compendium has a collection of nominations that were short listed for field visits; each one of the presented cases have some lessons to offer to the practitioners and researchers from the ‘inclusive growth’ perspective. We believe that bringing together the e-governance fraternity under an umbrella like CSI SIG is a small but significant step towards realising the goal of making e-governance initiatives all pervasive.

This compendium also contains interesting invited articles from learned authors covering issues related to emerging technologies and trends in the use of ICT in some key sectors. The major portion, however, is devoted to selected papers submitted by states, departments and districts as nomination for the CSI-Nihilent e-Governance Awards 2011–12. The Special Interest Group (SIG) on e-Governance, which oversees the nominations process, acknowledges with happiness the inherent value of these awards as perceived by the practitioners who chose to participate and compete for the various categories of awards. The organisers are indebted to the officials and the organisations they represent, both at the state- and centre-level, for their unstinted and enthusiastic support, for sharing their success stories and making the challenging 10-year journey enjoyable. But for their and their team’s hard work at the field level, successes such as these and publications of this kind that truly showcase the impact of ICT in the country for the benefit of practitioners, academicians and researchers, would not have been possible.

Editors

**Surendra Kapoor, Prabhu Gollamudi,
Nityesh Bhatt and Harish P Iyer**

[1] <http://web.worldbank.org/wbsite/external/countries/southasiaext/0,contentMDK:20980493~pagePK:146736~piPK:146830~theSitePK:223547,00.html>

[2] Book published by Wharton School of Publishing ‘The Fortune at the Bottom of the Pyramid: Eradicating Poverty Through Profits’

[3] The base of the pyramid protocol -<http://www.bop-protocol.org/docs/BoPProtocol2ndEdition2008.pdf>

Section I

Invited Papers

Enabling Public Cloud Computing: Challenges and the Way Forward

Renu Budhiraja, Virender Kaushik and Rahul Purohit

Abstract

This paper highlights the issues and challenges in the implementation of cloud based service delivery from the end user and the service provider's perspective. The paper also highlights the importance of regulatory framework and policy level issues in the adoption of cloud computing and provides a brief on thought-provoking issues

INTRODUCTION

The concept of cloud computing has recently emerged as a front runner in the field of information technology. In short, cloud computing proposes to transform the way IT is deployed and managed, promising reduced implementation time/costs, maintenance costs and complexity, while accelerating innovation, providing faster time-to-market, and providing the ability to scale high-performance applications and infrastructures on demand.

Cloud computing is at a nascent stage of development, and implementations world over have showcased success stories as well as failures which were largely due to mis-handling of issues not anticipated before moving to cloud.

There is certainly a need for these issues to be handled either through the regulatory or the policy framework to ascertain the success of cloud computing.

The goal of this paper is to provide a realistic perspective of the issues and challenges in creating a cloud enabled ecosystem. The paper in general highlights the following in creating a cloud ecosystem:

- What to look for in a cloud ecosystem
- What to avoid
- Legal provisions
- Policy interventions
- Security provisions
- Intellectual property rights (IPR)

CURRENT INITIATIVES BY THE GOVERNMENT IN INDIA

The Department of Electronics and Information Technology (DeitY) has been the frontrunner in providing a thrust to the National e-Governance Plan (NeGP). Apart from the 30 Mission Mode Projects, DeitY has undertaken Proof of Concepts (PoCs) on cloud computing in four states through leading OEMs/agencies primarily with an objective of forming private clouds for delivering efficient citizen centric services. Further, an initiative named 'Rapid Replication of Applications on Cloud', comprising of replicating some of the more successfully implemented and running applications across the country will be rolled out through private clouds to other states.

The overall goal of this initiative is to increase the online e-transactions in the country. Rapid replication of applications is Phase I of the initiative. Phase II would comprise formation/implementation of a National Cloud, an e-Gov App Store, and consolidation through a national information infrastructure (NII) for a federated/integrated Cloud, with the following objectives:

- i. To create a technological, organisational and process related environment that will enable delivery of 'cloud services on demand'
- ii. To facilitate and enable rapid replication of successful applications across states who are willing to subscribe to the model
- iii. Testing the concepts of infrastructure as a service (IaaS), platform as a service (PaaS) and software as a service (SaaS) in a highly flexible manner
- iv. Creation of an 'e-Gov App Store' accessible to states on a voluntary freewill basis

The above initiatives pertain to establishing private clouds. Due to various issues (Figure 1) in terms of privacy/security/compliance/governance, concrete steps towards availing of services through public cloud have still not commenced. The details of such issues are covered in the succeeding text.

END USER ISSUES

Some of the key issues facing the end user opting for public cloud based services are discussed below. These are issues that need to be addressed to gather confidence among the end users in the uptake of cloud offerings.

Security and Privacy

Cloud services involve processing and storage of data that is often commercially sensitive, confidential, and personal. Thus, moving the data to cloud means losing direct control over the data and in some cases this data

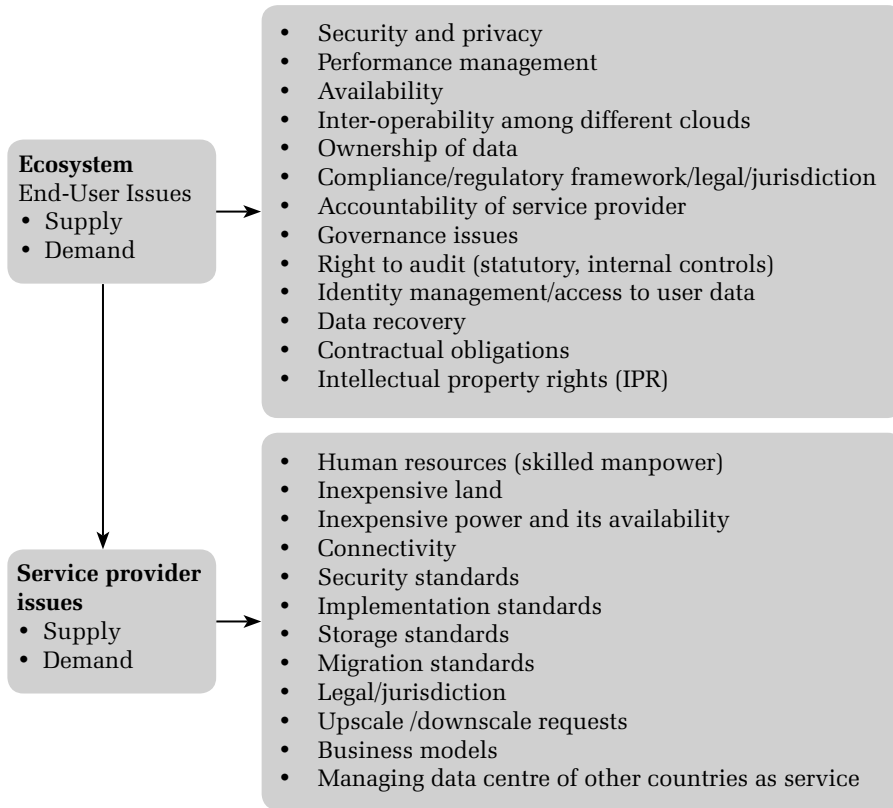


Figure 1 Issues in cloud ecosystem

is stored in a different territory. Data in cloud may be located anywhere in the world and even in multiple data centres in multiple copies worldwide. Thus, storing and processing customer data at remote data centres gives rise to potentially complex data protection issues which need to be addressed in order to avoid breach of applicable regulations. Cognisance should be taken of the following:

Sensitive and Regulated Business: Sensitive and regulated businesses such as financial services or health care are subject to extremely stringent data protection obligations given the financial value or sensitivity of data such as bank details and medical records. Future regulations should create a conducive environment for such industries to adopt cloud.

Data Handling: Personal data stored in cloud is required to be handled in accordance with the customer's instructions or contractual obligation and the service provider is under an obligation to take appropriate measures to keep the data secure.

Availability and Performance Management

Performance management issues are likely to come up during the operations as a result of non-granularity in the contracts between the cloud service provider and the end user. Issues within the cloud environment on SLA adherence, scaling up and down the user requirements, uptime provided and agreed upon, business continuity plan (BCP), compliance of applicable regulations etc requires execution of standardised contracts. Cloud service providers catering to the government shall have to ensure availability and performance management since these are services that are critical for citizens.

Migration to Another cloud

Lack of industry wide standards is a weak link in the cloud computing offering. An urgent issue would be standardisation at platform level, which will allow for greater flexibility if an entity wants to move from one cloud to another. This will ensure that the end user is not locked into one cloud service provider. Further, inter-operability between different clouds is the need of the hour for business continuity spread across regions.

Ownership

Multiple service providers may get involved in delivering one complete cloud offering. This leaves the cloud service provider with individual responsibilities and not a collaborative responsibility. The ownership factor plays a key role and this needs to be ensured by binding the end user with only one service provider who is also the single point of contact. This factor is directly related to the accountability of the service provider.

Regulatory Compliance, Right to Audit

Customers are ultimately responsible for the security and integrity of their own data, even when it is stored by a service provider. Traditional service providers are subjected to external audits and security certifications. There is lack of standardisation on auditing in cloud environment which may lead to customers using public cloud offerings for the most trivial functions.

Legal Jurisdiction/Governing Laws

There are no laws exclusive to the cloud. However, some legal issues whilst not exclusively applicable to cloud have perhaps become uniquely important to those operating or using the cloud. Cloud may not be fixed to any particular location but this is clearly not the case with the legislations of each country. Every country has its own set of legislations regarding data protection and privacy, and some are dramatically more stringent than others. Further, complying with data protection regulations will be

complicated if the data is split up and stored by the supplier in different data centres all over the world. Such data are potentially subject to:

- i. The data protection laws of every jurisdiction in which it is stored; and
- ii. Inspection by local law enforcement authorities (for example, under anti-terrorism legislation).

Intellectual Property Rights

Data is critical intellectual property for any user. When data and services move to cloud, there could also be intellectual property rights issues for both cloud computing providers and users to consider. These are complex matters. Some of the issues could be

- i. Who would be the owner of intellectual property created using cloud or the processes vital to cloud?, and
- ii. To what extent would a user be held liable in case the provider's service infringes any third party's intellectual property rights.

Cloud Contracts and Contractual Obligations

Cloud contracts can vary depending on the provider and type of solution the end user is seeking. Not all cloud contracts and not all aspects of the cloud contracts are negotiable. Given the range of offering in cloud, some cloud contracts may be negotiable. A cloud contract should be drafted and negotiated to ensure that it meets all legal requirements, mitigates associated risks, and addresses required operational and governance concerns.

SERVICE PROVIDER ISSUES

Some of the key issues that service providers need to cater to while offering cloud based services are discussed below. These are issues that need to be resolved to gather confidence among the end users in the uptake of cloud offerings and also provide for standardisation in the service offering in the entire ecosystem.

Human Resource Availability

Cloud computing is still in a nascent stage in India and key developments are on-going, world over. Knowledge is in the hands of a few and the resultant is fewer resources that have expertise in cloud based technologies. In the Indian context, cloud technologies should be made a part of the academics and be embedded in the curriculum to generate more skilled resources in this area. Capacity building in cloud and related technologies needs to be seriously considered for the cloud ecosystem to evolve.

Land, Power, Connectivity and their Availability

One of the key concerns in setting up large data centres is the availability of cheap land, either on purchase or on lease. Another aspect of vital importance is continuous availability of power and connectivity to run these data centres. These issues need to be resolved in the Indian context for the cloud ecosystem to flourish.

Standards

Standards pertaining to implementation, storage, migration need to be developed to ensure uniformity amongst the service providers. With such standards in place and an ever evolving model on standards, the end user shall be confident in the uptake of cloud based services.

Legal/Jurisdiction Issues

The legal issues arising out of cloud computing can be broadly categorised as operational, legislative or regulatory, security, third party contractual limitations, risk allocation or mitigation, and those relating to jurisdiction.

An aspect of cloud computing that presents an area of considerable ambiguity are regulatory and legislative issues. Cloud computing, as such, is an unregulated field with limited legislation and regulation in limited jurisdictions, wherein fewer countries follow stricter laws. The problem arising in this environment for data concerning individuals of a certain jurisdiction may involve certain standards that may not be necessary at the jurisdiction where the data is being stored or processed or accessed. Ensuring compliance within the numerous legislative and regulatory frameworks is cumbersome.

A standardised system/framework should be formulated and implemented wherein numerous such legislative and regulatory frameworks are embedded during the contract stage.

Service providers not only need to address issues at their end, but also need to come up with an amicable solution which addresses the needs of the end user. This would boost the uptake of cloud based services and adoption of cloud based technologies.

CONCLUSION

Cloud computing is a cost effective and efficient service delivery model provided it is managed as per applicable legal and ethical standards. The biggest roadblocks for cloud computing are security, legal and regulatory issues. Several fears and contraventions apply to cloud computing

service providers, especially where there are no existing privacy and data protection laws.

Laws vary from nation to nation and jurisdiction to jurisdiction. The Information Technology Act 2000 as amended further needs to incorporate dedicated privacy laws, data security laws and data protection laws encompassing cloud environment.

Cloud computing, simply offers a compelling value proposition—a technological firepower without the hassles of ownership and maintenance.

Keeping in mind the numerous benefits of cloud computing and its potential to dramatically overhaul IT in the public sector, a great need is felt in providing a robust framework to ensure privacy rights, data protection principles and data security practices in India. A policy framework is required to be evolved jointly by the government and the industry, addressing concerns raised in this paper so that intended benefits of cloud computing can be accrued by the end users.

Renu Budhiraja, Sr. Director, Dept. of Electronics and IT (DeitY)
Virender Kaushik, Sr. Consultant, NeGD, DeitY
Rahul Purohit, Consultant, NeGD, DeitY

e-Governance in Germany: A German City as a Best Practice Case of e-Government

Jörg Himmelreich

*e-government is about government.*¹

Smart technology in the following context is understood as the application of information and communication technologies (ICT). ICT have already changed governance policies in the past and will do even more so in the future. This change is taking place in many regards, which cannot be explored here in more detail, but one consequence of the increasingly intensive penetration of the daily and political urban life by ICT is a growing global competition between cities and megacities.

As progressing urbanisation is an unavoidable consequence of progressing globalisation, the number and size of cities have grown, mainly in Asia. The growing number of cities is going to make every city compete globally for attracting the smartest people, the smartest businesses and the smartest urban governance model.

ICT drives globalisation and confronts cities and megacities worldwide with more and more comparable problems in spite of all the historical, cultural, social and economic differences that influence the living conditions of each and every city. Very soon, cities in India will face more and more comparable challenges for urban governance (health service, education, traffic, urban planning, public services and utilities) like cities in Germany, even though in another magnitude because of the vast difference of the number of inhabitants in Indian cities—as strange as this remark may sound today.

Due to an increasing comparability of the challenges of urbanisation for all cities worldwide, a look on ways how German cities used e-governance might deepen the understanding of e-governance: what e-governance is able to do, what it is not able to do and what it might be able to do in future.

Like the Government of India, Germany's government administration structure consists of a federal level made up of the Federal Republic of

1 Klaus Lenk. Informationstechnik as key to the modernisation of the state: How will it go on?. In *Die Zeit nach dem E-Government* edited by Sayeed Klewitz-Hommelsen and Hinrich Bonin. Muenster. 2005. p. 95–108 (103).

Germany and of 16 individual states. In a slight difference to India, Germany has a significant third level of governance which is the autonomous self-government of the German cities, granted and protected by the German Constitution². Smart technologies drove and are driving political, federal, state and urban governance. Today, there is a broad understanding in the German political federal level that urban governance has to drive the use and application of smart technologies. Smart technologies can only deliver the means to improve urban governance, they cannot substitute bad governance. Governance deficits can only be solved by the governance itself (of the people, of the political parties and other stake holders of the political governments). Therefore, e-government is about government.

Electronic government means the settlement of management processes in the context of public governance and administration by the application of information and communication technologies.³ It comprises the entire public sector, consisting of public administrations, public associations and public business enterprises on all levels. On the one hand, e-government addresses the internal management of the administration in order to improve internal administrative procedures by the application of modern ICT. In the context of improving the internal service quality, e-government aims to accelerate the settlement of administrative files, to reduce costs, to improve the cooperation between various administration departments and sectors by a free flow of data and information and to reduce and simplify complex internal procedures. On the other hand, e-government looks at the external communication partners of public administration. It concerns communication processes with other government sectors (government-to-government, G2G), with private business companies (government-to-business, G2B), with non-profit organisations (government to non-profit, G2N), and with the citizens (G2C).⁴ Meanwhile, a broad sector in academic sciences discusses and analyses in Germany and worldwide, the political and legal implications of e-government for public governance and administration, which cannot be discussed here.

The potential of the ITC applications in government administrations was recognised by the Federal German Government, too, to make the administration more efficient, more transparent and to improve the participation of citizens in the administration process and in the government.

2 The 74th Constitutional Amendment Agreement from 1993 in India is aiming for this local self-government in cities too.

3 Heinrich Reinermann. *Verwaltungsmodernisierung mit New Public Management und Electronic Government*. in: *Globale und monetäre Ökonomie*, hrsg edited by von Hermann Knödler und Michael Stierle. Heidelberg 2003. p. 381–440 (381).

4 Jörn von Lucke und Heinrich Reinermann. *Speyerer Definition von Electronic Government*. Speyer 2000, p.1.

In order to regain supremacy in the fast modernisation processes of ICT and to lead it to the improvement of governance and administration, the German federal government set up an e-government platform (IT-Planungsrat). Representatives from all government levels (federal, state and municipal) participated in it to launch an e-government strategy⁵. This all-inclusive top-down approach guaranteed a harmonised common approach with the possibility of complete interconnection and data exchange where legally possible and to avoid separate individual ICT solutions by individual municipalities.

The following contribution describes how the German city of Delmenhorst improved its urban governance by smart technologies. This small German town with 80,000 inhabitants was chosen as the best practice case because the many challenges of applying smart technologies for urban governance are more easy to demonstrate in a small town than in the complex governance structure of a city with millions of inhabitants.

Before proceeding further, the particularities of German urban governance has to be briefly presented and contrasted with the Indian urban governance model⁶. Besides this, the e-masterplan of the German State of Lower Saxony has to be described as Delmenhorst is located in this state. After all, some lessons learned from the best practice case of Delmenhorst may be drawn even for an Indian megacity, in spite of the fundamentally different political, cultural, social and economic environment.

THE GERMAN URBAN GOVERNANCE MODEL

German cities enjoy a particular right of municipal autonomy, guaranteed in and by the constitution. Historically, this constitutional guarantee of municipal autonomy is rooted in the administrative reforms of the Prussian political reformers, Stein and Hardenberg⁷. In 1808 both remembered, the passed autonomy of German mediaeval towns to improve citizen participation in public affairs and to engage Prussian citizens against Napoleon's military invasion and occupation in Russia. These reforms helped to contribute to the foundation of a long German constitutional and administrative tradition of municipal autonomy—by the way, in stark contrast to the British model of urban governance in Great Britain and the Commonwealth. The reforms were implemented in 1808 in the Prussian City Charter ('Preußische Städteordnung' from 1808). During an era when at the same time parallel to the process of

5 e-Government strategy, launched by the IT-Planungsrat. http://www.it-planungsrat.de/DE/Strategie/negs_node.html. Accessed on May 14, 2012.

6 The author is aware that there is not one general urban governance model in India but different—at least three—in different states.

7 Günter Püttner. *Kommunale Selbstverwaltung*. In *Handbuch des Deutschen Staatsrechts*, Vol. VI. Edited by Isensee/Kirchhoff. Heidelberg 2008, p. 1141–1173 (1142).

industrialisation this kind of urbanisation took off, these municipal reforms proved to be more and more helpful to respond to the challenges of urbanisation until 1980-even during times of a monarchy in Prussia.

‘The law (of autonomous local self-government) has to be granted to all municipalities and to govern all matters of local community within the legal framework by themselves’, article 28, para 2 of the German Constitution reads. In application of this constitutional law of municipal self-governance, the voters among 80,000 inhabitants of Delmenhorst elect a mayor, who is in office for eight years and 42 other members of the municipal council for five years each. The mayor is at the same time head of the municipal administration. As the city of Delmenhorst is not part of the community of other districts, the mayor is directly responsible for all other local matters to the Minister of the State Government of the State of Lower Saxony.

As head of administration, he/she exclusively recruits the civil servants for the municipal administration. As to urban land use and infrastructure planning, the city of Delmenhorst is exclusively responsible for the use of land within the territory of the city as well as for the planning and maintenance of local streets within this territory. Regarding the planning of state and federal highways, this city has to be included in the planning processes as well.

The city has to administer its own financial resources. The financial revenues for municipalities are granted by Article 106 of the German Constitution. The city receives 15% of the federal income taxes, 2.2% of the federal VAT and the entire business tax for business licences granted by the city. For local services, cities are able to demand their own fees (like for the local public swimming pool, local bus transport etc.). The planning of land and the budget has to be approved by the City Council. In contrast to the overlapping responsibilities of municipal administrations in India, like for example in Bangalore, the administrative responsibilities in a German city are clear-cut and strongly separated (office for businesses licences, office for construction permissions etc.) and regulated by law. If there are shortcomings in the municipal services, citizens can claim compensation at the courts.

In comparison with the mayors in the majority of Indian megacities with multi-million inhabitants, the mayor of Delmenhorst with 80,000 inhabitants is a political heavyweight. The mayor of Bangalore, for instance, is elected just for one year by the council and has little responsibilities, no autonomous income resources for the city, no exclusive planning authority and is supervised by the Government of Karnataka and its administration consisting of civil servants he/she has not appointed.

This constitutionally and institutionally weak governance of the majority of Indian megacities cannot be changed and improved by smart technologies. It is a government problem and it makes the application and introduction of smart technologies in Indian megacities even more complicated and complex.

E-GOVERNMENT MASTERPLAN OF LOWER SAXONY

The e-Government Masterplan of Lower Saxony of 2010 updated the e-Government Masterplan from 2005⁸. Its objective was to implement a federal e-government strategy for the improvement of transparency and efficiency of the German administration and to improve, thereby, the quality of public services and administration services for the citizens, and the information and participation of citizens in local administrative affairs.

The focus of the masterplan is foremost on the improvement of the quality of services for the citizens to enable them to receive easy, clear and understandable online access to all services of the state and municipal administration. This project 'Citizen and Business Services' (CBS) aims at connecting all municipal administrations with the online services of Lower Saxony and to update the services regularly. Other objectives are:

- All forms of the administration are put online and shall be downloaded and printed out.
- One service portal service point 'www.service.niedersachsen.de' directs the citizen to all information, forms of online services.
- If the citizen is once registered and identified in a central service portal online, he/she shall be able to sign electronically all forms, applications and online services to the extent legally and technically possible.
- There will be implemented a tailor-made online service for the set up of companies and business resources.

For the improvement of the efficiency and transparency of the administration in Lower Saxony, the exchange of data, information and files among many different local and state administrations and within each administration itself shall exclusively be sent electronically. The use of paper shall become an exception. There are until today concerns as to the secure sending of electronic data files, and to the unification of the central personal management system for the whole state. Administrative procedures that require safe payments and procurements lack the technologically required standards of security.

SMART TECHNOLOGIES AND E-GOVERNANCE IN DELMENHORST⁹

The present status of the implementation of these objectives of the Lower Saxony Masterplan in Delmenhorst is described in this section. As to the

8 Cf. http://www.mi.niedersachsen.de/portal/live.php?navigation_id=14926&psmand=33, (accessed on May 14, 2012) leads to the e-master plans of 2010 and 2005 and to the e-government strategy of Lower Saxony.

9 The author owes many thanks to Patrick de La Lanne, the Mayor of Delmenhorst, for his frankness in giving all relevant information about the status of

electronic data exchange between the administrations of the municipality and the State of Lower Saxony, the city of Delmenhorst is completely connected with and included in the data exchange system of the State of Lower Saxony. The State of Lower Saxony is still in the process of developing various services like, for instance, the payment service for administrative services. At which point of time, this service can be offered locally, too, cannot yet be predicted realistically. Up to now, there is still not one municipal public service which can exclusively be settled electronically. Since August 2011, the city of Delmenhorst has a completely and newly restored internet presence. Via the website www.delmenhorst.de, local citizens can find all administrative services of the municipality and of the state as well as talk to the concerned civil official. Besides this, Delmenhorst is electronically connected closely with some federal administrations as well. For the issuance of an id card, for instance, the local citizen office sends all personal data via the State of Lower Saxony to the federal central registration office for ids. The citizen immediately receives the new id at any local citizen office. The city of Delmenhorst has its own server. Every civil officer is connected to it. For every civil servant, basic ICT knowledge is a requirement for the job.

As to the improvement of information about municipal administration and services of Delmenhorst for citizens, the efficiency and transparency of the administration and, thus, of urban governance are considerably progressing. The saving in time and administrative salaries is obvious, but difficult to measure by exact figures. Fundamental innovations like the entire completion of the administration procedures for granting licences, social aids etc. and the completion of the EU payment service have still to be finalised. In both these areas, technological safe solutions that meet all legal requirements still have to be found.

Even more distant in the future is the development of electronic political voting. As Delmenhorst has to deal with a high number of foreign migrants from Turkey and Eastern Europe (around 60% of the inhabitants), around 45% of the citizens still do not even have a basic ICT knowledge to use the online services of their city.

CONCLUSION

The fundamental precondition for the use, to the full potential, of smart technologies and applications for urban governance in many Indian megacities seems to be to improve the urban governance itself. The 74th

the implementation of e-government in the municipal administration in the interview on May 13, 2012 in Delmenhorst.

Amendment of the Indian Constitution, many Indian innovative initiatives¹⁰, commissions¹¹ and high task force reports¹² already demand and suggest that the federal Indian states grant the right of municipal autonomy and self-government to their cities.

India has the longest written constitution in the world. In 1947, it was influenced by British constitutional thinking that did not acknowledge the advantages of municipal autonomy outside of London and Delhi. That is why UK today sees comparable political struggles to grant larger municipal autonomy and an institutionally strong mayor for British cities to respond to the challenges of urbanisation on the local level¹³. This British constitutional heritage of a firmly centralised federal governance helped India early after independence to establish a united state in the South Asian continent. But today, all major problems of urbanisation in Indian (mega)cities (traffic, health, education, public utilities, urban planning) can only be solved by a stronger degree of municipal autonomy. It is time for India and her states to liberalise themselves from the last of British colonisation. The German model of municipal and constitutionally guaranteed autonomy is not entirely applicable to an Indian urban governance model, but it might offer some orientation.

Only then can political governance drive smart technologies and the modernisation of their applications instead of becoming their hostage. The potential for smart technologies in urban governance is huge. Efficiency and transparency of the municipal administration can be improved and various deadlocks in the urban governance can be overcome. It requires educating every civil officer and of course every citizen with sufficient smart technology. This education could be particularly helpful for the socially weak. But for the running, heading and managing of such a smart technology revolution in urban governance, a politically and institutionally strong mayor in many Indian cities is needed. In comparison with the mayor of a little German 80,000-inhabitants town of Delmenhorst, who is elected for 8 years and is the only head of the municipal administration with autonomous, legally guaranteed revenue resources, the one-year mayor of the megacity of Bangalore, for example, looks, because of his/her constitutionally limited authorities and his/her political and institutional dependence on the state government, rather weak¹⁴—unable to use the unlimited knowledge and technical expertise of smart technologies.

10 Compare: Jawaharlal Nehru National Urban Renewal Mission (JNNURM). December 3, 2005.

11 Government of India. Second Administrative Reforms Commission. Sixth Report. Local Governance. October 2007. p. 198–220.

12 The High Powered Expert Committee (HPEC) for Estimating the Investment Requirements for Urban Infrastructure Services, March 2011, p.89–116; Report of the Expert Committee, Governance in the Bangalore Metropolitan Region and Bruhat Bangalore Mahanagara Palike (Kasturirangan Report), March 2008, p. 23–29.

13 Elf englische Städte sollen einen Bürgermeister erhalten “(Eleven English Cities shall get a Mayor), Neue Zürcher Zeitung, May 3, 2012.

Bibliography

- e-Government Masterplan of 2010 of Lower Saxony. http://www.mi.niedersachsen.de/portal/live.php?navigation_id=14926&psmand=33.
- e-Government Masterplan of 2005 of Lower Saxony. http://www.mi.niedersachsen.de/portal/live.php?navigation_id=14926&psmand=33.
- e-Government Strategy of Lower Saxony. http://www.mi.niedersachsen.de/portal/live.php?navigation_id=14926&psmand=33.
- Elf englische Städte sollen einen Bürgermeister erhalten. (Eleven English Cities shall Get a Mayor). *Neue Zürcher Zeitung*. May 3, 2012.
- Government of India. Second Administrative Reforms Commission. Sixth Report. Local Governance. October 2007.
- Jawaharlal Nehru National Urban Renewal Mission (JNNURM). December 3, 2005.
- Just a pawn in the political game?. *Deccan Chronicle* Bengaluru. April 27, 2012.
- Lucke, Jörn, und Reineremann, Heinrich. Speyerer Definition von Electronic Government. Speyer 2000.
- Lenk, Klaus. Informationstechnologie als Schlüssel zur Modernisierung des Staates: Wie geht es weiter? (Information technology as key to the modernisation of the state: How will it go on?). in *Die Zeit nach dem E-Government* edited by Sayeed Klewitz-Hommelsen und Hinrich Bonin. Münster. 2005. p.95–108.
- National e-Government Strategy of Germany launched by the IT-Planungsrat, http://www.it-planungsrat.de/DE/Strategie/negs_node.html, accessed on May 14, 2012.
- Püttner, Günter. Kommunale Selbstverwaltung. in *Handbuch des deutschen Staatsrechts*, Vol. VI. Edited by Isensee/Kirchhoff. Heidelberg. 2008. p. 1141–1172.
- Reineremann, Heinrich. Verwaltungsmodernisierung mit New Public Management und Electronic Government. in: *Globale und monetäre Ökonomie hrsg.* Edited by von Hermann Knödler und Michael Stierle. Heidelberg 2003. p. 381–440.
- Report of the Expert Committee. Governance in the Bangalore Metropolitan Region and Bruhat Bangalore Mahanagara Palike (Kasturirangan Report). March 2008.
- The High Powered Expert Committee (HPEC) for Estimating the Investment Requirements for Urban Infrastructure Services. Final Report. March 2011.

14 As to Bangalore, see Just a pawn in the political game?. *Deccan Chronicle* Bengaluru, April 27, 2012.

Jörg Himmelreich is Visiting Fellow at the School of Humanities & Social Sciences of Jacobs University Bremen gGmbH, Germany. Before that he held various international academic occupations and served at the German Ministry of Foreign Affairs.

Smarter Cities for Better Urban Governance

Sreenath P Venkatesan

THE URBANISATION PHENOMENON WORLDWIDE

The world is at an unprecedented level of urbanisation and cities are now the hubs of the global economy. It is increasingly seen that most cities, especially those in developing countries, are finding it difficult to cope with the ever-increasing urbanisation.

Around the world, the concentration of population in cities is growing—in fact, more than half the world's population is already in cities—and growing by the day. The enormity of the situation becomes even more apparent when one realises that the cities with more than half the world's population account for just over 2% of the total land area in the world. That is a lot of people cramped in a small amount of space. The problem is even more aggravated in the entire developing world which is witness to an unprecedented shift of human settlement to cities. A recent KPMG (a global network of professional firms providing audit, tax, and advisory services) study has estimated that the urban population in developing countries will increase by more than 1.3 billion over the next 2 decades. Put that in perspective against the fact that India's current population is over 1 billion. This means that urban areas in the developing world will be adding a 'new India', population-wise, in the next 20 years!

RAPID URBANISATION IN INDIA

The chart shown in Figure 1 gives the growth of urban population vis-à-vis rural population in India.

As far as India is concerned, it is emerging as one of the fastest urbanising countries in the world. The economic base of India as a nation has already shifted to the urban areas through rapidly expanding industries, services and commerce. There are people who say that India is more of a rural-oriented country and is among the countries at low levels of urbanisation. This is true at one level when one compares India with the level of urbanisation of many other countries in terms of population in urban areas. However, the growth of urbanisation in India and the sheer numbers involved make India one of the fastest urbanising countries in the world in terms of population growth in urban areas. Let us take a look at the growth of urbanisation in our country—it was around 26% of the population in 1991, around 33%

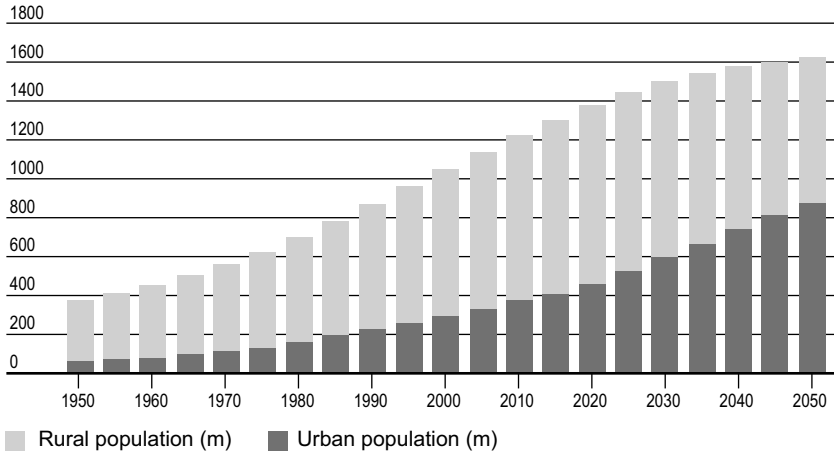


Figure 1 Division of urban and rural population (m)

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, Credit Suisse

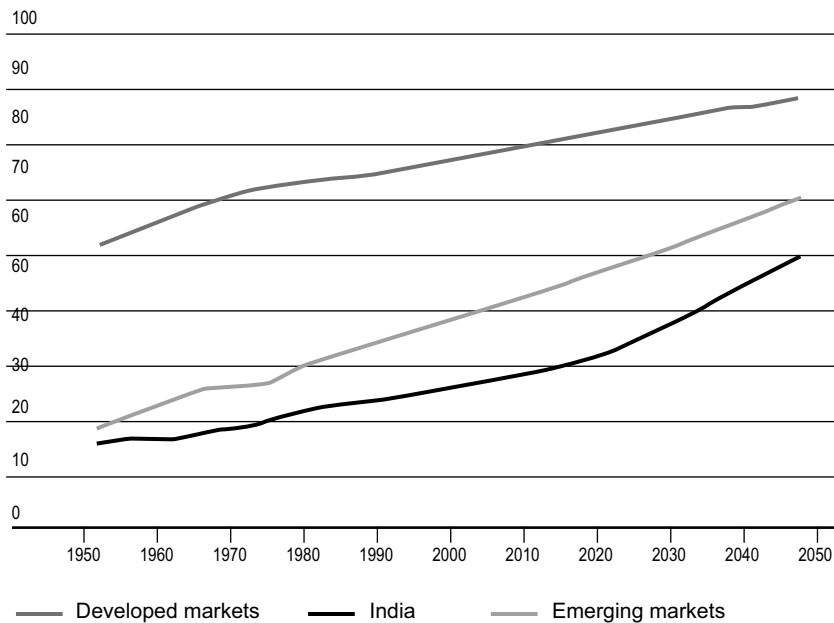


Figure 2 Urbanisation rate for India versus overall emerging and developed markets (%)

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, Credit Suisse

in 2001, and is estimated to be 40% by 2021 (Figure 2). Just to put those statistics in perspective—if urban India was to be considered as a separate country, then it would be among the top 5 countries in the world.

Major Indian cities are growing far more than their counterparts worldwide. To put that in perspective, India in 1991 had 3 cities amongst the 20 largest cities in the world, which grew to 6 cities amongst the 20 largest cities in 2001. Even if we do not look at a comparative picture with respect to cities globally, the population of Indian cities has been growing phenomenally—from 23 cities with a million plus population in 1991 to 40 in 2001 and this is expected to grow to around 70 cities by the year 2021.

CHALLENGES OF CITIES IN INDIA

There is thus an immense challenge for us to manage our urbanisation process in a sustainable manner for the benefit of generations to come.

Sustainable growth of urban centres in developing countries like India is greatly dependent on the provision and maintenance of modern infrastructure, whether it be transport infrastructure (roads, urban transit systems), power, water and waste water (water distribution networks, water treatment plants, sewage systems). The creation of this infrastructure is an expensive and time-consuming process and is also intended to last for a long time (at least a couple of decades, if not more)—thus, it is very important to get it right. The infrastructure that is created will shape our cities. How can we create and manage city infrastructure in a smarter way?

Let us consider the example of transportation. Across the globe, driver frustration and increasing pollution are causing city planners to re-think how cities are designed and optimised from the point of view of efficient transportation. Traffic congestion and efficient transportation are key issues in Indian cities. Traffic is growing four times faster than the population in major cities like Bangalore, Mumbai, Delhi, Ahmedabad, Chennai and Hyderabad—which means that there is no way that even continuous addition of road infrastructure would be able to cope with the growth in vehicular traffic—we need innovative solutions and technology-based solutions to address this issue.

Not only can vehicles be made smarter, as is happening rapidly but it is also possible to make the roads and the transportation systems in cities smarter. A number of these solutions are available today, for example, the use of global positioning systems to improve traffic in cities, as also roadside sensors to detect traffic conditions. There are also innovative approaches being taken to solve the problems faced. We need technologies that can simulate a broad range of urban transportation situations involving millions of vehicles, which can show the impact modification of existing

traffic laws or alterations in the timing or frequency of traffic signals and signs. These large-scale, high-speed simulations provide real time analysis of traffic status, levels of carbon dioxide emission, traffic volume, and travel time throughout a metropolitan area. This can enable urban planners to address the booming congestion problem through innovative transport measures, such as road-user charging systems. One example of a city where road user charging has made a tremendous impact is the city of Stockholm, where traffic congestion and carbon emissions have been reduced thanks to a smart tolling system—a case which has been well-documented by the Kennedy School of Government at the Harvard Business School. As the case study notes, ‘Is Stockholm a harbinger of things to come in a world newly alert to climate change and environmental challenges? If Stockholm offered lessons, what were they? And if the Stockholm solution might work for other municipalities, what conditions and analysis might identify regions ripe for a similar approach?’ While road user charging is an innovative solution that worked for Stockholm, the lesson for us is that innovative solutions to address traffic congestion are necessary to address our ever-growing traffic population.

Similarly, the water infrastructure in most cities is ageing and in case of some cities like Mumbai, a century old. At the same time, it is quite a challenge to find out the quantum of water losses, with estimates ranging from 30% to 70%. Replacing the ageing infrastructure poses its own challenges and may involve disruptions which cities can ill-afford. Here again, there is a need to manage water distribution networks better in a ‘smarter’ way.

Similarly, our cities have been witness to increasing threats of terrorism. Not only terrorist threats, we also face challenges of flooding in major cities during specific seasons with great regularity. Can such situations and emergencies be managed in a better manner and proactively?

If cities are increasingly becoming the hubs of the economy, then they also ought to be the focal points for transformation. The question that needs to be asked is, ‘Is there a way for cities to achieve smarter growth?’

WHAT IS A SMART CITY?

There are various views to what a ‘smart city’ is. One view is that a smart city is ‘an aggregation of different kinds of critical infrastructure enabled by information technology’. Forrester Research (an independent technology and market research company that provides advice on existing and potential impact of technology) defines the combined use of software systems, server infrastructure, network infrastructure and client services to be smart computing technologies—to better connect seven critical city infrastructure components and services: city administration, education,

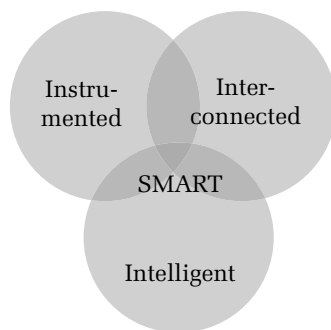


Figure 3 *IBM definition of a smart city*

health care, public safety, real estate, transportation and utilities. IBM defines a smart city to be as shown in Figure 3.

Cities which want to realise their full potential must become smart and smart solutions must utilise all three dimensions of ‘smart’—instrumented, intelligent and interconnected.

A study by the IBM Institute for Business Value has shown that cities need to initially focus on four high-impact areas of improvement:

- Reduce congestion in transport systems
- Improve public safety by reducing crime and emergency response time
- Streamline and tailor services for the citizen, including a heavy emphasis on education and training
- Enable appropriate access to health care data for better quality of care, early disease detection and prevention

However, a smart city is not necessarily one which brings high-end technology to a city. A look at the Life 2.0 Project in Europe should serve to dispel this notion. The main objective of the project is to increase opportunities for:

- Social contacts between elderly people in their local area
- Acquiring knowledge about people living in the areas and events occurring close by
- Getting knowledge about services and assistance available in their area
- Area residents to offer their residual capabilities and skills to friends, family and other people of any age, living in their area

A city which can offer its citizens services in the above areas can be construed as a smart city in some form.

As this initiative shows, a city can get smarter by focusing on simple areas of relevance to the city and its constituents.

TOWARDS SMARTER CITIES—THE IMPORTANCE OF RELIABLE DATA

As urban policy makers and administrators deal with numerous challenges, the key to their smarter decision making will be the availability and management of data—the key to a smart city is data. Lack of reliable data affects informed decision making. There is an interesting anecdote that comes to mind in this context. When he was Chancellor of the Exchequer in the mid-1920s, Sir Winston Churchill asked his chief economist what would be required to produce a good estimate of the total cost of World War I to Britain. The economist replied that it would take ten years by the best means available, whereupon Churchill promised his answer to the Prime Minister that same day. He explained: ‘If I give him my best guess this afternoon, it will take ten years for anyone to prove me wrong.’

In the city context, our city administrators face similar challenges and major decisions are often made based on ‘guesstimates’ in the absence of reliable data. As Christopher Williams of UN Habitat said some time back, ‘on urban data, we are today where we were in the 1930s on country or national level data.’ Today, technology is available to collect, analyse and interpret data from a variety of sources for an integrated view of a city to aid in better decision making. This is indeed true and we need to recognise this. The fact of the matter is that insufficient data is available to city administrators and even where available, most agencies tend to have their own sources of data and rarely share information with one another. So, even where information is available, we have the issue of ‘multiple versions of the truth’. There is an urgent need to collect and manage city data efficiently,

Once data is available, the possibilities of what it can be used for can be literally mind-boggling—some of which may seem futuristic today; there may even be those who may question the need for it. There will be nay sayers who will be skeptical and try to shoot down any progressive administrator who sees the value of such data. Even great people have often been unable to fathom the potential uses of some of the great innovations that the world has seen—the most famous one being, US President Ulysses S Grant, who in 1877, thought the telephone was ‘very remarkable’ but wondered ‘who in the world would ever want to use one of them.’ Today, this invention has transformed life for us and especially so in a country like India where the mobile phone is now almost on par with ‘*roti*’ and ‘*kapada*’ and possibly more important than ‘*makaan*’. The short point here is that *a city’s investments in the direction of data collection will be the first steps in its efforts to become a ‘smart city’.*

THE CITY AS A ‘SYSTEM OF SYSTEMS’

The first step towards making a city smart is to gather data. This requires the creation of a network of intelligent sensors to gather data on and enable

measurement of a variety of parameters for a more efficient management of the city's various systems. Cities are based on a variety of core systems related to their key functions: city services, transport, communication, public safety, health, education, water and energy. These systems in a city are inter-related in many ways. For example, a sewer overflow is first of all a sanitation problem. It may also have an impact on the drinking water supply, if it enters the water distribution network at some point; it may also be a health hazard; it may be a traffic issue if the overflow is substantial and warrants closure of the road and re-direction of traffic to other roads; educational institutions situated nearby may have to be informed to divert school buses.

A city can thus be considered as a 'system of systems'.

THE NEED FOR REAL TIME COLLABORATION IN CITIES

Given that a city is a 'system of systems', it has numerous departments and departmental systems—ranging from water and waste water to public safety. In most cases, city agencies are restricted to a view of their own systems and data. The need of the hour is to have a unified view across all arms and agencies of a city. Further, the availability of information for decision making in real time can be of great value in:

- Enabling city administrators to monitor and manage city services with greater efficiency
- Being able to proactively monitor and manage any situation/event as they arise
- Being able to respond speedily to situations/events and being able to do so in a city-wide manner, across various city agencies
- Providing the same view of the unified and consistent data to all city agencies
- Managing assets across various city systems in an integrated manner, including being able to assess the impact on other systems

SUMMARY

Increasing urbanisation is a worldwide phenomenon and increasing so in developing countries like India, where the move to urban areas is taking place at great pace. The growth rate of urbanisation in India, coupled with the magnitude of the sheer numbers involved, make it imperative that we look at options other than to merely create new infrastructure. There is only so much that can be done to create new infrastructure to meet increasing demands in cities—we need to look at smarter ways to manage the infrastructure and services. The rapid growth of urbanisation means that

the demands of efficient urban infrastructure outstrip the capacity created in no time. Technology today provides a way of managing infrastructure and service in a more efficient and optimal manner, and cities in India must embrace this approach. We need to make our cities 'smarter' to achieve the quantum jump in progress that is required in our urban environments. Some cities have already begun to take steps in this direction and more cities will have to do so to cope with the increasing pressures that growing urbanisation will bring.

References

- McKinsey Global Report titled "India's Urban Awakening: Building Inclusive Cities, sustaining economic growth"
- McKinsey Global Institute 2010 report
- Report by The High Powered Expert Committee (HPEC) for Estimating the Investment Requirements for Urban Infrastructure Services, March 2011
- Case Study by the John F Kennedy School of Government Harvard Business School on 'Congestion Pricing for Stockholm'
- Information from the Department of Economic and Social Affairs from the United Nations Secretariat
- Information from the IBM Institute of Business Value

Social Media and e-Governance: An Indian Perspective

Harish P Iyer and Mithila Harish

Abstract

The recent phenomenon of governments engaging with their citizens through social media¹ can be characterised variously as efforts by governments to keep pace with the changing times, as attempts to utilise the speed and reach of the social media to engage with their stake holder and so on. These are however rather obvious explanations for the increasing interest of governments in social media. Lying beneath these factors is a more fundamental shift in the manner in which sections of the society are able to organise themselves in *fluid* ways and as a result exert newer kinds of pressures on governments and the governing process.

This paper seeks to examine the characteristics of the social media based interaction between various agencies of the Indian government and its citizens. In examining the characteristics, the paper studies the relevance of tenets of attention economics to the sphere of social media based e-governance in India. Particular emphasis has been placed on the question of the confidence with which the government can employ popular third party social media tools, given the mixed reviews the social media has received in the recent days.

INTRODUCTION

Anecdotal evidence suggests that media freedom and Governmental agenda setting machinery have an uneasy relationship. In the Indian context, the first half of 2012 has already seen many instances where such unease has played out in the public sphere. It might perhaps be that it is the political inclinations and compulsions and not governance issues per se that render a Government's machinery far more sensitive to criticisms—whether real or perceived—and far more wary of citizens' demand for greater participation in the government decision making and performance review processes.

Traditional forms of e-governance have forced upon governments a certain level of openness, transparency and responsiveness. By *traditional*

1 In this paper, the terms 'social media' and the 'new media' are being used interchangeably. This paper does not distinguish between social media and social networking.

e-governance it is meant a system of ICT—especially custom-featured software delivered over such channels, mostly unidirectional or with limited bi-directional interaction—where the *level* of openness, transparency and responsiveness are still within the control of the governments.

Might this situation change?

The growth in the use of social media seems capable of bringing about greater levels of participatory forms of governance. Social media represented by such services as full-scale social networks (for example, facebook), microblogs (for example, Twitter), professional networks (for example, Linkedin), locational networks (for example, foursquare, Loopt), community building services (for example, Google/Yahoo groups) etc have the *potential* to usher in true e-democracy, transparency and other related goals, all of which are aimed at making governance a multi-directional and more representative process.

On the subject of how and whether social media will impact e-governance, the following questions seem relevant.

1. What are the specific characteristics of social media which make them relevant to the domain of e-governance?
2. If indeed social media is significant in the e-governance context, what behavioural responses might it elicit from government functionaries?
3. What impact—if any—might social media have on governance processes? Can these be negotiated effectively without compromising on goals of transparency and accountability?

SOCIAL MEDIA AND THEIR RELEVANCE TO E-GOVERNANCE

In describing e-governance, the National e-Governance Plan website of the Government of India states that ‘e-Governance in India has steadily evolved from computerisation of government departments to initiatives that encapsulate the finer points of governance, such as citizen centricity, service orientation and transparency². In describing the uses to which social media can be put, the Government of India, in its document titled ‘Framework and guidelines for use of social media for government organisations’ (henceforth referred to as the Framework document) states that ‘*social media offers a unique opportunity to governments to engage with their stake holders especially citizens in real time to make policy making citizen centric*’³. With citizen centricity providing a common link, social

² <http://www.negp.gov.in/Default.aspx>.

³ Framework and Guidelines for Use of social Media for Government Organisations. Department of Electronics and Information Technology. Government of India.

media appears but as a natural extension of the more traditional forms of e-governance being encouraged by the Government of India.

Using the phrase 'digital citizen' to signify web 2.0 aware citizens, and quoting examples of the United Kingdom and Denmark, an Accenture report titled 'How social media is reinventing government'⁴, explains how there exists a 'symbiotic relationship between social media and government transparency'. Referring to a survey conducted by it, the same report goes on to say that 'Fifty one per cent of survey respondents said they are not opposed to using it to contact a government official to request a service' (emphasis added).

It is thus clear that social media and e-governance are not two unrelated developments. They both concern themselves with the same set of core goals of modern day governance.

It is however surprising, and perhaps portentous, that the Framework document released by the Government of India is silent on service delivery and transparency uses to which the social media can be put.

Social media has come of age in India. As reported by *Business Week*, India has the third largest Facebook user base⁵ with over 46 million users. It is growing at 22% every six months and it is expected that by 2015, India will top the number of Facebook users in the world. With over 15 million accounts, India is ranked sixth among Twitter users.⁶ These numbers are truly impressive, especially when it is noted that the penetration of social media such as the Facebook among internet users in India is a staggering 66%.⁷

According to Cara Pring, a social media blogger in Sydney, '*while it's common to see a slight overrepresentation of younger age groups (i.e., 18 to 34) on social media channels, in India this group represents a huge 76 percent of all Facebook users. It's clear that this age group is driving the social media revolution within the country*'.⁸ This is a very significant observation since the population of India below the age of 35 is also a high 65%.⁹ It is clear that neither this age group nor the social media can be ignored.

4 <http://www.accenture.com/SiteCollectionDocuments/PDF/Accenture-Digital-Citizen-Social-Media.pdf>.

5 <http://www.businessweek.com/articles/2012-05-31/the-future-of-facebook-is-in-india>, Accessed on September 15, 2012.

6 Geolocation analysis of Twitter accounts and tweets. http://semiocast.com/publications/2012_07_30_Twitter_reaches_half_a_billion_accounts_140m_in_the_US. Accessed on September 15, 2012.

7 <http://www.socialbakers.com/facebook-statistics/india>. Accessed on September 15, 2012.

8 *ibid* 2

9 <http://www.slideshare.net/alertpersons/population-8683426>. Accessed on September 15, 2012

How is the government in India responding to such phenomenal numbers of citizen participation in social media developments? *Facebook* and *Twitter*—the two social media leaders—appear to have found some favour with several government organisations in India. The Delhi Police Department is on the *Facebook* with over 130,000 Likes. It is on *Twitter* too. The Ministry of External Affairs *tweets* under *@Indiandiplomacy* and has nearly 40,000 followers. The Prime Minister of India's office, the Planning Commission of India, the India Post, and numerous other government bodies too have established their social media presence.

Bihar plans to use social-networking sites to popularise Asia's largest cattle fair held annually at Sonapur in the state, according to Saran District Superintendent of Police, Sujeet Kumar.¹⁰

SOCIAL MEDIA AND BEHAVIOURAL RESPONSES FROM THE GOVERNMENT

The power of social media was evident as far back as January, 2001 when thousands of Filipinos, angry that their corrupt president might be let off the hook, converged on Epifanio de los Santos Avenue, a major crossroads in Manila, in a matter of less than two hours, in response to forwarded text messages reading, 'Go 2 EDSA. Wear blk.' In the next few days, over a million people arrived, choking traffic in downtown Manila. Close to seven million text messages were sent that week. The event marked the first time that social media had helped force out a national leader. Not all stories related to social media are successful ones. The Green Movement of 2009 in Iran, the Red Shirt Movement of 2010 in Thailand are both recent examples where the use of social media could not produce the effect desired by the activists¹¹.

Perhaps reflecting such a quirky nature of the social media, the Framework document acknowledges the '*viral nature*' of the social media and the expectation from stake holders of '*instant gratification*', while, in the same breath, suggesting that '*not all posts need to be responded to immediately*' and '*escalation mechanisms*'—perhaps as a knee-jerk response conditioned by years of bureaucratic forms of governance.

To understand how the government in India might view social media and shape its behaviour, a small baseline survey was conducted by the author¹². The detailed findings of the survey are presented in the appendix. Stated briefly, the survey required the respondents to first draw up a list of showing

10 <http://www.ndtv.com/article/india/bihar-to-use-facebook-to-promote-cattle-fair-271868>. Accessed on September 25, 2012

11 Clay, Shirley. The political power of social media. *Foreign Affairs*. Jan/Feb 2011.

12 For details of the survey, please refer to the appendix.

how social media could be of use to the government. The respondents were then asked to categorise their list into the following two groups

- *Group 1:* The uses to which government bodies will be *able and willing* to put social media
- *Group 2:* The uses to which government bodies will be *unable and/or unwilling* to put social media.
- No finer distinction was attempted with respect to *able but unwilling* and *unable and willing* categories.

The results of the survey indicated that

1. The respondents were of the opinion that government bodies will be *able and willing*—(Group 1)—to put social media to use when *one-way communication* was involved. The respondents referred to this as notice-board type usage of social media. The respondents further felt that situations requiring *limited two-way communication*—such as for recording and replying to grievances related to routine public services—too belonged to this category.
2. Against Group 2, the respondents were of the view that when the issues raised in the social media related to transparency and accountability, the government is likely to be *unable and or unwilling* to put social media to effective use. It is very informative, and at once troubling, to note that the respondents placed under this group, the government's ability to put social media to effective use for moulding public opinion or when faced with the need to counter negative propaganda.

The net result to which the survey draws attention to is that government bodies in India will be putting social media to very limited use.

As illustrated below, both literature study and random review of Facebook and Twitter accounts of government bodies provide enough anecdotal examples to support the opinion of the respondents.

'Notice-board' Approach to Social Media

Mukesh Meshram, the then District Magistrate of Kanpur remarked that '*From complaints related to... garbage disposal and other civic problems, all can be posted on the (Kanpur District Administration's Facebook) account*'¹³. Likewise, a statement accompanying reporting of opening of Information and Broadcasting Department's dedicated Facebook account, reads '*The*

13 <http://www.hindustantimes.com/India-news/Lucknow/Governance-online-as-DM-asks-officials-to-join-Facebook/Article1-638722.aspx>. Accessed on September 15, 2012.

14 Government opens account on Facebook to create awareness. Economics Times. March 12, 2012, http://articles.economictimes.indiatimes.com/2012-03-12/news/31153078_1_facebook-account-digitisation-account-on-social-networking. Accessed on September 01, 2012.

government has launched ... www.facebook.com/DigitalIndiaMIB to facilitate exchange of information and clarifications¹⁴ (emphasis added).

Such limited use to which social media is being put is however not confined to India. A study involving 78 local authorities in England revealed that *'posting news stories and information (96 per cent) and promoting specific events and campaigns (90 per cent) were the most popular activities. Further, over two-thirds of authorities claim to use social media for both one-way and two-way communications while a quarter admit to using it for just one-way communication. The study goes on to state that 'Worryingly, only 9 per cent of authorities said they used social media solely for two-way communications'*.¹⁵

Spirit is Willing... or Is It?

Offering anecdotal evidence showing how government might be *unable and/or unwilling* to put social media to effective use for moulding public opinion, Shruti Pandalai of the Institute for Defence Studies and Analyses, states that *'Journalists reporting on the ground in Assam confirm that there has still been no effort from either the state government or the centre in using the social media and other forms of communication to counter the rumour mongers creating havoc in the state.'* She further adds that *'the problem seems to stem from the organisational culture and mindset, which has still not embraced the phenomenon that is the new media revolution.'*¹⁶

It is not clear if the idea of engagement with the citizens through the new media sits easily on the Indian government's shoulders. To quote Manmohan Singh, the Prime Minister of India, *'the use of social media and other modes of communication to aggravate such tension is posing a new challenge'*¹⁷. The Google Transparency Report states that the requests for content removal from the Government of India increased by 49% in July to December 2011¹⁸, compared to the previous reporting period. India was ranked number one among the countries listed, with 96 content removal requests¹⁹. Following the exodus of the Northeast Indians from other parts

15 The London School of Economics and Political Science blog. <http://blogs.lse.ac.uk/politicsandpolicy/2012/04/13/social-media-local-government-spurrell/>. Accessed on September 14, 2012

16 http://www.idsa.in/idsacomments/DontShoottheMessengerTheUnsocialStrategy_spandalai_280812. Accessed on September 14, 2012. The quote refers to the recent mass exodus of Northeast Indians from all over the country.

17 http://www.dnaindia.com/india/report_use-of-social-media-to-inflate-communal-tension-worrying-pm_1738353. Accessed on September 8, 2012. The Prime Minister was referring to the ethnic disturbances in Northeast India.

18 <http://www.google.com/transparencyreport/removals/government/> Accessed on September 10, 2012.

19 <http://www.google.com/transparencyreport/removals/government/countries/> Accessed on September 10, 2012.

of the country, the Government of India ordered blocking of more than 250 sites²⁰.

The survey conducted as part of this paper brings out the same concern when a significant majority (details in the appendix) of the respondents felt that the Indian government *will be unable and/ or unwilling to successfully use the social media for influencing public/stake holder opinion*—an area which requires adept handling of multi-way communication.

It appears that the Indian government is, on the one hand, drawn to the social media process and, on the other hand, appears unsure on how to deal with situations when the new media behaves in ways which it considers unfavourable to its interests. An ambivalence of this kind has serious implications on how social media will be incorporated into the e-governance lifecycle.

SOCIAL MEDIA AND E-GOVERNANCE LIFECYCLE

In one of its handbooks²¹, the DeitY (Department of Electronics and IT, Government of India) describes the e-Governance project lifecycle (eGLC) as having six phases.

- strategy development
- current state assessment
- future state definition
- implementation approach and sourcing
- develop and implement IT system(s), and
- operate and sustain

The first four stages are essentially *design and planning stages* while the latter two belong to the *action* phase. The results of the survey presented in this paper, when read together with commentary of experts such as those quoted above, have important implications for the use of social media in e-governance projects. The survey results suggest that governments are more likely to *prefer and succeed* in the use of social media during the later (action) stages of the e-government lifecycle—such as during implementation and post-implementation stages—than during the early, conceptualisation stages, where multiple opinions and sensitivities need to be assuaged, and where multiple alternatives need to be reconciled.

20 Northeast exodus: Government blocks more than 250 sites. <http://www.ifp.co.in/imphal-free-press-full-story.php?newsid=8773&catid=1>. Accessed on September 10, 2012.

21 http://deity.gov.in/sites/upload_files/dit/files/e-Governance_Project_Lifecycle_Participant_Handbook-5Day_CourseV1_20412.pdf

Throwing light on why this might be so, the respondents listed the following reasons why the government may be *unable and/or unwilling* to engage with the citizens effectively using the social media.

1. Lack of understanding of the nature of social media (83%)
2. Lack of knowledge of new media management (78%)
3. Fear of criticism (72%)
4. Not taking social media seriously (61%)
5. Fear of transparency (50%)
6. Insufficient time (33%)
7. *Insufficient personnel (33%)*

SOCIAL MEDIA AND IMPACT ON GOVERNANCE PROCESSES

The Framework document, which is intended to guide all government bodies in India on negotiating the developments in the sphere of social media, appears to have preferred rather simplistic and formulaic approaches. Using guarded phrases such as '*re-pronouncement of public policy*' (not pronouncement, but *re*), and undefined words such as '*marginalised*' (economically marginalised? religiously marginalised? digitally marginalised?...), it appears to be suggesting tackling the unknowns, the complexities, and the quirkiness of social media more through hope than actionable substance.

What is so unique about social media that specialised skills and new forms of behavioural responses are required to put it to a specific use? The answer to this question has many facets to it, but for the purpose of this paper, only two are being highlighted.

FROM ACRACY OF MANUAL SYSTEMS TO THE PROFLIGACY OF CONNECTEDNESS

For decades, the government in India has been used to a system of manual records and manual means of planning, assessment and control. It has only been during the course of the last decade or so that the government has opened up to ICT and introduced limited amount of purpose built/custom designed IT solutions—what has come to be recognised as e-government solutions.

The key point is that because of their largely custom designed nature, the e-government solutions, as they exist today, permit governments to introduce into the sphere of public service delivery, a measure of structure, order, openness and control *that it desires*. As opposed to such organised e-government solutions, the social media presents to the government a

shockingly disorderly landscape, with no definable boundaries, controls, directions or purpose. Indian government—as perhaps most governments worldwide—are ill equipped to deal with profligacy which comes from the connectedness of the current forms of social networks and media.

The difficulty with the domain of social interaction and networking formation—especially the digital variety—is that even what appears evident and innocuous pose complex challenges. Take for instance the narrative contained in the Framework document where it is acknowledged that the social media platform ‘*offers the ability to connect with each and every individual*’. It goes on to suggest that ‘*such an interaction also enables the marginalised to participate in discussions and present their point of view, thereby improving the political position of marginalised or vulnerable groups*’²². What this rather obvious observation fails to take into account is that the process of individualisation ‘*attacks the traditional supports and agencies that previously aided the individual in constructing and fixing his or her identity*’²³.

Therefore, in order to make any sense of the complexity of the social media, there is no alternative except for government bodies to train adequate number of personnel in specialised skills. This hardly seems to be the case however. As Shruti Pandalai reports, ‘*the NTRO (National Technical Research Organisation), the apex intelligence body under the National Security Advisor, still does not have an official mandate of a monitoring agency. Ironically, it has only 50 people to handle media monitoring for the entire nation*’²⁴.

The Apparition—Flux Syndrome

Without going into reasons for the same, it may be said that non-social media based e-government solutions deal with stake holders who—unless proven otherwise—are real. In contrast, social media, in its current form, is an apparition—unreal unless proven otherwise. Facebook, in its recent quarterly return to the US regulators confirms this view when it concedes that over 85 million accounts registered with it are fictitious.²⁵ A *New York Times* article suggests that over 70% of Barack Obama’s 19 million Twitter followers—this is a staggering 13 million plus accounts—are fictitious²⁶.

22 *ibid* 22

23 Gane, Nicholas. *The Future of Social Theory*. Viva-Continuum Edition. Chapter 2, titled ‘Zygmunt Bauman: Liquid sociality’.

24 *ibid* 16

25 <http://www.guardian.co.uk/technology/2012/aug/02/facebook-83m-profiles-bogus-fake>.

26 http://www.nytimes.com/2012/08/23/fashion/twitter-followers-for-sale.html?_r=3&adxnnl=1&adxnnlx=1345810035-hPtdwhoE1D2MaX4UUGwl9g.

If the government decides to engage with citizens in a multi-way basis to shape and fine tune its policies and services using the social media, not only do they have to factor in ‘apparitions’ (non-existent citizens, duplicate accounts, and so on), they will also have to contend with a process of opinion formation over the social media that is constantly in a state of flux.

There are at least two reasons for the ever shifting nature of opinion formation over the social media. One, virtual identities that exist on the social media thrive on their ability to express unfettered opinions. Given this predisposition, *non-socially predicated*²⁷ opinion forming processes repulse ‘all efforts at organisation and structure, which can be the enemies of freedom, creativity and adaptability’²⁸. Two, since there exists, on most social network forums, an absence of nodes exercising restraint over the nature and intensity of opinions expressed therein, either the cycle of *appearance–diffusion–contraction* of opinions are completed in quick time, or, the process simply loses steam at any stage in the cycle for unpredictable reasons.

Such unpredictable and/or bursty nature of opinion formation over the social media ordains that any response from the government too should match, in near real time, the speed of formation and diffusion of opinion, if it is to effectively influence the opinion of the stake holders. Indian government, ‘stuck in the paradigm of colonial era mindset’²⁹, hardly appears prepared for the task. This is evident from the Framework document where it is suggested that ‘*not all posts need to be responded to immediately*³⁰’ when, as the experience of Philippines mentioned earlier suggests, a revolution can be triggered in a matter of less than two hours.

CONCLUSION

The paper seeks to carry out preliminary examination of the interplay between social media and e-governance. In its examinations, it is guided by a set of three questions. It has also been guided by the results of a very focused survey on the subject, undertaken on a small scale.

The paper dwells on tension between two thoughts—one, given that social media has already amply demonstrated its ability to mobilise and channel the voice of sections of society around their respective areas of interest, what e-participative/e-democratic pressures might it exert on the government and two, given that social media is yet to mature as a risk free

27 This is also referred to as emergent behaviour by sociologists.

28 Gary T Marx and Douglas McAdam. Collective behavior and social movements: Process and structure. <http://web.mit.edu/gtmarx/www/cbchap1.html>.

29 *ibid* 16

30 *ibid* 22

medium of interaction, how far is it prudent for the Indian government to use it as a channel for its e-governance initiatives.

In this connection, the experience of the Egyptian government may be quoted. The blocking by the Egyptian government of websites and servers which were critical of the government resulted not in the elimination of opinion formation on the virtual front, but in invigorating the hidden, parallel world of *Tor* and *Freenet* based social networks³¹.

The Hindu in its article on Sam Pitroda's effort at using Twitter to reach out to the citizens³² opined that '*Despite his reputation as the government's tech czar, Mr. Pitroda ...often seemed uncomfortable with the medium*'. It further went on to state that '*Mr. Pitroda seemed to be ducking controversial topics including social media censorship, privacy concerns and technology timelines*'. This perhaps best sums up the current status of, and general views about the behaviour of social media in a government setting.

APPENDIX

The document 'Framework and guidelines for use of social media for government organisations', released by the Department of Electronics and Information Technology, Government of India contains a good set of non-detailed guidelines.

In order to seek an *independent set of answers* to some of the issues taken up by the Framework document, a small survey was conducted. Given the specialised nature of e-governance, the survey intended to seek the opinion of a small, representative set of stake holders. Excluding rejections, 18 responses were received with the following breakup.

1	Government officials (responding in their individual capacity)	2
2	Students pursuing postgraduate level professional courses	6
3	Senior private sector executives currently in service	4
4	Retired employees (private sector and public sector undertakings)	6
	Total	18

Questions marked * are compulsory

The responses received—where ever appropriate—are shown in percentage terms

31 http://www.boston.com/news/world/africa/articles/2011/01/30/mass_groups_software_helps_avoid_censorship/

32 <http://www.thehindu.com/news/national/twitterati-hail-pitrodasams-press-meet-as-welcome-first-step/article3936055.ece>

- 1 Please tell us your name
This will ONLY be used for contacting you when the compendium is published
- 2 Your email id
This will ONLY be used for contacting you when the compendium is published
- 3 Your occupation*
 - O government officials
 - O Senior private sector executives currently in service
 - O Students pursuing post graduate level professional courses
 - O Retired employees (private sector and public sector undertakings)
- 4 The following are a few popular social networking applications. Please indicate your level of familiarity with them*
Enter 1, 2 or 3 against each option. [1] Current user; [2] Have heard but not used; [3] Unfamiliar.

	[1]	[2]	[3]
Facebook	50%	60%	–
Linkedin	55%	23%	22%
Twitter	60%	40%	–
Blog	33%	67%	–
Orkut	45%	30%	25%
Diaspora	5%	5%	90%
Google+	40%	20%	40%
Youtube	100%	–	–

- 5 If you are familiar with a social media tool not listed above, please share the name[s] with us *[No answers were received]*
- 6 IF you use social media, do you maintain more than one 'account' on ANY [Facebook / Twitter / Google+ etc] of them? [State yes, no or not applicable]
 - Yes – 22%
 - No – 78%

In your opinion, what are the uses to which social media might be put to use by the government in India?

- 7 *With a view to eliciting original answers, the respondents were required to prepare their own list. Where ever possible, similar ideas expressed differently have been grouped together. Response received against each idea is shown as %.*
 - 1 For providing electronic (e-governance) services 78%
 - 2 As a 'notice-board' for sharing information (GOs, announcements, government advertisements etc) 67%
 - 3 For influencing citizens'/ stakeholders' opinion 61%
 - 4 For obtaining feedback on *current* policies/plans/programmes of the government 56%
 - 5 For being transparent and accountable 50%
 - 6 For promoting e-democracy and greater citizen participation 44%
 - 7 For obtaining feedback on *future* policies/plans/programmes contemplated 22%

Classify the list of uses into those that the government might be able and willing [Group 1] to adopt and those that the government might be unable and/or unwilling [Group 2] to adopt

- 8 *With a view to eliciting original answers, the respondents were required to prepare their own list. Where ever the ideas stated were similar but expressed differently, the same have been combined under one expression. Response received against each idea is shown in bold in brackets.*

		Group 1	Group 2
1	For providing electronic (e-governance) services	72%	6%
2	As a 'notice-board' for sharing information (GOs, announcements, government advertisements etc]	67%	–
3	For influencing citizens'/ stakeholders' opinion	17%	44%
4	For obtaining feedback on <i>current</i> policies/plans/ programmes of the government	44%	12%
5	For being transparent and accountable	44%	6%
6	For promoting e-democracy and greater citizen participation	33%	11%
7	For obtaining feedback on <i>future policies/plans/</i> programmes contemplated	16%	6%

In your opinion, what might be the reasons for the government not being unable to use social media effectively, with respect to Group 2 items above?

- 9 *With a view to eliciting original answers, the respondents were required to prepare their own list. Where ever possible, similar ideas expressed differently have been grouped together. Response received against each idea is shown as %.*

1	Lack of understanding of the nature of social media	83%
2	Lack of knowledge of new media management	78%
3	Fear of criticism	72%
4	Not taking social media seriously	61%
5	Fear of transparency	50%
6	Insufficient time	33%
7	Insufficient personnel	33%

Harish P Iyer, Fellow Member of the Institute of Chartered Accountants of India, Co-ordinator of the first, full-time executive programme on e-Governance [eGPX] jointly offered by DeitY, NISG and TAPMI, e-mail:pharishiyer@gmail.com

Mithila Harish is an Online Journalist with background in Engineering and Economics

Thirty Years of e-Governance in CSI

D V R Vithal, R K Bagga and K S Vijaya Sekhar

OUR FOREFATHERS' DREAM FOR INDIA

Our forefathers gave their all to win political freedom for our country. Their dream of an India in which the poorest of the poor would feel that they are living in their own country and in whose making they have an effective voice; where women will have the same rights as men—neither exploiting nor being exploited; which will have the smallest army and no police, but only *santhi sainiks*, remains largely just that—a dream. Unemployment, corruption, gender and caste insensitivity are major problems that beset our country. Another fundamental problem is land-ownership or lack of ownership of it. People in rural areas waste their energies as they have no regular and fulltime work. Unemployment and underemployment bring about physical deterioration, and undermine mental and physical capacities. The absence of opportunities for village communities to develop their social, economic, political and cultural life in accordance with their own ideas and aspirations, results in the increasing authority of the state. Ineffective governance, in turn, breeds corruption. A strong *Jan Shakti* will keep government power in balance. To expect everything to be done by the government is very wrong, and even dangerous. Recent agitations for the Lok Pal Bill by Anna Hazare brought to light the weakness of our present political dispensation. The effort taken by our legal and parliamentary democracy in starting serious investigations against the powerful political/corporate lobby is yet to yield results. In such a scenario, the question to our nearly 50 years old professional society, the Computer Society of India (CSI), is what is its contribution to governance in general and e-governance in particular by using information and communication technology (ICT) for the populace?

INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) FOR THE TRANSFORMATION OF INDIA

The social and geographical distance between sections of the Indian population is being rendered meaningless by new information and communication technologies (ICTs). The old dichotomies of *north and south* are being replaced by *fast and slow* and *empowered and unempowered*. The opportunities arising out of ICTs are immense and, in convergence with a visionary approach, political stimulant and right value framework, can secure considerable gains toward a sustainable human development. The

danger is that countries that fail to use these technologies to their advantage will fall further behind, what is popularly termed by Gartner Inc. (a leading information technology research and advisory company) as the Digital Divide. The political negative impacts of not using ICTs—upon economies, economic decision making, networking, advocacy and empowerment potential to civil society groups—are the major areas of serious concern to CSI.

With the enactment of the IT Act and the Right to Information Act, the necessary framework for supporting the use of ICT to improve the quality of life of common citizens has been set up in India. The freedom of the media and press enables free expression to be encouraged at all levels. Deregulation can help free and fair information to flow effectively to civil society. Support to enhancing such flows to the most vulnerable and marginalised groups should be given priority. Non-government organisations (NGOs), civil society organisations (CSOs), community development officers (CDOs) and society can effectively get their voices heard, and share knowledge and experience in managing affairs of governance. The convergence of internet, radio and TV offers new opportunities for strategic donor support to key intermediaries that develop pro-poor content and who inform civil society. Because of their potential to make a difference, support for developing pro-poor media content on new ICTs should not be allowed to wane. Poverty excludes the underprivileged from the most basic of ICTs. Governments and donors must support the development of pro-poor strategies that actively promote social inclusion and social equity.

THE ROLE OF CSI

The Early Years (1965–1980): The Computer Awareness Era

When the Computer Society of India (CSI) was formed in 1965 due to the vision of stalwarts like R Narasimhan (first president of the society) and A Balasubramanian (first secretary), it was the sole professional body in computers in India. CSI was always in the forefront of spreading computer awareness among users community through its members. All chapter and student branches were duty bound to conduct professional activities in spreading computer culture among professionals. Computer science departments in IITs and universities played a major role in ensuring that this essential knowledge of first generation computers was not missed in India, in spite of the high cost and difficulty in importing computers. There were regular CSI courses for banking, insurance and other private sectors, as a prerequisite for their in-house competence building. The CSI Directorate of Education at Chennai played a major role in conducting regular examinations to encourage computer professionals to upgrade their skills in system analysis and design of computer based systems using upcoming programming languages.

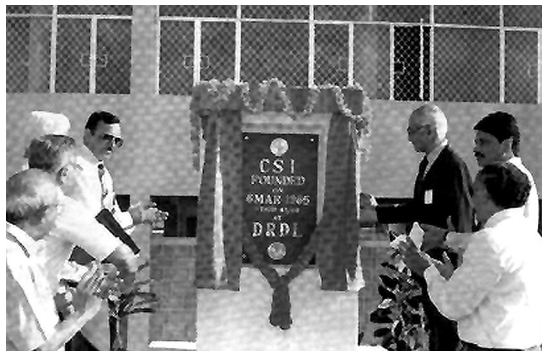
The Last 30 Years (1980–90): The Computer Education Era

The Department of Electronics (DOE), a prime agency in the Government of India was made responsible for the spread of computerisation in the early 1980s. One of the major handicaps the department felt in fulfilling their responsibility was the non-availability of computer-trained manpower to undertake various projects for utilisation of computers in the government sector. CSI was called upon to come up with a scheme to utilise the expertise available in the private sector for training working level people, both in the government and private agencies. It, therefore, conceived a unique scheme called the Department of Electronics Accreditation of Computer Courses (DOEACC), which made a tremendous impact in the initial computerisation of all agencies in India, under the leadership of Late Brig. V M Sundaram, one of the past presidents of the society.

In 1988, a Working Group of DOE with representatives from CSI was set up to go through the details of the manpower requirements in the computer area. They made the following major recommendations:

1. The existing government/aided institutions will not be able to meet the large manpower requirements through formal channels due to shortage of qualified teachers, financial constraints and limited resources.
2. The private sector can play a major role in computer training to fill this gap, as it has the necessary competence, financial resources and adaptability to undertake changes in the curriculum, based on job requirements.
3. The following four levels of courses are to be started for all categories of computer manpower required:
 - i. 'O' Level Foundation Course for programmers at the assistant level
 - ii. 'A' Level Advanced Diploma Course for programmers
 - iii. 'B' Level Course for system analyst/software engineers
 - iv. 'C' Level Master's Course for system managers

These recommendations were duly accepted by the DOEACC scheme under the aegis of the All India Council of Technical Education (AICTE) and DOE was started in 1990 to conduct these examinations in consultation with professional bodies. The Computer Society of India (CSI) and the Institution of Electronics and Telecommunication Engineers (IETE) were selected to conduct various examinations for these courses, once the students have undergone the necessary training. CSI looked after O, A and B levels, whereas IETE(I) helped in C level courses. DOE also approved a scheme where various private institutions were accredited, based on their competence for conducting computer-based training for various levels of courses. A Screening Committee of senior computer professionals from CSI was set up to carry out a thorough inspection, before giving provisional accreditation to these private institutions. Over 1000 institutions in all states in the country took part in this innovative scheme of generating trained manpower, utilising the hardware and software available with CSI which provided the main faculty from its large pool of



CSI Founder President, the Late Professor R Narasimhan, unveiling the plaque on March 6, 1991 at DRDL, Hyderabad (then CSI Registered Office) to mark the Silver Jubilee of CSI.

members in various chapters. The DOEACC scheme is still being maintained by the Department of IT, Government of India under DOEACC Society.

1990–2000: Computer in the Government Era

The Government of India formed a special committee under Late Dr P P Gupta, Past President, CSI and Secretary of DOE to recommend suitable actions for spreading computer culture in India. A policy was framed in 1994 and the committee recommended undertaking Project INTENT—Information Technology for National Transformation. The policy focused on application development, infrastructure development and manpower development, and made the following specific recommendations for the government, the industry as well as CSI.

Actions by the Government

- Support setting up, funding for COMPITANT (Commission for Promotion of IT for National Transformation)
- Treat IT on par with infrastructure industries
- Create telecommunications infrastructure—to begin with this could be accessible from all district headquarter towns and industrial growth centres.
- Remove constraints on interconnection of public/private networks
- Promote use of project management/monitoring tools, electronic mail, workflow automation, computing in local languages
- Set up a national body to oversee IT education, evolve standard courses, bring together expert groups to set syllabi, liaise with industry to fund training facilities, ‘can’ training material, get case studies prepared—it could perhaps be part of COMPITANT
- Promote venture capital funds for software development
- Fund and sponsor technology development projects

Actions by Industry Associations: CII, FICCI, ASSOCHAM, Chamber of Commerce, MAIT, NASSCOM, IETE, IE (I), NACT

- Re-examine role of in-house IT departments—departments need to have a business mission
- Support setting up, funding for COMPITANT
- Cooperate with CSI to institute National IT Application Awards
- Develop IT awareness programmes for telecasting; arrange sponsorships; conduct seminars
- Sponsor the effort of setting up a national database for electronic access

Actions by the Computer Society of India

- Set up COMPITANT—this could be funded by the industry, government, CSI.
- Institute National IT Application Awards
- Set up an inter-disciplinary group to prepare the Annual Technology Forecast
- Set up technical committees to identify IT standards to be followed
- Prepare standards for electronic data interchange (EDI) etc.
- Develop IT awareness programmes for telecasting; arrange sponsorships for conducting seminars, conferences and tutorials
- Liaise with the government and funding agencies to fund technology development projects
- Set up a national body to oversee IT education, evolve standard courses, expert groups to set syllabi, liaise with industry to fund training facilities, 'can' training material, get case studies prepared—it could perhaps be part of COMPITANT

CSI 1995: Issue Process Action Agenda

By the 1990s, advancement in information and communication technology (ICT) had started impacting all aspects of life worldwide. It was changing the way governments functioned and their interface with citizens. In spite of all efforts to the contrary, a worldwide Digital Divide started appearing, especially in the developing countries. e-Governance aims at transparent, SMART (simple, moral, accountable, responsible and transparent) with seamless access, secure and authentic flow of information which crosses inter-department barriers and provides a fair and unbiased service to citizens. ICT was increasingly being used by governments to deliver services to citizens at convenient geographical locations. The Computer Society of India was the most popular platform during this decade, where thousands of computer professionals from all walks of life would participate in its annual convention, and share their expertise for improving computer applications in all areas including the government sector. In one of its annual conventions—which was held in 1995 at Hyderabad (CSI95)—a special effort was made to discuss the issues facing computerisation of the country under the following three selected heads:



Leading specialists in the Session on Action Agenda during CSI95— (Seated left to right) Professor P V S Rao, TIFR, Shri N Vittal, Secretary, DOE, Shri F C Kohli, TCS, Late Dr P P Gupta, CMC; (Standing) J A Chowdary, STPI, Dr Shridhar Mitta, WIPRO, Late Shri Dewang Mehta, NASSCOM, Dr Gopal Rao, ECIL, Ashok Agarwal, CSI and Brig. R K Bagga, PC Chair CSI95.

1. Will software growth and exports continue?
2. Will hardware industry survive?
3. Manpower in IT: Is quantity the answer?

In the panel session of Action Agenda, the participants made the following major recommendations for implementation of government policies in India.

1. Link every village to the internet.
2. Start the National Identity Card Project
3. Automate land record registrations
4. Implement FAST transit systems
5. Consolidate a national database of all IT initiatives

Even in 2012, we see how important these policy directions are for the Indian government. These policy guidelines were regularly reviewed by the Computer Society of India in various forums to make suitable corrections depending on the availability of resources and trained computer manpower. Somehow, in the later part of the decade, CSI remained in the background and newer bodies like NASSCOM, MAIT and CII took the lead in government sector computerisation, leading to the formation of a National Task Force on Information Technology and Software Development in 1998. Its 108 point Action Agenda, mostly based on CSI policy recommendations, set the trend for the IT revolution in India!

2000–2010: The Internet and e-Governance Era

With rapid computerisation, particularly in major centres like Bangalore, Mumbai, Delhi, Chennai, Kolkata and Hyderabad, the computer industry

was transformed into Information Technology Hubs for undertaking major international projects which meet the requirements of multi-nationals by extensive outsourcing. It was during this period that a number of state governments came forward with their IT policies to attract foreign direct investment (FDI), thereby bringing in much needed foreign exchange. The Government of India's liberalisation policy launched during 1991–92 by Dr Manmohan Singh, the then Finance Minister, set the trend for the explosive growth of the IT sector in the country. With availability of the internet, e-commerce applications started taking shape, even in India, and required a National Policy Framework in the form of the IT Act 2000 (amended in 2008) to ensure proper nurturing of this important technology in India. The Right to Information (RTI 2005) Act gave the common man a long-pending tool for finding out the progress of various cases in the government domain. CSI with its over 50 chapters, 200 student branches and over 20,000 members played a major role in ensuring that their voice was heard and that India did not miss the IT Revolution like it did the Industrial Revolution! Many CSI chapters conducted regular e-governance events to benefit professionals working in the government sector and bridge the gap between industry and government.

CSI Special Interest Group on e-Governance

CSI, under its revised Constitution, set up a Special Interest Group on e-Governance (CSI SIGeGOV) in 2007, to address some of the major issues which still remained unsolved in the later half of the last decade. The objective of e-governance initiatives was to improve the reach, make services more transparent and reduce response time by reducing costs. In a developing country like India, one of the important results of an ICT enabled SMART government was reduction in corruption. e-Governance empowers citizens and increases transparency. ICT applications in e-governance define a major share of IT spending worldwide, and it is crucial to address the key issues of reducing the Digital Divide, as well as corruption. A key focus area of this SIG was to consolidate the e-governance initiatives in different states and ensure that experiences and best practices are shared to benefit all, with its regular events.

Major Activities of CSI SIGeGOV

- The website for the Special Interest Group (www.csi-sigegov.org) was launched to act as a knowledge sharing portal for all e-governance initiatives in India. All major activities including the e-Governance Awards database is maintained and updated here.
- Based on inputs from the Executive Committee, research work was undertaken with NISG and IIIT-H on the methodology for evaluation of e-governance projects, to be used for e-Governance Awards.
- Concept of field visits and analytical hierarchy process (AHP) was implemented to make the presenting of awards process transparent, unbiased and thus acceptable to government officials for sharing their project.

- CSI–Nihilent e-Governance Awards (started since 2002) was conducted on a yearly basis with financial support from M/s Nihilent Technologies, Pune and extended from including state, industry and projects, to cover departments and districts also. Since industry was covered by other CSI Awards, these were dropped from the e-Governance Awards list.
- Major efforts in knowledge sharing was initiated with the states of Andhra Pradesh (2009), Madhya Pradesh (2010), Gujarat (2011) and Chhattisgarh (2012) to encourage knowledge sharing of e-governance initiatives at the grass-root level, by organising Knowledge Sharing Summits.
- International research was conducted with University of Tampa, Florida, USA to compare citizen services in US and India (e-Seva of Andhra Pradesh).
- It interacted with the International Conference on e-Governance (ICEG) since 2007 by holding joint conferences—at University of Hyderabad (2008), IIT Delhi (2009), IIM Bangalore (2010), Institute of Management Nirma University, Ahmedabad (2011) and now School of Communication and Management Studies, Cochin (2012).

CSI–Nihilent e-Governance Awards: Documentation of Case Studies

CSI, along with Nihilent Technologies started a series of awards at the national level to encourage government departments by giving annual awards to ones following best practises. In this process, all the nominations, which are shortlisted for the final phase are documented and published—this has been happening every year since 2006. The idea of this publication is to share the best practices among various government agencies by providing them a good resource. From 2011 onwards, SIGeGOV has started a new award called ‘Sustainability Award’ for those projects which had already won awards in earlier years.

The following six publications of SIGeGov covering case studies were released during the annual convention of CSI and are available for free download to be used by all:

1. *Widening e-Governance Canvas: Selected e-Governance Initiatives in India* edited by Surendra Kapoor, G S N Prabhu and Nityesh Bhatt. ICFAI University Press. 2011.
2. *Enablers of Change: Selected e-Governance Initiatives in India* edited by Piyush Gupta, R K Bagga and Ayaluri Sridevi. ICFAI University Press. 2010.
3. *Fostering e-Governance: Compendium of Selected Indian Initiatives* edited by Piyush Gupta, R K Bagga and Ayaluri Sridevi. ICFAI University Press. 2009.
4. *Transforming Government: e-Governance Initiatives in India* edited by R K Bagga and Piyush Gupta. ICFAI University Press. 2008.
5. *Compendium of eGovernance Initiatives in India* edited by R K Bagga and Piyush Gupta. Universities Press. 2007.
6. *eGovernance Case Studies* edited by Ashok Agarwal. Universities Press. 2006.
7. *The State, IT and Development* edited by R K Bagga, Kenneth Keniston and R R Mathur. SAGE Publications. 2005.

The 5th ICEG in 2007 at Hyderabad

The International Conference on e-Governance (ICEG) was founded at IIT Delhi in 2003 to address the growing need for furthering knowledge in e-governance by inviting researchers to share their work. It is organised under the umbrella of the International Congress of e-Government (ICEG) (www.iceg.net) which is a forum for the advancement of knowledge in the discipline of e-governance and promotion of the same at various levels of governments, across the globe. The 5th ICEG was hosted by CSI SIGeGOV at the University of Hyderabad in December 2007. It was inaugurated by the then Chief Minister of Andhra Pradesh, Late Mr Y S Rajasekhara Reddy and held to ensure that a structured methodology of issue process is followed in the area of e-governance in particular socio-political areas.

The main highlight of this conference was the release of a document containing 'issues' that required immediate attention of the policy makers. This was made by taking inputs from various stake holders. A set of recommendations and an action plan emerged, which was shared with all stake holders. A structured *Issue Process Methodology* was followed for this purpose. Four critical issues were identified and specific recommendations were made for each of the following issue:

- Building capacity for implementation
- Management of the complete project lifecycle
- Enterprise architecture model, integration and inter-operability
- Socio-political implications of e-governance

SIGeGOV Knowledge Sharing Summit, Hyderabad (June 2009)

The first Knowledge Sharing Summit (KSS) was made possible with major support from the Principal Secretary, Shri Ajai Mishra, IAS and Additional Secretary, Shri Suresh Chanda, IAS Department of IT&C, Andhra Pradesh. The presidential address was delivered by Shri S Mahalingam, President CSI. In his address, he elucidated the evolution of CSI and the objectives of establishing its SIGeGov head quarters in Hyderabad. He also set the tone for CSI to support the National e-Governance Plan.

The two-day programme was organised as four sessions on 'e-Governance Applications' and a special session on 'e-Governance-Appropriate Technology' followed by a panel discussion on 'e-Governance Initiatives: Implementation Issues'. During the four sessions on 'e-Governance Applications', many state government leaders shared the e-governance initiatives taken up by their respective states. The state project heads came forward to share their knowledge and experience for the replication of their respective projects with the participants of other states. During the summit, the knowledge on a number of e-governance projects were shared by the respective state governments for the benefit of the delegates, who were all invited at the host states' cost.

SIGeGOV Knowledge Sharing Summit, Bhopal (June 2010)

CSI SIGeGOV, in collaboration with the Department of Information Technology, and MAP_IT, Government of Madhya Pradesh, conducted the second successful Knowledge Sharing Summit on e-Governance in June 2010 at Bhopal, Madhya Pradesh. The inaugural session was presided over by the Hon'ble Minister IT, Shri Kailash Vijayavargheya, where Professor. P Thrimurthy, the then President, CSI and Dr Ashok Agarwal, the then Chairman, CSI SIGeGov took part in the deliberation, including inaugurating an exhibition of e-governance solutions from government and private organisations. The summit with the theme 'Transforming Government and Enabling Citizen', was attended by a large number of participants from different states, including some IT Secretaries. Shri S S Mantha, Chairman, AICTE, as well as the Hon'ble Justice Shri Rajesh Tandon, Chairperson of CAT also shared their views on ICT in e-governance. Mr Anurag Jain, Secretary IT, GoMP shared the status of e-governance initiatives in Madhya Pradesh. The Knowledge Sharing Summit concluded with a special IT Awards ceremony conducted by the Government of Madhya Pradesh, where all award winning project leaders were honoured by Shri Avani Vaish, Chief Secretary, GoMP and the Hon'ble Justice Rajesh Tandon.

Knowledge Sharing Summit (KSS) and ICEG held at Ahmedabad (October 17–18, 2011)

In a unique experiment, an integrated programme of the Knowledge Sharing Summit and the International Conference on e-Governance was launched at Ahmedabad on October 17, 2011 by Shri Narendra Modi, the Hon'ble Chief Minister of Gujarat. In the inaugural session, Shri R Chandrasekhar, IAS delivered the keynote address stressing the need for an innovative approach in India to derive the maximum benefit from the telecommunications growth and ICT applications in e-governance. He also highlighted recent government regulations including the NTP (National Telecom Policy) 2011 and the updated IT Policy, apart from the Delivery of Services Rules being released shortly. The Chief Guest, Shri Narendra Modi, in his usual style covered the meteoric rise of the state of Gujarat resulting from the use of ICT for providing efficient services to all its citizens. He shared his experiences of the last decade in applying ICT in improving the e-governance scenario in the state of Gujarat. As a recognition, CSI President, Shri M D Agarwal and Past President, Professor P Thrimurthy honoured Shri Narendra Modi with a citation and the plaque of the newly instituted 'CSI-eRatna' Award. Chief Secretary Shri A K Joti welcomed the guests including the President, CSI and Chief Minister. Shri Ravi S Saxena's efforts in ensuring a high quality of participation from the government, academia and industry was highlighted by R K Bagga, CSI SIGeGov Chair.

With the theme, 'Government Transformation: Agenda for eGov 2.0', four plenary sessions covered 'Inclusive Growth', 'Restructuring Governance', 'Citizen Empowerment and Technology Management' during the two-day



Chairman, SIGeGov highlighting KSS 2011 and ICEG programme during the 3rd Knowledge Sharing Summit and the 8th International Conference on e-Governance during the inauguration on October 17, 2011 at NIRMA University, Ahmedabad. The Hon'ble Chief Minister Narendra Modi inaugurated the Conference and was seated on the dais.

KSS-ICEG 2011. Over 400 delegates from the government sector, private organisations and academia participated in the deliberations of this unique event held at Ahmedabad. In 4 parallel tracks, ICEG-contributed papers from over 60 participants and from 9 countries were presented in implementation, emerging technologies and policy practices chaired by distinguished professionals from CSI. In parallel Knowledge Sharing Sessions, IT secretaries from a number of states including Maharashtra and Tamil Nadu shared their best practices for the benefits of all. In a special session exclusively devoted to the practices being followed in Gujarat chaired by Dr Viresh Sinha, Addl Chief Secretary and moderated by Dr Neeta Shah, the unique experiments in various departments including healthcare, commercial taxes, PDS and education were shared. In the concluding session, Dr Ashok Agarwal and R K Bagga highlighted the need for strengthening the electronics, hardware industry by making affordable tablets like Akash for use by the common citizen. In the valedictory session of the conference, a recommendation was made for CSI to undertake a special study for inclusive growth and restructuring of e-governance 2.0 era involving the Government of Gujarat.

Where Do We Go from Here?

- CSI can introduce courses on e-governance at the national level for various management colleges. There is an urgent need to set up a centre of excellence in e-governance to undertake curriculum standardisation for the government sector.

- CSI can also play an advisory role to bridge the gap between central and state governments in implementing various citizen centric services.
- Governments should offer consultancy for senior CSI Fellows to look after various welfare programmes in implementation phases at the national level (like Nandan Nilekani).
- A roadmap is to be designed for every 10 years of e-governance activities under the CSI banner.
- Any government policy matter includes some kind of evaluation or pilot study—CSI can take this up with the help of its student members. It can then come out with a final plan for implementation at the national level. A three-tier architecture is to be maintained for any policy related matters and society members are to be involved.
- Moral and financial support is to be provided to e-governance professionals at the chapter and student branch level.

The Role of Professionals in CSI

CSI professionals must monitor the development of technology and its use, and if necessary influence it. Radio and TV were hailed to be a boon for education and culture; instead it became a boon for marketing. Web and networking, if allowed, will follow suit. Professionals need education that includes not only technology and its uses, but also its history and social effects. Authorities will press for benefits in property. Professionals must press for benefits in personality. The willingness to part voluntarily with expertise, time and money for a social cause has great moral and psychological value. e-Governance provides an opportunity to CSI professionals to use their expertise for the betterment of citizens. It should not be that the hearts of the 'haves' are poor. We are in the business of creating the future. ICT has provided a quantum in providing affordable broadband connectivity using mobile devices. We must pursue this with both hope and fear—hope that it will be used for public good, and fear that it will be used for the destruction of all that we cherish. *Sarva Udaya*, empowering all, will ensure *Desh Udaya*, empowering of our country to rise to dizzy heights and fulfil the dreams of our forefathers.

D V R Vithal, CSI Fellow, email: vithal.dvr@gmail.com

R K Bagga, Advisor, Outreach Division, IIIT-Hyderabad, email: rbagga@iiit.ac.in

K S Vijaya Sekhar, Research Associate, IIIT-Hyderabad, email: vijay@iiit.ac.in

Section II

**e-Governance Success Stories—
State Level Initiatives**

Recognising State Level Initiatives for CSI–Nihilent State Category of Awards:

A brief note on the approach adopted

Harish P Iyer

At a micro level—at the level of a project or a department for instance—e-government initiatives have fairly discernible boundaries of action, outcome, benefits and drawbacks. e-Government outlook at a macro level—at the level of a state—however presents a level of complexity which is not a mere aggregation of the complexities of individual, lower level projects and programmes. Arguably, macro level e-government decisions are in fact decisions centering around issues of *governance*.

The pulls and pushes of governance are never easy to come to terms with. It is however when mantled in their electronic—the e-governance—form, that they fall into a far more sensitive caldera of dilemma. The questions before a state when faced with e-governance related decisions are as complex to fathom as they are difficult to answer. How much should a state invest in e-government programmes, what form should the programmes take, how should a state ensure that the speed of delivery of services which ICT promises does not, at the same time, with equal speed in the reverse direction, widen the chasm of the Digital Divide, to what extent should the private sector be encouraged through ICT policies and directives to partner with the government—the list of questions is, indeed long.

Perhaps mirroring this difficulty is the challenging task that the CSI–Nihilent Awards Committee faces every year when assessing the performance of states. What however need special mention with respect to the 2011–12 edition of the state category of awards are two significant decisions of the Awards Committee.

The first was the decision to form an expert task group to rework the nomination template and processes for the state awards. The second was the decision to invite only those states to participate in 2011–12 which had not won the state category of awards in the past.

REPHRASING THE NOMINATION PROCESSES

As acknowledged earlier, understanding the role of a state in the promotion of e-governance within its borders is a complex task. In the previous

years, in order to form an opinion about the performance of states, a fairly elaborate but mostly descriptive nomination form and related assessment criteria were in use.¹ With a view to simplifying this and to make it more crisp and focused, a task force was formed under Dr Ashok Agarwal². The team was entrusted with the task of revamping the entire process relating to recognising states for CSI-Nihilent e-Governance Awards.

The process commenced with one of the senior core members of the Awards Committee drawing up a forty-point parameter list which offered excellent coverage of the e-government landscape and included diverse factors ranging from establishment of citizen contact centres to horizontal transfer and replication of ICT solutions. In order to cull out a smaller set of representative factors from this and other similar lists drawn up in parallel, the team formulated a set of guidance questions.

The guidance questions attempted to grapple with extremely complex issues such as an ideal definition of 'success' at state level, the manner in which critical success factors that an IT Secretary of a State might hold dear might need to be reconciled with those which common citizens might favour and so on. Even on the issue of outlays and funding models, there were numerous questions that the task force set out to answer—questions of the likes of relative merits of studying absolute figures compared with planned and actual outlays modified for sectoral preferences of a state, its demographic profile etc.

The State Awards for 2011–12 is based on the outcome of this exercise³. It may be noted that states which submitted their nomination details using the revised, simplified and yet very focused template, were requested to provide additional details through email follow-up.

Given the premier position that the State Government Awards holds within the CSI-Nihilent e-Government Awards hierarchy, and given the mammoth task that the team set out to do, this initiative of reformulating the template for assessment of performance of states was expected to be an ongoing task.

NARROWING OF THE QUALIFICATION CRITERIA

As might already have been inferred by the reader, the second significant decision of the Awards Committee with respect to the state category of

1 Please refer to the compendium of shortlisted nomination papers of previous years published as part of the CSI-Nihilent Awards process for details. For obtaining copies, visit the awards website www.csinihilent-egovernanceawards.org.

2 Dr Ashok Agarwal is a Fellow of CSI, Past Chairman of CSI SIGeGOV, Adjunct Professor, BITS Hyderabad, Professor, IIM, Calcutta, and President of Engineers without Borders.

3 For details visit www.csinihilent-egovernanceawards.org.

awards had the effect of trimming the size of potential contenders. With a view to bringing more states and union territories of India under the spotlight of the CSI–Nihilent State Category Awards, it was decided to narrow the qualification for submission of nominations for 2011–12 to those states and union territories which had not hitherto been recognised under this category.

It was hoped that this decision by the Awards Committee would serve to bring into national level prominence, the initiatives of more of the states of India.

Notwithstanding a tough deadline, four states filed nomination papers—Bihar, Delhi, Odisha, and Rajasthan.⁴ As noted earlier, the states were also required to answer a set of detailed follow-up queries. The directions the states preferred with respect to such difficult questions, and the answers they worked out were reflected in their respective nomination papers. The states differed not only in the budgets they had allocated to e-governance, they also adopted varying approaches to the questions of capacity building and greening the e-government terrain.

CONCLUSION

The CSI–Nihilent Award under the State Category is one of the most respected. Winning it serves as a strong reinforcing force for a state to broad base and deepen the reach of e-governance within its borders. Arguably, the CSI–Nihilent e-Governance Awards has an immense measure of motivating effect too. Without emphasising the point too strongly, it may be noted that several award winners under the state category have gone on to repeat their performance and win the award under the same category more than once.

Continuing the process of refinement, for the past four years, winners of State Awards have organised and played hosts to e-Governance Knowledge Sharing Summits promoted by CSI's Special Interest Group on e-Governance. A new e-Ratna Award was also instituted by SIG-eGov. Hon'ble Chief Minister of Gujarat, Shri Narendra Modi, was the first recipient of the e-Ratna award, on October 17, 2011 during the Knowledge Sharing Summit, Ahmedabad. Dr Raman Singh, the Hon'ble Chief Minister of Chhattisgarh was honoured with the e-Ratna award on November 5, 2012, at the Knowledge Sharing Summit, Raipur.

It is perhaps not surprising then that the CSI–Nihilent State Category Awards is one of the most coveted.

4 The details submitted can be obtained from the Awards website.

Section III

**e-Governance Success Stories—
Department Initiatives**

SWARNIM-RTO: A New Service Paradigm, Government of Gujarat

J P Gupta and D H Shah

DEPARTMENT OVERVIEW

Background of the Initiative

The Motor Vehicle Department is entrusted with the task of monitoring motor vehicles and drivers; and taking road safety initiatives in the country. The department carries out its mandate with help of regional transport offices (RTOs) spread across the state. With the growth in the economy and rising social standards, the demand for vehicles and mobility has grown manifold. The last decade has particularly witnessed a heavy growth in both number of vehicles and drivers. For example, the number of registered vehicles in Gujarat has risen significantly from about 60 lakhs in 2001 to around 129 lakhs in 2011 indicating that the vehicle population has almost doubled in the state in a decade.

Increased vehicle population has put tremendous strain on the existing resources of the department which caters to the needs of the public under the Motor Vehicles Act. The main functions of RTO include:

- i. Registration of motor vehicles and subsequent changes in the details of registration during its lifecycle
- ii. Issuing of driving licences and changes therein
- iii. Collection of motor vehicle taxes
- iv. Road safety initiatives
- v. Miscellaneous functions like issue of permits etc.

About 60 lakh people visit RTOs per year (figures of the year 2010–2011) for various purposes as stated above. The RTO is one of the frontline offices of the government—it acts as a huge public interface, particularly for young people who visit the government for the first time to get a driving licence. In order to service such a large number of people effectively, while maintaining service standards, it was decided to perform comprehensive process re-engineering in the department.

Objectives

The project aimed to establish the following.

- i. Simple and easy processes
- ii. Paperless and IT savvy environment
- iii. Speedier, efficient and transparent services

- iv. Faceless administration to the extent possible
- v. Stringent standards and fool proof system
- vi. Service orientation with better infrastructure for citizen centric services

RESULT INDICATORS

1. Key Performance

ICT Based Services

The scope of the project is very wide and covers all aspects of the process of issuing driving licences in the state in all RTOs through an integrated IT platform. The different processes relating to driving licences include:

- i. Learners licence
- ii. New driving licence
- iii. Renewal of driving licence
- iv. Addition to a category of driving licence
- v. Duplicate or change of details in a driving licence
- vi. International driving permit

All the above processes concerning issue of driving licences include receipt of application with attached documents, collection of fee, test and dispatch of licence to the applicant.

Implementation Coverage

The project covers all the RTOs in the State of Gujarat. These RTOs, 27 in number, are located in different parts of the state.

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency Improvements

The project has benefited all stake holders in varying degrees. Not only has there been a significant improvement in the delivery time of services but the beneficiary feedback has also been very positive. The simplification of procedures has broadly resulted in reduction of paperwork, elimination of queues and better civic amenities. Overall reduction in time taken to service an applicant has resulted in the psychological satisfaction of the applicants, particularly the youth.

A comparative analysis of key criteria, performance indicators and impact before and after the implementation of the project is shown in Table 1.

Table 1 *Outcome of the project*

Sl. No.	Key result area	Before	After	Change
1	Paperwork (attachment by applicant)	10 pages per application submitted twice	8 pages submitted once	Saving of 12 pages per application resulting in annual saving of 12 million pages approximately
	Paperwork by department	Maintenance of paper bound registers and books	All in electronic format	Saving of almost 1.2 million pages every year along with saving in manual effort involved in writing
2	Time in queue	Standing before 10 windows	Sitting in waiting hall	Saving of 3 hours per person on average basis resulting in an annual saving of 3 million man-hours
	Time in services	Standing before 10 windows	Sitting in front of one counter	Saving of 25 minutes per person to both system and person
	Time to get delivery of documents	3 to 15 days	1 to 3 days	Substantial improvement in delivery system
3	Road safety awareness	No focus	Waiting time is productively used	Road safety messages are delivered to aspiring drivers without additional effort
4	Service orientation	No focus	New orientation	Better citizen satisfaction and improved performance
5	Error free document	Mistakes reported in large number of documents	Fewer mistakes	Customer dissatisfaction reduced to a large extent
6	Feel good factor	Lengthy processes, dampening people's spirits	Overall feel good factor	All stake holders feeling good leading to better interaction

Cost effectiveness

Issuing driving licences is a core government function. The government provides human resources and other supporting system required for carrying out the process. An applicant has to pay a fee to the government for a driving licence. In addition to this, the citizen spends considerable amount of time and resources to undergo the process. If the process is cumbersome and non-transparent, there are also significant other costs. One of the main objectives of the project is to reduce the cost borne by citizen-payment to the government, investment of time and other costs. Similarly, the government saves cost on account of faster and efficient process. The saving of the citizen is both in terms of time saved and elimination of hidden cost due to the transparency the new process has brought.

Innovative Ideas Implemented

Single Window System

A large number of citizens come to the RTO to fulfill their requirements under the Motor Vehicle Act and the Gujarat Motor Vehicle Taxation Act. Under the old system, an individual was required to approach different windows that were catering to a small segment of the overall process. Individuals were required to move from one window to another and wait for their turn at every window in order to get their work done. The system resulted in long queues and was a time-consuming and tiring with lot of hassles and inconvenience. The multiplicity of windows was one of the main reasons that resulted in the prevalence of middlemen and touts that had a huge disruptive effect on the system and encouraged non-transparent behaviour at times.

The new system envisaged the following:

- i. Single window where all processes relating to an application like receiving application, scrutiny, fee collection, bio-metrics etc. is done
- ii. Multiple counters depending on number of applicants, for a particular process like licence, etc.
- iii. Sitting arrangement for applicants in front of the window/counter while their application is being processed
- iv. Elimination of queues with controlled flow by online appointment/token system.
- v. Introduction of special features like highback chairs for comfort and better quality of photograph, double monitors for participation of applicants in data processing and reduction of errors etc.

Due to the single window system, the whole process has become more efficient, transparent and citizen friendly. It ensures better citizen services and at the same time increases efficiency and effectiveness of the system many fold.

Highback Chairs

One of the major complaints people had was poor quality of photographs appearing on driving licences—the main reason being improper background and lack of lighting. An innovatively designed chair was conceived wherein the person was made to sit while his/her application was being processed and the same chair was used as background for taking photographs. Highback chairs with appropriate colour was designed for this purpose. It proved to be one of the most visible change with significant impact.

Double Monitor at the Counter

People reported mistakes in the driving licences, be it in name or address. One of the major culprit was the data entry operator who at times converted documents from the local language, Gujarati, to English in the prevalent IT system. This resulted in mistakes, causing dissatisfaction to the applicant.

In order to minimise mistakes, the idea of a double monitor was conceived and implemented. While the operator made the data entry, another monitor was placed facing the applicant. The applicant hence could see the data entry being done and could point out mistakes, if any, made during the process. If a mistake was pointed out, the same is corrected immediately resulting in errors being minimised. As a matter of fact, the photograph was also shown to the citizen through the same window which helped in better quality of photograph.

New Document Delivery Initiatives

A large number of people come to RTO to get vital documents. The vital documents issued by RTO includes driving licences, registration book and permits. It is important that documents are not only error free but are given in a format and shape that is durable and convenient to carry. All documents should also be delivered in time and without hassle. Considering these, the government took a series of steps to facilitate delivery of these documents to the citizen in a timely manner. These initiatives included re-designing of learning licence from a paper based format to I-card shaped format.

Earlier, driving licences were delivered at office. The approval and printing of the driving licence took time, therefore either an applicant had to make a second visit or it was collected by intermediaries. This caused delay and resulted in non-transparent behaviour. The Postal Department was roped in to deliver driving licences through Speed Post at home without charging any money from the applicant. This made the process faster and efficient. The delivery of driving licenses through Speed Post is now made mandatory, thus stopping hand delivery totally. Speed post delivery has ensured that the address of the applicant is verified while delivering documents, thus satisfying an important security aspect. The home delivery of documents by Speed Post is done without taking any extra charge from the applicant. The document is delivered with a road safety kit and a message from the Hon. Chief Minister urging the applicant to follow road safety norms. Simultaneously, an online tracking system and SMS intimation system is also initiated to facilitate prompt and accurate delivery of these documents to the citizens. The delivery initiative is an important step in reducing delays and increasing transparency in the whole system.

Stringent Testing Procedure

A person desirous of obtaining a driving licence is required to undergo tests in order to prove his/her knowledge of traffic signage and road behaviour. He/she is also required to appear for a driving test in order to prove his/her driving skills. Unfortunately, the testing methods for both lacked stringent norms and had a manual interface resulting in bias and non-transparent behaviour. It was decided to change the system and introduce stringent test methodology while keeping it user friendly.

The changes introduced are as under:

Knowledge Test

- A compulsory computerised knowledge test having objective type questions
- 15 random questions to be answered in 10 minutes wherein the questions are picked from a bank of more than 200 questions
- In order to pass, a candidate has to answer 11 questions correctly
- No two candidates have a similar set of questions
- Instantaneous declaration of results
- Computerised tracking of the results

Driving Test

- 37 automated driving test tracks at 16 locations for LMV (light motor vehicles) and 2-wheelers
- 5 automated test tracks for commercial vehicles on zonal basis
- Online registration system for driving test

The driving test project is currently under implementation and it is expected that the first track will be functional shortly. One of the key features of the test is its scope. It is totally IT based with testing by sensors, monitoring by cameras and is without any human interface. It is expected that such a stringent test will improve the standard of drivers in the state and will benefit the country.

Online Appointment System

One of the major points of inconvenience to the citizen was long queues seen at the RTOs. There were multiple queues—a queue before every single window. A major focus of the project was to eliminate these queues and thus increase the citizen's convenience and save precious time. In order to ensure this, online appointment system was introduced in the state. Many of the offices have already migrated to complete online appointment system while in many others, this process is under way. When people come without an online appointment, a token system is used to eliminate queues and streamline the entry of applicants to the service zone.

Combining of Forms

Earlier, separate forms were used for learning and driving licence applications resulting in duplication of efforts and wastage of paper. Both the forms are now subsumed into a single form. The online process as well as the offline process has been completely re-arranged keeping in mind this revised form. This resulted in significant saving of paper, higher processing speed and avoiding many redundancy prevalent in the process.

ENABLER INDICATORS

1. e-Governance Policy and Strategy

The department has prepared an IT road map and integrated IT solution based on a hybrid architecture. The solution will link all RTOs and check posts to the central server which will also serve as a single gateway for online services. This will help in further reducing duplication of work and will help cross-checking of data, thereby improving the efficiency and efficacy of the system and reducing the burden of applicants.

2. Process Re-engineering

The existing processes were complex, cumbersome and full of redundancies. It had to be simplified and standardised in order to reap the full benefits of e-governance. As a matter of fact, this was the pre-condition for e-governance, therefore re-engineering of different processes was initiated. For example, the whole process of issuing driving licenses has been re-engineered which has resulted in significant improvement in efficiency. Table 2 shows the old process and the new process that has been initiated.

Table 2 Comparison of the old process and the new

Process	Old	New
Application	Twice	Single
Attachments	Twice	Once
Fee	Twice	Once
Bio-metrics	Twice	Once
Test	Two types	Two types
Method of submission	Manual	Primarily online
Waiting	Long queues	Token/online appointment system

Similarly, a number of steps have been initiated and the process of registration, issue of permits etc. has also been re-engineered.

3. Capacity Building

The whole process is designed in such a manner as to make it very effective and sustainable. The front desk as well as printing and dispatch of the cards has been outsourced whereas the core function of verification and approval has been retained by the department. The staff involved in the process was trained in both the IT system as well as process flow. The training involved people at all levels. The officers and technical staff were specifically trained in the technical aspects and finer aspects of process changes. The operating staff was given training on software process flow and handling of applicants. Training is a constant endeavour and is therefore

carried out periodically wherein significant suggestions received from the operating staff are incorporated in the process to improve efficiency and effectiveness of the system further. One of the major impacts of the new system is reduced turnover of hired staff and greater level of satisfaction achieved by both staff and public.

Citizen Interface

A driving licence is a special document which is required in order to enable oneself to drive a motor vehicle in public places. It is one of the most coveted documents to be possessed by a person. A motor vehicle is today a symbol of upward mobility of a citizen and therefore every citizen desires to have a driving licence at the earliest. Many people, in order to get a livelihood, are engaged in driving transport vehicles, tourists vehicles, and other such vehicles used for ferrying goods and passengers. For them, a licence is an essential qualification in order to get a job. Therefore, driving licence has become an essential document to be had by a citizen.

As per law, a driving licence can only be issued by the licencing authority having jurisdiction over a particular territory. Normally, this authority is given to an RTO and through a network of regional transport offices, this task is carried out by the government. A citizen needs to fulfill the following in order to have a driving licence.

- i. Be eligible to hold a driving licence in terms of age and qualification
- ii. Produce necessary documents to supplement his/her claim of eligibility
- iii. Pay requisite fee
- iv. Pass through tests mandated by law in order to prove knowledge and skills required for driving

A citizen spends considerable amount of time and money to get a licence. Going by the sizeable number of people coming to RTOs to get a licence, the process acquires significance. The whole process has been re-engineered keeping the citizen at the centre. The aim of the project is to make the process

- i. Convenient to the applicant
- ii. Transparent
- iii. More efficient

Consultation with Stake Holders

Different stakeholders involved in the process can be classified into:

- i. The state government, Commissioner of Transport, RTOs and subordinate staff
- ii. The vehicle owners, licence holders, dealers, permit holders, drivers etc.

The Commissioner of Transport took the initiative and is the guiding force behind the whole project. The project was conceptualised and discussions

were held with different stake holders by the Commissioner. Once the project was broadly conceptualised, discussions were held in the government at various levels. The government took necessary policy decisions, provided guidance for implementation and sanctioned the budget. The Commissioner also held discussions with department officials and staff at the grassroot level. He made it a point to tour most of the districts and held meetings with local staff. Thus, the staff got involved with the project and communication was clear. During field visits, discussions were held with dealers of motor vehicles, vehicle owners associations and agencies involved in road safety work at the district level. These forums were used to invite suggestions that helped conceptualise and implement the project effectively.

What makes the project noteworthy is the fact that the entire project was conceptualised and implemented despite a shortage of staff and the large quantum of work at hand. Direct and clear communication helped implementation in a big way. Team work at different levels also played a significant role in the project.

User Convenience

The present process is both time-consuming and hassle-prone. The citizen is inconvenienced due to lack of facilities as well complexity of the process. The major focus of the initiative was therefore to make it convenient to the citizen to obtain his or her licence. In order to improve convenience to the user, the following steps were taken for modernisation of RTOs.

On an average about 25000 people visit the RTO every day. The existing infrastructure of offices was under severe strain considering the large number of citizens coming to the office. In order to ensure that the initiative outlined above is implemented with fullest efficacy and that the citizens are provided better amenities, the civil infrastructure is to be upgraded in all 27 RTOs in the state. Thirteen new RTO building were planned while in the remaining districts, where existing offices were found to have sufficient space, RTOs were taken up for renovation.

While constructing new offices or renovating the existing ones, a series of steps were taken and modern concepts were introduced which was an in-house job led by the Transport Commissioner. To streamline the movement of applications, the entire layout has been redone with required facilities. Some of the salient features of this design are as follows:

- i. *Facilitation Area:* which is equipped with a help desk, token counter and LED displays.
- ii. *Waiting Hall:* has been air conditioned (in major centres) and remodelled to have civic amenities. It also has an audio-visual display for viewing road safety films/messages while waiting.
- iii. *Service Zone:* has single window counters with seating facilities and also the knowledge test centre.

The waiting time of the applicant is innovatively utilised by displaying and showing road safety messages through panels and multi-media devices.

4. TECHNOLOGY

Presently the IT platform as envisaged in the national model of VAHAN and SARATHI and developed by NIC has been used. Many of the initiatives mentioned above would not have given the kind of good result it has if an e-governance plan had not been made and implemented. The software SARATHI developed by NIC was implemented throughout the state with all modules. Applications for driving licences are also being received online in a number of districts. For taking up this initiative to villages, *e-gram viswagram* centres spread over 13000 locations in the state are being dovetailed in the project. The centres are being used to facilitate submission of applications and obtaining online appointments.

VALUE INDICATORS

1. Digital Inclusion

The new initiative is planned in such a manner that maximum people benefit from it. Specifically, village level institution of e-gram has been effectively leveraged to increase reach of the initiative. The benefit is cutting across all differences. The test is planned in three languages so as to benefit a cross-section of people with varied language skills. Touch screens have also been kept at select locations to help people with difficulty in dealing with a mouse.

2. Green e-Governance

The project is proving to be environment friendly in a big way. It is resulting in huge savings of paper for both public and government. The amount of paper saved is indicated in Table 1.

J P Gupta, Commissioner of Transport, Government of Gujarat, Gandhinagar.
Email: commitrans@gujarat.gov.in

D H Shah, OSD, Port & Transport Department, Government of Gujarat. email: osd-trans@gujarat.gov.in

Sevana Civil Registration Application Suite, Government of Kerala

M Samsuddin

PROJECT OVERVIEW

Civil registration can be defined as the official registration of vital events. In India, this process covers registration of live births, stillbirths, deaths and marriages. As stated by the United Nations, civil registration is a continuous, permanent, compulsory recording of the occurrence and characteristics of vital events in accordance with the legal requirements of each country. Kerala is one among the four states where near cent per cent of occurring vital events are registered. Births, deaths and marriages are registered through 1044 registration units. Among these, 1043 are local governments (i.e., 978 gram panchayats, 60 municipalities and 5 municipal corporations) and one is Kannur Cantonment.

The Information Kerala Mission (IKM), while deciding to initiate computerisation of local bodies, had thoroughly assessed the characteristics of the prevailing system of service delivery through the local governments and the various technological and administrative interventions that could serve to improve them. In the study, the civil registration process was identified as a major service area with public interface that needs to be included in the initial phase of computerisation. This resulted in the development of *Sevana* (civil registration) application software. Computerisation and automation of different operations involved in the civil registration will offer incremental improvements in the existing system and will certainly give sufficient transparency and efficiency in the operations. Following are the major benefits of computerisation in the civil registration system.

- Ensures quality of data and efficiency in the governance and foolproof archiving of records
- Maintains transparency and accountability at the time of registration and subsequent transactions of vital events
- Ensures confidentiality and maintain security of data and operations
- Services delivery improvement
- Automated generation of extracts (birth/death/marriage certificates) from registers
- Generates automated statistical data
- Creates centralised personal information system with adequate restrictions to avoid misuse by integrating events registered at various

registration units within the state of Kerala and providing access to other public agencies or general public for the verification of authenticity of records received or for collecting information

Sevana Application Suites

An application suite was developed containing more than 10 independent applications for handling different types of activities related to the civil registration system in a local body. The applications are bilingual—in Malayalam and English. A small synopsis of the different modules are given below.

1. *Sevana Admin:* The Sevana Admin Module works as a 'master database updating module'. All the Sevana applications are working based on this master. Basically, the module is used for local master entry and pre-setting of different users based on privileges.

2. *Sevana Inward:* The Sevana Inward Module works as a register for keeping requests coming for registration, certificate issue and all other requests relating to civil registrations. The inward number is used for tracking the file. Also inward is the source to count the various types of requests received under civil registration.

3. *Sevana LB Kiosk:* LB kiosk application is for data entry of registration application forms received other than from hospital kiosks and marriages registration forms under the Hindu Marriage Act. Details of birth, death, stillbirth and marriages are captured and a verification report is generated and given to the informant for verification. After approval from the informant, the details are transferred to the LB Module for registration and related processes.

4. *Sevana Hospital Kiosk:* The hospital kiosk application is for the online transfer of the civil registration report form from the hospital to the registration unit. The details of birth, death and stillbirth which ever occurred in the hospital are captured and a verification report is given to the informant. After getting approvals from the informant, the details are transferred to the local body using dial up/broadband connection. In the local body, the incoming records are subjected to duplicate checking and verification. After that, the data is transferred to the LB Module for registration. The certificate from the local body is handed over to the concerned individual through the hospitals.

5. *Marriage Kiosk:* Marriage kiosk application is for registration of marriages under the Common Marriage Rules. The details including photos are captured and a verification report is generated to the applicant for verification. After approval from the applicant, the details are transferred to the LB Module and registered by the registrar.

6. *Gateway:* Gateway applications receive the data transferred from the hospital kiosk, checks duplication and transfers it to the LB Module for registration.

7. Past Data Entry: There is an electronic data capturing tool for capture and import of civil registration data from 1970 to the date of starting online (electronic) registrations. The integrity of data is checked to avoid discrepancies and duplications. A pre-processing and frame work is created to capture basic details of past data before starting data entry.

8. LB Module: The Sevana LB Module is used for approving and issuing certificates of civil registrations and also used for taking statistical information. Searching records, name inclusion, correction, various types of report generations etc. are also done under this module. All the official workflow is included under this module. Therefore, it is also known as the official module. Only after approval from this module, is the data transferred to the web module (website).

9. Sevana Web: URL: <http://www.cr.lsgkerala.gov.in/Index.php>

The Sevana web module provides services such as

- Registration search and certificate printing
- Official verification of certificates
- Official login for Regional Cancer Centre for retrieving Death Cause Report
- Immunisation vaccination alert through SMS/e-mail
- Registration alert through SMS/e-mail
- Login creation for various departments (web)
- Population clock (registration count: state/district/local body type/ local body wise)
- Online birth/death /marriage certificates
- Online applications/e-filing of common marriage registrations
- Malayalam search (Web)
- GOs (Government order)/circular

10. Web Service: Web services are used to transfer data between local bodies and data centre

Recent Initiatives

Birth registration in the state is a statutory function exercised by the gram panchayats and urban local bodies. The operations related to registrations are fully computerised and all current registrations except that of the Anchuthengu Gram Panchayat are carried out using the Sevana Civil Registration Suit. Near cent per cent registrations in the state is done electronically using the IKM software. The local bodies having connectivity with the state data centre upload the registration details to the centre on a concurrent basis. Nearly 70 per cent of birth and death registrations of the state are thus made available through the state data centre. With the proposed implementation of the connectivity in all LSGI (land surveying and geo-informatics)'s, civil registration process in the entire state is expected to be fully online by the end of this financial year. State, district

and local body wise count of registrations are also now available in the State Registration Clock in the website of LSGD_www.cr.lsgkerala.gov.in.

Kerala is the only state to have a hospital kiosk system established for online reporting of births and deaths—registrations are performed within 24 hours of its occurrence which at present is carried out through 426 hospitals in 116 registration units (local bodies). Sixty five of these are government hospitals and 361 in the private sector which includes almost all medical colleges and major hospitals in the state and covers 80 per cent of birth registrations in the state. Through the hospital kiosks, births/deaths are reported online to the concerned local bodies where the event is registered within 24 hours of its occurrence. On registration, government approved certificates are made available in the *Sevana* website. The public can download birth and death certificates from the website, which is approved by the government as a valid document for all official purposes.

Along with registration details, Information Kerala Mission has developed a facility to capture the mobile number of parents/guardians of the new born, to issue SMS alerts on registration and remind the parents on due dates of immunisation. Once the registration data reaches the state data centre, the SMS immunisation alerts would be sent automatically to the mobile number of the parent on due dates. Common marriage registrations and furnishing of application using web service is another major initiative during the current period. The current features includes:

- Birth/death/Hindu marriage/common marriage registration and certificate issue
- e-filing of common marriage through Akshaya, Kudumbasree, internet kiosks
- SMS alerts
- Verification report and acknowledgment slip to informer
- Digitisation of records which is registered before starting online registration
- Name inclusion and corrections
- Non-availability certificates
- Extracts for judicial purpose
- Daily, monthly annual and summary reports
- Transaction details
- State wide cause of death data collecting of RCC is done through Sevana
- Birth, death and marriage certificates is given through internet www.cr.lsgkera.gov.in_(online birth certificates are permitted as a valid age proof document for school admission procedures (GO (MS) No. 173/10/. Dated 02/09/2010)
- State wide statistical data
- Facility for online registration of hospital cases in local bodies

RESULT INDICATORS

1. Key Performance

ICT Based Services

Users: Almost the entire population of the state (for availing various services provided by the local governments and for obtaining information on developmental programmes)

Service Providers: The local government personnel handling the IKM application software and information systems, the hardware vendors/support agencies, Information Kerala Mission

Public Sector: Kudumbasree (the State Poverty Eradication Mission), Kerala State IT Mission (the nodal agency for IT and e-governance programmes in Kerala), Centre for Development Advanced Computing (C-DAC, the Government of India agency for super computer and local language interface initiatives), Akshaya, Friends etc.

Other: Experts from various walks of local government functioning, retired personnel from local governments who have involved themselves in product or information system design and implementation

Stake Holder Reviews and Benefits

- Participatory software development
- Prototype vetting by users through the Sevana Civil Registration application clinics conducted with the active participation of the Chief Registrar of Births and Deaths
- Reviews with elected representatives were conducted at selected local governments
- Reviews with hospital representatives were conducted in all local governments where the hospital kiosk system was introduced
- State level reviews of the registrars of municipalities and district level reviews of registrars of gram panchayats
- The services from local governments are provided without any additional cost for the IT intervention
- In hospital kiosks, a service charge of Rs.15 to Rs.25 is taken for each registration to account for the cost of data entry, electronic data transfer and certificate delivery at hospital. This is exempted for special categories of people and hospitals.
- In the manual process, officials are required to write the details in the reports to a register and then at the time of issue of extracts (certificates), they again need to copy the information in the manually prepared register to the extract sheet. In comparison to that, in the present system, once an electronic report for registration is generated, all subsequent processes can be done correctly and quickly. The citizen centric benefits accomplished in these processes are:

- Online certificates are available in the Sevana CR website itself; one can download the certificate at any time using their own personal computers or through Akshaya or Kudumbasree centres or internet cafes.
- For births and deaths events reported for registration within a stipulated period, it is mandatory to issue an extract of the register immediately after registration. In the existing manual process, it could be implemented only in a few registration units. But with Sevana Civil Registration application, once the registration process is over, this extract can be printed out immediately and issued. With the start of the functioning of hospital kiosks, these extracts (certificates) are now issued within 24 hours after registration. So this system helps to fulfill the mandatory obligation that could not be implemented otherwise in all registration units.
- For getting a certified extract from the registration unit, people needed to wait for long periods as this process required search and copying of information from the register to a new sheet and cross-checking of the same by another official before issue. Now since the registers are kept electronically, extracts can be easily searched, printed and issued after putting the signature of the registrar. Therefore, at several registration units, these extracts are issued to the public within minutes after receiving their application or after a few hours.
- Archiving of civil registration records is a major task as these are of permanent nature. Manually prepared records crumble after some years and it is very difficult to keep them perfect. Now registers are electronically stored and can be securely archived at different locations on multiple media. A centralised disaster recovery mechanism is getting ready.
- Electronic archiving of legacy data also does away with the requirement of recreating new registers in place of the dilapidated manual records.
- The suite of *Sevana* software has various modules for the capture of data. But 'registration' and all official transactions with legal responsibility are restricted to the main LB module, to which only designated officials have access using their username and password. Moreover, all transactions carried out by each official will be tracked through the audit trail and logs that are available for audit.
- The hospital kiosks have an interactive mechanism with the citizen in terms of ensuring the quality of data. The 'reporting form' given by a user at the hospital for births and deaths events, is converted into electronic form and is verified by the informant to ensure data accuracy. This has substantially reduced the instances of the citizen running around for correction of data, which is a very tedious and time consuming process, once it is registered.

Services Introduced

- e-filing of common marriages
- Online availability of civil registration certificates
- SMS alerts on immunisation schedules and alerts on registration intimation

- Issue of mandatory extracts (certificates) under Section 12 of the Registration of Births and Deaths Act, 1969
- Hospital kiosk for online reporting of births and deaths from hospitals with quality data
- Issue of mandatory extracts (certificates) under Section 12 of the Registration of Births and Deaths Act, 1969 through hospitals within 24 hours of online reporting of the event
- Generating extracts within three minutes for issuing certified extracts (birth/death/marriage certificates)
- Maximum options for the effortless search of a particular record from among lakhs of records
- Covering all transactions involved in the civil registration processes including, electronic reporting of events, registration, corrections, cancellations, registration of names of children in the birth registration records, inclusion of adoption details in the birth records, generation of extracts, generation of non-availability (non-registration) certificates etc. for a complete e-governance system for civil registration
- Generation of codified statistical reports as stipulated by the Registrar General of India
- Flexibility of consolidation of statistical data on the basis of place of occurrence or place or residence of the individual involved
- Auto generation of acknowledgement slips as envisaged in the citizen charter at the time of saving a new entry in the inward module

Implementation Coverage

- Covers all districts in the state
- All 5 municipal corporations, all 65 municipalities and 977 grama panchayats (out of 978) and Kannur Cantonment are covered
- Handles nearly 99.9% of the total births and deaths registrations in the state
- 426 hospital kiosks as sub-service delivery centres covering 117 local governments which covers nearly 90% of births in the state

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency Improvements

- Efficiency enhanced to the maximum in the public service delivery; the authenticated birth and death registration certificates are made available through internet to the public within 24 hours of registration
- The services from local governments are provided without any additional cost for the IT intervention
- e-filing facility helps to save the time of the stake holder as well as the local body staff
- Quality and speed enhanced

- It reduces the time taken for distribution of certificates from a minimum duration of one day to a matter of minutes

Innovative Ideas Implemented

The present status of civil registration computerisation in the state is as follows.

1. As part of e-governance initiatives of the local governments, the civil registration process is performed in Kerala using the Sevana application software developed by IKM. The application is used in the state by all registration units except two and 99.9 per cent current events of birth, death and stillbirth are registered electronically. The application is capable of carrying out all the operations as per the acts and rules related to civil registration.
2. Information regarding statistical and legal aspects is also captured and data entered, which enable instant and timely processing and the data generated is given to the Department of Economics and Statistics (Additional Chief Registrar) who make use of it for furnishing reports to the Registrar General of India.
3. In the state, more than 90 per cent of the birth registration is reported online through the hospital kiosks set up in 426 locations all over the state, which is an extended citizen centric service.
4. The registered data from individual units are also uploaded and updated to the government data centre.
5. Citizens can access and download certificates from the data centre within 24 hours of the registration from the URL www.cr.lsgkerala.gov.in. The downloaded certificates with unique id and barcode protected are approved as an authorised record of birth and death by the government.
6. The legacy data since 1970 is also being digitised and the same is also made available through the website.
7. A module for sending SMS message to parents on new-born birth registration and also for sending SMS alerts on immunisation has been set up.
8. New features have been incorporated in the software application for reporting of events through web based services and mobile interface for sending SMS.
9. e-filing of marriage is also possible using the application.

Online facilities and computerisation of the past records enhanced the accuracy and speed of transactions. More complicated processes were simplified and stake holders are getting more services in time. The others includes the following.

1. Electronic Reporting of Events—Hospital Kiosks

- The hospital kiosk module of the application can transmit remotely prepared electronic reports of births/deaths/stillbirths to the registration unit through a network or through the telephone line.
- Online civil registration certificates from the website
- e-filing facility of common marriage

2. Transparency

Application designed in such a way as to provide maximum transparency in the procedures. One example is the provision to auto generate acknowledgement slips at the time of saving the information regarding the receipt of a report for civil registration or an application for any other transaction.

3. Accountability

Sevana LB module is part of the Sevana (Civil Registration) application software suite where registration and other official transactions are made. Provision of audit trail in this module helps to track the chronology of transactions made by each user. This could function as a mechanism to thwart any misuse and unauthorised transactions usually practiced in the manual registration system.

4. Security

The application has different tier level of users in accordance with the hierarchy defined in the respective rules. In a persons' login he/she can perform actions delegated to their designation only. For example, effecting delayed registrations, corrections, cancellations etc. can be done only by a registrar. User addition to the application is restricted through the login of the user designated as 'administrator', who usually will be the head of office.

5. Checking Duplication

The application can identify duplication of new entries with that of existing data and will warn about the possibility of duplication of registration. It will not totally prevent duplicate registration to facilitate registration of twins.

6. Codified Statistical Data Generation

At state and national levels, vital statistical data from the civil registration system is compiled using codes prescribed by the Registrar General of India. In consultation with the state Economics and Statistics Department that is doing this annual task, Information Kerala Mission could devise a mechanism to generate the codified statistical data directly from the Sevana (Civil Registration) application.

7. Standardisation of Information

An application for civil registration naturally contains a number of information that required consolidation at different levels. Free direct entry

of such information by different data entry operators at different offices will result in the creation of an obscured database of such information limiting its further use for any purposeful means. For example, while entering the name of Koyilandy municipality, the data entry operator can use other spellings like Koyilandi/Koylandi/ Koylandy/Koilandy/Koilandi/Quilandy/Quilandi at different occasions. In another case, entry of the name 'Sree Avittom Thirunal Hospital' can be in different forms, like SAT hospital/SAT Hospital, Medical college/SAT Medical College/SAT Thiruvananthapuram etc. In the manual reports, statistical information like occupation used to be entered as gulf/abroad/bank/agent/ hospital/ government/private etc. Therefore, the application comprises of 'masters' prepared by standardising the form and spelling of some frequently used selected information to ensure that such information can be entered in the application only in a particular predefined spelling and form by selecting from the masters. Masters thus created include names of local governments in Kerala, states, districts, talukas and villages in Kerala, list of occupation, list of level of literacy, religion, cause of death, post offices in Kerala and their pin codes, names of hospitals and other institutions where births and deaths may happen, list of places where marriages are generally solemnised etc. The last two masters are applicable only to individual registration units and are termed as local masters while the others are global masters relevant in all registration units.

8. Creation of Unique Id

The civil registration system may possibly be used as a foolproof mechanism for creating personal information system that can deliver information on the vital events of each individual. A key feature of such a system should be its ability to keep the uniqueness of every event registered by it. Sevana (civil registration) application can generate an unique identification number for each vital event registered by it. This is a 16-digit scheme accompanied with two alpha characters, for example, B0020167-050722205. Among the 16 numerals, the first three numbers (002) denotes the id of the LB kiosk/hospital kiosk where the report is generated, the next four digits (0167) is the id of the local government, the subsequent six digits (050722) represents the date of registration in the yymmdd format and the last three digits (205) show the current sequential number of registration on that date. The first part of the id is an alpha character (B) which represents the type of registration. The first seven and last nine digits are separated by a hyphen.

9. Legacy data

- Data regarding registration is available in the registration units from 1970. Most of the records are in poor condition. Requests for any certificate from old records requires searching of these records, and in cases where the exact details are not available, it is a tedious process.
- Realising that for real improvement in the entire service delivery related to births, deaths and marriages registration, the legacy data has to be

available in electronic form, a mandatory programme for converting all the legacy records into electronic form was initiated in parallel to the online operations for current registrations.

- The legacy data has many problems in terms of incorrect dates (for example, February 30), non-availability of mandatory fields (such as sex), missing data due to damage of records, etc.
- A framework with provisions for handling exceptions in data was developed and the pre-processing of records to provide this framework was made part of the digitisation process. This also provides details on how incorrect/incompatible data has been input in the database.
- Further modification of the legacy data capture was put into operation by having an online verification and porting tool to the online database. As part of this modification, data capture was mandated to be done within the registration unit. This was necessitated due to the fact that the offline data capture process at data entry centres outside the registration unit usually led to problems in data, delays in data verification, high percentage of incorrectness in data, and mainly, the inability to accommodate the changes/corrections in data.

Level of Integration

In the domain of e-governance, IKM has developed the following software applications:

- Online birth registration and certificate issue
- Online death registration and certificate issue
- Online Hindu marriage registration and certificate issue
- Online common marriage registration and certificate issue
- e-filing of common marriage through Akshaya, Kudumbasree, internet kiosks, personal computer etc.
- PF legacy details of municipal employees with provision for credit card, PF statements and report
- PF legacy details of panchayat employees with provision for credit card, PF statements and report
- Online birth, death registration through the hospital kiosk
- Birth, death and marriage certificates of all local bodies of Kerala for public access through web based services
- Online marriage registration
- Registration clock for online count of birth/death registration
- Accrual based double entry accounting application
- Formulation expenditure, and monitoring of annual plans for decentralised planning at local level
- Workflow application handling file tracking over web, eSMS integration, grievance handling
- Disbursement of social welfare pensions with eMO integration
- Capture details of tax payee, demand and e-payment of property tax based on demand note through payment gateway

- e-filing of profession tax details online
- e-filing of self assessment plinth area based tax calculation
- Linkages for property tax payment through Friends, Sparsh, Akshaya and India Post
- Processing of D and O licences
- Preparation of estimate of work and cost estimation
- Online processing and issuing of building permit
- Preparation of agenda notes and minutes of meetings
- Portal on local self governments
- Website for the 1209 local bodies of Kerala
- Monitoring the assets of local self government institutions
- Cadastral information based maps and asset register
- Preparation of payroll of employees and establishments
- Personnel database linked to the service book including leave particulars, service matters, disciplinary issues, promotion etc.
- Community information system
- Handling micro watershed management
- Encyclopaedia on acts, rules, court orders, GOs m-governance
- Facility for sending SMS on registering birth/death/marriage
- Facility for sending SMS on paying property tax through e-payment
- Facility for reminding parents of the immunisation schedule for the new born
- Online file tracking mechanism and status of file information to the public through SMS

All the softwares developed and deployed have interlinkages with each other to avoid duplications, improve efficiency, avoid chances of data entry errors etc.

ENABLER INDICATORS

1. Process Reengineering

In e-governance, introducing an application software for handling a particular office procedure is not merely for replicating the manual process as such. There should be an inherent objective for redesigning the processes—say, for improving the performance of that procedure. While doing so, the objective should be for the final output of that particular procedure and not the separate single functions involved at different stages as per the manual process. Functional specialisations involved in these types of processes will have the natural tendency to hamper the expeditious outcome of the process. So tactics for making the processes user-friendly and expeditious should be derived from field level feedbacks and process audits. For this purpose, areas where existing rules and guidelines are required to be changed should be identified and action should be taken in

that direction for achieving transparent, efficient and expeditious processes. Standardisation of processes includes:

- Devising strategies for level jumping
- Building integrated information systems for holistic decision making
- Devising a methodology for benchmarking services, process audits
- Banking upon citizen feedback for front-end service delivery and devising stake holder feedback mechanisms in back-end processing

ICT and Non-ICT Front-end Changes

- Front-end process changes implemented include being integrated with Soochika, the file tracking system for local governments
- Verification process introduced
- Collection of mobile numbers for m-governance/SMS alerts
- Facility for common marriage e-filing

ICT and Non-ICT Back-end Changes

- Integrated with other IKM applications
- Streamlining vital statistics system
- Citizen information system based on birth and death registration
- Inputs for improvement of public health service
- Death cause reports provided to Regional Cancer Centre (RCC) for research purpose

2. Capacity Building

Training has been imparted to the local government staff handling registrations. Refresher training programmes are also organised periodically based on the necessity and user feedback. Quality improvement *training* has been provided for the staff.

3. Technology

- The software has a provision for updating all details to a central web server at the state e-governance data centre using web services technology. Currently scheduled peer backups are done at the local governments. It is transferred to external media and retained for disaster recovery purposes.
- The database and application are secured through user names and passwords
- The database user name and password are not published
- The application has multiple user levels, with different privileges as per the roles of the user
- Users who are transferred out of the registration unit are disabled

- The network in a registration unit is configured as a Windows domain, with only authorised users having access to the computers in the local area network.
- As per the requirements of the Act and Rule, the statistical data (passed on periodically to the Registrar General of India) is maintained separate from the personal details.
- Online certificates are provided with a 2D barcode for security purpose.

VALUE INDICATORS

1. Digital Inclusion

The application is targeted to reach the doorsteps of persons belonging to all classes of society including the illiterate. This is achieved through making the application available through internets with the use of and services of personal computers, Akshaya centres, Kudumbasree units or through internet cafes.

The network diagram of the Sevana Civil Registration Application Suite is shown in Figure 1.

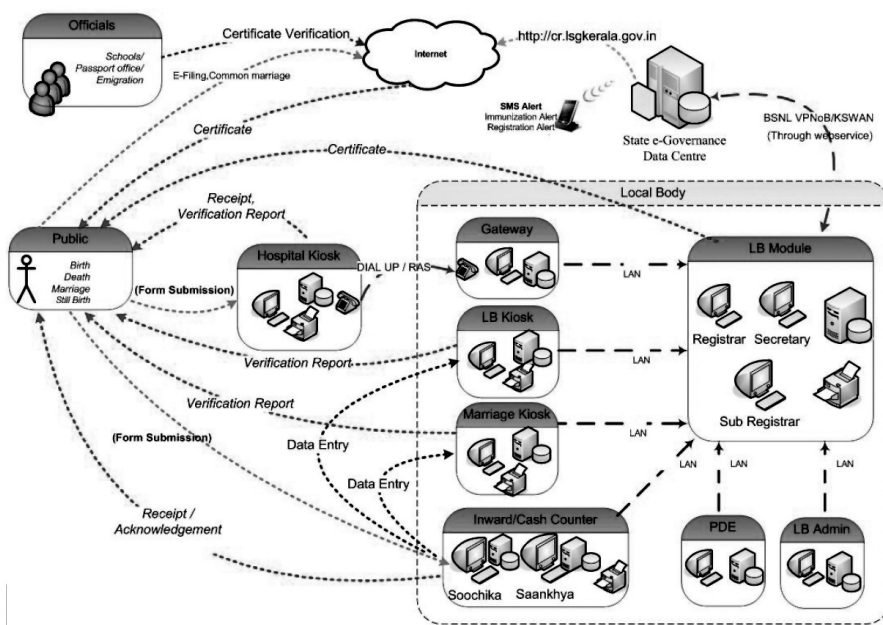


Figure 1 Sevana civil registration application suite (used with permission from Information Kerala Mission)

2. Green e-Governance

Our vision is total e-governance implementation in local governments which function as paperless offices with increased transparency in all transactions. Availability of online services reduces paper work and wastage of stationery.

Forest Department, Government of Maharashtra

R R Sahay

DEPARTMENT OVERVIEW

The Department of Forest, Government of Maharashtra has taken the initiative to deploy information and communication technology in the department. The department envisages making information technology a tool for attaining all-round development in the state. The main objective of the ICT deployment in Maharashtra Forest Department (MFD) was to systematically organise planning, implementation and monitoring of forestry and other related operations by systemic collection, storage and retrieval of MIS and geo-spatial data through a computer based communication network. It is planned that the Maharashtra Forest Department would execute its technology initiatives in an integrated manner wherein all its key functions will be carried out through web based workflows and mobile hand-held devices which facilitate each role player to log on to the departmental portal and enter his or her work/data/information. It will also facilitate every employee to remain in constant touch with any new events in the department. This working methodology is aimed at bringing not only transparency, responsibility and accountability but will also enhance efficiency.

The following ICT initiatives are currently being taken up by the Maharashtra Forest Department in order to achieve the desired outcome:

- Deployment of communication network and wide area network (WAN) to connect nearly 500 offices of the department across the state.
- Deployment of local area network (LAN) in the department offices till circle level. It includes headquarters at Nagpur, 11 circles namely Nagpur, Nasik, Pune, Thane, Chandrapur, Dhule, Kolhapur, Aurangabad, Amrawati, Yawatmal and Gadchiroli and 4 wildlife circles namely Melghat, Mumbai, Nagpur, Nashik.
- Procurement of additional computers and peripherals in the offices. Nearly 100 additional high-end computers at Nagpur and 90 computers at range level for WAN connectivity have been procured. Currently there are around 2000 computers already in the Forest Department.
- Implementation of ICT cell or server farms for centralised monitoring, storage and effective utilisation of network. Deployment of hardware (servers, clients, printers and UPS) in ICT cell.
- Development and deployment of forestry applications integrating GIS and MIS data. The following forestry related applications are being developed

as part of this project: Fire alert management system, forest offence management system, wildlife management system, land management system, FC Act, plantation management system and e-auction.

- Procurement of personal digital assistants (PDAs) for field level data collection.

RESULT INDICATORS

In order to achieve the objective of the project, the following components pertaining to IT, hardware, software, networking and capacity building are planned under this initiative (Figure 1).

1. Deployment of communication network and wide area network (WAN) to connect all the offices of the department across the state.

Benefits

- WAN is the basis for any ICT development initiative to be successful considering that all offices of the department as well as the forest areas span across the state.

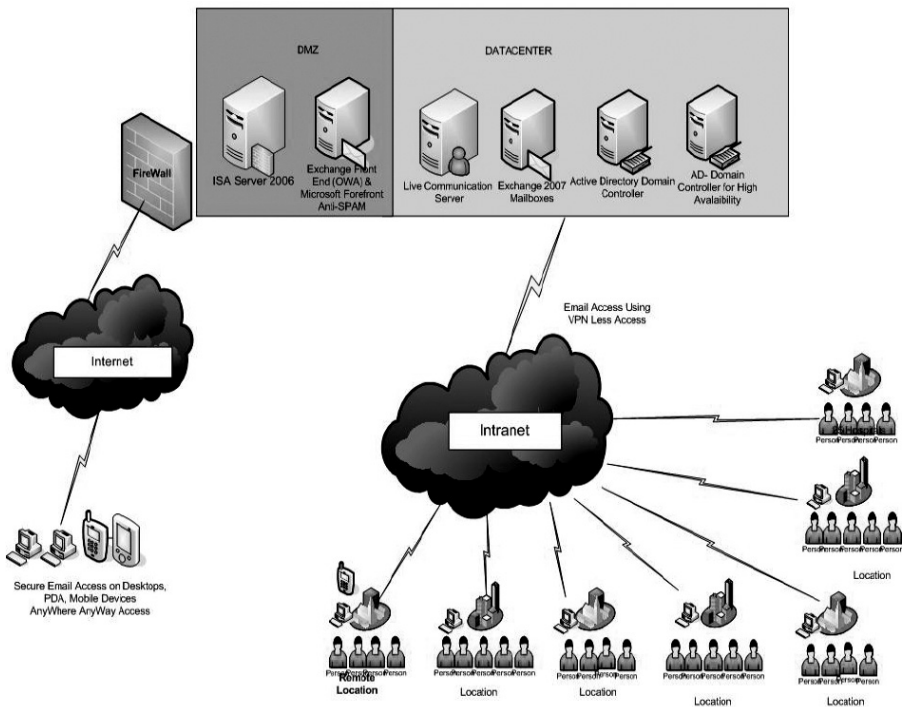


Figure 1 IT, hardware, software and networking for the ICT initiatives taken by the Maharashtra Forest Department

- Once the departmental connectivity backbone is in place, all the forest offices up to range offices would be connected by a common network with the required bandwidth provided by BSNL.
- WAN connectivity will act as the basis for all ICT development/ initiatives which are and will be taken up by the department.
- It will be possible to set up video conferencing up to division level.

2. Deployment of local area network (LAN) in the department offices.

Local area network is being implemented up to circle offices currently. NIC has completed configuring and commissioning of the entire network in the head office and all circle offices.

Benefits

The LAN network in head offices as well as circle offices will help in automating many manual processes and the concept of a paperless office can be achieved in days to come.

Benefits

- Sharing of files and network resources
 - Shared bandwidth with internet connectivity
 - Saving of funds up to Rs 1.19 lakhs (for 199 (100 headquarters + 99 circle offices) connections @ Rs 600/- per connection) from a single connection
 - Meetings through video conferencing
 - LAN will also facilitate in providing necessary infrastructure for various forestry applications which are being developed
 - It will also help the employees to get access to internet so as to ensure their exposure to other IT and web applications.
3. Video conferencing is being used increasingly in various offices.

Benefits

- Easy and fast communication across the offices to ensure quick decision making; video conferencing setup can be extended to all circle and territorial offices
- Saving time of the public officials and saving on funds by reducing travel costs.

4. Procurement of additional computers and peripherals in the offices.

Currently around 2000 computers are available in the department, starting from *Mantralaya* to range office. Considering that some of these computers are old and becoming obsolete, it has been decided to procure 200 computers each year to ensure availability. Three computers for *Mantralaya* and seventy computers for the head office have been procured. Ninety nine computers have also been procured for range offices.

Benefits

- These computers and other peripherals like printers, UPS will aid in expediting exchange of information and bring efficiency to the system. High-end desktops will also help in carrying out the complex algorithm needed for GIS applications.
 - It has also been decided to provide solar power backup for offices which are located in remote places to provide uninterrupted supply of electricity to support the IT infrastructure.
5. Implementation of ICT cell or server farms for centralised monitoring, storage and effective utilisation of network.

Benefits

- The ICT cell will majorly be used to support and manage the various ICT initiatives being taken up.
 - The infrastructure will be used for imparting trainings from basic awareness to application oriented functions.
6. Development and deployment of forestry applications integrating GIS and MIS data.

Benefits

- The forestry application will become the basis for carrying out various citizen centric and day-to-day office activities.
- These applications will be supported by the basic infrastructure being developed in terms of WAN, LAN and ICT cell.
- Majority of these applications are citizen centric like the Forest Land Management System and key result areas and the Forest Conservation Act. The data entry on these applications has started.
- Once complete, this data will become a centralised database for gathering any information online.

Currently, the following applications are running on pilot basis in the state.

1. *Land Management System*

State forest departments can use the portal to manage the records of their forest land in an efficient and effective manner. The functionality of the system is as follows: Master data management of administrative structure (districts, tehsils, revenue circles, *patwari halkas* and villages, *khasra*); master data management of departmental structure (forest circles, forest divisions, forest blocks) and centralised repository of all gazette notifications related to the forest land for online dissemination.

Benefits

- Manage forest land
- Oversee diversion of forest land for non-forestry purposes

- Settlement of land disputes
 - Settlement of encroachments
 - Maintenance and upkeep of forest boundaries
2. *Key Result Areas* (This application covers the status of key areas for forest department)
- Increase in forest cover of the state
 - Enhancement of people's participation in the forestry sector
 - Modernisation of the monitoring procedures especially at the field level for forest protection
 - Promotion of eco-tourism in the state
 - Help in decreasing man-animal conflict
 - Strengthening of protection of forests
 - Updating land records

The following applications are undergoing development.

1. *FAMS (Fire Alert Management System)*

- To create spatial and temporal data base of fire locations
- Instant messaging of fires to front line field officers
- Identification and delineation of fire prone forest areas
- To monitor forest burnt area, loss of life and other property

2. *FOMS (Forest Offence Management System)*

- Violation of acts and rules with section/sub-section under the case is registered
- Offenders and witnesses
- Loss/damage of forest produce, material or wildlife
- Stump details in case of illicit felling
- Photographs related to offence

3. *Wildlife Management System (WMS)*

- Monitoring of habitat status, population variance
- Alert generation for untraced key species
- Monitoring of patrol camps
- Creation of temporal and spatial database of wildlife sightings
- Decision support system for patrolling and habitat improvement

7. Procurement of personal digital assistants (PDAs) for field level data collection

Considering that the forest reaches to the farthest locations in the state, it is very important to have a system in place to monitor them at real time. Thus it has been decided to procure PDAs/smartphone to make the staff and officials equipped with technology to track, store and report details

from the field itself. These PDAs will also act as a platform for running MIS and GIS based applications to store and maintain a geographic database on fire alert, forest offence and wildlife management system.

8. Maharashtra Forest Department Website (<http://www.mahaforest.nic.in>)

Maharashtra forest website has been developed by NIC and it provides useful information to citizens with respect to department functions and new initiatives.

Besides these, major initiatives are taken towards capacity building and digitisation of maps which will bring the following benefits.

- *Digitisation* will ensure the upload of these maps in soft copy for easy access by the public as well as official use. It will also be essential for integration of GIS and MIS based applications. Digitised maps will be available for:
 - Scanning
 - Geo-referencing
 - Mosaic
 - Publication
 - Facilitating real time monitoring through PDAs
- *Capacity building* is a major task considering the huge work force in the forest department.

Efforts have been made to provide basic IT awareness and application training to several staff members. In this regard, many training programmes and workshops have been organised to sensitise the department officials to various ICT initiatives being taken up in the state.

Around 90 personnel which comprises one personnel at each circle and division were trained in Bhopal PDAs and applications.

Similarly NIC has assisted in deploying 15 assistant programmers for training the data entry operators in all circle offices (territorial and wildlife) on land management and KRA applications. Thus a conscious effort is being made in the direction of sensitising the staff and officials of the department about the new technologies for the future. It will also ensure sustainability of the project.

1. Key Performance

- i. The computerised network backbone is in place till the range level. 516 sites of Maharashtra are being connected. They will have access to internet and other forestry related applications.
- ii. LAN connectivity has been provided till circle offices.

- iii. The ICT Cell is in a position to provide a basic level of centralised network monitoring and managing facility.
- iv. Video conferencing (VC) has been successfully carried out. It has been completed at 14 sites (11 circles (T) + 1 *mantralaya* + 1 wildlife circle, Mumbai + 1 head office, Nagpur]. Till now 56 VCs have been successfully conducted so far.
- v. Digitisation: Digitisation of maps of 51 (T) divisions and 43 divisions/national park/sanctuary/tiger project is in process.
- vi. Procurement of 200 computers have been done both at the head office and range level. It has been decided to procure 200 computers per year as part of the continuous strengthening of infrastructure in place.
- vii. Development of forestry based application in place like land management system, plantation, monitoring system, FAMS, FOMS and WMS etc.

2. Efficiency and Improvement Initiatives

- i. Access to internet and other forestry related applications will be used by citizens to get useful information. Thus, the technology infrastructure is the first step to take governance to the hands of citizens by empowering them with information and data.
- ii. Initiative will be taken to deploy LAN connectivity in the division and range offices. It has been planned to procure and implement generic software like e-office, Human Resource, Payroll, LAQs etc to facilitate making offices paperless.
- iii. It is also decided to utilise the ICT Cell infrastructure to impart capacity building trainings and keep all the forestry related applications as well as generic software on the servers currently in place.
- iv. It is planned to extend video conferencing to all circle and territorial offices.
- v. The development of e-auction application is going to play a significant role in the auction of logs in depots. Once implemented, it will help in revenue generation. The e-auction application has been envisaged to be a real time application which will also enable remote users to make a bidding from their homes.

ENABLER INDICATORS

1. e-Governance Policy and Strategy

- i. The department has developed an ICT work plan for the next five years. A vision document is also under preparation. The vision for the future is to achieve the concept of e-forestry.
- ii. It has been decided to utilise facilities of the state data centre, State Wide Area Network (SWAN) and National Informatics Centre wherever needed.

- iii. All application development is done under the DIT standards. All hardware and software procurement is taking place as per NICSI norms.

2. Process Reengineering

ICT and Non-ICT Front-end Changes

- i. e-Office
- ii. e-Auction
- iii. Land Management System
- iv. KRA
- v. FC Act
- vi. Maharashtra Forest Department Website

ICT and Non-ICT Back-end Changes

- i. WAN up to range level
- ii. LAN till circle offices
- iii. Server farms

3. Capacity Building

- i. An exhaustive capacity building calendar has been developed to impart training to the forest staff continuously for the entire year.
- ii. Preparation of training modules and training material is in place keeping in mind the needs of stake holders.
- iii. For project management and monitoring, two third party consultants have been hired full time to support various ICT initiatives.

4. Technology

- i. The MP Forest Department has planned and decided to upgrade the technology in place for MIS and GIS based applications. It has decided to go with Android based PDA/smartphones which will be cost effective and meet the requirement for the future too.
- ii. It has also been decided to have maintenance of all the software and hardware procured up to three years.
- iii. All the applications are being developed in compliance with the department of IT standards for application development.
- iv. The disaster recovery site will be SDC, Mumbai.

VALUE INDICATORS

- Automation of the entire department with connectivity to all 516 office location

- Reach of technology till the lowest level
- Capacity building of entire staff
- Transparency and accountability in the whole system

1. Digital Inclusion

- a. The procurement of new computers leads to a certain difficulty for the new staff in terms of usage of the Marathi language. To avoid this problem, the staff was trained in Unicode. Also, to avoid discontinuity of work, ISM software was installed on each software to give staff time to learn Unicode.
- b. It is ensured that all the applications which are built by the Maharashtra Forest Department are multilingual to ensure comfort in getting used to the new technology.

2. Green e-Governance

- a. With the procurement of computers and other peripherals, it has been possible for the staff to carry out most of the activities on the computer itself. Most of the generic communication and review of documents are now through e-mails and computers. It has resulted in saving lot of paper at the office level
- b. With the plan to implement generic softwares like e-office, HRMS, Accounting, it will be possible to achieve the objective of a paperless office. It has also been planned to adopt digital signature for important communications.
- c. Proposed use of solar cells would lead to green technology.

Commercial Taxes Department, Government of Madhya Pradesh

Amit Rathore and Dharmpal Sharma

DEPARTMENT OVERVIEW

The Commissioner Commercial Tax (CCT) Department, Madhya Pradesh is the largest revenue earning establishment of the Madhya Pradesh government, having 5 zonal offices, 15 divisional offices, 80 circle offices and 32 check posts spread over the state for administering the activities of tax collection for the government. With the computerisation of the Commercial Tax Department (CTD), a Mission Mode Project (MMP), dealers/taxpayers have been provided with a gamut of services with upgraded hardware, a VAT-enabled application, and an interactive public web portal.

This project is an e-governance initiative towards improving the service levels and providing transparent, fast and efficient services to dealers/taxpayers. With the implementation of this project, the department has successfully transformed key processes leading to improved service delivery—the services include e-registration application, e-return, download of statutory forms (C Form, Forms 49 and 60, Forms E1, E2, F and H, etc.)—and built capacities among all stake holders to deliver better services.

The project has helped the department in improving tax collection from Rs. 9,416 crores in 2009–10 to Rs. 14,992 crores in 2011–12. The biggest achievements has been the growing popularity of the web portal. The web portal/application modules already launched by the department are registration, returns, tax accounting system, industrial incentive system, law and judicial system, enforcement, assessment, luxury tax and professional tax.

Some of the benefits for the dealers/CTD employees using the web portal/application are shown in Table 1.

Table 1 *Benefits of the web portal to share holders*

Benefits to dealers using web portal	Benefits to CTD employees using application
• Online application for registration • Online dealer profile access • Online return filing • Online payment of tax • Resolving dealer query through	• Processing of online return filing • Processing of online tax payment • Scrutiny of returns through system • Reconciliation of challans through system

Continues

Table 1 *Continued*

Benefits to dealers using web portal	Benefits to CTD employees using application
- helpdesk - Form 49 and 60 available in downloadable format - Online download of C Form and Forms E1, E2, F, H - Policy/act changes—Web publishing - Track application - Online filing of various other applications	- Verification of input tax rebate - Timely action against return/tax defaulters - Analysis of revenue figures/generation to help tax administration - Reduction in malpractices resulting in increase of overall revenue

A snapshot of some of the e-Services availed on the web portal from launch date till July 31, 2012 is given in Table 2.

Table 2 *e-Services availed on the web portal*

Web portal e-services	Launched on	Nos. availed up till July 31, 2012
e-Registration	August, 19, 2010	31,105
e-Return	August 19, 2010	378,878
Form 49 download	August 19, 2010	2,673,567
Form 60 download	January 7, 2012	10,296
C Form download	January 9, 2012	171,660
Other statutory forms download	January 9, 2012	7,882

To conclude, the way forward for the department will be addition of many more services, like e-payment and e-refund, to the growing list of e-services—this will provide a conducive business environment and better tax compliance.

RESULT INDICATORS

1. Key Performance

ICT Based Services

The following services are currently being delivered using ICT.

- *e-Registration:* Facility to apply for registration in the department has been made online. In this facility, TIN is allotted to the dealer on the same day of online application for registration. Details of the same are available on the web portal.

- *E>Returns:* Facility for online filing of returns has been made available on the web portal. With this facility, the process of filing returns has been eased and scope of error has been reduced.
- *Form 49:* Facility to download check post declaration form (Form 49) from the web portal. This form is now available free of cost to the dealers.
- *Form 60:* For transportation of goods through railways, the essential requirement of Form 60 has been made available online. It is not required to produce the downloaded Form 60 at the Circle Office.
- *Statutory Forms:* Facility to download statutory forms such as C Form, Form H, Form F, Form E1 and E2 have been made available online.

Services Introduced and Planned

The following services were introduced during the year.

- *e-Verification:* Facility to verify the authenticity of the dealer registration certificate has been made available online. Through this facility, the dealer can verify the registration status of a fellow dealer with whom he/she is doing business with.
- *e>Returns:* Facility for online filing of returns has been made available on the web portal. With this facility, the process of filing returns has been eased and the scope of error has been reduced.
- *Green Channel Facility:* In this facility, if a transporter (before entering Madhya Pradesh state border) fills in the tentative date and time of entry into Madhya Pradesh into the departmental web portal, then he/she will not be required to furnish Form 49 at the check post. This facility is applicable only for fully filled Form 49 details.
- *Form 49 and 60:* Facility to download check post declaration form (Form 49) and railway goods declaration form (Form 60) from the web portal.
- *Statutory Forms:* Facility to download statutory forms such as C Form, Form H, Form F, Form E1 and E2 have been made available online. It is planned to deliver the following services.
 - *e-Payment:* This facility will provide dealers/ tax payers with the option of online payment for registration, returns and penalties (if any) levied on them.
 - *e-Refund:* For any refunds applicable to dealers/ tax payers, this facility will serve the purpose.

Implementation Coverage

The application usage is spread across 5 zonal offices, 15 divisional offices, 80 circle offices and 32 check posts. The 5 zonal offices are based in Indore Zone 1 and 2, Bhopal Zone, Jabalpur Zone and Gwalior Zone. The 15 divisional offices are based in Bhopal Division 1 and 2, Chhindwada

Division, Gwalior Division 1 and 2, Indore Division 1, 2 and 3, Jabalpur Division 1 and 2, Khandwa Division, Ratlam Division, Sagar Division, Satna Division and Ujjain Division.

The stake holders will include MPCTD employees and dealers/taxpayers.

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency Improvements

The efficiency improvements in delivering of ICT enabled services can be derived from improvement in services (S), improvement in transparency (T), simplification of procedure (P) and reduction in administrative costs (C) which are enlisted module wise in Table 3.

Table 3 Comparison of processes occurring in the department before and after ICT projects implementation

Pre-project department	Post-project department
Registration	Registration
• Dealer registration done manually • Viewing of registration data with complete dealer profile was not available • Hard copies of statutory forms • Overall registration process took one working day to complete	• Online processing of dealer registration through the web portal does not require any manual intervention from CTD officials (S, T, P, C) • Viewing of registration data with complete dealer profile available on application as well as web portal (S, T, C) • Statutory forms (Forms 49 and 60, Forms C, E1, E2, F and H) issued through application as well as web portal (S, P, C) (Forms 49 and 60, Forms C, E1, E2, F and H) issued • e-Registration takes few hours to complete with saving in time and resources both for dealers and CTD officials (S, P, C)
Returns	Returns
• Dealers used to submit hard copy of returns to CTD officials at Circle Office • No cross-check of dealer-to-dealer transactions	• Online filing of returns through the web portal does not require any manual intervention from CTD officials (S, T, P, C) • Cross-check of dealer-to-dealer transactions (S)

Continues

Table 3 *Continued*

Pre-project department	Post-project department
Registration	Registration
• Scrutiny of returns not available • Entire process of return filing took one working day to complete	• Scrutiny of returns through application (S, P, C) • e>Returns take few hours to complete with saving in time and resources both for dealers and CTD officials (S, P, C)
Tax Accounting System (TAS)	Tax Accounting System (TAS)
• Reconciliation of bank challans with dealer copies done manually • Electronic porting of challans not available	• Reconciliation of bank challans with dealer copies done through application (S, P, C) • Electronic porting of challans (S, P, C)
Audit	Audit
• Institution and allotment of audit cases done manually • All necessary information unavailable to audit officer	• Institution and allotment of audit cases through application (S, T, P, C) • All necessary information available to audit officer through application (S, P, C)
Assessment	Assessment
• Institution and allotment of assessment cases done manually • All necessary information unavailable to assessing officer	• Institution and allotment of assessment cases through application (S, T, P, C) • All necessary information available to assessing officer through application (S, P, C)
Enforcement	Enforcement
• Processing of raid cases done manually • Institution and processing of penalty cases done manually	• Processing of raid cases till end point through application (S, P, C) • Institution and processing of penalty cases through application (S, P, C)
Law and Judicial System (LJS)	Law & Judicial System (LJS)
• Manual filing of appeal against order passed by assessing officer • Status of filed appeal not available online	• Online filing of appeal against order passed by assessing officer (S, T, P, C) • Checking status of filed appeal through application (S, T, P)

Continues

Table 3 *Continued*

Pre-project department	Post-project department
Registration	Registration
Management Information System (MIS)	Management Information System (MIS)
• Reports were generated manually from compiled excel files • No access privileges for viewing data	• Various types of reports made available online (S, T, P, C) • Privilege of viewing any data of any module given to supervisory officers (S, C)

Innovative Ideas Implemented

Some of the recent innovations to the original project are given below.

Dual Login Facility: A dealer can login separately with two different passwords in the same user account. While the first password could be used to access all functionalities of web portal, the second password can only be used to file returns. With this facility, the dealer has the option to provide the second password to his/her tax practitioner (TP), who can file returns on his/her behalf without accessing any other functionality.

SMS Facility: Various types of SMS (Table 4) are being provided currently.

Table 4 *Types of SMS*

SMS type	Requirement for	Sent to
Bulk SMS	Policy/act changes and other key information	Dealers
Transactional SMS	Registration status, e-return status, Form 49 download status, statutory forms request and approval status	Dealers
Pull SMS	Form 49 verification from check posts	CTD employees

Flagging of Dealers Based on Turnover: Facility to exempt small dealers from being flagged as return defaulters by CTD officials' choice.

Facilitating Early Assessment: Early initiation for assessment process bypassing the scheduled batch processes which gives flexibility to CTD officials.

Enhanced Security Features for Form 49 and Statutory Forms (C, F, H, E1, E2): Online downloadable forms available with digitally signed, bar coded and water marked features.

Green Channel Facility: If a transporter (before entering MP state border) fills in the tentative date and time of entry into MP into the web portal, then he/she will not be required to furnish e-way bill (Form 49) at the check post. However, this facility is applicable only for fully filled Form 49.

- *Multilingual Support:* Web Portal can be viewed in the Hindi language in addition to the existing English version.

Level of Integration

The MPCTD web portal/application is loosely coupled with the central level TINXSYS (tax information exchange system) application. Dealer information and data from various statutory forms is uploaded into the TINXSYS application. The validity of statutory forms issued by other states is checked using TINXSYS from time-to-time.

ENABLER INDICATORS

1. e-Governance Policy and Strategy

Objectives

The following are the objectives for the department:

- To provide a hassle-free and progressive tax administration regime through the latest software solution
- To offer dealers/taxpayers with e-services so that he/she can access those services from home/office
- To prevent tax evasion practices by bringing more and more dealers/taxpayers under the gamut of taxes
- To establish a corruption-free system for providing transparent, fast and efficient services
- To make the process of tax intelligence and self-compliance more effective and efficient
- To strive towards creating a paperless office environment

Shared Infrastructure

The MPCTD web portal/application uses the state wide WAN (i.e., MPSWAN) for providing access to dealers/taxpayers and CTD employees across the state.

2. Process Reengineering

Tables 5–8 show examples of front-end and back-end process changes that were implemented in services.

Table 5 *Changes in the registration process (net saving of three days)*

Before computerisation			After computerisation	
No.	Activity	Day	No.	Activity
1.	Dealer provides registration details and required documents to his or her CA/tax practitioner (TP)	1	1.	Dealer provides registration details and required documents to his or her CA/tax practitioner (TP)
2.	CA/TP fills up registration application and attaches the required documents	1	2.	CA/TP downloads the registration template, fills it up and uploads the same
3.	CA/TP submits registration application along with documents in the circle office	1	3.	The circle-in-charge (CIC) verifies the application and issues the TIN
4.	Section clerk prepares notesheet to put up application to circle-in-charge (CIC)	1		
5.	The CIC calls dealer to verify details and issues the TIN	1		
Cost of registration application: Rs. 500/-			Cost of registration template: Nil	

Table 6 *Changes in the filing of returns process (net saving of 3 days)*

Before computerisation			After computerisation	
No.	Activity	Day	No.	Activity
1.	Dealer provides turnover figures to his or her CA/ Tax Practitioner (TP)	1	1.	Dealer provides turnover figures to his or her CA/ Tax Practitioner (TP)
2.	CA/TP prepares the Returns form manually	1	2.	CA/TP downloads the Returns template, fills it up and uploads the same
3.	CA/TP submits the Returns form in the circle office	1		
4.	Section clerk gives Returns receipt on same/next day	0–1		
5.	Section clerk enters Returns detail onto the system	1		

Table 7 *Changes in Form 49 process (net saving of 4 days)*

Before computerisation			After computerisation	
No.	Activity	Day	No.	Activity
1.	Dealer notifies requirement of Form 49 to his or her CA/TP	1	1.	Dealer notifies requirement of Form 49 to his or her CA/TP
2.	CA/TP files application for Form 49 to circle office	1	2.	Dealer/CA/TP applies for Form 49 on web portal

Continues

Table 7 *Continued*

Before computerization		After computerization	
No.	Activity	Day	No. Activity
3.	Section clerk prepares note sheet to put up application to circle-in-charge (CIC)	1	3. Dealer/CA/TP downloads the requested Form 49
4.	CIC sanctions the request	1	
5.	Section clerk informs dealer to get his or her seal and collect Form	1	
6.	Peon puts department's and dealer's seal on Form 49 and issues it to dealer	1	
Cost of form 49: Rs. 1/-		Cost of form 49: Nil	

Table 8 *Changes in statutory forms (net saving of 3 days)*

Before computerisation		After computerisation	
No.	Activity	Day	No. Activity
1.	Dealer notifies requirement of statutory form to his or her CA/TP	1	1. Dealer notifies requirement of statutory form to his or her CA/TP
2.	CA/TP files application for statutory form to circle office	1	2. Dealer/CA/TP applies for the statutory form on web portal
3.	Section clerk prepares note sheet to put up application to circle-in-charge (CIC)	1	3. CIC checks for Dealer's No Dues and Return Filing status
4.	CIC checks for Dealer's No Dues and Return Filing status	1	4. CIC approves the request and the dealer downloads statutory form
5.	CIC sanctions the request	1	
6.	Section clerk informs dealer to get his or her seal and collect form	1	
7.	Peon puts department's and dealer's seal on Statutory form and issues it to dealer	1	
Cost of statutory form: Rs. 1/-		Cost of statutory form: Nil	

3. Capacity Building

Leadership Support

Two rounds of training of trainers (ToT) had been planned by the system integrator (TCS) as part of the capacity building plan. The first round of ToT has already been conducted and the second round will be initiated

soon. In addition to the ToTs, the department has also conducted state-wide trainings using the trained trainers in various circle offices.

Change Management Strategy

Change management was not required as the department was already using an old application with minimal features developed much earlier.

Project Management

Project Management is being carried out by a full-time project management consultant (PMC) from Wipro Ltd. who is stationed at the MPCTD premises. The following are the roles of the PMC.

- Evaluating change requests and monitoring the implementation of the MPCTD web portal and application
- Conducting day-to-day programme management for various IT initiatives
- Assisting the client and other vendors for finalisation of SLA and resolving technical issues
- Scrutiny and validation of various documents presented by the system integrator

Financial Model

Since the project is under the Mission Mode Project (MMP) scheme, the project cost is shared by the central as well as the state government.

4. Technology

The following methodology was adopted for implementation:

Analysis Phase: MP CTD had formed dedicated module teams comprising of MP CTD personnel involved in the relevant business domain. In each module team, one senior official (Deputy Commissioner or Assistant Commissioner) was designated as module team leader.

Finalisation of Gap Analysis Document: Along with the TCS (system integrator) team, MP CTD module teams analysed and documented the departmental requirements as per the new act, provisions and functionalities. The gap analysis document (GAD) was approved by MP CTD

Customisation of Application Software with Functional Testing: Based on GAD, TCS completed the customisation of the application. Comprehensive functional testing was conducted at the headquarters by CTD and TCS personnel. Reports with comments and suggestions by the module team members were submitted to the department and conveyed back to the TCS team for necessary action.

Hardware Procurement and System Integration: MP CTD formed a Technical Core Committee, which reviewed and approved the processes and

activities of project execution including the hardware sizing, tendering and bid evaluation. The PMC, M/s 3i Infotech, prepared tender documentation in consultation with the Technical Core Committee and TCS. After evaluation, M/s Tulip Ltd got the contract for hardware procurement, system integration and facility management services.

User Acceptance Tests (UAT): M/s Tulip completed setup of the data centre for UAT commencement. The third party testing agency, STQC submitted their test plan and provided sample test cases. TCS conducted the UAT and implemented the suggested changes.

User Training, Pilot Testing and Go Live: The first phase training by TCS was already provided to around 1000 CTD personnel (operating staff) on the application/web portal. Pilot testing took place after the successful completion of UAT. MP CTD identified the locations for pilot testing. The application went live on July 6, 2010. There was a one year warranty period after the completion of go live.

Post Implementation Maintenance with Change Requests (CRs): Three years of post implementation maintenance period commenced after the completion of the warranty period. Any further modification to application is being carried out under CRs.

The technology used is explained in Table 9.

Table 9 Hardware and software used for the ICT enabled services

Technology used	Details
Operating system hosting the website	Red Hat Enterprise Linux 4.0 64-bit
Web page development language	Java JDK 1.5, Struts, Servlet and JSP
Database	Oracle 10g Enterprise Edition Release 10.2.0.1.0 64-bit
Application/Web server	Oracle Application Server 10.1.3.1

Disaster Recovery and Service Continuity

The disaster recovery (DR) site has been set up at Bhopal in addition to the data centre (DC) site at Indore. The database server at the DR site takes real time backup of the data being stored at the DC site. There is also a dedicated application server and web server at the DR site which can provide service continuity in case of failure of servers at DC site.

VALUE INDICATORS

1. Digital Inclusion

To address language differences, the application has been designed in both English as well as Hindi to suit the needs of each and every stake holder.

2. Green e-Governance

In order to strive towards creating a paperless office environment, the department initiated e-services which has helped reduce the overall paper consumption to a large extent. Paper savings has taken place in terms of printing of registration form (4 pages), returns form (4 pages), Form 49 and 60 (2 pages each) and statutory forms (1 page each). Power saving has been taken into account while purchasing computer hardware for the department computerisation. A suitable example would be the purchase of LCD monitors in place of CRT monitors for reducing power consumption.

Amit Rathore, Commissioner, Madhya Pradesh Commercial Tax Department, Government of Madhya Pradesh, Bhopal. e-mail: commissioner.h0@mptax.gov.in
Dharmpal Sharma, Assistant Commissioner, Madhya Pradesh Commercial Tax Department, Government of Madhya Pradesh, Bhopal. e-mail: dp.sharma@mptax.mp.gov.in

Treasuries and Accounts, Government of Rajasthan

Veebala Joshi and I D Variyani

DEPARTMENT OVERVIEW

The Directorate of Treasuries and Accounts (DTA), set up in 1960, is the financial and technical controller of all the district treasuries of Rajasthan. It is the responsibility of DTA to provide department wise monthly revenue and expenditure details received from the treasuries to the Finance Department of the Government of Rajasthan. The Director, Treasuries and Accounts is responsible (Figure 1) for guiding the treasury officers in technical matters and ensuring their implicit obedience to Treasury Rules particularly with regard to receipt, custody and withdrawal of funds from the treasury, compilation of accounts and their rendition to the Accountant-General. Headquarters of DTA is in Jaipur. Presently, a total of 38 treasuries are functioning in Rajasthan and one at New Delhi, out of which 32 are district treasuries, located at district headquarters, and 6 are special treasuries. Under these treasuries, a total of 221 sub-treasuries are in function. Sub-treasuries function at the tehsil level. They can pass bills for the offices under their jurisdiction.

Accounts are a tool for effective and efficient management in an organisation. They are the most important data essential for planning, decision making, control, feedback and for effective functioning of the organisation. In India, the Treasuries play a vital role in fiscal arrangements. Under the treasury system, the treasury is the basic fiscal unit and focal point for the primary record of financial transactions of the government. It forms a link between Drawing and Disbursing Officers (DDOs), where the financial transactions actually takes place, and the Accountant-General (AG) office, where the accounts are finalised. Thus, the treasury is the main and vital means to compile revenue and expenditure, control budget and maintain fiscal discipline. Financial statements show the overall position of revenue received and expenditure incurred during the year.

The state government uses the financial statements received from the treasuries as a guideline for preparation of budgets. On the basis of the financial statements received by the treasuries, the government regulates and supervises the ways and means position of the state. In turn, on the basis of revenue statements, the government decides taxation policies.

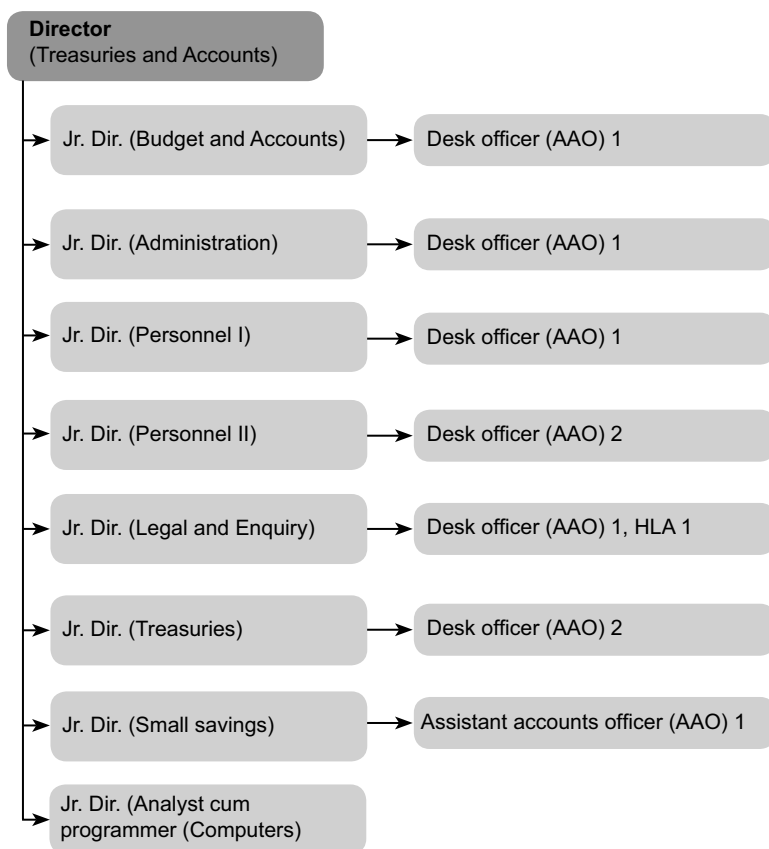


Figure 1 Organisational structure of DTA

Approach to e-Governance

The department had taken the initiative for e-governance long back in 1995–96 when computerisation of treasury accounts was taken up with the help of NIC. Rajasthan was one of the pioneer states where voucher level computerisation had been achieved at the treasury level. All the treasuries were computerised in a phased manner. In the first phase, the compilation section of the treasury was computerised. In the second phase of the computerisation, other sections of the treasuries was taken up. Phase III and IV of the treasury computerisation included the computerisation of independent sub-treasuries and their connectivity with treasuries. During 2002–03, another project was initiated which was aimed at computerising the salary bills of the employee drawing salaries from the treasuries. The objective of this project was to reduce the manpower efforts in pay bill preparation, its checking, and availability of data in the electronic form for deduction and collection agencies like SI and GPF, LIC etc, and preparation of a data repository for employees.

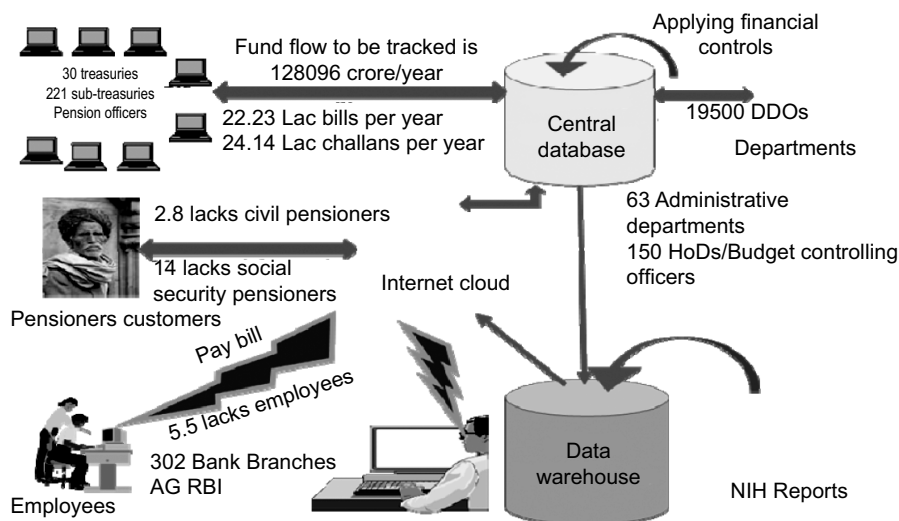


Figure 2 IFMS: Web based solution

The treasury application was in use till 2010–2011. Since the application was developed in 1996 on the technology prevalent at that time, it was offline based. Because of the increasing demand for information on a click and obsolescence of technology, the Integrated Financial Management System (IFMS) was introduced. IFMS (Figure 2) was taken up by the Department of Treasuries and Accounts in 2010–11 and later on it became part of a Mission Mode Project of the National e-Governance Plan (NeGP).

Integrated Financial Management System (IFMS)

The IFMS is sanctioned under a Mission Mode Project as a part of NeGP. The Finance Department, Government of Rajasthan has entrusted the IFMS project to NIC, Rajasthan. DTA is the nodal department for implementing the project.

- i. IFMS has been conceptualised to address the shortcomings of the earlier offline computerisation pertaining to budget processes and treasury functions. The state government took up its implementation in the year 2010–11. IFMS is a web based solution for the complete government financial accounting process, but in practice it is more than that.
- ii. After IFMS implementation, the treasury and in turn the Finance Department can have a complete picture of the total budget expenditure compared to allotted budget on a day-to-day basis. Today, a bill is passed by the system only when sufficient budget is available in the department—the concerned accountant need not check the budget from the printed budget volume. Any change in budget allocation by the Finance Department (FD) is instantly reflected in the system. Similarly, information of complete revenue receipts is also available on this system. After implementation of e-GRAS, this information of revenue receipts will also be available on

real time basis. Today, the Finance Department is in a better position in terms of financial planning and revising budget allocation according to the availability and expenditure status which is available on IFMS. *So the IFMS is a sum total of activities like planning, estimates preparations, distribution/allocation of budget, fund management, treasury functions, e-government receipt accounting system and interfacing with external users like citizens, banks and AG and RBI.*

- iii. The IFMS has been designed to develop as an umbrella system covering all modular systems and their integration to ultimately achieve the status of complete computerisation of state wide financial transactions with an aim of efficient monitoring. It is indeed a system which has been developed to automate accounting processes in a more efficient and transparent way. It has made the state budget estimation, finalisation and distribution process online which in turn has become an effective budget control tool.
- iv. Though the state treasury (39 treasuries and 221 sub-treasuries) used computers even before IFMS, with IFMS they also have all their functions online (from May 1, 2011). Communication with all banks (345 bank branches) and AG offices has become very fast. The online availability of payment and receipt information for reconciliation has made the task easier. The database of complete employees is available and pensioners of the state will also be available for planning purposes. Through online payment of salary, there will be no chance of any mistake. An employee has access to his or her salary status. The tax payer will also be benefited by any where any time tax payment facility proposed to be made available through e-GRAS. For pensioners, pension tracking of an individual pensioner will be possible. Similarly, for social security pensioners, the process of application filing, sanction and disbursement has completely been automated resulting in saving of time and energy.
- v. IFMS is a comprehensive system of financial practices and transactions. The scope of IFMS consists of modules like
 - Budget module
 - Annual development plan module
 - Treasury module
 - e-GRAS module
 - Social pension module
 - Civil pension module
 - Payroll module
 - Fund management module
 - Financial data warehouse module

Goals and Objectives

The state government is committed to placing a high premium on good governance, transparency and accountability. Optimum utilisation of

technology will help in minimising discretion and delays in delivery of public services. Automation of government processes through technology will ultimately result in reducing the difficulties of the public.

The integrated financial management system is an e-governance initiative of the state government. It is a web based system for complete government financial accounting which includes budget planning, estimates preparations, distribution/allocation and fund management, treasury functions, etc. This system is capable of enabling controlled and efficient access to all the financial data of the government and provides a support system to strengthen government financial controls. It eventually improves government services and expedites government operations, making the budget process more transparent.

The project is expected to make the budgeting processes more efficient, improve cash flow management, promote real time reconciliation of accounts, strengthen the management information system (MIS), improve accuracy and timeliness in accounts preparation, bring about transparency and efficiency in public delivery systems, better financial management along with improved quality of governance. IFMS would facilitate the convenience of anywhere anytime payment of tax, employees and pensioners' portal with all details, database of social security pensioners with particulars of disbursement.

The ultimate goal of the project is to ensure transparency and accountability in the public financial management system. The major objectives include

- facilitate citizens by providing timely pension payments
- electronic payments to initiate faster payments and green governance
- eliminate redundancies and integrate data to ensure better financial control and information system
- ensure effective control by quick availability of data/ MIS
- improve treasury system and budget control
- improve strategic and day-to-day decision making
- improve efficiency and reduce cost of operations
- provide better interface with RBI, agency banks and accountant-general
- provide better interface with external stakeholders: employees, pensioners, taxpayers, contractors and suppliers
- ensure adequate controls to minimise risk of fraud and malpractices
- increase accountability and transparency in financial operations

RESULT INDICATORS

1. Key Performance

ICT Based Services

Spread of Project Service Users (Stake holders)

- Finance department
- Departments
- Treasuries and sub-treasuries
- Drawing and disbursing officers
- Citizen (i.e., taxpayers, social pensioners, pensioners)
- Employees
- Banks
- Accountant-general office

The IFMS offers services to the stakeholders in the following categories.

- Government-to- government services (G2G)
- Government-to-business services (G2B)
- Government-to-citizen services (G2C)

Government-to-Government Services (G2G)

Finance Department

- Monitoring and controlling of state revenue and expenditure
- Effective management of state finances so that funds are optimally utilised for various citizen centric projects
- Online budget estimation, finalisation, distribution and re-appropriation
- Managing the total budget process and timely release of grants/funds to government departments/organisations
- Effective support and coordination with other departments specially for budget process, disbursement of grants, bill processing, PD account maintenance
- Revenue trend analysis
- Decision support system including MIS
- Active communication with banks/RBI and AG office

Departments

- Online budget distribution and control and revenue trend analysis
- Utilisation of savings in due time
- Monitoring of subordinate offices in regard to budget and accounting
- Internal e-audit facility
- Easily available MIS for regular monitoring
- Interface with external users like AG, banks, etc

Treasuries

- Online bill processing
- Online payment advice to banks

- Online payment by banks and intimation to treasuries
- Online accounts scroll and reconciliation
- Online submission of accounts to AG
- Effective budget control in heads of offices
- Interface with AG, RBI, banks, Directorate of Pension and Pensioners' Welfare
- Real time and error free reconciled daily receipts and payment position
- Electronic centralised payroll system
- All relevant MIS for appropriate accounting

Drawing and Disbursing Officers (DDOs)

- Online bill submission
- Online bill tracking
- Online payments and receipts information
- Real time expenditure status
- Centralised payroll system
- Easily available MIS in regard to accounts, employee information, payments status

Government-to-Business Services (G2B)

- Electronic data transfer between treasuries and associated banks for e-scroll, encashed cheques and ECS/EFT payments are being carried out. Salary of the employees is being transferred electronically to banks.
- The virtual treasury (e-treasury) will be a portal with the facility of online payment of various taxes by using e-payment facility of the banks and e-communication for all kinds of confirmations and transactions.

Government-to-Citizen Services (G2C)

Employees

- Employee portal with all required information
- Online deductions for income tax, SIPF (state insurance and provident fund) and other deductions
- Online salary slips
- Online transfer of salary details

Pensioners

- Complete pensioner portal with all information
- Online status of pension case
- Pension tracking of individual pensioners

Citizen/Taxpayers

- It would enable taxpayers or taxpaying agencies to fill up their challans any where any time on the e-treasury website
- Taxpayers would have the facility to deposit online payment and know the status of their payments

Social Security Pensioners

- Complete pensioner portal with all information

- Online system for submission of application, its verification and sanction of pension
- Interface with banks and post offices
- Pension case tracking
- Electronic money orders

Implementation Coverage

It covers offices situated in Rajasthan as well as offices established in Delhi under the Government of Rajasthan. The project is implemented in all the treasuries, sub-treasuries, DDO offices, sub-divisional offices, block development offices, departments, AG office, finance department and banks. Over 18000 DDOs covering around 5.50 lakhs employees of the 39 treasuries of the State of Rajasthan are covered under this project. The target locations and beneficiaries are given below.

Finance Department		
Directorate of Treasuries and Accounts		
Directorate of Pension		
Administrative departments	–	63
Head of departments	–	150
Treasuries	–	39
Sub-treasury offices	–	221
Drawing and disbursing officers	–	19500
No. of employees	–	5.5 lakhs
Civil pensioners	–	2.8 lakhs
Social security pensioners	–	14 lakhs

2. Efficiency and Improvement Initiatives

Project Timelines and Milestones

The IFMS is sanctioned under a Mission Mode Project as part of the National e-Governance Plan (NeGP). The Finance Department, Government of Rajasthan has entrusted the project to NIC, Rajasthan. DTA is the nodal department for implementing the project. Table 1 shows the highlights of the project.

Table 1 Highlights of the project

MoU signed on	November 24, 2009
Mou between	Finance department, Government Of Rajasthan, National Informatics Centre and National Informatics Centre Services Inc. (NICSI)
Operations started on	February 9, 2010
Department	Finance department Government of Rajasthan

Nodal department	Directorate of treasuries and accounts
Implementing agency	National Informatics Centre, Rajasthan
Total project cost	33 crores
Project period	5 years
Project sanctioned under Mission Mode Project as a part of National e-Governance Plan (NeGP) of the Government of India	

Time and Cost Efficiency Improvements

In Availing Services

Before discussing the cost involved, the concept behind the project is elucidated here. The project aims at providing services to citizens, employees, departments, drawing and disbursing officers, civil pensioners, and weaker sections of the society faster, more timely and accurately by strengthening the procedures using e-governance. The cost-to-benefit ratio of this project cannot be measured merely in terms of rupees incurred, spent, saved or earned, but in terms of improved efficiency leading to improved performance of the services and lowered cost of delivery of services for the government.

There was no cost involved in availing the services for the beneficiaries; however, establishing of infrastructure and development of the application involved cost and the same was procured through NIC on a cost plus basis. However, availing the services saved significant time for the beneficiaries as well as government and use of modern technology in providing the services of electronically transferring payments led to green governance by saving time, paper and power.

In Delivering Services

The cost of delivery of services in the earlier system included the manpower cost involved in repetitive non-value added services. In the current system, it was deliberately planned to keep technology simple and use the internal resources and manpower to the maximum possible extent so that acceptance is high and risk due to change is minimal. This has been the biggest area of success in this project. The processing time has come down significantly as only minimum changes are required to process and print the salary bills. Also, availability of pay slips and other reports on the net made access easy and faster without the employees moving anywhere. Electronic data exchange with banks, instead of sending cheques, also saves cost of printing the cheques. Printing of reports saves lots of time in comparison to writing with hands. The validation and checks imposed in the system saved time and manpower cost, generation of electronic advice and money order saved paper and time and improved performance.

Innovative Ideas Implemented

The major innovations include the transfer of salary electronically using digital signature authentication along with the transfer of personal deductions, for example, deductions due to court order, departmental recoveries etc.

- Initiation of salary payments through electronic mode using intra bank transfer as well as NEFT. It is the first application of the state where payment is being made through electronic transfer
- Highly secure as authentication is based on digital signature
- Integration with departments and banks
- Unified coding pattern for allowances and deductions throughout the state
- Transfer of payments related to personal deduction/cooperative directly to banks through electronic mode as being part of the salary
- Report formats were changed and brought under the size of A4 papers—earlier, big 132 column papers were used for reports
- Initiation of electronic money order concept in the state as a pilot test
- Single web based application for the state itself is a major innovation looking at the wide geographic spread of the population and large numbers of target beneficiaries and location

Level of Integration

The IFMS project has been conceptualised with the view to either provide interface or integrate with the other internal or external ICT systems. It has been integrated with some internal ICT systems and has provided interface to other external systems as mentioned below:

- The PayManager application is fully integrated with the treasury application. The pay bills prepared using PayManager application becomes input to the treasury application.
- The budget application is integrated with the treasury application which gets the input from the budget application.
- Banks have been provided interface for downloading the payments information in such a way that the same information may be used in the banks application without any change. The formats for NEFT and intra banks transfer have been designed as per requirements of the bank application.
- The AG interface in the treasury application has been built to provide the receipts and payments information to AG office in similar formats so that the AG application directly accepts it without any change.
- Banks are uploading the manual payments data in the treasury system in a format mutually agreed upon.
- Departments like commercial taxes, SI and PF and LIC etc. are downloading the softcopies of the required data and uploading them into their ICT systems for further analysis. The information is being provided in mutually agreed upon formats.

Major Outcomes and Achievements

The major outcomes and achievements of the department are:

- Automation of all financial and accounting practices
- Creation of an IT culture in the state as drawing and disbursing officers are spread across the state
- Standardisation of allowances and deduction throughout the state
- Ensured faster and timely payments due to transfer of salary through electronic mode
- System is capable of interfacing with external users like agency banks, AG and RBI
- Single web based application is widely accepted across the state and is being used by all drawing and disbursing officers drawing salary through the treasury
- Software helped to identify duplicate employee id
- Availability of consolidated database of the employees
- Electronic data exchange with banks save paper and make the department environment friendly
- Streamlining of manual practices by business process re-engineering

The major outcomes and achievements of the project are:

- Online estimation, preparation and distribution of budget
- Online treasury functions, i.e., bill receiving, passing and account compilation
- Online budget control
- Online application for social security pension including application receiving, verification, sanctioning of pension, printing of money orders, pension case tracking
- Online pay bill preparation by implementing a web based solution for the state causing uniform pattern for salary preparation and providing salary slips to employees on a single click
- Enhanced security by implementing digital signature for fund transfer
- Maintenance of stamps inventory using the online stamps inventory application

ENABLER INDICATORS**1. e-Governance Policy and Strategy****Vision**

The vision of the department is to bring transparency and accountability in the public financial management system, make available information on a 'real time basis' and provide the services to departments, employees and citizens, efficiently and timely with the optimum use of modern technology.

Current Status

Applications/Activities Implemented During 2010–11

Budget Module (<http://rajkosh.raj.nic.in>): Application for budget estimation, distribution and processing was developed and implemented in October, 2010. The state budget 2011–12 was prepared using this application. The budget distribution was also carried out using this application.

Network Connectivity: Local area network (LAN) was established at the Directorate and in treasuries. Network connectivity was also established in all the treasuries and sub-treasuries providing lease lines and VPN on broadband connection. All the treasuries were equipped with lease lines/ NICNET and sub-treasuries were provided BSNL VPN over broadband.

Applications implemented during 2011–12

Treasury Module (<http://rajkosh.raj.nic.in>): Application for treasury accounting was implemented on May 1, 2011 in all treasuries and sub-treasuries. The functionalities include bill receiving, bill passing, budget checking, cheque printing, account compilation and reports.

Social Security Pension Module (<http://rajsp.raj.nic.in>): This online system provides public and social assistance to the weaker sections of the society by facilitating timely and hassle free disbursement of the social security pension payments. Application for social security was implemented in October 2011 in the treasuries, sub-treasuries, sub-divisional officers and block development offices. The functionalities include application receiving, sanctioning of pension, verification, pension preparation, money order printing and reports.

Pay Bill Preparation Module (<http://paymanager.raj.nic.in>): PayManager application was implemented in December 2011. It is a web based application used by over 17855 drawing and disbursing officers covering 5.27 lakhs employees of the state with the facility of preparing salary bills, DA arrears, bonus, surrender bills and with the facility of generating softcopies for further merging of the pay bill data in the treasuries for further analysis. It facilitated the drawing and disbursing officers/ employees of the state to get information on a real time basis along with the electronic transfer of payments which led to faster and timely payments into individual's bank account with the means of authenticated data transfer using digital signature at both ends, i.e., treasury as well as the bank's end.

Interface Module (<http://rajkosh.raj.nic.in>): The interface module for the Accountant-General (AG) and banks has been extended from June 2012. This module provides transactional data to AG and banks electronically and in turn, banks also upload the processed data to treasuries electronically by uploading information on the website.

Annual Development Plan Module (<http://ifms.raj.nic.in>): This module has been extended to facilitate the linkage between the planning department and the finance department to monitor expenditure on various schemes as well as to prepare the estimates for budget provisions.

Post, Vehicle and Computers Module (<http://ifms.raj.nic.in>): This module has been developed to facilitate the finance department to capture information regarding posts sanctioned, vehicles and computers available in various offices of the state.

Applications in Process and to be Implemented during 2012-13

Stamps Module: Stamps application is being developed with the objective of making real time stock of stamps inventory available in the state. It would facilitate demand raising, issues of stamps, sale of stamps, stock maintenance and reports.

e-Gras Module: The main objective of e-Gras (government receipt accounting system) is to facilitate the taxpayer's convenience in many ways including any where any time payment, extended time and a choice of banks. Similarly, it will be a place where all proper electronic accounting and reconciliation process can be maintained on real time basis. The system would facilitate electronic payment to citizens using net banking.

Civil Pension Module: The civil pension application is being developed with the objective of maintaining the records of civil pensioners electronically and keeping a watch on overpayments to pensioners.

Other modules that are expected to be implemented during this financial year are the fund management module, the annual development plan, long term advances, transfer entries.

Shared Infrastructure

The department is making full use of the common infrastructure created in the state. The common infrastructure being shared is:

- NICNET services created by NIC for net connectivity under IFMS project
- Departmental servers are hosted at NIC data centre; no additional data centre has been created
- Technological services of NIC district centre are being used to provide technical support and training services; no additional infrastructure for support services has been created by the department
- The department is making use of state training institutes for providing training to users
- Video conferencing studios created by the states are being used by the department for review and training programmes
- DR sites, already placed by NIC, would be used by the department

Technology Standardisation

The project is fully owned by the Government. The Directorate of Treasuries and Accounts with the technical support of NIC implemented the project. The software was developed by NIC after a rigorous system study.

2. Process reengineering

To implement the IFMS application in a sustainable manner various government orders were issued and reforms carried out.

- Treasuries were asked to entertain only computerised salary bills
- Bulky monthly salary bill format was modified so as to ease the printing of bills on computer stationary of A4 size
- Bulky budget formats were re-designed and reduced from 33 formats to 11 formats
- e-Treasury concept was introduced and rules for e-treasury framed
- Electronic transfer of payments was introduced and the procedure for electronic payments was laid down with banks
- Electronic money order process was initiated
- Security based on digital signature was introduced in the treasuries for electronic payments
- Unified coding pattern was introduced for offices, departments, allowances and deductions
- Electronic data exchange formats with banks were finalised and emphasised electronic payment transfer
- Monthly reconciliation of accounts with the department process was initiated to minimise transfer entries
- Treasury procedures were standardised
- Detailed guidelines for revised budget practices were issued

3. Capacity Building

Leadership Support

Project Teams at the Policy Level: Principal Secretary (Finance) → Secretary Finance (Budget) → Director Treasuries and Accounts (DTA)(Project Implementation Coordinator with respect to administration) → State Informatics Officer (NIC)(Project Manager)

On Requirements Basis: Director Treasuries and Accounts (DTA)(Project Implementation Coordinator with respect to administration) → State Informatics Officer (NIC)(Project Manager).

Fulltime: Joint Director Treasuries and Accounts (DTA)(Project Implementation Coordinator with respect to administration) → Scientist 'D' (NIC) (Project Coordinator for Design, Development and Implementation (Technical)) → DIOs of NIC and Treasury Officers.

The project is running successfully since 2010–11 and that speaks excellently of the top-level support for the project.

Project Teams: Implementation

Director Treasuries and Accounts (Project Implementation Coordinator with respect to administration) → State Informatics Officer (NIC), Project Manager → Scientist 'D' (Project Coordinator for Design, Development and Implementation (Technical)) → DIOs of NIC, Treasury Officers and Sub-treasury Officers for Implementation.

Change Management Strategy

User department requests NIC for any change in requirements. The 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. Then the new version of the software is released. Refresher training sessions for master trainers are also organised in case of major changes.

Capacity Building Plan

Various training programmes and workshops were organised to train and sensitise the workforce. Initially, three persons from each treasury (consisting of two persons from treasury, one technical assistant and district informatics officers), i.e., 150 personnel were imparted training and declared as master trainers to impart further training to the rest of the users at their respective locations. Video conferencing sessions were held to impart training to users. Refresher training sessions were also organised for the master trainers to make them aware of the changes carried out time to time in the application. Training sessions were also organised at district locations to impart training to drawing and disbursement officers. Training sessions and workshops were also organised for all departments to sensitise as well as to impart training for various modules. The department is also trying to make this project a part of the regular training programmes or refresher course, organised by the it time to time as a part of the service.

Project Management

Project monitoring is a major step for the success and sustainability of the project. The IFMS is consistently and closely being monitored by the Finance Department as it pertains to the complete accounting and financial practices. All the exercises required for business process reengineering are being done by the Directorate Treasuries and Accounts with the help of the departments and treasury officers. Different information is sought from the department and treasury officers regarding the use of the software to

monitor the project. This information in various formats is very helpful to assess the project. Regular workshops and meetings are also organised to tune them with the latest versions of the software.

Financial Model

The IFMS is sanctioned under mission mode project as a part of the National e-Governance Plan (NeGP) where 75% of the funds would be provided by the Government of India and the rest 25% would be the responsibility of the Government of Rajasthan. The project costs Rs. 33 crores which includes hardware for the data centre, finance department, directorate of treasuries and accounts, treasuries and sub-treasuries, system software, network establishment, application software development, trainings, handholding support and civil work.

At DDO Level: No manpower was sanctioned. The existing manpower was trained to use the software. Hence, the software did not put any burden on the DDO offices. Wherever DDOs were not equipped with computer systems, they were asked to get the salary bills prepared from common service centres (CSCs) or computer service providers (CSP) identified by the treasuries at specified rates.

At Treasury Level: Technical manpower has been provided on a contract basis under the IFMS project to assist the treasuries technically. The existing treasury staff was imparted training to make them master trainers.

At Sub-Treasury Level: No additional manpower was sanctioned. The existing sub-treasury staff was imparted training for various modules. They are also using the same application.

Additional hardware was made available to treasuries based on the requirement assessed by the department.

Efforts at Sustainability

To ensure sustainability of the project, the following procedures are adopted.

- BFC meetings are being conducted using this system only
- All departments make the budget allotment for their subordinate offices through this system
- Submission of monthly accounts to the Accountant-General office using the online treasury module only was made mandatory for all treasuries
- e-Payments for salary and other bills have been made compulsory for all treasuries and DDOs
- Online preparation of bills was made mandatory at the DDO level and treasuries were directed to entertain only online salary bills
- Proper trainings are organised.
- Proper technical support is provided to treasuries and DDO offices.
- Refresher training programmes are being organised time to time.
- Video conferencing sessions are being held with the users

- Review meetings for progress are also being held.

Computer Service Provider

Many of the DDOs in the state are not equipped with computer systems. DDOs, not having computer systems, are allowed to use the services of computer service providers (CSP) to prepare computerised salary bills. CSPs are designated for each treasury to prepare the salary bills at the prescribed rate.

Service Users' Feedback Mechanism

DDOs can directly give their feedback to the Director Treasuries and Accounts (DTA) as well as to treasury offices. Anyone concerned can send their feedback through e-mail. Regular meetings are held at the DTA office to discuss issues related to feedback and changes of requirements. User feedback is also taken during the workshops whenever organised. Helpdesk facility was also established at the Directorate to directly interact with users. The facility to provide feedback and raise issues has also been built in the PayManager application—a blog was created where the user can write his/her problems or suggestions. A separate e-mail account has also been provided to send the feedbacks related to different applications. Review meetings and video conferencing session are also organised with treasuries, banks and departments.

Implementation Challenges

As the user at the implementation locations, i.e., DDO offices, SDO offices, DBO offices was not very acquainted with information technology, it required a lot of effort to implement the software. The main challenges were:

To Impart Training of the Software: As the users were located in a widely geographically spread area, imparting training was a big challenge. Modern technology 'training through VC' mode was used. Master trainers were also prepared to impart training personally in the field.

Users were not very Acquainted with the Computer System: It required a lot of effort to make them ready to use computers. Sophisticated user manuals and brochures were prepared. Proper guidelines and instructions were circulated in the state. Users were made aware about the benefits of using the computer systems.

Identification of all the Allowances and Deductions given to Employees: Since different department gave varieties of allowances, it was a huge exercise to identify all the allowances. Workshops were organised with major departments to collect the information and make them unified. Uniform codes were allotted to various allowances and deduction.

Changes in the Existing Proformas: Several different formats were designed and presented in the workshops to finalise the proformas.

Development and Implementation of a Uniform Software for the Large Number of Departments: Several workshops were organised with the department to study and freeze their requirements. Various prototypes were discussed with users.

Quantitative Figures

Tables 2 and 3 show some important statistics of the IFMS project.

Table 2 *Yearly transaction volumes*

Transaction description	Volumes
Bills per year	24 lakhs
Challans per year	17 lakhs
Social pensioners	14 lakhs
Civil pensioners	2.8 lakhs
Employees	5.50 lakhs

Table 3 *Trainings and workshops details*

Date	Days	No.	Participants
22/10/2010	1	39	Workshop of treasury officers
25/11/2010	1	34	Workshop of treasury officers for social pension
15–18/02/2011	4	86	Training on treasury application; two persons from each treasury and eight from DTA
14/03/2011	1	71	VC with treasuries and DIOs for demonstration of treasury application
29/04/2011	1	81	Training on treasury application; two persons from each treasury and three from DTA
14/06/2011	1	38	Training on treasury application for deployed technical manpower
21/07/2011	1	68	Workshop for e-GRAS with departments; total participants were 68
19-23/09/2011	5	140	Training on SSP application to prepare master trainers; four persons from each treasury (SDO, BDO, treasury and NICSI) attended
22/09/2011	1	39	Workshop of treasury officers to review and learn new development
23/09/2011	1	33	Workshop of DIOs
24/11/2011	1	6	Training on SSP application at helpdesk to sub-treasuries (Sanaganer, Amer, Bassi and APPO Jaipur) of Treasury Jaipur® and Treasury®
25/11/2011	1	6	Training on SSP application at helpdesk to sub-treasuries (Chaksi, Jamwa-Ramgarh, Shahpura, Kotputali and Virat Nagar) of Treasury Jaipur®
28/11/2011	1	4	Training on SSP application at helpdesk to sub-treasuries (Samber, Chomu, Dudui and Fagi) of Treasury Jaipur®
29/11/2011	1	11	Training on SSP application at helpdesk to BDO staff of District Jaipur (Jamwa-Ramgarh, Shahpura, Amer, Bassi, Kotputali, Sanaganer and Virat Nagar)
05/12/2011	1	8	Training on SSP application at helpdesk to BDO staff of District Jaipur (Dudu, Samber, Fagi, Chaksu, Shapura, Sanaganer and Virat Nagar)

Continues

Date	Days	No.	Participants
13/12/2011	1	4	Training on SSP application at helpdesk to treasury Chittorgarh, sub-treasury Gangnar, Bari Sadari and Begun
19-20 /12/2011	2	600	PayBill application for Sikar Treasury DDOs
04/01/2012	1	38	VC with treasuries on SSP application
16/01/2012	1	33	VC with DIOs for Paybill training
18/01/2012	1	76	PayBill training to all treasury officers and their staff
21-22 /01/2012	2	500	PayBill application for Jaipur City Treasury DDOs
15-17/02/2012	3	33	Workshop of DIOs for PayBill, IFMS, Rajkosh, SSP
16/03/2012	1	39	Treasury officers workshop for digital signature and PayManager application
23/04/2012	1	38	VC with treasuries for revised ECS and digital signature process
08/05/2012	1	5	ACT for RAJKOSH, PayManager and SSP
17/05/2012	1	38	VC with treasuries and banks ECS issues
11/06/2012	1	7	Workshop with banks for signer utility
12/06/2012	1	39	Workshop with treasury officials for signer utility, stamps demo and RajKosh Version 2
13/06/2012	1	38	VC with technical assistants for signer utility, and RajKosh
14-15/06/2012	2	6	Training on SSP application; four persons from each treasury (SDO, BDO, treasury and sub-treasury)
21-22/06/2012	2	12	Training on SSP application; four persons from each treasury (SDO, BDO, treasury and sub-treasury)
16/07/2012	1	15	Stamps act (Pali, Sikar, Ajmer and Jaipur City)
16/07/2012	1	38	VC with treasuries for PayManager, ECS other than salary, civil pension and general
26/07/2012	1	2	Stamps demo at IGRS, Ajmer along with Treasury Ajmer
30/07/2012	1	38	Training for stamps and ECS for other bills
31/07/2012	1	38	Training for stamps and ECS for other bills

4. Technology

ICT Solution Adopted

The application is a web based solution and has been developed using .Net with C# as front-end and SQL Server 2008 as back-end. The project aims to provide the services under the categories G2G/G2E, G2B and G2C.

Disaster Recovery and Service Continuity Site

Presently, primary servers are hosted in the State NIC data centre. It is planned that secondary servers would be hosted at the NIC DR data centre.

VALUE INDICATORS

1. Digital Inclusion

The application has been developed in English as it is mainly for government employees who have sufficient knowledge of English language and reports mostly contain numeric figures which are easily understandable. However, the social security application has a report in Hindi language which concerns pensioners.

2. Green e-Governance

The government has initiated processes to transfer salary directly into employee's bank accounts. Earlier, cheques were printed and handed over to DDOs to present to the bank—this consumes lots of paper and power. Now the employee's salary is directly sent to the bank electronically and no cheques are being printed. It saves consumption of paper and power. The government has taken the initiative to transfer payment electronically in case of bills other than salary. Electronic money order process has also been initiated and tested that would discontinue printing of bulky money orders, which, in turn, would save paper and power. The department is also working on an electronic government receipt system which would eliminate physical challans and emphasise electronic receipt through net banking. The department is also working on the use of e-voucher which would minimise the use of paper.

In this way, the department is encouraging green governance in the state.

Veerbala Joshi, Director, Department of Treasuries and Accounts, Government of Rajasthan. e-mail: dir-ta-rj@nic.in

I D Variyani, Scientist 'D', National Informatics Centre, Rajasthan, e-mail: id.variyani@nic.in

Section IV

**e-Governance Success Stories—
District Initiatives**

e-Governance Initiatives in Jabalpur District, Government of Madhya Pradesh

Gulshan Bamra and Madhu Mishra

DISTRICT OVERVIEW

Situated in the heart of Madhya Pradesh, Jabalpur is one of the largest and most important cities in the state. It is located on the banks of the Narmada and surrounded by rocky hills.

The district is one of the major cities of Madhya Pradesh. It is the administrative headquarters of Jabalpur district and Jabalpur division and the headquarters of the Electricity Board of the State Madhya Pradesh; the High Court of the State of Madhya Pradesh is also located here. It was the epicentre of a major earthquake in 1997. It is known for its picturesque marble rock formations (Bhedaghat) across the banks of the River Narmada. Being the army headquarters of five states (Madhya Pradesh, Chhattisgarh, Orissa, Bihar and Jharkhand), one-sixth of the city is occupied by the Indian Army. It is also the birthplace of Maharishi Mahesh Yogi, Osho Rajneesh. Several important federal and state institutions are located in Jabalpur, including the premier technology institute, Indian Institute of Information Technology, Design and Manufacturing, Jabalpur, four ordnance factories of the gigantic Ordnance Factories Board, Tropical Forest Research Institute and West Central Railway zonal headquarters. Jabalpur has a variety of industries largely based in mineral substances of economic value found in the district—although the ready-made garments industry also provides a substantial portion of income in Jabalpur.

Jabalpur is an important divisional headquarters having 8 districts: Jabalpur, Seoni, Mandla, Chhindwara, Narsimhapur, Katni, Dindori, Balaghat. The Jabalpur district has been reconstituted on May 25, 1998. It now has six tehsils—Jabalpur, Sihora, Patan, Majholi, Shahpura and Kundam. According to the Surveyor-General of India, the district has a total area of 5211 sq kms.

Excellence in Implementing e-Governance Initiatives

The district has used ICT infrastructure to deliver citizen centric services for the benefit of the common citizen as well as to improve government process in an effort to promote excellence and transparency in administration. To strengthen the e-governance activities, an e-governance society was formed on July 9, 2010. Defined targets were envisioned by the Chairman, District e-Governance Society, Jabalpur, Madhya Pradesh, India with the objective of simplifying the public delivery system and improving the quality of

administration. Some MMP (mission mode projects) and other initiatives implemented in the Jabalpur district are given below.

1. *e-Court Project*: This project has been initiated in 2007 at the office of the District and Session Judge, Jabalpur. Installation of hardware, establishment of LAN, implementation of DCIS for civil courts have made case filing and retrieval process easy. For two sub-courts, hardware and LAN establishment is in progress.

2. *e-District Project*: e-District is also one of the 27 projects under NeGP with the department of IT. It aims at providing support to the basic administrative unit, i.e., district administration, to enable content development of G2C services that deliver services to citizens at their doorsteps. Public service delivery system for delivering 34 different certificates is operational.

Excellence in Implementing State Level Initiatives

3. *MNREGA*: The district is rapidly updating the NREGA (National Rural Employment Guarantee Act) MIS data. This makes data transparent and available in the public domain to be equally accessed by all. It makes available all the documents like muster rolls, registration application register, job card/employment register/muster roll issue register, muster roll receipt register which are hidden from public otherwise. It empowers the common citizen by using information technology as a facilitator.

4. *e-Panchayat*: Twenty-one panchayats of Jabalpur district has been selected for the e-Panchayat project. Hardware installation is on progress which will start service delivery to the doorstep of the common citizen. Three to four panchayats are connected through a portal based video conferencing system, which was also appreciated by the Hon'ble Chief Minister of Madhya Pradesh.

5. *Agriculture Project*: Agmarknet is a web enabled application for gathering and display of daily market price of commodities which has been implemented in all three *mandies*, i.e., Jabalpur *mandi*, Sihora *mandi*, Shahpura *mandi* of the district. Another application recently initiated in the district is Hortnet related to production and benefit of horticulture beneficiaries: www.agmarknet.nic.in.

6. *Treasury Computerisation*: Integrated Treasuries Computerisation Project has been implemented successfully. It provides on-line budget allocation and expenditure. In addition to the day-to-day activities of the treasury, it provides an internet interface for bill search, chalan search and pension search for getting updated information without meeting officials at the treasuries: www.mptreasury.org.

7. *Education*: The complete details of schools, teachers, and students are kept on the portal along with circulars. Teachers, students, parents are the main stake holders of the application: www.educationportal.mp.gov.in.

8. *Transport*: Various forms, circulars, acts related to the transport department are available on the portal. Vehicle registration search, driving license search, tax details search are the features available. All operation processes related to registration (new registration, transfer, NOC, entry of hire/purchase), licences (LL, DL, renewal), permits, entry of taxes, CRR have been computerised: www.mptransport.org.

9. *Confonet*: Consumer forum and networking project is implemented at the consumer forum. It includes online registration of cases, cause list generation, hearing details, interim and final order generation etc. These details are available for public access in www.confonet.nic.in.

10. *Food and Civil Supplies*: A computerised system to monitor the distribution of food grains to fair price shops (FPS), lifting by FPS is implemented. This is a G2G initiative. The website is www.mpssc.mp.nic.in/pdsallot

11. *SWAN*: SWAN centres had been identified at 4 tehsils; 2 *janpad* and main PoP (point of presence) have been identified in the Collectorate Campus. All tehsils and *janpads* are given fibre connectivity of 2.0 mbps. The authority of the SWAN centres has been given to MPSEDC (Madhya Pradesh State Electronics Development Corporation). The execution will be done by the Ms. Tulip Ltd. Commercial tax, treasury, RTO, high court, forest departments are already covered in the project.

Excellence in District Initiative

1. *Letters Monitoring System*: Everyday about 50–70 letters are received at Jan Shikayat Kendra. Monitoring and timely redressal of these letters are the primary step to good governance. The offline System for letters monitoring has been developed and implemented by NIC—it enables fast record processing and easy monitoring of cases.

2. *Time Limit Paper Monitoring*: The Collector of Jabalpur convenes a weekly time limit meeting on all Mondays to monitor the work of district level officers. The Time Limit Monitoring System developed by the NIC is used in this meeting to monitor the actions taken by the agencies with regard to critical matters of governance. Copies of the pending actions with respect to the different district level officers are circulated to them in advance and the progress of the same is monitored at the weekly meeting. More than 20 letters are marked as time limit by the Collector daily.

3. *Paybill and Accounting system*: Generation of salary bills is another huge task that requires lots of attention and time. Computerisation makes it fast and easy to handle work. This software has been developed by NIC and implemented in many offices, i.e., finance section, collectorate, assistant commissioner tribal welfare office, civil court, central jail.

4. *Court Cases Monitoring system*: The software has helped in proper record keeping of all pending cases. It keeps track of OIC appointments

and filing status of returns. It provides the progress status of a case at any moment of time. The OIC wise pending list can also be generated which helps to keep track of cases and act accordingly. About 100 cases per annum are filed against administration for which OICs are appointed by the administration.

5. Prisoner Management System: The main purpose behind the implementation of the Prisoner Management System is to enhance the administration capabilities of the jails in terms of monitoring, efficiency and planning. A complete record of a prisoner's individual and family details with health and educational background, bio-metric features, court case details are kept in the server for easy retrieval of records.

6. ISO 9001-2000 certification: Office of the Collector, Jabalpur has been awarded ISO 9001-2000 certification in 2007. The efforts made in the use of e-governance and computers and other technologies to provide better, effective and timely citizen services had a major role in obtaining the ISO certification. All the officers and employees had discussions and coordinated with each other to achieve the scales laid down by the ISO standards. The certification was achieved by proper maintenance and compilation of all records for easy monitoring and disposal of all files within the time frame.

10. CCTV cameras at the Collectorate campus: The main objective of these cameras is to make certain security, promote public safety and reduce the fear of crime which in turn will strengthen e-administration. A total of seven cameras have been installed to achieve the stated purposes.

11. Local Area Network in the Collector's Office: Gone are the days when computers were meant to be kept only in computer rooms where they would be used as glorified typewriters. Jabalpur district office now has a local area network that enables internet access to each and every part of the office complex. This has resulted in a new attitude towards computers in the office staff. The potential of the machine is being realised and more among the traditional staff have come to appreciate the usefulness of the machine.

12. Land Records Computerisation: Each tehsil has been provided with a server, a client, a printer and a UPS. Computer centres have been redesigned so that the citizens can have direct contact instead of going through mediators. The *khassra* and B1 *nakals* are provided directly to the citizens. Besides this, a data centre has been opened in the collectorate where the data of all tehsils is kept so that anybody can get the reports of any tehsil from the data centre. Linking of *bhu-naksha* to the land details provide *khassra* along with *bhu-naksha*. This has been very useful for those who come for registration of their land. Work is on for providing connectivity from all the tehsils to the data centre so that online data transmission can take place between tehsils and the data centre. On an average, this *khassra* amounts to over 6400 certified copies per month across the district. Average number of B1 *nakal* and *naksha*

distributed is about 34,163,318 per month. Jabalpur is the leading district in this regard in Madhya Pradesh.

RESULT INDICATORS

1. Key Performance

1. Marriage Registration and Court Marriage Application (e-MaRCMA)

The project is primarily delivering G2G services with a mixture of G2C services. The stake holders to this application are the marriage officers, their staff and the applicants. The main benefit is generation of MIS. With one time entry of the applicant's details, notesheet, affidavit and registration form are generated. The application uses camera/scanner to capture the photos and enclosures in the database. This enables fast record tracking for the applicant. The application has been implemented from February 2012.

2. Revenue Court Cases Monitoring System (RCMS)

The project is primarily delivering G2G services as well as G2C services. The stake holders are revenue officers, court staff, advocates and public. Generation of cause list and timely disposal of revenue cases is the main responsibility of the revenue officer. Earlier, it was a difficult task to find out the hearing date and present status of a case. The district has developed a web enabled application for monitoring cases; certain details have authorised access only for officers, while the rest is in the public domain. With a single click, anybody can know the complete details of a case without going to court. This has substantially reduced the public rush in the court premises to ascertain the next hearing date or case status. Revenue officers (RO) in urban and rural areas are using this portal which helps higher officers to monitor the progress of the lower court.

RCMS is a web enabled application software covering the entire (urban and rural) district. Each revenue officer has a unique login id by which cases are registered. Using the administration login, one can get the details of all ROs' cases. One sub-division magistrate was tested as a pilot; only after successful pilot testing was completed, has this been rolled out in the entire district. Revenue officers, their staff are stake holders for the authorised area, while the applicant, advocates can see the remaining details from the portal.

3. BPL Ration Card in One Day

The project is primarily delivering G2G and G2C services. The stake holders for the project are sub-divisional magistrates, food officers, project officers and public. The district has designed a form for application of below poverty line (BPL) registration number. After getting this BPL number, the applicant gets the BPL ration card on the same day. Earlier, these processes took more than a month for final receipt of the ration card. This is because the applicant had to

apply for the BPL no., then after getting the BPL no., they had to apply again for the ration card, which involved huge verification and paper work. Technically, now a web enabled application has been designed, user and roles are created which enables the complete movement in one day as all verification involved are centred at on window. As the applicant fills the application form only one time, paperwork is also reduced. Presently, this has been implemented in urban areas, but in the near future, after this pilot test is over, it will be extended to rural areas too. The beneficiary need not wait for days for the ration card. Updation of data on a single window, updates the rest automatically. Reduced processing time results in fast delivery of certificates. Till August 2012, 1129 BPL ration cards has been delivered using the system.

4. Management System for Diversion and Nazool Leases

The major objective of the system is to have a computerised system for maintaining the records of diversion and *nazool* leases and carrying out timely updations in the records in case of mutation. The system provides transparency and faster processing of data. It reduces paperwork and provides quick analysis and easy retrieval of data. Using the system, updated data is always available for monitoring. This provides accurate information at any time with less paperwork.

2. Efficiency and Improvement Initiatives

An email id citizenforumjab@mp.gov.in has been created for grievance registration which helps applicants to file their grievance easily using the internet. After redressal of the grievance, the same will be intimated to the applicants on their sender id. This has resulted in a fast grievance redressal system. The public need not to come to the office and stand in front of a table to know the status.

All seven blocks of the district are connected with portal based video conferencing to the district administration. This helps in proper monitoring of schemes as well as staff posted at Janpad and has a good impact on time and cost savings.

Most e-governance initiatives are web enabled and can be easily accessible from any net end. The same can be replicable to other places with little modification.

ENABLER INDICATORS

1. e-Government Policy and Strategy

e-governance is not simply limited to computerisation of government departments and putting information on the web. It has more to do with

adopting a holistic approach, process reforms and leveraging technology to provide government services that are citizen-centric, user friendly, cost effective, integrated, transparent and at the citizen's doorstep.

Though the district has been working hard to provide ICT solutions and citizen centric services, the central and state government has come up with a national e-governance plan. The e-governance plan should aim to promote e-governance on a massive scale in the areas of concern to the common citizen.

2. Process Reengineering

A website www.mponline.gov.in is already in place and has started delivering some of the services to the citizens through the common service centres. In Jabalpur district, SWAN centres are in place in all the seven blocks and will start delivering services. About 60 common service centres are in place, covering the whole geographical area of the district. Most of them have started delivering services to the citizen through the state level website and also through the district website.

Apart from this network, NIC has been working closely with the government department for the last two decades in ICT initiatives in various capacities, right from consultancy, design and development and implementation of e-governance initiatives. NIC has provided e-mail connectivity to most of the departments, set up LAN for the district administration, provided various software and also web enabled applications which play a role in data transmission to high level officers and provision of citizen services.

The state government is also constantly working towards the implementation of e-governance and IT enabled services for general citizens, farmers, traders, students and employees, especially those living in far flung and remote areas. The state government is also geared up for extending ICT in rural areas through implementation of kiosks and single window systems, providing connectivity, bringing more departments, directorates and services under the fold of IT and implementing quality standards within the organisations for enhanced citizen satisfaction.

Thus with the infrastructure of NIC in place and the infrastructure of SWAN coming up, sharing of common infrastructure will be there at the state as well as district level. This will considerably strengthen and reinforce the existing ICT infrastructure. Once the infrastructure under NeGP CSC's SWAN and SDC get implemented and becomes fully functional in most states, it will provide a broadband backbone that will facilitate the delivery of e-services to the common citizen located in the remotest parts of the country in a seamless and integrated manner. The strategy and focus would now be to provide alternate service delivery of all G2C e-services.

3. Capacity Building

For achieving the above results, rigorous technical trainings have been imparted to the staff regarding computer operations, application software, e-mail and internet. It has been explained to the employees that the laggardness of the pen-pushing paper-passing past should be done away with to make administration responsive to the call of the common citizen. The introduction of computers and modern means of communication, which, in short, is described as the adoption of e-governance, seldom brings in any new policy change in the functioning of the government.

Under the leadership of Jabalpur's collector, the district has won many awards and have implemented many e-governance initiatives. The district has won the best e-governed district award given by the department of IT Government of Madhya Pradesh, 2006–07, and again in 2007–2008 and in 2008–09. Samadhan ek Diwas, the offline programme of public certificate delivery was implemented under the leadership of the previous collector and is running at present as well. This is just one example of the several initiatives which have been so designed that change of management has no effect on the programme and the services delivered to the common citizen.

The district has also designed a training programme and hired a private partner, Appin Technology, for this purpose. Some of the training programmes have already taken place and some are in the pipeline.

4. Technology

The district of Jabalpur has been endeavouring to further e-governance objectives by actively implementing the state level schemes, innovating in the usage of the software through new workflow models and business models. In its own right, software development is also being carried out in the district where automation is found to be of use in expediting the work.

All software that have been developed by the district confirm to the open source policy—the entire package is made available in the accompanying CD and not just the executable. The district is strongly committed to the policy of allowing free modification of its own software and believes in continuous successive improvements.

VALUE INDICATORS

A number of district administration functions have been computerised as against the total functions.

Issue of Certificates: The district has successfully implemented the Samadhan ek Diwas scheme whereby certificates are issued to the citizens in the defined time frame.

Issue of Licences: The issue of driving licences has been computerised as per the state level initiative. Other licences like the gun license are being computerised.

Monitoring and reporting in schemes: The schemes handled by the zila panchayat used the computer for collation of reports.

Municipal services: The municipal corporation has automated almost all its services at www.jmcjabalpur.org.

Land records maintenance: The alpha numeric data has already been computerised and copies are being made available from the tehsil centres. The digitisation of maps has been done as the next step.

Grievance redressal system: The grievance redressal mechanism is registering a total of about 2000 complaints per year. About 75 per cent of the complaints are disposed in time limit manner.

Web workflow automation: Maintenance of the divisional commissioner tour diary and district collector tour diary is on portal.

Inclusion of Sparsh Abhiyan of the Social Welfare Department for physically challenged persons are in progress.

Farmer registration and government purchase from farmers during *kharif* procurement for 2012 was done through offline application; the same data was made online for stake holders.

Bank recovery web enabled software, Brisk, of the Department of Institutional Finance has been implemented. Bank officers, branch officers, revenue officers are stake holders.

1. Digital Inclusion

Almost all the software projects used by the district administration and other departments are being implemented in Hindi. All the software has front-end as well as reporting formats in Hindi. The content put on the website is being converted to Unicode fonts (Mangal). All data in Hindi is being displayed on the website using Mangal font.

2. Green e-Governance

Mobile communication and applications and videoconferencing as green and cool ICT have been promoted, wherever possible in government working. The e-Waste Handling Committee under the District e-Governance Society, Jabalpur has been constituted for policy development, implementation and monitoring.

Most of the communication is being done through e-mail in the district. All the communication from the collector's office to the state headquarters

and commissioner's office is being done through either e-mail or data transfer. Communication to the *Janpads*, tehsils and sub-divisions is being done by e-mail.

SMS is also being widely used by the collector and other officers of the district for communication.

Digital signatures are used for transactions. This will enable paperless transactions with legal certification.

Epilogue

The implementation of these projects is just the beginning of providing citizen centric services to the common citizen using ICT tools and procedures. Computers are no longer glorified typewriters to be kept faithfully in the confines of dark rooms. They have come to occupy the mainstream in providing the required service as per the expectation of the common citizen. Government officers have been imparted training for the effective use of the technology as an approach to capacity building.

Gulshan Bamra, IAS, District, Jabalpur, Madhya Pradesh, e-mail: dmjabalpur@nic.in

Madhu Mishra, District Informatics Officer, National Informatics Centre, Jabalpur, Madhya Pradesh, mpjab@nic.in

e-Governance in Jhalawar District, Government of Rajasthan

Rohit Gupta, Badal Agarwal and S D Mathur

DISTRICT OVERVIEW

District Jhalawar is a part of the State of Rajasthan, situated at approximately 330 kilometres from its capital Jaipur the Jaipur–Jabalpur NH-12.

The total population is 14,11,327 (urban: 2,29,438 and rural: 11,81,889) and area is 6219 sq. km. Administratively, it is divided into 7 sub-divisional offices, 7 tehsils, 4 sub-tehsils, 6 panchayat samities, 252 gram panchayats and 5 municipal towns. Most of the district level offices are available in a single building—the ‘mini secretariat’.

The main crops of the districts are garlic, coriander, opium and oranges; the main industrial business is mining, cutting–finishing and trading Kota stone.

The two IT leading departments—National Informatics Centre (central government department) and the Department of Information Technology and Communication (state government department)—are the main agencies working to promote and implement IT for betterment and continuous improvement in governance.

IT projects running in the district for e-governance are shown in Table 1.

Table 1 *IT projects in Jhalawar*

Sl. No.	IT project title	Objective
1.	IFMS (Integrated financial management services)	Integrated financial management system (IFMS) is an e-governance initiative taken by the Rajasthan government for effective, accountable and transparent public finance management. IFMS has been conceptualised as an umbrella system covering all modular systems and their integration. The main objective of IFMS is to achieve computerisation of state-wide financial transactions, efficient monitoring and to facilitate a single window interface across various functions.
2.	Computerised land record system	To provide transparency and easy approach of citizens to get/view copy of land record

3.	e-Sugam (online grievance redressal system)	To provide immediate (minimum response time) solutions for the grievances of citizens about any particular government official/process
4.	CSC/e-Mitra project	Counters (on PPP model) to deliver G2C services to the citizens in urban and rural areas

Apart from the above e-governance projects implemented by the state/central government, the district itself has developed and implemented other e-governance projects in the district Jhalawar to provide better governance to the citizens (Table 2).

Table 2 *e-Governance projects developed by the district of Jhalawar*

Sl. No.	IT Project Title	Objective
1.	e-Avakash	Better and speedy administration and increases transparency (online leave management system)
2.	Online video call system (<i>Prashashan ke liye sujhav</i>)	To have online face-to-face communication among citizens and district administration to obtain real feedback on need fulfilment and various schemes launched by the government to benefit/facilitate citizens
3.	Online SMS system (PHED: Public Health and Engineering Department)	To have online communication through auto generated SMS to citizens about any failure/deviation in regular water supply
4.	Computerised arms licence monitoring system	To monitor and update information about arms licence holders and their authorisation

RESULT INDICATORS

A brief description of the e-governance projects implemented by the state/central government is given below

e-Mitra/CSC Project

Under NeGP, project e-Mitra/CSC is basically a system wherein private entrepreneurs located at municipal towns (urban) and gram panchayat level (rural) act as government counters on PPP model to provide various government departmental deliveries related to the citizen.

Jhalawar was the first district in the country to start the e-Mitra concept based on PPP and private kiosks, way back in 2002.

e-Sugam

This is a system where public grievances are registered, viewed, forwarded and disposed off online. Registration of public grievance can be done by the citizen itself.

Single Window

A single window has become operational at all tehsil/SDM offices of the district to collect applications of caste/bonafide/income/solvency certificates and deliver them.

Apna Khata

This project provides relief to the common citizen by delivering accurate and updated land ROR (*Record of Rights*) instantly through a network of private kiosks in the district.

The e-governance projects developed and implemented by the district itself are described below.

Online e-Avakash System

- The leave management system is totally online, so officials do not have to approach their reporting officer in person just to get leave sanctioned.
- Every day, the names of officials are displayed on the website. Hence a common citizen can know if an official is on leave or planning to go on leave.
- It results in direct cost and time savings of officers, who, previously, had to travel to meet the boss personally.
- It results in direct cost and time savings of citizens, who previously, have to travel a distance to meet the officer who is on leave.
- 100% transparency among the entire administration as well as people.

Online Video Call System

- Collects real feedback about the schemes of the government
- Collects suggestions/grievances of the citizens to improve government services/facilitate/optimize utilisation of resources
- Provides as immediate (minimum response time) solutions as possible to citizens' grievances about any particular government official/process
- Promotion/advertisement of various government schemes among citizens
- A single cohesive group, for example, senior citizens, youth, local media, public representatives, retired pensioners, MGNREGA beneficiaries, school children, widow pensioners, government scheme beneficiary group etc is taken up
- Till date, district officials have interacted with 14 different cohesive groups, 60 citizens, received 21 grievances and 7 suggestions.
- Makes citizens a part of the team for policy making and real implementation based on ground reality.

OnLine SMS System (PHED)

The main aim of this system is to have online communication via SMS to the consumers of PHED about the schedule of water supply.

Arms Licence Monitoring System

- This is a powerful monitoring tool for issuance/holders of Arms Licence.
- It provides a list of Arms Licence holders, their authorisation and date of expiry at different office levels.

1. Key Performance*e-Mitra/CSC Project*

This is a G2C type service to provide various government services like deposition of utility bills (PHED, DISCOM, BSNL), issuance of caste/ bonafide/income/solvency certificates, deposition of examination fee for recruitments of RPSC/PWD/ Panchayati Raj etc department's vacancies.

All transactions are made online on a web based application developed and handled by the DoIT department. There are 13 e-Mitra centres and 47 CSCs, having an average transactions of 28,000 - 30,000 per month. On an average, 2000 digital certificates are issued in a month through these centres.

e-SUGAM

This is a G2C type service for citizens to register grievances and view the status of their grievances. It also acts as a G2G service to forward/dispose off registered grievances within the authorities at different levels. There are 30 department users and the number of average applications received per month are 135.

Single Window

This is a G2C type service to collect and deliver various certificates of citizens. The average delivery of certificates is 4200 per month.

Apna Khata

This is a G2C type service to view/take a copy of land records. The number of private counters functioning in the district is 28.

e-Avakash

- Used as a G2G type service for the government official/officer, to put up/sanction the leave for an individual government officer/official.
- Used as G2C type service for citizens—a platform to view the availability of an individual government officer/official at their office.

The total number of officials included is 70 (40 at district level and 30 at block/tehsil level).

Online Video Call System

This is a G2C type service delivered as a video call (VC) between citizens or a cohesive group and district collector through a platform like Yahoo messenger/Skype etc. Total VCs held are 32, and cohesive groups interacted are 16.

Online SMS System (PHED)

This is a G2C type service providing required information via SMS to citizens about interruption in regular water supply so that they can plan accordingly.

Arms Licence Monitoring System

This is purely a G2G type service for obtaining authorised information, date of expiry, list of defaulters, disposal of arms licence applications, ensuring 100% depositing of the arms at police stations at the time of election, Dipawali or any other sensitive time. The total arms licence registered is 2248.

2. Efficiency and Improvement Initiatives

e-Mitra/CSC Project

This is a system of effective counters to provide services to citizens on a 24 × 7 basis. It ensures smooth and easy approach to citizens at their nearest place. The number of services delivered by these counters are increasing day-by-day.

e-Sugam

This is a web based application, easy for citizens to access and register their grievance and view the status at home. There is no need for the citizen to travel anywhere for this purpose.

Single Window

This is a popular window to serve citizens—collecting their applications for caste/bonafide/solvency/income certificates and delivering the prepared certificates.

Apna Khata

This application is functioning through a network of private kiosks.

Online e-Avakash System

This system has helped in streamlining administration.

Online Video Call System

By the implementation of this system, the district collector and the citizen both are benefited in the following manner:

- The district collector can keep himself or herself updated about the benefits/impact of various schemes launched by the government in favour of citizens.
- Various other schemes/processes can be innovated and launched based on the suggestions of the public, who really face the problems day-to-day.
- Time saving of the district collector and citizens
- Saving of travelling expenses of the district collector and citizens

- A computerised application is constructed to maintain the database of video call held and suggestion/grievances received from the citizens for better monitoring and implementation.

Online SMS System (PHED)

By implementing this concept, grievances of the public about water supply is removed. This concept was launched for the first time by the District of Jhalawar.

Arms Licence Monitoring System

After implementing this application, administration can ensure that all arms licence holders are authorised, obtain a list of defaulters and ensure 100% compliance of government orders about deposition of arms at police stations on various occasions.

The administration can get a complete and accurate information of arms license holders at different office levels.

By this system, a list of defaulters who have not renewed their arms licence can be obtained and uploaded on the district's website.

ENABLER INDICATORS

1. e-Governance Policy and Strategy

The policy of the district is to provide transparent and speedy governance to citizens. IT makes it easy for the administration to ensure an error less, systematic approach.

2. Process Reengineering

With the implementation of various projects, the whole process of providing services have undergone a transformation (Table 3)

Table 3 *Process of delivering of services before and after implementation of projects*

Sl. No.	Project title	Before implementation	After implementation
1.	e-Mitra/CSC Project	Delivery of whole government services depended on the government offices/counters only	The e-Mitra counters are like government counters, delivering various services to the citizens smoothly and efficiently. Commission for the kiosk holder for deposition of utility bills, applications of certificates etc. are inbuilt and reimbursed by the government.

Continues

Table 3 *Continued*

Sl. No.	Project title	Before implementation	After implementation
2.	e-Sugam	A common citizen had to go to the concerned office in person to put up their grievance and follow up.	After launching this web portal, grievance redressal is speedy and transparent for the citizen.
3.	Single window	A common citizen had to go to the concerned office in person to apply and collect the caste/bonafide/income/solvency certificate. It was time consuming and costly.	After launching this application, a systematic, time framed approach is involved in service delivery.
4.	Apna Khata	Earlier a common citizen had to go to the Land Record Section to obtain/view the copy of a land record, which was time consuming and costly.	After launching this web portal, a counter is available to the citizen at his or her nearest approach.
5.	Online e-Avakash system	Previously all leaves were paper based; the process of sanctioning leaves was arbitrary; records of leave could not be updated regularly.	With e-Avakash, all issues regarding leaves have been resolved.
6.	Online video call system	The only way for a common citizen to convey his or her needs/grievance/suggestions to the state government was by approaching the district collector in person, which was both time consuming and expensive.	With online video call, any citizen, even from remote areas can easily have access to the district collector.
7.	Online SMS system (PHED)	Erratic changes in water supply, due to external reasons, led to a lot of difficulties to the consumer as he or she could not make alternative plans.	Now, citizens are informed well in time in case supply is to be affected

Continues

Table 3 *Continued*

Sl. No.	Project title	Before implementation	After implementation
8.	Arms license monitoring system	Record of arms licence was kept manually which was both cumbersome and time consuming.	Now administration has a powerful tool to get any required information quickly.

3. Capacity Building

E-Mitra/CSC Project: Training to all kiosk holders with a login id and password for individuals was carried out.

e-Sugam: Training to all kiosk holders and officers concerned with a login id and password for individuals was carried out.

Single Window: Training to all counter operators with a login id and password for individuals was carried out.

Apna Khata: Training to all counter operators and kiosk holders with a login id and password for individuals was carried out.

Online e-Avakash System: Training to all officers/reporting officers to use this system with a login id and password for individuals was carried out.

Online Video Call System: Training to all e-Mitra/CSC kiosk holders to execute video call with a login id and password was carried out.

On Line SMS System (PHED): Training to all concerning staff of PHED with a login id and password was carried out.

Arms License Monitoring System: Training to concerned staff/officer with a login id and password was carried out.

4. Technology

E-Mitra/CSC Project: This is a web portal developed and handled by DoIT (Department of Information Technology, Government of Rajasthan). It is totally secured and provided with a highly confidential login id, password and CUG (closed user group) code to operate the portal for transactions. Two powerful integrated MIS portals generate the online updated MIS in different angles.

e-Sugam: This is a web portal, developed by NIC, Rajasthan state unit; the database as back-end is SQL server.

Single Window: This is a stand alone application developed by NIC, Rajasthan state unit using VB and Access.

Apna Khata: This is a web portal, developed by NIC, Rajasthan state unit.

OnLine e-Avakash System: This is a web based application; technology used in this application are ASP.net and Access. Login id and password is provided to all concerned.

Online Video Call System: Social sites like Yahoo messenger, Skype is used to make online video calls. Login id and password is provided to the district collector and all e-Mitra/CSC kiosk holders.

Online SMS System (PHED): This is a web based application (php); database as back-end is mySQL. Login id and password is provided to all concerned.

Arms Licence Monitoring System: This is a stand alone application developed locally by NIC Jhalawar; technology used are VB, Access and Crystal Reports. It is secured by login id and password for the operator and the administrative officer.

VALUE INDICATORS

1. Digital Inclusion

All kiosk holders have been sensitised to help the common public coming to CSC/e-Mitra kiosks and guide them for applications like redressal/digital certificates etc.

2. Green e-Governance

e-Avakash, online grievance redressal, digital certificates etc. at kiosks have significantly led to decrease in paper usage. Also, because the citizen can go to his or her nearest kiosk for availing the services, fuel cost are also cut down—this saves the environment from pollution.

Rohit Gupta, IAS, District Collector, Jhalawar District, Rajasthan, e-mail: dm-jha-rj@nic.in

Badal Agarwal, DIO, NIC, Rajasthan, Jhalawar, e-mail: rajjha@nic.in

S D Mathur, Asstt. Programmer, DoIT, Jhalawar, Rajasthan

Section V

**e-Governance Success Stories—
G2B and G2G Initiatives**

e-Uparjan Project, Government of Madhya Pradesh

Anthony De Sa and Subash Kendurkar

PROJECT OVERVIEW

The e-Uparjan (e-procurement) system is an initiative of the Department of Food, Civil Supplies and Consumer Protection, Government of Madhya Pradesh to (1) bring in transparency and efficiency in procurement of wheat at minimum support price (MSP); (2) develop a unified database of farmers of the state; (3) ensure speedy and transparent transfer of the MSP dues of the farmers into their account directly; (4) streamline the procurement operations (under MSP), and develop a near real time reporting mechanism at different levels and a decision support system for enhancing the forecasting, monitoring and tracking capabilities of the department.

Thus the basic objectives behind the computerisation of the Uparjan are as under:

- To streamline the procurement operations (under MSP) in the state
- To develop a unified database of farmers of the state
- To develop a nearly real time reporting mechanism at different levels
- To facilitate farmers of the state in selling grains at MSP
- To forecast procurement and identify genuine farmers
- To serve as a transparent citizen interface
- To develop the nearly real time alert mechanism for farmers for procurement operations.

The e-Uparjan system is entirely developed in the local language—Hindi—and 15 lakhs farmers of Madhya Pradesh are being benefited through this system. The application works in two modules—offline module (working at the 2300 Uparjan Kendras) and online module (connected to the internet). With the help of data entry operators and ‘runners’, all data from the field level (offline module) is updated onto the online system. All registered farmers are intimated about the procurement details through the SMS mechanism. An SMS is sent to the farmers 4 to 5 days in advance, indicating the date on which they need to bring their produce for sale to the centre. After the procurement stage, the amount due to the farmers is directly transferred to their respective bank accounts. No cash or cheque transactions take place. After all the processes are finished at the field level and district level, all the data is transferred to the online module with the help of the runners on a daily basis—this gives all the state and district officials near real time reporting which enhances the decision making and planning at the state level.

Benefits of the Project (Improvement in Measurable Indicators)

- i. 15.62 lakhs farmers registered through citizen service centres.
- ii. Nearly 13.5 lakhs SMS sent to farmers to intimate dates for selling their wheat.
- iii. 85 lakhs MTs of wheat procured through the e-Uparjan system.
- iv. An amount of Rs. 11,636 crores transferred to farmers' bank account as payments.
- v. Computer hardware worth Rs. 15 crores purchased for 2300 cooperative societies.
- vi. Undertaking procurement operations and training given to all data entry operators.
- vii. Solar chargers worth Rs. 15.2 lakhs installed at 18 centres.
- viii. Around 3500 people given hands-on trainings organised at state and district level for all stake holders.
- ix. 2313 data entry operators at PCs and 551 runners between 4–5 centres for collecting and uploading data trained.
- x. Project roll-out completed in a record 5 months from date of conceptualisation.

The e-Uparjan system was conceptualised during the month of October 2011 and set in place, including farmer's registration by March 2012. It was implemented as per the planned schedule and was rolled-out on March 15, 2012 all across the state of Madhya Pradesh. The entire wheat procurement which started on March 15, 2012 and continued till June 4, 2012 was done through the e-Uparjan system, resulting in the procurement of 85 lakhs MTs of wheat, and Rs. 11,636 crores transferred directly into the bank account of 10.26 lakhs farmers.

RESULT INDICATORS

1. Key Performance

ICT Based Services

The e-Uparjan service has brought in a lot of benefits as can be seen in Table 1.

Table 1 *Comparison of pre-project state with post-project state*

Sl. No.	Pre-project state	Post-project state
1	There was no record maintenance of farmers details	Unified database of farmers and centralised MIS of farmers in the state

Continues

Table 1 *Continued*

2.	All decisions were made after making regular calls to the district officials to get the Uparjan status	Decision support system is in place
3	All monitoring was done on the basis of the status received after making regular calls to the district officials to get the Uparjan status	Efficient monitoring and control of Uparjan processes
4.	All monitoring was done on the basis of the status received after making regular calls to the district officials to get the Uparjan status	Real time alert mechanism for farmers regarding Uparjan processes
5.	No alert mechanism used for the Uparjan process	SMS alert mechanism for farmers (SMS scheduling date-wise)
6.	All the decisions were made after making regular calls to the district officials to get the Uparjan status	<i>Bardana</i> management
7.	All the decisions were made after making regular calls to the district officials to get the Uparjan status	Storage management
8.	Farmers were given a cheque and they had to spend days and days in queues in banks to get their cheques cleared and receive the amount	Payment of the due amount in a more convenient manner
9.	There was less transparency because of inaccurate reporting and monitoring of the wheat Uparjan process	Transparency and citizen interface
10.	All the decisions were made after making regular calls to the district officials to get the Uparjan status	Development of near real time reporting mechanism
11.	Every report had to be made manually after getting telephonic updates from the district officials	System generated dashboard reports at various levels
12.	Every receipt was given manually and all the reports had to be made based on not so accurate reports	System generated orders, receipts and reports

Additional Services that are being Planned for the Future

- Registration of farmers would be done solely through the procurement centres in order to avoid any kind of data loss or data misinterpretation.
- Farmers would be able to sell their crops in nearby procurement centres based on the area and its territory, thereby decreasing their cost of travelling to sell their crops and also the rent for the vehicles they use for taking their crops to far-off places.
- Farmers would be able to open zero account balance so that there would be much more percentage of directing banking being done for the purpose of farmers' dues.

- Internet facility would be made available to each procurement centre to increase the efficiency, transparency, and also to have better decisions. Currently, the offline data is being transferred to an online system by an upload/download process from outside the procurement centres which incurs time loss.
- A new version of the software would be released that would have the facility to track the storage capacity of the godowns at any instant of time—this would help in the process of storage management.
- This software is being extended for the *Kharif* marketing season (2012–13) also.

Implementation Coverage

The e-Uparjan system has covered all the 50 districts of the State of Madhya Pradesh. It has been rolled-out in all 2313 wheat procurement centres during the 2011–12 season. The e-Uparjan system is accessible to all state officials and district officials (Hon. CM, Minister, Food, CS Office, APC, ACS Food, PS Finance, PS Revenue, RCS, Com. Food, MPSCSC HQ, MPSWLC HQ, Mandi Board, Apex Bank, Collectors, DIO, DSO, DMs, DMOs, DRs, RMs, CEO Zila Panchayats, Tehsildars, Samities etc.). Further, there has also been a study done after the wheat procurement season to determine the developments/ changes/additions that could be done to make the e-Uparjan system more user-friendly and more effective.

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency Improvements

Previously, farmers were given a cheque and they had to spend days and days in queues in banks to get their cheques cleared and receive the amount. Now, payment of the due amount is in a more convenient manner.

Level of Integration

The Information Technology Department of the State of Madhya Pradesh has already initiated the project that can be rolled-out based on the e-Uparjan initiative. The e-Uparjan system has the data of all the farmers with their land details, crop details and other details which can be used by other departments like the agriculture department, food department in bringing out new projects for the welfare of the farmers.

ENABLER INDICATORS

1. Process Reengineering

The whole process involved in Uparjan had to be reengineered to make it e-Uparjan. It involved bringing about change in a systematic manner.

- i. The Project Management Committee chaired by ACS overviewed the work done every week to assess the development of the project against the stated timelines.
- ii. A Project Plan was made keeping in view all the aspects of the project.
- iii. Necessary directions and orders were given to all the stake holders mentioning their roles and responsibilities.
- iv. Setting-up of an application development team in coordination with NIC for application development.
- v. Deployment of project management consultants to overlook project related activities during the entire course of the project.
- vi. Conducting training for all the state and district officials at the state and district level regarding the e-Uparjan system.
- vii. Coordination with cooperative societies for the recruitment of runners and data entry operators required for the e-Uparjan system at the district level.
- viii. Regular video conference meetings with the stake holders in all the districts.
- ix. Regular coordination with all the hardware vendors to supply, install and commission the required hardware at all the procurement centres.
- x. Regular field visits/district visits to monitor all the activities performed by the district officials and team members of the project.

2. Capacity Building

For the purpose of capacity building, all the departments, agencies and other officials worked in tandem and in coordination to successfully roll-out the e-Uparjan system in the entire state of Madhya Pradesh. The e-Uparjan project motivator(s) were Anthony De Sa (ACS) and Dipali Rastogi (IAS). The recruitment of the data entry operators and runners at the society level for the smooth functioning of the e-Uparjan system was done by the cooperative societies at the district level. Around 2313 data entry operators at PCs and 551 runners between 4–5 centres for collecting and uploading data were recruited during the entire project.

Change Management Strategy

A ‘train-the-trainer’ approach was adopted, i.e., in the first phase, training was done for the state and district officials. The district officials would then imparting the trainings at district level with the help of state officials.

Around 3500 people were given hands-on trainings organised at the state and district level for all stake holders.

Project Management

A steering committee and project management unit was constituted which was meant to assist and coordinate activities during the whole course of the project for the successful implementation of the e-Uparjan system. The roles and responsibilities of the different stake holders are mentioned in Table 2.

Table 2 *Roles and responsibilities of various stake holders*

Sl. No.	Stake holder	Role
1.	Madhya Pradesh State Civil Supply Corporation (MPSCSC)	MPSCSC is a leading supply and distribution company, sponsored by the Government of Madhya Pradesh registered under the Companies Act. Spanning all Madhya Pradesh, the MPSCSC has 7 regional offices, 50 district offices. It procures food grain at MSP for the government. In this project, the MPSCSC is involved in overall project management and operational support. It has key ownership of the project and will monitor and control the project operations.
2.	Madhya Pradesh State Cooperative Marketing Federation (MARKFED)	MARKFED is an apex level federation of cooperative marketing societies in the State of Madhya Pradesh. The Society is registered under the Madhya Pradesh Cooperative Societies Act 1960. The Federation represents numerous marketing and allied societies of the state. It also procures food grain at MSP for the Government of MP. Hence it will be involved in the project operations actively.
3.	Department of Food, Civil Supplies (FCS) and Consumer Protection	The department administers Uparjan and the public distribution system which is an important constituent of the strategy for food security to the population below poverty line. The FCS Department will administer the project at the government level.
4.	National Informatics Centre (NIC)	NIC will be responsible for designing, developing, implementing, managing, operating and maintaining the application at state level. It will customise the application and roll it out across the state. NIC will provide training and operational support. Further, initial application installations will also be done by DIOs of NIC at respective districts.
5.	Madhya Pradesh Agency for Promotion of Information Technology (MAP_IT)	MAP_IT will facilitate MPSCSC in preparing the detail project report. It will also monitor the application development and solution implementation.

Continues

Table 2 *Continued*

6.	Food Corporation of India (FCI)	FCI was set up under the Food Corporation Act 1964, in order to fulfil the following objectives of the Food Policy: (a) Effective price support operations for safeguarding the interests of the farmers. (b) Distribution of food grains throughout the country for public distribution system. (c) Maintaining a satisfactory level of operational and buffer stocks of food grains to ensure national food security
7.	District Central Cooperative Banks	Cooperative banks in India are registered under the Cooperative Societies Act. They are also regulated by the RBI and governed by the Banking Regulations Act 1949 and Banking Laws (Cooperative Societies) Act 1965. The cooperative banks in India play an important role in rural financing. Payment against Uparjan to farmers will be done through the Cooperative Department.
8.	Cooperative societies	Cooperative societies are established for the purpose of self-help among farmers. There are 4526 PACS and 298 marketing societies.
9.	Farmers	Approximately 50 lakhs farmers are there in the state. They are the people who will be benefited by the system.
10.	Mandi Board	Mandi Board is also a stake holder and will share the one time cost of the project.
11.	Project Management Unit (PMU)	• e-Uparjan monitoring and evaluation • Providing technical and managerial support to district and field level units • Assisting the state officials for effective administration of the project • Performance reporting and analysis • Management of project operations • Coordination and communication with stake holders • Financial management and planning • Day-to-day state level project activities Any other task as assigned to PMU by the state department/Steering Committee

Financial Model

The e-Uparjan project was funded by the Government of Madhya Pradesh, Department of Food, Civil Supplies and Consumer Protection. The total cost of the project was Rs 18 crores which included all the software, hardware, manpower and other operational expenses.

3. Technology

ICT Solution Adopted

The technologies adopted in the e-Uparjan project covers aspects like software development, hardware deployment and the system generated SMSes. The software, which was developed on Dot NET framework has two modules—the offline module which works at Uparjan Kendras where the farmers' crops are procured, the entry done, receipts given to the farmers against the procurement, and daily payment reports generated and sent to banks for due payments of the farmers; and the online module; which includes all the MIS reporting and forecasting which is done on the basis of the data fetched from the offline module. The hardware deployed at Uparjan Kendras includes Atom processor laptops and printers that are power friendly, thus making the system work for longer periods. Inverters are provided for continuous functioning of the system. Solar charges have also been deployed for swift functioning of Uparjan Kendras having acute shortage of electricity. SMS technology is used to intimate farmers prior to their procurement date to help them make necessary arrangements. The system has the capacity to send 10 lakhs SMSes in just 3 hours. The delivery report is also generated.

Security and Confidentiality Standards

- All the data related to the e-Uparjan system is hosted at the NIC state data centre which has all the security facilities are available in order to ensure data security and service continuity. Regular backup of all the data is also taken and stored in tapes to restore data in case of any natural calamity.
- All state and district users have been given unique usernames and passwords to access the e-Uparjan system.
- There is a regular log maintained at the NIC state data centre regarding all the modifications that are done by any user.
- There is single access to the database of the application, i.e., for Technical Director at the state NIC HQ.
- For any substantial change, a written request has to be forwarded to the state NIC with due approval from the Food Department officials—only then are the changes done.
- All security and confidentiality standards are monitored and maintained by the NIC team at the NIC state data centre which includes accessing data, data privacy policy for accessing data, data confidentiality, data protection mechanism from loss, disaster recovery and business continuity plan, monitoring and management of state data centre, monitoring access of data, data security while retiring data/infrastructure and the security audit.

Disaster Recovery and Service Continuity

The data is hosted in the NIC state data centre. A parallel data backup is taken at the disaster recovery site—NIC, Hyderabad. All the data stored at the state data centre has a replica at NIC, Hyderabad in order to cope with any kind of natural disaster.

VALUE INDICATORS

1. Digital Inclusion

- i. The e-Uparjan system is accessible to all state officials and district officials (Hon. CM, Minister Food, CS Office, APC, ACS Food, PS Finance, PS Revenue, RCS, Com. Food, MPSCSC HQ, MPSWLC HQ, MPSCSC HQ, Mandi Board, Apex Bank, Collectors, DIO, DSO, DMs, DMOs, DRs, RMs, CEO zila panchayats, tehsildars, samities etc.)
- ii. With the help of the e-Uparjan system; near real time monitoring is done. All the payments to farmers are directly transferred to the farmers' bank account; thus saving the time they might have spent standing in queues in banks to get their cheques. All the wheat procurement data are updated at all the district and state offices within a day; till last year, telephonic updates have to be taken from all the districts. *Bardana* status is now being monitored through online reporting; warehouse management etc. are also maintained on a real time basis
- iii. Transparency is a major benefit of the e-Uparjan project as all the status related to the wheat procurement process is readily available round the clock. The project also helps in decision making and forecasting as near real time data is available for all the districts at the same instance.
- iv. Under the e-Uparjan system, more than 15 lakhs farmers have registered and benefited all across Madhya Pradesh.
- v. All the manual processes have been automated; thereby increasing the accuracy of data and also the efficiency of the processes with a more refined data available all round the clock.
- vi. The e-Uparjan system is typically based on .net Framework; open-source technology is not used in the development and deployment of the system.
- vii. The e-Uparjan system is developed in the mother tongue—Hindi to give a better understanding to all the people getting benefited from the project.

2. Green e-Governance

No cash or cheque transactions take place, thus leading the way to green e-governance.

Anthony De Sa, Additional Chief Secretary, Department of Food, Civil Supplies and Consumer Protection, Government of Madhya Pradesh, Bhopal. e-mail: anthonydesa.ias@gmail.com

Subash Kendurkar, Additional General Manager (Finance), Madhya Pradesh State Civil Supplies Corporation, Madhya Pradesh, e-mail: mpscsc@gmail.com

Community Managed Sustainable Agriculture, Government of Andhra Pradesh

D V Raidu and Venkat Trinath

PROJECT OVERVIEW

SERP (Society For Elimination of Rural Poverty) initiated community managed sustainable agriculture (CMSA) in 2004 as part of its mandate to eradicate poverty and improve the livelihoods of the rural poor. CMSA was meant to support poor farmers in their efforts to adopt sustainable agriculture practices, to reduce the costs of cultivation and increase net incomes. This initiative also aims at addressing the major causes of agriculture distress—extensive use of chemical inputs, high costs of agriculture, displacement of local knowledge, unsustainable agricultural practices like mono-cropping, imperfect markets etc. CMSA is a paradigm shift in moving from an input-centric model to a knowledge and skill based model. It involves making best use of locally available natural resources and takes best advantage of the natural processes.

The core investment in this project is on supporting the community managed extension system than on material inputs. CMSA is essentially a farmer-centred movement. Transfer of technology is through community based local best practicing farmers. Farmers Field School (FFS) is the key activity for transfer of technology and capacity building is the key component in CMSA. Financial support is only in the form of capacity building and transfer of technology. Programme management is done by the SHG (self-help group) women. Sub-committees review the performance of the village activist, cluster activist and DPM on a monthly basis.

Methods promoted under CMSA are a blend of scientifically proven technology, local wisdom, and, farmers' innovations. Over a period of time, these methods are building a good ecology where there is a balance between friendly insects and crop pests. This is leading to a reduction of money spent on pest management to 'zero'. Further, the focus is on building life into the soil by adopting various recommended practices, such as monocot–dicot crop combinations, mulching, efficient composting techniques like Nadep and by using dung based inoculants which will pave the way to reduce and eventually eliminate chemical fertilizers. Radical soil and moisture conservation methods such as conservation

furrows, trenches, farm ponds etc to harvest rain water and to prevent soil erosion are also adopted.

CMSA is now owned by communities. Each farm family including farmers outside the SHG fold pay Rs. 50/- per year as registration fee. This year, an amount of Rs.2.9 crores was collected as registration fee. The village organisations are seriously looking at how they can become financially self sustaining, through a mix of NPM enterprises, marketing of output, etc.

Impacts of CMSA include reduction in cost of cultivation, increased net incomes, increased food and nutritional security at the village and household level. Further, CMSA enabled farmers to reduce expenditure on health. Many farmers have been able to reclaim their land from mortgage.

The primary source of data is data generated through mobile based applications from field functionaries. At the village level, data is available in the village level registers. Few important outcomes are monitored through internal MIS. Further, data on adoption rates are captured through COCO (connect online, connect offline) for villages where Digital Green (a system that uses participatory videos and mediated instruction to train smallholder farmers in sustainable agricultural practices and technology) is working.

Validation of data is done by the state unit and also by the sub-committee members. Data generated through mobile application is monitored periodically and is verified by the state unit and sub-committee members on a random selection basis.

Objectives of the MIS Application

The goal of the MIS application for CMSA is to regularly assess the amount and type of investments made, and the impact of these investments. Following are the major objectives of the monitoring and evaluation framework.

- To make real time corrections based on field data
- To know the status of commitments and achieved targets
- To find out the effectiveness of the interventions
- To maintain consistency of planned interventions with the proposed targets
- To assess the impact of interventions

The following activities are done on a daily basis:

- Sending alerts to *Polambadi* (Farmers Field School) for not uploading cluster activities by 11 AM
- Sending abstract reports of CA's activity to ZS and MS by 2 PM as an SMS
- Sending state-wide abstract reports to higher officials by 4 PM as an SMS

Using MIS as a decision making tool, data and photo based information technology helps to review the factual field situation in the entire state. Abstract reports with images help in decision making and reviewing project progress. GPS coordinates are acquired ensuring that the photographs were taken at the designated place only. Data is updated from time to time by field assistants and supervising officers.

Data collection through mobiles required a mobile application to be developed and installed in the mobile.

The process involved in data collection is as follows:

- User input (CA/functionary)
- Entry of columns: alphabets, numeric or a combination of data type through a mobile device
- Selection of data from the list of available master data
- Device/system specific requirement data
- Using mobile camera to capture images/video for CCE (continuous and comprehensive evaluation) etc
- GPS for capturing GPS coordinates
- Using GPRS communication, the collected data are uploaded into the central server through mobiles which then generates various MIS reports

Generating various exceptional reports like the following helps in analysing and reviewing field assistants and supervising officers

- List of members who have not uploaded data on a particular day
- List of members who have not uploaded data for a given period
- List of farmers using chemical pesticides
- List of members who have not uploaded data even once
- List of members with the highest/least uploaded data

RESULT INDICATORS

The system has the following characteristics.

- It enables the community to own the programme.
- It helps in real time corrections.
- It helps field functionaries in taking the right decisions in implementing the programme.
- It sends alerts about data not uploaded to field functionaries daily.
- Farmers' information is available any where any time through the web.
- Socio-economic analysis of revenue generated is possible by using NPM methods.
- Comparisons of non-NPM methods vs NPM methods is possible.
- The MIS helps in better understanding of CMSA implementation at various locations.

- Data warehousing and a strong DSS can be built as implementation progresses. Grading reports can be generated based on upload performance.
- Exceptional reports help in analysing and reviewing field assistants and supervising officers.
- Community is benefited with MIS as verifying the instantaneous web reports helps in monitoring cluster activists and functionaries.
- Meticulous individual resource level tracking on work progress results in dramatic improvement in work output.

1. Key Performance

- Capturing 1 million farmers data from 40,000 locations
- Design and development of an online (when GPRS signal is available) and offline (when GPRS signal is absent) system for capturing 1 million farmers data from 40,000 locations
- Training semi-skilled end users in using mobile applications
- Data synchronisation from mobiles to servers
- Enforcing farmers to use NPM methods and avoid chemical fertilizers and pesticides

2. Efficiency and Improvement Initiatives

- Market demand and crop production can be ascertained well in advance.
- The produce from the farmers were sold at a higher price than the produce that used fertilizers and pesticides.
- Cost of cultivation came down drastically.
- Use of fertilizers and pesticides increases pollution. Consumption of food that was produced using fertilizers and pesticides leads to health hazards. By advocating NPM methods, pollution can be reduced to a larger extent. Soil strength can also be protected and it works towards the well being of humans. Thus, the project can be replicated in other parts of the globe.
- Centralised pest management can be a good solution for controlling pests.
- Crop-cutting experiments will help in better estimation of yield and their by-products. It will protect the farmer by way of providing insurance.
- These experiments will also help in analysing the yield so that socio-economic analysis can be made.
- There is increased savings as amount spent on pesticides are reduced.
- Soil fertility is enhanced.
- The improvement is eco-friendly.

ENABLER INDICATORS

1. Process Reengineering

The opportunities provided by information technology to improve access to government services, particularly in terms of real time processing and delivering of services have made good progress. Portal-based central servers make it much easier to provide Internet-enabled services to stake holders and staff. The portals will bring transparency in the organisation. To ensure the e-government journey with vision, clear objectives, effectiveness and security, it is mandatory to have a policy for enforcement.

The prime consideration of SERP is to ensure that economic and non-economic initiatives reach the underprivileged groups. There is a need to make use of the rapid transformations in IT to monitor the initiatives and measure outcome, while bettering people's lives, by implementing efficient information systems.

Thus the vision statement of SERP is 'leverage information and communication technology for the creation of an effective MIS and DSS to monitor, intervene and resolve the empowerment of the disadvantaged communities to overcome all social, economic, cultural and psychological barriers'. In practical terms, it boils down to creating an online robust secure information system to capture the data at the source of generation in real time and create a transparent, role-based workflow to the management system to monitor all process in real time.

ICT Changes

SERP is a facilitation and co-ordination department which introduces various schemes and interventions to targeted communities. Hence a small IT team for coordination had to be created. IT resources were placed either on deputation or outsourced on a need basis

SERP did not create any large-scale IT infrastructure. It used the IT infrastructure created by the government (IT and C Department) or service providers under cloud computing model. IT-related services are drawn from multiple operators/service providers for cost effectiveness and efficiency.

All processes in SERP are automated and the office made into a low-paper use office. The 'single source of truth paradigm' is to be applied in all the dimensions of IT implementation to ensure IT alignment to SERP objectives.

The system created shall deliver value to the stake holders. The performance of the stake holders, staff and the schemes/intervention will be computed from the IT system itself.

A detailed project report (DPR) for automation of units was prepared with a view of the IT framework of SERP, keeping in mind the big picture. The DPR covered the as is (present), to be (visualised) and the phasing of

the project from 'as-is' to 'to-be' for implementation. On approval of the DPR and roadmap, the same was adopted and implemented.

2. Capacity Building

A support team was established to implement the system. The composition of the team is as follows.

- Project Lead
- DBA/System Administrator/Network Administrator
- Programmer

The team will attend to problems, errors and bugs reported at the helpdesk from time to time. The team is permitted not to attend to any oral instructions given by various officers of the SERP. The following are the roles and responsibilities of the team

Project Lead

- The individual will be responsible for overall management of the following:
- Helpdesk and its operations, team management, database management, and monitoring the daily work done by programmers
- Requirement gathering for the changes reported at the helpdesk, and freezing the logic and scope for the same
- Coordination and mediation between SERP unit and M/s. Bluefrog
- Complete technical guidance to the project team
- Execution of change/configuration
- Code review and testing activities

DBA/System Administrator/Network Administrator

The DBA will attend to performance tuning of the database on a regular basis. He or she is also responsible for the maintenance of the system administration and network administration.

Programmer

Programmers will attend to coding and debugging including testing for the proposed change managed applications.

Project Management

- Project planning and monitoring
- Planning for process realisation
- Monitoring daily progress of production with plan
- Ensure production measurement, analysis and improvement
- Resource planning
- Ensure in-house training for manpower as per requirement
- Client interaction

- Update clients on status of the projects at a regular basis
- Technical guidance
- Coordinate with project leaders and team leaders and clear production hold-ups
- Project support
- Maintain and enhance quality policy
- Manage operational techniques and activities that are used to fulfil requirements for quality
- Overall management of the project
- Ensure in time project deliveries
- Updating the management on the status of various projects as and when required

3. Technology

ICT Solution Adopted

Blue Frog's process model combines the best principles of the waterfall and spiral models, deriving the benefits of predictability from the milestone-based planning of the waterfall model, as well as the benefits of feedback and creativity from the spiral model.

The solution framework component design model structure provides for a continuum of design-related project activities through conceptual, logical and physical design. The use of the term 'continuum' in this context

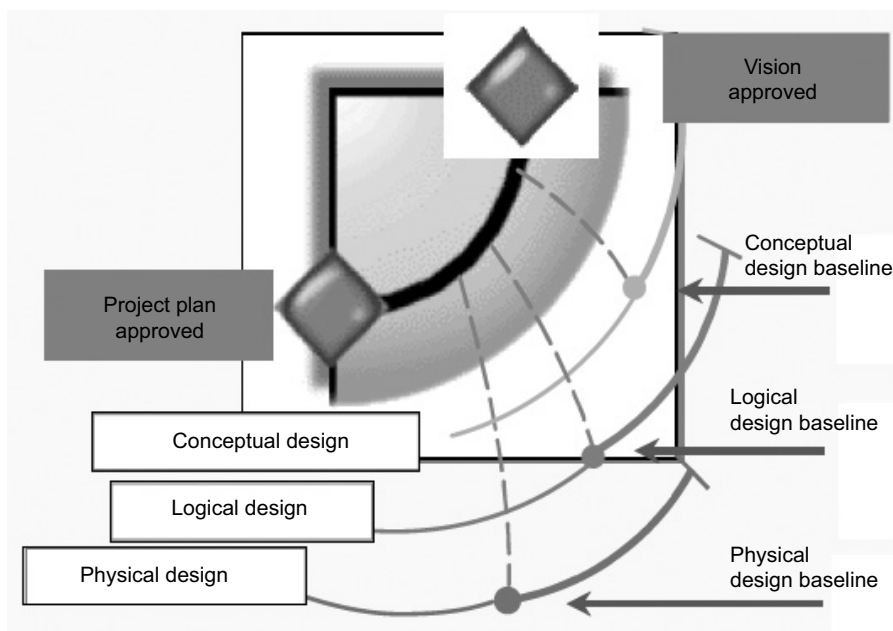


Figure 1 Framework component design model structure

refers to the process whereby each design activity (conceptual, logical and physical) flows into the next activity and between activities (Figure 1). For example, the output of conceptual design feeds into logical design, but holes in the logical design may make further conceptual design necessary. By definition, the implementation of a physical design should be traceable back to conceptual design.

Security and Confidentiality Standards

All information relating to organisation asset management, access control, human resource are secured for internal use only. The data is secured and anti-virus updates is feasible by push technology.

Disaster Recovery and Service Continuity

As the establishment of disaster recovery facilities enhances the operational efficiency of the department, the following are imparted:

- Training on recovery and business continuity in the event of disaster
- Placement and distribution of necessary documents and information
- Identification of and necessary training to key people in the event of disaster

Apart from these, a business continuity plan (BCP) is prepared by:

- Identifying critical processes
- Impact analysis
- Risk analysis

Depending on impact and risk factors, the BCP is prepared to provide continuity of business in case of emergencies related to the following:

- Hardware
- Application
- Connectivity
- Data

BCP included the following:

- Fail over and fault tolerance mechanisms
- Manpower training requirements for business continuity
- Preparedness testing procedures
- Data backup and recovery procedures
- Disaster recovery plan and related procedures

VALUE INDICATORS

1. Digital Inclusion

To reduce the Digital Divide, efforts are on to generate reports in the local language, i.e., Telugu. Further, SMS alerts on status are being sent to SHG members and leaders. These two steps have enabled the communities to review the programme, own it and take right decisions at the right time.

2. Green e-Governance

CMSA mobile application with GSM/GPRS service is available across the state on mobile instruments and therefore reduces the capital cost associated with computers/e-notebooks at the field. The mobiles enabled to update data in real time, results in real time information being available by instantaneous updating of data in the server and availability of information to generate MIS reports for proper decision making.

D V Raidu, Director, Society For Elimination of Rural Poverty (SERP), Community Managed Sustainable Agriculture (CMSA), Hyderabad, e-mail: raidudv@gmail.com

Venkat Trinath, Director, Business Development, Bluefrog Mobile Technologies Pvt. Ltd., Andhra Pradesh, e-mail: venkat@bluefrogindia.com

Bihar Infrastructure Mapping: Geomatics-Oriented Application Model, Government of Bihar

Arun Kumar Singh and Santosh Kumar

PROJECT OVERVIEW

The main aim of iBhuGoal is to establish 'Bihar GIS' as a tool to represent resources (natural as well as man made) of Bihar for location specific planning, decision making and monitoring. The project envisages establishment of a spatial data infrastructure for multi-layer GIS for planning and e-governance by taking advantage of existing and available data, and ICT infrastructure involving various stake holders in the state of Bihar. It is to be noted that up to project date, there was no concept of spatial data inventory or SDI (spatial data infrastructure) in Bihar. There were scattered efforts from officers at different departments to map the existing MIS data and other infrastructure using drawing tools in computer, for their reference. These were available in bits and pieces and lie with departments in different formats. They however did not conform to any mapping standards and there was no such policy within the state, which defined the standard procedures of mapping and their maintenance. The main drawback of such practice is that integration of these maps is not possible. Such practices also fail to reflect the current functional status of infrastructure and the services on the ground to administrators at higher levels to make strategic and informed decisions. In turn, large investments are incurred to answer specific queries frequently made from various apex forum and internal planning. Besides this, results may also vary for similar queries raised at different points of time. It was felt that the introduction of GIS technologies will bring into focus existing spatial reality which will lead to dynamism and transparency in the nature of working. This will overcome problem issues related to planning, development, monitoring and decision making. Establishing a GIS system for data organisation and management of existing infrastructure and its coverage, with an appropriate technology framework and standards may go a long way in creating a collaborative dynamic environment and may lead to large-scale benefits.

Geomatics, the synergy of multiple disciplines, has evolved as a separate discipline dealing with spatial and non-spatial information, its method of acquisition, organisation, classification, analysis, management, display and dissemination. It provides not only the answers for macro-level planning, but also state-of-the-art models to the government in the

context of decentralised planning for sustainable development in rural areas. The present work focuses on developing a Web GIS integrated framework for planning infrastructural facilities up to the village level. The infrastructural facilities considered at village level include educational and medical facilities, *Anganwadi Kendras*, rural roads, forest cover, agricultural facilities, water canals, schemes under MGNREGS at different levels, power supply for agriculture, physical connectivity, water supply, bank and post office etc. Spatial utility maps for infrastructural facilities existing at village level have been created using GIS, while spatial gaps in the existing facilities have been examined to plan for new facilities. The GIS/ GPS/remote sensing based project for Bihar Infrastructure Mapping with the following objectives has been implemented:

- Creation of a digital spatial database
- Creation of primary layers and the ability to generate the required number of secondary layers and composite maps from those layers
- GIS analysis using state-of-the-art technology
- Generation of location-specific thematic maps
- Action plan maps for location-specific problem solutions
- Development of an appropriate GIS-based query system
- Appropriate methodology for collection, collation, storage and processing of data on natural resources in a given region and in totality
- Standardised formats for natural resources and socio-economic data in an integrated manner to establish linkage among various hierarchical units
- Utilisation of information for planning and development
- Evaluation and monitoring of various schemes activities
- Keeping ahead of the maintenance curve
- Developing a methodology for state-wide monitoring considering time and economic feasibilities.

The project envisages the establishment of a 'common central ICT/GIS server infrastructure and services for Bihar' (Figure 1) for planning and e-governance by taking advantage of the existing and available data, and the ICT infrastructure resources involving various stake holders in the state of Bihar.

Establishment of a Central GIS Server

A central GIS server was established as a repository for spatial data. Database servers were set up as repositories for MIS data of all the user departments connected to the GIS server. The GIS server will have maps with village, block and district boundaries along with various other resource layers like roads, rail, river etc. This uses Survey of India supplied 1:50K scale maps of villages across the state. These maps have been 2011 census location codified. In addition, it includes those locations such as *tola*/ward. The GIS server can be connected to the *internet* for public access and through leased line connectivity to user departments.



Figure 1 Snapshot of the home page of iBhuGoal

Customised Web GIS Service

The GIS server will be able to leverage customised web GIS service as per user requirements (Figure 2), involving the above layers in conjunction with other resource layers like administrative boundaries, roads, rails etc. The requirements of access mechanism for various map based services will be decided in consultation with the user.

Establishment of Staging Database Servers at User Departments

These servers can be connected to the central database servers for updating

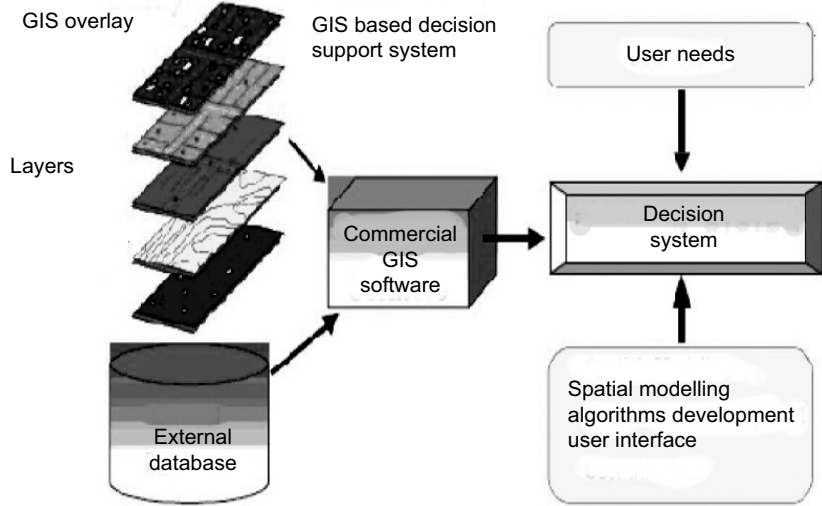


Figure 2 Establishment of a customised Web GIS Service

attribute data from various departments. They can host MIS applications as well as such data which is related to the concerned department and need to be hosted at the GIS server. It is the responsibility of the concerned department to update the data from field locations with the help of field information and later synchronise those data which is needed for GIS applications. The database servers at each department can be connected to the central GIS server.

Sectoral Information and Integration with GIS

These need identification of operational MIS/databases for priority areas as mentioned above, including their availability with the user department. The MIS databases need to be census codified and a notification to all departments should be given to use 2011 Census Village Codes for any kind of geographical location based MIS. It must be clarified that GIS cannot be a replacement for all MIS applications—rather, only identified, suitable parameters is ported into the GIS application after consulting the department.

GIS Based Application Model

Geographic information technology has developed at a remarkable pace over the past two decades (Figure 3) and will play a key role in development. The time has come for all decision makers to discuss the appropriateness of GIS technology and its applications to rural development, forest management, urban development planning, land information systems and agricultural

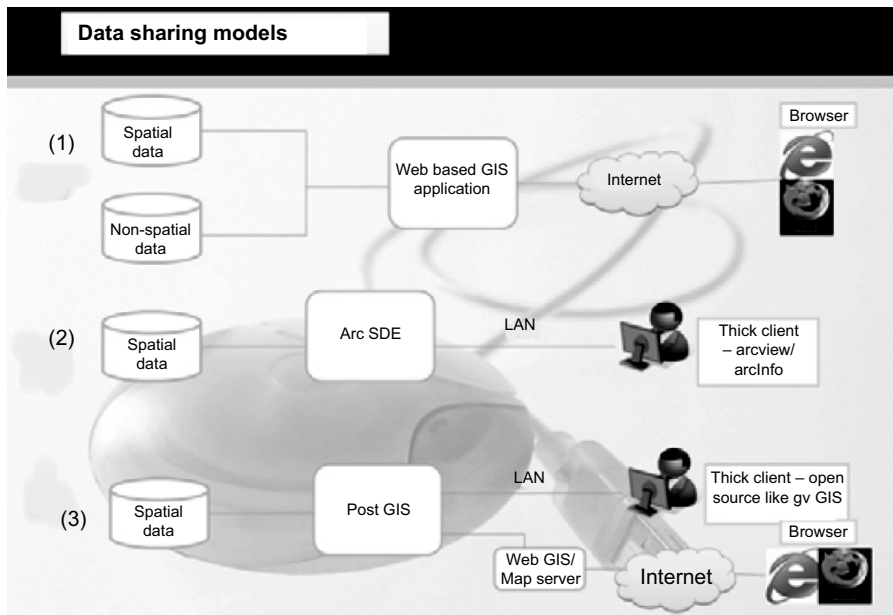


Figure 3 Data sharing platforms showing the evolution of the web based GIS application used now

development. GIS can also be used for educational infrastructure development with special emphasis on the rural sector. It is a proven technology that has been in use for several decades by many government agencies and other organisations as a decision support tool and information management system. GIS provides the capability to collect, manage, manipulate, analyse and distribute information that is tied to a location. It layers that information in a map-based environment to provide a better visual image of location, patterns and relationships. GIS is an enabling and core technology that touches numerous business processes, systems, data and other applications. As such, it is an integral part of the computing infrastructure that contributes to the success of service delivery and operations.

RESULT INDICATORS

Works Completed as Part of Project Deliverables

- Development and implementation of a web GIS portal for Bihar for hosting GIS applications (<http://gis.bih.nic.in/>) which provide a service oriented architecture.
- GIS mapping of rural roads has led to the release of Rs. 2500 crores to Bihar under PMGSY (Pradhan Mantri Gram Sadak Yojana) from the central government. The RD Ministry, GOI has appreciated this effort.
- GPS data and photograph capturing of schools and *Aganwadi Kendras* has been completed for 67,000 (total 69,000) schools (Figure 4) and 14,000 *Aganwadi Kendras* of the state. Survey and data entry is being done for the remaining schools (<http://gps.bih.nic.in/>).
- Web GIS application has been developed for integrating DIAS data of Bihar Education Project along with MAPS and query facility for

Institution Information	
DISE Code	1202603
School Name	NAV SARJEET PRIMARY SCHOOL KHAR
School Type	Primary
Village	Jaitipur Kurva
Panchayat	JAYTIJUR KURUA
District	JEHANABAD
***** TOTAL ENROLLMENTS	
Boys	62
Girls	47
Total	109
***** DIFFERENTLY ABLE CHILDREN	
Boys	5
Girls	3
Total	8
***** TEACHERS	



Figure 4 Snapshot of the system display showing information of a government school in Bihar

generating maps.

- Web site for an Atlas of Bihar (<http://gis.bih.nic.in/>) has been created and hosted.
- Digitisation of NH, SH, major district roads on 1000 scale has been completed (Figure 5).
- Digitisation of rural roads (PMGSY) on 1000 scale has been completed for all districts of Bihar as per the specification of NRRDA. Integration of key indicators has also been done with maps. This includes preparation of CN1 and CN6 sheets which is being attached with applications. It

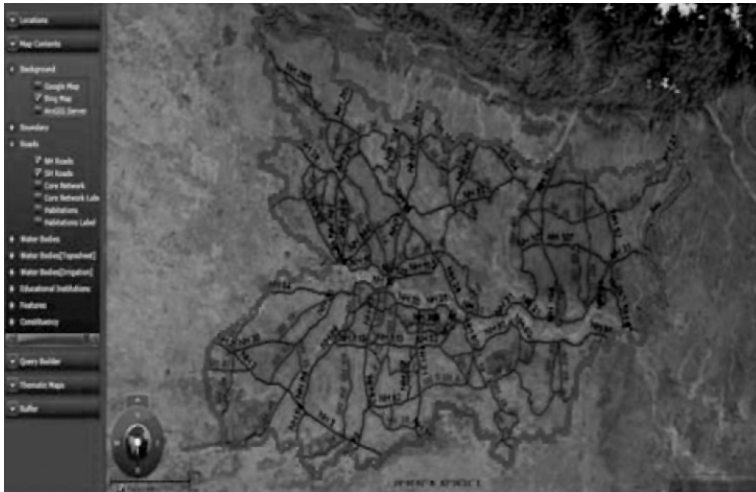


Figure 5 Snapshot of the system display showing the National Highways in Bihar

involves around 60,000 habitations and 70,000 roads.

- Urban boundaries, i.e., ward boundaries of six cities has been integrated with the system.
- Digitisation of forest cover has been started after discussion with the forest department. Classification of forest cover and other parameters are being carried out.
- Irrigation canals, rivers, streams (Figure 6) on 1000 scale has been completed and integrated with the Bihar GIS system.
- Parameters have been identified with the Rural Development Department and National Rural Livelihood Mission for generating thematic maps of rural development schemes and SHG distribution (Figure 7).
- Mapping of health facilities such as PHC, APHC etc. along with revenue village has been started.
- Mapping of habitations as per the National Habitation Survey 2003 is also being done.
- GPS mapping of 62,000 election booths (Figure 8) to be used in assembly or parliamentary elections has been completed.

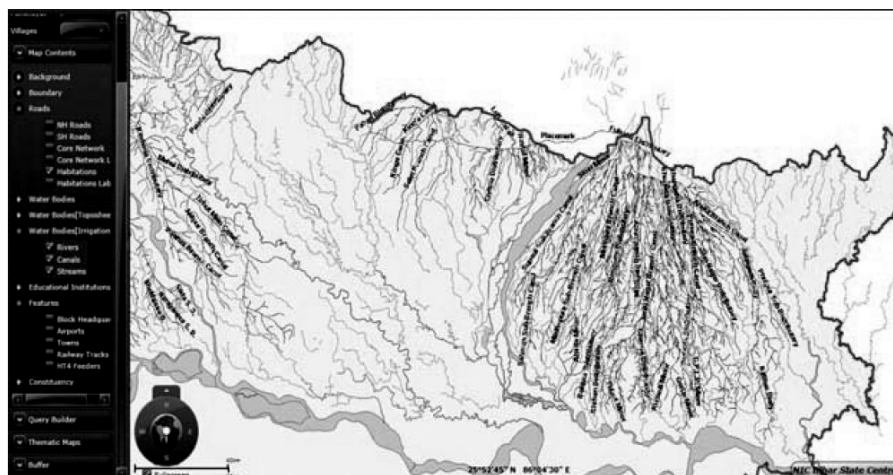


Figure 6 Snapshot of the system display showing water bodies in Bihar

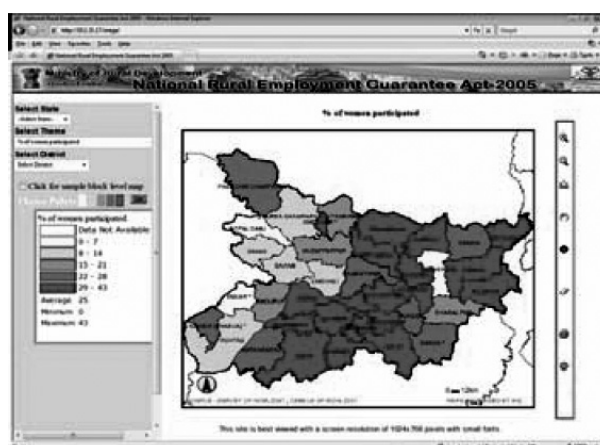


Figure 7 Snapshot of the system display showing the percentage of women who participated in the National Rural Employment Guarantee Act in Bihar

- Pilot project has been initiated for agriculture transmission line to supply electricity for government owned pumps.
- Identification of middle schools outside 5 km radius of high schools so that they can be converted to high schools.

Project Details

Project original start date	: 15/03/2011
Planned completion date	: 31/07/2012
Actual completion date	: 31/12/2012

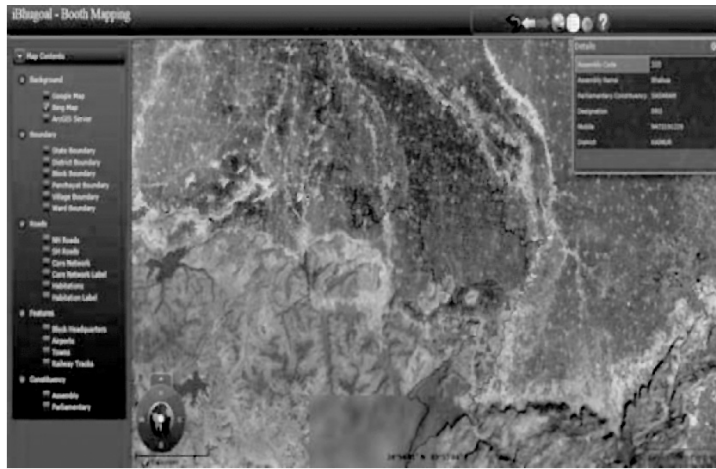


Figure 8 Snapshot of the system display showing booth mapping

1. Key Performance

ICT Enabled Services

G2C

- Geographical maps of state, district, block, panchayats
- Booth details, ERO and BLO details of each booth of the entire state
- Bihar Atlas containing various thematic maps
- Road and habitations details of selected areas
- Urban boundaries of major cities of the state
- Integration of GIS maps with on-line GIS services such as Google, Bing, ESRI etc.
- Profiles of rural roads regarding physical and financial progress
- Assembly, parliamentary, booth distribution maps of Bihar
- Integration of various MIS data for on-line queries

G2G

- Distribution of schools and buffering of high schools within 5 km radius
- Digitisation of rural roads which cover 250 population in Naxal affected areas and 500 population in other areas
- Identification of election booths and preparation of route chart
- Road profile and progress monitoring of physical and financial targets
- Management of irrigation facilities such as rivers, streams and canals
- Creation of core network for agriculture transmission line of electricity
- Creation of core network under Mukya Mantri Gram Sampark Yojana
- Coverage of Naxal affected assembly segments and booths
- Forest area mapping and identification of forest reserve

- Mapping of rivers, canals, streams for irrigation and flood management
- Generation of on-line thematic maps based on MIS data
- Spatial query facility based on spatial data and MIS data available

2. Efficiency and Improvement Initiatives

- The project has taken one and a half years to shape up the geo-database for the state. It is creating an integrated GIS framework for the state most suitable for creating a data sharing platform for the departments. The state infrastructure mapping for Bihar integrates spatial and non-spatial data on location, extent and coverage of services. The national GIS framework at NIC having a 'spatial data infrastructure for multi-layer GIS' is the service oriented architecture over which 'Bihar infrastructure mapping services' is being customised as a web based GIS service for various stake holders.
- The national GIS portal around SOI (Survey of India) reference system, covering data on administrative boundaries, village locations, soil, forest, watershed, drainage, river and water bodies, transport network is the base data over which spatial and non-spatial data from user departments is being overlaid for value added GIS services.
- As part of the project 'iBhuGoal' sponsored by the Information Technology Department, Government of Bihar, NIC has set up GIS service infrastructure at a cost of Rs. 1.99 crores.
- The entire project envisages a 'whole to part' approach of data organisation and navigation. At the national level, the base reference is in 1:50,000 scale and is being further scaled up to 1:10,000 or higher depending upon availability of data as per application requirements. An integrated and holistic approach is used, combining data in various scales of mapping such as 1:50K, 1:10K, 1:1K etc and from various sources.
- Most of the applications at NIC developed so far have been done as a web service under which the users can access the map resources through browsers from their desktops and hence have one-way communication. Whatever service is made available is available only for viewing—no editing or modification is possible in such services. Update for the same are carried out offline. Further, the concept of providing specific services to clients were tested where editing of data was feasible locally. The audience to these services is the general public. However, it is also proposed, as per requirement, to go a step ahead and enable the service for interaction from the field staff of the Bihar government to identify various resources and infrastructures on the map service and forward the same to NIC for updation in the spatial database—this will create a shareable repository of data. It is proposed to deploy suitable tools at the client level to capture the infrastructure as a point, line or polygon on the base map provided through web service.
- The strategy for development envisages a framework ICT/GIS infrastructure like the hardware, software and data available at NIC (up

to 1:50,000 scale) and also provided by the Bihar Government (attributes or higher scale data). In the current context, it can be used in mapping linear features like road network connecting villages and towns and also point locations like PHCs, schools in the villages where such accuracy will suffice. However, in the current framework available at NIC, the mapping of geographic content such as those within the city is not feasible. It requires high-resolution satellite data such as those from Quickbird, which has a resolution up to 60 centimetres. With such data, it would be possible to map the entire Bihar government infrastructure and the service areas within the cities. The high resolution maps for selected cities/areas will have the same look and feel. Therefore, the project envisages a framework architecture which can manage data in various scales and resolution as per the requirements of the Bihar government.

Innovative Ideas Implemented

- Integration of geo-spatial data and MIS data of different departments
- Integration of SOI maps with online map services such as Google, Bing, ESRI etc.
- Query facilities for planning and decision making by departments
- Provides an efficient and effective tool for planning rural road connectivity to habitations.
- Helps in better management of facilities such as schools, *Aganwadi Kendra*, PHCs etc.
- Helps achieve transparency and ease in planning and monitoring processes
- Efficient updation of thematic maps
- Smooth management of election process through proper use of GIS maps
- Offers scientific approach for irrigation facilities planning
- Analysis of forest reserve and forest inventory

Level of Integration

- The national GIS framework at NIC having 'spatial data infrastructure for multi-layer GIS' is the service oriented architecture over which 'Bihar infrastructure mapping services' is being customised as web based GIS services for various stakeholders
- Use of Census 2001/2011 location codes so that e-governance standard applications can easily be integrated
- The application involves creation of spatial layers of different parameters with desired attributes on top of the 'base map service' leveraged by NIC as an 'image based web service' to authorised and registered state government departments
- Access to customised spatial data service for different state government authorised user groups for viewing, data creation and updates with due validation and authentication process

- Customisation of front-end application for Bihar government user groups
- Web based MIS system for attribute data entry, its validation and update and report generation
- Application software for spatial and non-spatial data integration in a customised web GIS service environment
- GIS services under this project assist planners and administrators in their task of operational planning, decision making, developing and monitoring needs

ENABLER INDICATORS

1. Process Reengineering

- Use available data in 1:1M, 1:250K and 1:50K as part of national GIS framework
- Standardisation of framework for planning purpose in 1:50K scale
- Use satellite data at various resolution, viz., AWIFF (56 m), LISS-III (23.5 m), PAN (5.8 m) and QuickBird (61 cm)
- Extend national GIS and image services for Bihar state with due customisation as per location needs
- Identify state data sets and sources (meta-data) and define, develop and implement 'state data inventory' around the national GIS framework
- Data available at state integrated on priority wherever there is better confidence with data
- Cost of additional data sets, for example, for high resolution satellite images, bridging gaps, processing to be taken up by the Bihar state government
- Data provided by the state government; data entry done under supervision by NIC state centres; spatial data value addition carried out by state organisations
- Meta-data report with state approval
- Appropriate delivery and implementation mechanism of services

2. Capacity Building

A desktop GIS roll-out programme using open source GIS products has been undertaken for identified sections/division in the state department where there is a need to sensitise the staff regarding GIS concepts and process data as per the local needs. The ease of use of GPS for data collection had changed the entire philosophy of data collection, although requisite skill set has to be developed. A three-level plan of training master trainers to actual management can be taken up from the state to the block level for using GIS in decision making and enabling of GIS culture in government functioning.

State GIS Core Team

NIC, Bihar and Information Technology Department, Government of Bihar has notified officers as project members of the Bihar GIS team. This team also has members from the central GIS team, Delhi, who advice and assist during project implementation. The team is also supported by a team of programmers well versed in adopting GIS for applications and providing technology implementation of the project. A set of data entry operators—at least one for each department—has been hired at the GIS core team. The team has also been assisted by officers looking after different sectors of the state government. It works under the overall supervision of the Principal Secretary, Information Technology Department, Government of Bihar and the State Informatics Officer, Bihar. The Central GIS team at New Delhi organises training on GIS tools for the team and hand holds the project.

User Department Core GIS Team

In order to support the project at the department level, it is necessary to create and train a group of resource persons who can work at the department level and integrate the MIS applications with GIS. User departments formed a cell with hired manpower and domain experts. These people have been trained on GIS applications by the central core Bihar GIS team. The cell not only coordinates with the Bihar GIS team but also interacts with field formation for collecting MIS data. Sectorial data is being updated at regular intervals to the GIS server by this cell. Departments are also advised to hire expert manpower for digitising maps depending on requirements. In addition, the cell can motivate decision makers to use GIS in the decision making process and create a GIS enabled environment for planning and monitoring.

Resource Persons at District Level

In order to support the project at the district and block level, large chunks of data had to be uploaded to the department level on a regular basis. The kind of parameters required at decision making had to be identified by the district. It must be clarified that the entire MIS data should not be ported on to the GIS server—rather only such data which has location importance and which is needed for planning and monitoring. Nodal officers, at district and block level, who co-ordinate for data at district level and also check whether all the data which are being collected contain census codes, have been identified. District officials dealing with data have been trained and equipped for uploading data, data standardisation and also using GIS as a tool for decision making. Proper hardware and software infrastructure has been created at field formations for updating data and viewing maps.

Change Management Strategies

Workshops have been conducted for various stake holders of the project to make them understand about available GIS technologies and best practices.

Capacity Building Plan

Around 1500 officers and staff have trained for capturing data and using GIS technology on a day-to-day basis. Engineers of various engineering departments have been trained to use GIS web applications and generate thematic maps and other map requirements based on dynamic needs. Officers who have been trained to use the applications include

- District Election Officers and Additional Districts Election Officers
- Executive engineers/assistant engineers/junior engineers of the Rural Works Department to use GIS application for PMGSY roads and Mukhya Mantri Gram Sampark Yojana
- Officers of the Forest Department
- District Education Officers of the state
- Surveyers of A N Sinha Institute, Patna for schools and *Anganwadi Kendras*
- District Informatics Officers and the District Informatics Associate
- Nodal officers of the Rural Development Department
- Civil engineers of the Irrigation Department

Project Management

The following committees have been created by the Information Technology Department, Government of Bihar for monitoring the fulfilment of long-term objectives and progress of the project.

State Level Apex Body

This has been constituted under the chairmanship of the Chief Secretary, Bihar with Principal Secretaries of departments such as Rural Works, Forest, Water Resources, Rural Development, Urban Development, PHED, HRD, Social Welfare, Information Technology, State Informatics Officer, NIC, Bihar as members.

State Level Steering Committee

This has been constituted under the chairmanship of the Principal Secretary, Information Technology, Government of Bihar with GIS Nodal Officers of departments such as Rural Works, Forest, Water Resources, Rural Development, Urban Development, PHED, HRD, Social Welfare, Information Technology, two representatives of districts and the GIS Coordinator, NIC, Bihar as members.

District Level Executive Committee

This has been constituted under the chairmanship of the District Magistrate of the respective district of the Government of Bihar with GIS Nodal Officers of departments at the district level such as Rural Works, Forest, Water Resources, DRDAs, PHED, HRD, Social Welfare, two representatives of blocks and DIOs of NIC as members.

Roles and Responsibilities of the State Government

- Provide necessary budgetary support for the development and execution of the project
- Notify all government departments that all MIS data/or any data collection must contain census village codes, and existing data must be converted in mission mode for census village codes
- Finalise data requirements, formats and standards (content, meta-data, data survey, data classification, taxonomy, legends, annotation and symbols) in consultation with NIC
- Provide time frame and work plan to NIC to ensure desired data availability to NIC for development, customisation and deployment of services
- Provide or facilitate all spatial as well as non-spatial data inputs (including data updates) needed in the project
- Provide all coordination and administrative and logistic support, for necessary institutional linkages for data capture, as well as for making available existing/currently data, expertise and knowledge, needed for the project
- Provide/facilitate verification, validation and approvals for resolving any data/map related problems
- Provide all possible help in base data organisation, as and when needed for the project
- Facilitate or help NIC for appropriate feature coding of spatial data element with non-spatial/attribute data
- Provide list of probable decision-making queries to NIC to develop an integrated GIS based system
- Provide or facilitate all subject matter related to inputs to the project, including analytical/modelling aspect, needed, if any
- Establish institutional environment within the state government for
 - Data capture (survey, procurement, collection and collation)
 - Broadband VPN connection for department's field staff (data access/visualisation, validation and updates)
 - Provision of necessary terminal computers and broadband modems to field level personnel engaged in planning, operations and service delivery for direct access of central repository (data access and validation/updates)
 - Setting up an Apex Committee at Chief Secretary level and department level and a development team that will interact with NIC in evolving GIS deliverables as well as providing inputs to NIC to achieve the desired output for each department
 - Setting up a GIS cell in each department to organise training, issue guidelines for uploading data and continuously monitor the progress of data entry so that information stands up-to-date in a targeted time frame
- Provide/identify appropriate site for department level GIS cell for establishment of Bihar's GIS ICT infrastructure

- Provide necessary state government manpower/staff for GIS training, on project, as well as on GIS technology, to facilitate transfer of technology to users, for future operational services
- Commission/lay appropriate high bandwidth connectivity/circuit between department GIS data centre and NIC data centre

Roles and Responsibilities of NIC

- Establish the framework service oriented architecture for Bihar infrastructure mapping services
- Design, develop and implement a web based system for capturing and disseminating data and services among the user groups as specified by the state government
- Set up hardware and software infrastructure required under the project
- Develop web based GIS applications and services for planning, decision making and e-governance
- Provide a work plan and time frame for development and implementation of project requirements, as per the work plan and time frame for data availability for development, customisation and deployment as provided by the state government
- Transfer technology to the state government through appropriate GIS training package, for future operational services
- Provide/extend user hand-holding and maintenance services mutually agreed upon with the state government

Financial Model

The project has been implemented in collaboration with NIC, Bihar through NICSI (National Informatics Centre Services Incorporated), a section 25 company under NIC, Department of Information Technology, Ministry of Communications and IT. This is to facilitate appropriate provisioning of outsourced services required for the project. However, NIC is the single point coordination for project development and execution for the state government. The Government of Bihar has sanctioned Rs.1.99 crores for execution of the project for two years.

3. Technology

ICT Solution Adopted

Hardware Platform

- High-end blade servers with 64 GB RAM and Quad processors for hosting web GIS applications
- High-end blade servers with 64 GB RAM and Quad processors for hosting database server
- SAN storage system for storing large amount of data

Software Development Platform

- Visual Studio .net 10.0 with .NET Framework 4.0 AND C# and JavaScript
- MS-SQL Server 2008
- Arc GIS Server 2010
- Arc Map
- IIS Web Server 7.0
- Apache Web Server
- Google Earth
- Microsoft Silverlight
- Survey Of India Toposheet Service of NIC
- Google API for on-line access of Google Service
- Bing API for on-line access of Bing Service
- Unicode Support and Fonts
- XML and Service Oriented Architecture

Security and Confidentiality Standards

There are various levels of control that can be allowed in a system.

- Mandatory access control (MAC) requires that data items are classified at different security levels and that users of the database have security clearances assigned to them. When a data access is requested, the security clearance of the requesting user is compared to the security classification of the requested data item. If the access control rules are satisfied, the data access is permitted, otherwise it is rejected.
- Discretionary access control (DAC) defines access permissions for each user of the database. It is assumed that the owners of data should be able to protect their data and grant access rights to other users.
- Role-based access control (RBAC) is attracting increased attention in commercial systems. RBAC is based on modelling organisational-specific access control policies. The main components of RBAC are users, roles, permissions, user–role assignments, and role–permission assignments. Access control is enforced in terms of role. Intuitively, when initiating a session, a user may activate any roles that he or she has been assigned to and use the union of corresponding permissions.

Based on practical considerations, such as ease of implementation, database support, and processing needs, a model was developed that allows view-based access control. Users of the database system are able to access pre-defined sets of views, based on their authorisations. Views are built from a multi-level database and may be updated, according to the users' privileges. Any update is then propagated back to the multi-level relation. Users of the database system are the non-GIS users, having direct access needs to some of the SQL server database items, accessing the database through the GIS application. These users have different access requirements according to the role they are using in a given scenario. SQL

server's support of role-based access control is taken advantage of and security administration based on the users' roles in the system is proposed. Beside user roles, SQL server allows application a role where accesses to the database depends on the application the user is using.

Disaster Recovery and Service Continuity

Backup and recovery when a data centre is intact is one thing, but what if we lose access to the data centre, or the data centre itself? Disaster recovery (DR) must provide a method for recovery in the event of site loss. Some assume that the answer is storing a copy of data offsite using backup to tape or similar media. But how current is that data and how quickly can it be recovered? It is also very difficult to test a DR plan that involves remote replication. With the right replication technology, snapshots can be replicated continuously between sites—synchronously or asynchronously—to ensure that data is current. The right solution should be reasonably simple to deploy, manage and test. Today, enterprise geographic information systems (GIS) are mission-critical for the data centre. As more and more organisations implement spatially enabled applications, it is increasingly important that these applications remain up, running and available under all circumstances. Spatially enabled applications are often the applications most needed in an emergency. The fact is, that for one reason or another, systems go down, and for many organisations this means lost revenue or the inability to serve customers. The site has a DR site at Hyderabad connected through 34 MBPS leased line. It is also planned to create a DR centre at Patna itself.

VALUE INDICATORS

1. Digital Inclusion

In order to make the application available to masses, a local language interface in Unicode has been added so that the information so provided can be used by a large set of people. Applications are accessible both for citizens and for government functionaries as per needs. It has been hosted on internet to facilitate large number of public to access the services. Easy navigation facilities help make it accessible to a larger audience.

2. Green e-Governance

- GIS MAPS printing require plotters and extensive printing. Web GIS application can reduce printing requirements as most of the dynamic map requirements can be serviced through the application itself.
- Special care has been taken to reduce the number of maps which need to be printed.

- Special training sessions are conducted for participants on Green ICT and its impact.
- Computers, monitors, printers and peripherals are turned off overnight, on weekends and when not in use for extended periods.
- Settings of IT systems are adjusted to save power when not in use for short periods.
- Tasks that need computer processing are scheduled to be done in a block of time.
- For printers that have duplex capability, default settings are set to duplex and grey scale to reduce the amount of electricity, paper, ink and toner used.
- Printing files are avoided if reading the same on the monitor will suffice.
- Computers, printers and other IT equipment are operated with proper ventilation.
- Virtualisation are used on servers, when available, to allow multiple operating systems to run on each machine.
- e-mail is used when possible rather than fax to save on paper and energy used.

Arun Kumar Singh, IAS, Principal Secretary, Information Technology, Government of Bihar, Bihar, e-mail: prsec_it@bihar.gov.in
Santosh Kumar, State Informatics Officer, National Informatics Centre, Bihar, e-mail: sio-bih@nic.in

Chhattisgarh Geographic Information System, Government of Chhattisgarh

A M Parial and K Harish Kumar

PROJECT OVERVIEW

The Government of Chhattisgarh through ChiPS, the Indian Space Programme and the Regional Remote Sensing Service Centre (RRSSC), Nagpur set in motion the project on GIS database generation in the state of Chhattisgarh. It was done with the use of high resolution satellite data specifically IRS, PAN and LISS III to update road maps, infrastructure planning, urban development, watershed management, agriculture and forest development and to take up, on priority, implementation of GIS database on natural resources using remote sensing data and geo-referencing of village maps to facilitate land and water resources development.

The project comprises three application areas:

- Establishment of natural resources database for the state of Chhattisgarh on a 1:50,000 scale
- Geo-referencing of village maps and development of LIS (land information search) for Chhattisgarh
- Development of spatial database for road network of Chhattisgarh

On an average, the cost of database generation has been worked out as Rs. 10,000/- per village for 20379 villages. The total cost of the project was 20.38 crores

The database thus generated follows NRIS (natural resource information system) standards and also meets the requirement of the State Natural Resources Management System (SNRMS) in future for the state of Chhattisgarh. The database specifications are being designed to meet the additional database requirements of various government departments such as rural development, agriculture, irrigation, forestry, public works, mines and geology.

Cadastral maps are prepared for each village in Chhattisgarh, totalling 20379 villages—they are under the custody of the Directorate of Land Records.

Maps which are available on larger scales like 1:4000 to 1:10,000 have been standardised to 1:4000. These maps depict the survey boundaries with survey numbers, cultural features like transport network and natural features like drainage etc, and are fully integrated. They had to be brought

under standard projection /coordinate system for effective linkage of the plans generated in the GIS environment. The work included

1. Gridbase generation
2. Mapgrid generation
3. Satellite data preparation
4. Creation of raster cadastral images
5. Registration of cadastral images
6. Generation and overlay of cadastral vectors
7. Output generation

Apart from this, computerisation of land records under the modified project submitted to GOI shall also include

- i. Data entry/re-entry/data conversion of all textual records including mutation records and other land attributes data
- ii. Tehsil, sub-division/district computer centres
- iii. Survey/re-survey and updating of the survey and settlement records (including ground control network and ground truthing) using the pure ground method with total station (TS) and differential global positioning system (DGPS)/ high resolution satellite imagery (HRSI) and ground truthing by TS and DGPS.
- iv. Computerisation of the sub-registrar's offices (SROs)
 - a. Data entry of valuation details
 - b. Data entry of legacy encumbrance data
 - c. Scanning and preservation of old documents
 - d. Connectivity of SROs with revenue offices

The purpose of the project was to optimise and sustain outputs from primary systems to meet the growing demands of the rising population and developmental planning which needs an integrated approach. This will help in optimal management and judicious utilisation of natural resources while improving living conditions of the people. The practical approach adopted in planning activities directed at preservation, conservation, development and management of natural resources of the region for the benefit of the people has been operated within the framework of physical and biological attributes, socio-economic conditions and institutional constraints. While the physical and biological attributes comprises of baseline data on geology, hydrology, soil, land use/land cover, climate, demography, flora and fauna, the socio-economic condition comprises of information on basic needs of people, input-output relationship, marketing and transportation arrangements, developmental incentives and facilities, such as technologies, equipments, labour, material, energy, power etc (Table 1).

Table 1 *GIS layers prepared (completed)*

Primary database elements (spatial)	Derived database elements (spatial)	Primary non-spatial elements
Land use/cover map	Water body mask	Demographic data: Village/tehsil wise
Geomorphic units and landforms	Habitation mask	Occupation data: Village/tehsil wise
Rock group /lithologic units	District boundary	
Geological structures	Ground water prospects	
Soil types	Default land development	
	User specified land development composite map	
Drainage network	Final land resources development	
Watershed hierarchy	Area specific water resources development	
State/district boundaries	Land capability	
Village boundaries	Watershed priorities for soil conservation	
Protected/reserved forest boundaries	Run-off potential derived from soil layer	
Well type classification; observation of well data and well log	Met. observations	
Data water quality		
Settlement locations	Service centre hierarchy of settlements	
Rail network	Soil irrigation	
Rainfall / temperature	Land irrigation	
Mineral	Water quality for irrigation	
Survey Of India toposheets	Water quality for irrigation purpose	

The State of Chhattisgarh is the first state in India to develop this comprehensive geographical information system (GIS) consisting of 37 layers which include hydrology, demographics, land maps etc. Several

applications are being developed to utilise the GIS in various departments (Table 2).

Table 2 *Application of GIS in various departments*

Sl. No.	Department	Uses
1.	Forest Department	Demarcating forest boundaries, estimation of forest density, details of vegetation, firewood, timber etc.
2.	Revenue Department	Digitisation of land maps and online mutation of land records
3.	Election Office	Demarcating gram panchayat boundaries, <i>janpad</i> panchayat boundaries, <i>vidhan sabha</i> boundaries, pictorial representation of census data and habitat, analysing polling trends, tracking of polling party movement and ballot box movement
4.	Hydrology Department	Watershed mapping, water table mapping, demarcation of catchment areas and submergence areas, ground water simulation including site characterisation, model development, post processing, calibration and visualisation
5.	Chhattisgarh State Electricity Board	Installation of HV lines in the remote areas of Bastar and Dantewada, effective planning, installation and operation of HV lines throughout the state
6.	Mining Department	Demarcation of mining lease boundaries and identification of potential exploration/ mining lease areas

The state intends to provide GIS data to all government departments/agencies and NGOs for identifying areas for improvement, thereby, increasing the productivity and GDP of the state. A GIS application centre is also being set up. The geographical atlas of the state with various layers has been prepared using GIS.

As of date, the department has as many as 37 layers of GIS data—superimposition of them over one another creates yet another set of information. In this way, out of the 37 layers, some 100+ information have been created for various departments of the state. Now impedance analyses, for implementing a plan on the field, can be performed in the office well before the proper launch, reducing cost of the project drastically.

RESULT INDICATORS

1. Key Performance

ICT Based Services

- To generate various thematic maps of natural resources on a 1:50,000 scale using remote sensing collateral data

- To establish a district level database in GIS
- To identify the potentials and limitations of land and water resources and understand the priorities of the people
- To integrate various thematic information and socio-economic parameters for the generation of action plans
- To generate a comprehensive plan for water resources development and land resources development
- To generate sub-watershed wise site-specific and area-specific action plans for easy implementation by implementing authorities
- To bring about participation of the local people into the planning process by holding meetings with farmers, *gram sevaks* and district officials as part of the awareness programme

Services that were Enhanced

- Prioritisation of blocks and watershed for perspective water resources development plan for Priority Areas, Department of Panchayat and Rural Development
- Rural road connectivity to villages through the forest for the 12th Finance Commission, Government of Chhattisgarh
- Identification of suitable sites for horticulture, floriculture and vegetable crops in Mahasamund District for CEO, Zilla Parishad, Mahasamund
- Identification of suitable sites for establishing PURA (providing urban amenities in rural areas)
- Chhattisgarh Forest Management Information System (CHFMS), Forest Department
- Hydrology project of Chhattisgarh State (funded by World Bank) for Water Resources Department
- Election commission GIS for delimitation of constituencies for Chhattisgarh State Election Commission
- Identification of suitable areas for situating industries in the state for Chhattisgarh State Industrial Development Corporation (CSIDC)
- Optimal routing of high power transmission lines for Chhattisgarh State Electricity Board
- Development plan using Cartosat 1 / LISS IV and village maps (cadastral) for 68 towns in the state of Chhattisgarh
- Development planning of new Raipur City for Town and Country Planning, Raipur
- Estimation of water spread area and aquaculture potential of village ponds and tanks in Mahasamund District
- Mining information system
- National Rural Employment Guarantee Act (NREGA)
- Remote sensing studies for flood mitigation along Shivnath River in Rajnandgaon District, Chhattisgarh
- Establishment of separate GIS cell
- Developmental planning of major towns and New Raipur City of Chhattisgarh State, Department of Town and Country Planning, Raipur

- Atlas for the whole state including 9 new districts formed on January 1, 2012 with various layers

Implementation Coverage

- Industry Department: Industry map and irrigation map for Raigarh, Surguja, Janjgir Champa, Korba districts.
- Serriculture Department: Detailed map demarcating information for soil type, texture, soil depth, water bodies, forest cover for all districts
- Veterinary Department: Information regarding labs and specimens located in Raipur
- PHED: Map delivered for Mahasamund containing information of rock type, soil type, ground water, soil depth.
- Zila panchayat, Dhamtari: New tehsil boundary demarcation—village name updation, lab to land list, web based solution for various departments concerned
- NRHM: Database preparation of different centres like SC, PHC, CHC, Dist.
- CRPF/PHQ : Complete information showing physical map for Bastar Division
- State Housing Board: Initial maps for Dhamtari, Ambikapur for Vikas Nagar Yojna
- Zila Panchayat, South Zone: Villages proposed for agricultural zone, water bodies, which are silted under the integrated district development plan.
- Town and country planning: Cadastral maps and planning area maps, complete town planning
- State Atlas covering various layers for all districts including 9 newly formed districts
- SIRD: Watershed informative maps, village preparation for Bastar, Kawardha, Mahasamund, Bagbahara, Saraipali, Pithura
- Bhatiya Coke Pvt. Ltd.: Cadastral maps for three villages with road, rail and water body for coal mining
- Power Grid: Power lines for Raigarh, Champa, Raipur, Korba, Ambagarh Chowki to Dhamda, Korba to Lailunga, Bilaspur, Champa–kurcha line, Durg, Raipur–Wardha line, Korba–Jabalpur, Korba–Dharmjaigarh
- Zila panchayat, Bilaspur: District, tehsil and village boundary maps for web hosting
- WRD: Cadastral maps across Mahanadi basin
- Krishi Vidhyala: Task for cadastral work information
- Indian Oil: 202 village cadastral maps preparation
- IG, Raipur: Map for CRPF Division
- NTPC: Application planning area map

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency

Time and cost savings with full geo-referenced accuracy is one of the main motives of the project. Addition of factual information in the existing layer will lead to reduction of dependency on many agencies. Planner/administrator will not have to wait for reports reaching from remote areas (sometimes taking days) wasting precious time. Besides this, pooling of knowledge in any relevant field is a click away. This is now possible, as the records are probated in a way that is concordant to the requirements of Chhattisgarh state. If the thematic and socio-economic data generated in the project are synergised properly, necessity of field measurements can be reduced drastically. Soil/water conservation, resource development, generation of accurate watershed wise, site-specific and area-specific action plan is now a reality in Chhattisgarh. The tasks of the revenue department like mutation can be done online, in a few moments, and with full accuracy. Cadastral maps, prepared using the system will not only reduce the time utilisation in furnishing information, but also reduce the chances of corruption (alleged) to zero.

Innovative Ideas Implemented

- Micro-level planning and implementation of developmental activities
- Parcel level monitoring and assessment of the impact of developmental activities
- Crop identification at the parcel level and water levy assessment
- Smart cards for farmers to facilitate e-governance and e-banking
- Efficient settlement of compensation claims
- Land acquisition and rehabilitation in infrastructure projects
- Precision farming
- Land value assessment
- Parcel level soil health cards
- Crop insurance
- Community /village resource centre
- Digital cadastral India
- State geoinformatics centre is in the pipeline

Level of Integration

Immediately after the formation of the state, many IT initiatives were selected and certain specific data were finalised as the base data, to act as the broad platform for spicing the facts through variables. LISS III and PAN data are used separately, as well as in combinations to create a precious bank of information. Thematic layers are prepared on a 1:50000 scale, whereas cadastral maps are digitalised and fitted to a large 4000 scale. RRSSC Nagpur, the regional branch of ISRO has been selected as the service providers.

ENABLER INDICATORS

1. Capacity Building

The system has generated 37 thematic layers from ISRO data. More than 54000 sheets pertaining to 20000+ villages were digitalised. All of these digitised sheets were then geo-referenced in two years. All *Patwaris* were given training in this regard. Today, they themselves are issuing the land records through computers. Training was arranged through RRSSC, Nagpur in batches. CHiPS team has also been trained. Softwares like 'Naksha', 'Gyan', for mutation and editing have been developed. Legal amendments/government circulars have been released.

Financial Model

The project was funded by the Department of Panchayat and Rural Development, Government of Chhattisgarh for the creation of database. Later it was distributed to all panchayats. Planning at the lower or higher level is done on a need basis. Monitoring of most areas can be a daily routine. Research and development can also be performed at any level. For cadastral maps also, updation is a click away—only the verification part will need time. AMC of the software and other maintenance will be the task of respective users. Now all the specific applications are being developed in house with minimum charges from the department.

In future, data will be hosted at the state data centre at Raipur. Access will be provided to the user as and when needed—but with different limitations (read only/read and write/add only/editable version). For cadastral maps, the accessibility will follow the normal existing route but will obviously be online.

Efforts at Sustainability

GIS based atlas on various layers has been prepared for each district, which is available on atlas.choice.gov.in. Creation of a GIS cell is in the pipeline. CHOICE project is to be integrated with GIS. CHOICE centres will be the delivery points for providing *Khasara*, B1& maps. The proposed state data centre would support the state for better development planning and decision making towards the expansion of the project.

2. Technology

ICT Solution Adopted

Chhattisgarh Geographical Information System database comprised more than 37 thematic layers for various government department users. Front-end maintenance was done by CHiPS officials and if any database related

problem occurred, the team of RRSSC and CHiPS officials would resolve the queries.

- Natural resources database on 1:50,000 scale (IRS LISS III multi-temporal data)
- Road information system (IRS PAN+LISS III and LISS IV)
- Geo-referencing of 20,379 village (cadastral) maps (IRS PAN+LISS III and LISS IV)

Language support: Hindi/English

Software: Map Server: Oracle Spatial, Oracle Map Viewer, Web Server: Tom Cat, Database: Oracle, ARC GIS SERVER, ERDAS

Hardware : Blade server

Security and Confidentiality Standards

All the applications are fully secured and security compliant as per the guidelines issued time to time.

Disaster Recovery and Service Continuity

To guard against disasters, one complete set of the entire database is kept with CHiPS in the form of CDs. RRSSC Nagpur is another point where the data is available; IPR is obviously with the Government of Chhattisgarh. Databank is used for planning purposes, and is updated at regular intervals. RRSSC Nagpur is also using the databank for research and development and for academic purposes. Maps can also be viewed online at atlas.choice.gov.in.

VALUE INDICATORS

1. Digital Inclusion

ICT has a tremendous potential to fundamentally change the delivery system of services by making it customer centric. It also has the potential to literally take any organisation to the doorstep of its customers. ICT can play a significant role in development by increasing the reach of the organisation to far-flung and inaccessible areas. It also helps in augmenting social capital by digitally empowering and reaching the marginalised population of scheduled castes, scheduled tribes and women. Effectively, ICT can help not only in bridging the last mile gap but also reaching the last man of the society. This GIS project helps to do just that.

2. Green e-Governance

Chhattisgarh has been focusing on this issue for around a decade; more efforts are being planned out. The Chhattisgarh Environment Conservation Board has been in existence since 2001. The government has tried to promote waste management courses in academic institutions. Efforts are also being made to sensitise people about e-waste management. Increasing mobile penetration and internet penetration in Chhattisgarh are indicators of the rapid increase in the use of electronic devices by the citizens of the state. The state is considering e-waste initiatives like a programme for making available used computers for the benefit of the most disadvantaged individuals and communities in Chhattisgarh; data destruction standards for government data; corporate electronic recycling programmes and establishment of high technology recycling plants; encouraging refurbishing and re-selling of electronic items and annual drives in which people can voluntarily donate their old electronic items.

The world has just woken up to the fact that we live in a fragile ecosystem. The integration of the comprehensive GIS database developed by RRSSC for Chhattisgarh and the usage of it in various combinations can be a firm abutment for an action plan to save the ecosystem.

A M Parial, CEO, CHiPS, Department of IT, Government of Chhattisgarh, Raipur.
e-mail: ceochips@nic.in

K Harish Kumar, District Manager, CHiPS, Department of IT, Government of Chhattisgarh, Chhattisgarh, e-mail: hr-chips@nic.in

Dharnaksh: Goa Web GIS, Government of Goa

R Mihir Vardhan and Saneet Naik

PROJECT OVERVIEW

By the year 2010, Goa had become the first state in the country to have 100% computerised land records—both the graphical map data as well as alphanumeric Record of Rights. All the Land Records Department's offices across the state are interconnected on the state-wide Goa BroadBand Network. All the activities of the department are computerised and online, namely,

- Land acquisition
- Land mutation
- Land sub-division
- Mutation to land use/ownership records
- Issue of certified extracts to the public

In 2011, the department took a giant step forward in fulfilling its vision of 'Land Records From Anywhere', by undertaking the Dharnaksh project.

The Dharnaksh project envisaged implementation of information dissemination services over the web. Dharnaksh derives its name from a composite of two words—*Dharani*, meaning 'Earth' and *Naksha*, meaning 'map'.

In January 2012, a website was commissioned with the facility of viewing extracts of any land parcel across the state along with its integrated land use and ownership information. The website was initially put to departmental use as a part of beta testing and on June 26, 2012, the Hon'ble Chief Minister and the Hon'ble Revenue Minister officially inaugurated www.dharnaksh.com, making the site open to the public.

Public and institutional users can register with the website and use it to view, free of charge, any land parcel extract. Public users can also make an online payment and obtain a certified copy, either through online download, or through post, or by collecting it from any of the departments' offices.

Land, which is the most precious commodity for individuals as well as for any infrastructure creation, is now being managed in a most transparent and environment-friendly manner through use of IT infrastructure, which includes a web-based software server, a geographic information system, map and attribute databases and computer systems and network infrastructure.

This is the first implementation of its kind, in the country, that provides online up-to-date information about any land parcel in the state to any user sitting in front of an internet enabled computer system anywhere in the world.

RESULT INDICATORS

1. Key Performance

ICT Based Services

Public users can view the official record of their own land or any land that they are interested in. They can obtain a certified copy of land records sitting in the comfort of their own homes or offices.

Institutional users like banks, courts, etc, can log in and obtain a transaction record or verify submitted land documents by viewing and comparing them with the official online data.

Key Benefits to the Public

- Viewing and obtaining information on any land parcel without the need to visit the Land Records Department
- No queues in department offices to apply for a certified land parcel extract
- Verification of their mutation application by online viewing of the updated data

Key Benefits to Institutional Users

- Easy verification of applications involving land transactions or mortgages
- Guarantee of authentic online data
- Reduction of risk due to manipulated document/records submission

Key Benefits to the Land Records Department

- Reduction in manual requests for certified copies in department offices
- Reduction in workload due to automatic transactions
- Fulfilling the transparency requirements as per RTI

Services Enhanced/Introduced

- Viewing of any land parcel details (both graphic and textual) using the web-based system
- Online payment and obtaining of certified extract online/by post/at office
- Online posting of comments/suggestions/complaints by public
- Complete audit trail of all transactions and secure payment gateways

Services Planned for Release in the next 2–3 Months

- Viewing of any village map or city map using the web service
- Viewing of up-to-date re-survey maps

Implementation Coverage

Geographical area: The entire state of Goa excluding forest areas have been covered by the system

Stake holders: All private land as well as government land details are hosted online

2. Efficiency and Improvement Initiatives**Time and Cost Efficiency Improvements***Time Efficiency*

- Prior to computerisation of the departmental processes, the norm for date of issue of a certified copy of land parcel extract was 15 to 45 days from the date of application by a member of the public. After computerisation, the process was being done at the departmental counters within 30 minutes to 4 hours, depending upon the length of the queue of public members making the application.

Now the *web-based system* enables a member of the public to download an online certified extract within *2 to 5 minutes*, covering the process of registering on the website, logging in, selecting the land parcel for which extract is required, making payment and downloading the soft copy of the extract.

- With more and more popularisation of the website, it is expected that the number of applications that are presented manually at the departmental counters will come down substantially, saving the time and effort of the department staff.
- Due to automated reports made available for transaction audits, the time required for consolidating monthly/quarterly applications, payment receipts etc is also expected to come down.
- Institutional users save time due to fast online verification processes.

Cost Efficiency

- Public saves the cost of travel to department offices when they transact online.
- Department saves cost of manpower and paper as more and more users transact online.

Innovative Ideas Implemented

- Online revenue transactions were approved for the Land Records Department enabling hosting of e-commerce facilities.

- Internal department processes were changed to accept online requests for a certified copy through post or collection at department offices as a valid application and provide the desired service to members of the public.

Level of Integration

The Dharnaksh web services have online connection to the live data servers of the department, enabling delivery of online and up-to-date maps and data to the public. If any mutation, acquisition, partitioning etc occurs as part of departmental routine operations on its intranet, on the land records information system, the same is reflected instantaneously on the Dharnaksh system.

ENABLER INDICATORS

1. Process reengineering

ICT and Non-ICT Front-end Changes

- Viewing of any land parcel detail from anywhere using an internet-connected system by any member of the public free of cost
- Obtaining digital copy of any land parcel through secure online payment
- Applying for a hard copy certified land record online and receiving it at the department office through a visit within the next working day or obtaining it by post within four days anywhere in India and within 15 days anywhere in the world

ICT and Non-ICT Back-end Changes

- Online receipt of applications for a certified hard copy extract and processing of the same within the specified time norms
- Integration of the new web system with the existing state-wide land records information system to ensure accurate and up-to-date data availability in the Dharnaksh system
- New processes for management of online payments and maintenance of audit trails
- New processes for handling online comments/suggestions/complaints from the public

2. Capacity Building

Leadership Support

The Director of Settlement and Land Records has actively participated and interacted with the department staff on various training sessions wherein the new technology and business processes were explained.

Change Management Strategy

All the process changes that were envisaged have been successfully implemented. Since its inauguration to the public, the Dharnaksh system has got over 9000 hits and 700 registered public users who have viewed over 20,000 land parcel details within a span of the first two months.

Capacity Building Plan

Training has been imparted in multiple rounds to functionaries from all the 12 taluka offices of the Land Records Department—right from the Inspector of Land Records down to the computer operators—on the use of the system and on the new business processes.

Training is a continuous process as new staff keep joining or rotating.

Project Management

There were three stake holders involved in the Dharnaksh project. The Land Records Department acted as the prime beneficiary of the system and its project management team led by the Director of Land Records has guided the system integrators and software developers in understanding the domain and requirements, and in monitoring and testing the results.

M/s. Goa Electronics Ltd were the prime system integrators and its team has coordinated with various agencies like the Land Records Department (prime stake holder), NIC (Record of Rights data provider), BSNL (internet service provider), CCAvenue (payment gateway service provider) and VISIONLABS Institute (software provider).

M/S VISIONLABS Institute, Hyderabad, were the software providers who have provided a custom web GIS solution built over their indigenous GIS product.

Financial Model

The project was implemented with state government funding. The total cost of ownership was approximately Rs. 200 lakhs.

Efforts at Sustainability

The Dharnaksh web-based land records system was audited by independent, government approved and empanelled web security auditors. All their recommendations were implemented and certification to this extent obtained.

3. Technology

ICT Solution Adopted

The operationalisation of Dharnaksh LIS involved automating and re-engineering the business process of the department. The mechanism and software tools that are provided are explained here.

Updation of Land Records

The old system of manually updating the cadastral records on mutation, is replaced by a full-fledged GIS/LIS having the following features:

All initial digital cadastral records are *digitally authenticated and archived*. This is done by *bio-metric signatures* of at least two officers.

The software provides for maintaining the record of various staff and their authority. The authority levels are Director (super-user, who can do/approve all activities), Approval Authority Staff (who are authorised to approve mutations to land parcels), Authentication/Verification Authority Staff (who are authorised to verify and authenticate changes), Updating Authority Staff (who are authorised to carry out digital mutation).

The software also provides features for updating land parcel data. *Every mutation is archived* and the software provides for a complete *mutation history* of every cadastral record. For issue to public, only the latest record is used.

Information Dissemination

Information dissemination to public and other organisations is by way of the following applications:

Kiosk version software: It provides for selecting any *taluka/village/town/survey number/sub-division* interactively, and viewing/printing an extract.

Integrated LIS: This is available with the department and facilitates issue of GIS-ready digital data to any indenter.

Web GIS: Land records, both graphical and textual, are made available to the public and other organisations for planning purposes through a web GIS for viewing of information. Use of payment gateways is done to facilitate online payment by members of the public and take prints of the certified copy of the survey record.

Security and Confidentiality Standards

The basic design principle takes into account the requirements of:

High Server Availability: DSLR requires high server availability, but not a truly 24×7 availability. It is acceptable to make the system go offline for maintenance/update purposes, whereby, services are unavailable for maybe less than an hour in a week. In the event of failure of one of the servers, the takeover time (making another server take over) will be less than 30 minutes.

Making Land Records Tamper Proof: More than availability, tampering of digital records is a great concern for DSLR as land records are legal records. The proposed design ensures that no modification to the map data can be done outside of the intranet. Within the intranet of DSLR, bio-metric authentication ensures a digital audit trail, whereby even registered users are discouraged from making unauthorised changes, as they will be held answerable for the same.

The web application is also audited by independent web security auditors for vulnerability to top 10 Internet hacking vulnerabilities and certified as compliant as per the Department of IT standards.

Disaster Recovery and Service Continuity

All map data is backed up onto a secondary server. The web server and map server are hosted on two separate machines that have the same hardware configuration. In the event of failure of one of the systems, the other system can be brought up with both software servers in a very short time.

VALUE INDICATORS

1. Digital Inclusion

In India, though computer awareness is steadily on the rise, the number of internet users is a small percentage of the total possible beneficiaries from a project such as Dharnaksh. To address this issue, care has been taken to provide online certified records to internet and computer savvy users. However, users who do not have computers at home can also visit internet centres and access the Dharnaksh system, either on their own, or with the help of the internet centre operators. Public users who are not computer savvy and would be uncomfortable with receipt of a soft copy of a record can make online application for a record to be sent by post to their address or opt to collect it from the department the next day.

An audit of registered user database of Dharnaksh in the first two months reveals that its youngest user is 16 years old and the oldest user is over 80 years old!

2. Green e-Governance

Dharnaksh encourages use of soft copy of records and saves paper due to online application processes, doing away with the need to fill application forms, payment vouchers etc.

R Mihir Vardhan, Director, Directorate of Settlement and Land Records, Government of Goa. e-mail: dir-land.goa@nic.in
Saneet Naik, Senior Software Engineer, IT Division, M/s. Goa Electronics Ltd., Goa. e-mail: saneet@goaelectronics.co.in

Poll Monitoring System, Government of Goa

R Mihir Vardhan and Anant Yende

PROJECT OVERVIEW

A poll monitoring system (PMS) involves the use of technology to qualitatively improve the electoral process on the day polls are held. The system facilitates online tracking of voting, automatic generation of statutory reports and helps to prevent impersonation/bogus voting. The idea of a poll monitoring system was conceived about two years ago and was first tried out successfully in an Assembly Bye-election. It was tried out again on a slightly larger scale in the Corporation of the City of Panaji (CCP) elections with favourable results. The former was an offline system and the latter was an online one. With two successful experiments, the Department was encouraged to propose to the Election Commission of India to implement PMS for the State Assembly Elections. The Department is grateful to the Election Commission of India (ECI) for approving the proposal and providing an opportunity to demonstrate the use of technology as a value addition to the electoral process.

The system was the first of its kind in India and required proper planning, training and operations management. The project start date of the system for the Legislative Assembly Elections, Goa was August 2011. It was executed (implemented successfully) on March 3, 2012 to the best of the project undertakers' ability.

The poll monitoring system consisted of an offline (Windows) application which communicated with an online (web) application through web-services. The District Election Officers (North and South Goa) appointed officials to survey all the 1612 polling stations. Provisions were made for extra lighting arrangements and electrical switches with proper earthing arrangement that was very essential for the functioning of laptops. Power extension boxes were provided so that the laptops could be placed at any convenient position in the polling station.

RESULT INDICATORS

- The PMS worked with great success on the polling day.
- *Goa had the highest voter turnout that day as compared to previous elections.* The misgivings expressed by political parties about the system causing delays and resulting in low voting percentage were belied.

On the contrary, *this poll recorded 80% voting which was 10% more than the voting trends of the 2007 elections.*

- The real time PMS coverage was 99.15% out of the total votes polled.
- The total voter details captured were the following:
 - 97.64% voters photo and fingerprint captured
 - 0.48% voters only fingerprint captured
 - 0.68% voters only photo captured
 - 1.21% voters photo and fingerprint not captured due to PMS being bypassed
- The PMS not only helped in monitoring the poll process, it also helped in determining incorrect details in the electoral roll. This data can now be used to cleanse/correct the roll.
- 90.07% booths streamed data to the server on a real time basis and 9.93% booths worked in an offline mode due to unavailability/poor network connectivity (Table 1).
- The introduction of PMS was welcomed by the people of Goa. The PMS monitoring team received calls on the poll day complaining about the delay in the poll process. However, on investigation, in all such cases, it was observed that the polling officers III (PO III) who were in-charge of the 17A register and inking were taking a long time in completing their duties. The issue was addressed by Returning Officers who appointed additional PO III to the task. This helped expedite the process.
- PMS provided a way to minimise malpractices and contribute to a free and fair polling system in Goa. There was no bogus voting or impersonation. The system ensured that the polls were conducted efficiently.
- Real time reports generated by the poll monitoring system like, age cohort, male–female count, two hourly, EPIC–non-EPIC, 49-0, 40-M were available for the state—district-wise, *taluka*-wise, AC-wise and polling station-wise—for the authorities to monitor the election process. The application was hosted on SSL (secured socket layer) and was available for viewing by the concerned election authorities up to the level of the Election Commission of India.

Table 1 *PMS connectivity status (based on poll day data streaming)*

Sl. No.	Ac name	Total booths	Fully connected	Offline	% connectivity
1	Mandrem	46	41	5	89.13
2	Pernem	48	33	15	68.75
3	Bicholim	41	27	14	65.85
4	Tivim	38	36	2	94.74
5	Mapusa	42	41	1	97.62
6	Siolim	44	35	9	79.55
7	Saligao	39	39	0	100
8	Calangute	33	32	1	96.97

Continues

Table 1 *Continued*

Sl. No.	Ac name	Total booths	Fully connected	Offline	% connectivity
9	Porvorim	38	36	2	94.74
10	Aldona	41	38	3	92.68
11	Panaji	30	30	0	100
12	Taleigao	41	40	1	97.56
13	St.Cruz	39	38	1	97.44
14	St. Andre	37	37	0	100
15	Cumbarjua	36	35	1	97.22
16	Maem	42	35	7	83.33
17	Sanquelim	46	40	6	86.96
18	Poriem	52	45	7	86.54
19	Valpoi	46	40	6	86.96
20	Priol	42	39	3	92.86
21	Ponda	43	41	2	95.35
22	Siroda	42	37	5	88.1
23	Marcaim	40	33	7	82.5
24	Mormugao	29	27	2	93.1
25	Vasco-Da-Gama	38	35	3	92.11
26	Dabolim	26	26	0	100
27	Cortalim	35	34	1	97.14
28	Nuven	39	37	2	94.87
29	Curtorim	38	32	6	84.21
30	Fatorda	38	38	0	100
31	Margao	38	36	2	94.74
32	Benaulim	39	35	4	89.74
33	Navelim	35	32	3	91.43
34	Cuncolim	42	41	1	97.62
35	Velim	44	41	3	93.18
36	Quepem	46	40	6	86.96
37	Curchorem	41	39	2	95.12
38	Sanvordem	44	32	12	72.73
39	Sanguem	43	39	4	90.7
40	Canacona	51	40	11	78.43
Total		1612	1452	160	90.07
Percentage			90.07	9.93	

All the offline booths updated the poll statistics information through SMS based PMS.

1. Key Performance

ICT Based Services

The project mainly focused on delivering G2G services. The main objective of the project was to reduce the operational burdens of the poll duty staff and make information available rapidly.

- With the introduction of PMS, poll personnel were relieved from maintenance of various counts and were able to perform their duty more efficiently.
- The Presiding Officer had the data for his/her poll end report readily available through PMS. Additionally, he/she was able to identify the ASD (absentee, shifted and duplicate) voters as indicated by PMS and could take necessary action—this would have been difficult in the manual process.
- The Sector Officers were able to get accurate two-hourly counts.
- The ARO (Assistant Returning Officers)/ROs (Returning Officers) were able to monitor voting trends from their office. In the manual practice, RO/AROs would get two-hourly counts after another two hours.
- DEOs and CEO were also able to monitor the voting trends from the root to the top-most node.

Real time voter information capture/streaming

The automatic alerting system in PMS helped the polling team to control malpractices. The data captured in PMS was automatically streamed to the central server. The streamed data in various real time reports was available with the RO/ARO/DEO and other stake holders for better monitoring. SMS based integration was carried out in the PMS application so as to enable PMS sector officers to intimate the server about the latest status of voting in booths without network connectivity.

The project was executed (implemented successfully) on March 3, 2012 to the best of the project undertakers' ability.

2. Efficiency and Improvement Initiatives

The outcome of the poll monitoring system was that fingerprint and photographs of about 831070 electors were captured. This bio-metric data can now be integrated with the prisoner information available with the Inspector General of Prisons, Directorate of Social Welfare.

The success of PMS has also compelled the Election Commission of India to think on the lines of issuing SMART EPIC. The fingerprint data was integrated with the electoral data into a SMART EPIC on a trial basis for 500 employees and it has worked with 100% success. The identification of the voter can now be established based on the EPIC itself. This has made it possible to visualise a time when pooling booths may not be necessary for the election process.

ENABLER INDICATORS

1. Capacity Building

Capacity Building Plan

Training played a vital role in preparedness, readiness and proficiency while assessing and using communication capabilities during emergency

events on the actual poll day. Standardised training programmes were conducted which delivered regular trainings to PMS Sector Officers (PMS Master Trainers) as well as PO II.

To build knowledge and competency throughout the first line of contact team, these trainings were conducted separately for the PMS Sector Officers and PO II. The training programmes were comprehensive in understanding the entire functioning of the poll monitoring system (PMS). In addition to these trainings, demonstrations of the software were given to the District Election Officers, Returning Officers, Assistant Returning Officers, Deputy Collectors and *Mamlatdars* across the state to bring about awareness.

GEL (Goa Electronics Limited) deployed 15 engineers for training and selecting PMS Sector Officers and monitoring PO II training sessions. All the trainees were provided with PMS operational manuals which described all the operations in detail.

In addition, the Nodal Officer held meetings and discussions with the PMS Sector Officers, Presiding Officers and Polling Officers II to boost their morale and motivate them to achieve success in this project. All concerns and doubts were clarified and issues pertaining to implementation were discussed. These meetings inspired the participants to perform well and instilled in them zeal and confidence.

Change Management Strategy

Rehearsals

To ensure the smooth functioning of the poll monitoring system (PMS), the executive committee decided that rehearsals had to be conducted. The dates set for rehearsals were February 17–19, 2012. Approximately 540 polling stations were scheduled for rehearsals each day. The rehearsals were carried out according to the schedule shown in Tables 2–4.

Table 2 *Schedule for trial run on March 17, 2012*

Ac. no	Ac name	Total booths
1	Mandrem	46
2	Pernem	48
3	Bicholim	41
4	Tivim	38
5	Mapusa	42
6	Siolim	44
7	Saligao	39
8	Calangute	33
9	Porvorim	38
10	Aldona	41
16	Mayem	42
17	Sanquelim	46

Table 3 *Schedule for trial run on March 18, 2012*

Ac. no	Ac name	Total booths
11	Panaji	30
12	Taleigao	41
13	St. Cruz	39
14	St. Andre	37
15	Cumbarjua	36
18	Poriem	52
20	Priol	42
21	Ponda	43
22	Shiroda	42
23	Marcaim	40
24	Mormugao	29
25	Vasco	38

Table 4 *Schedule for trial run on March 19, 2012*

Ac. no	Ac name	Total booths
28	Nuvem	39
29	Curtorim	38
30	Fatorda	38
31	Margao	38
32	Benaulim	39
33	Navelim	35
34	Cuncolim	42
35	Velim	44
36	Quepem	46
37	Curcholem	41
38	Sanvordem	44
39	Sanguem	43

19	Valpoi	46	26	Dabolim	26	40	Canacona	51
Total booths		544	27	Cortalim	35	Total booths		538
			Total booths		530			

Rehearsals helped in ascertaining loopholes if any, and became the means to correct them so that the team as a whole was well prepared on poll day. The mock runs also helped the POs II in getting actual hands-on training in a poll day like simulated environment. Besides these, the rehearsals helped in testing connectivity and addressing the issues therein.

Communication Plan

The communication plan (Figure 1) was formulated looking at the manpower involved in the polling process, and through the experiences at the Valpoi Bye-Elections in 2010 and the CCP Elections in 2011 to strengthen the effectiveness of PMS. The plan focused on technology, coordination, planning, training and exercises at all levels. This approach recognised that communications operability was a critical building block, the first line of contact officials must be able to diagnose the problem over a phone call and if they cannot, then they can report immediately to the supervisor above.

Emergency communications reporting was followed up at all levels in the reporting structure. This enabled the people involved to establish control and command, maintain situational awareness and function under a common operating structure for a broad scale of events.

Project Management

The roles and responsibilities of various officers in charge of the project is given below:

PMS Sector Officer (PSO)

Each PSO controlled 10–15 polling booths approximately in case of any problem that may arise during the pre-poll and the poll day. The PSO were the first level of contact between any polling booth and the higher nodal authorities.

Assembly Constituency (AC) Head

There was one AC Head for each assembly constituency. The AC Head was the contact point between any particular PSO and *Taluka* Head.

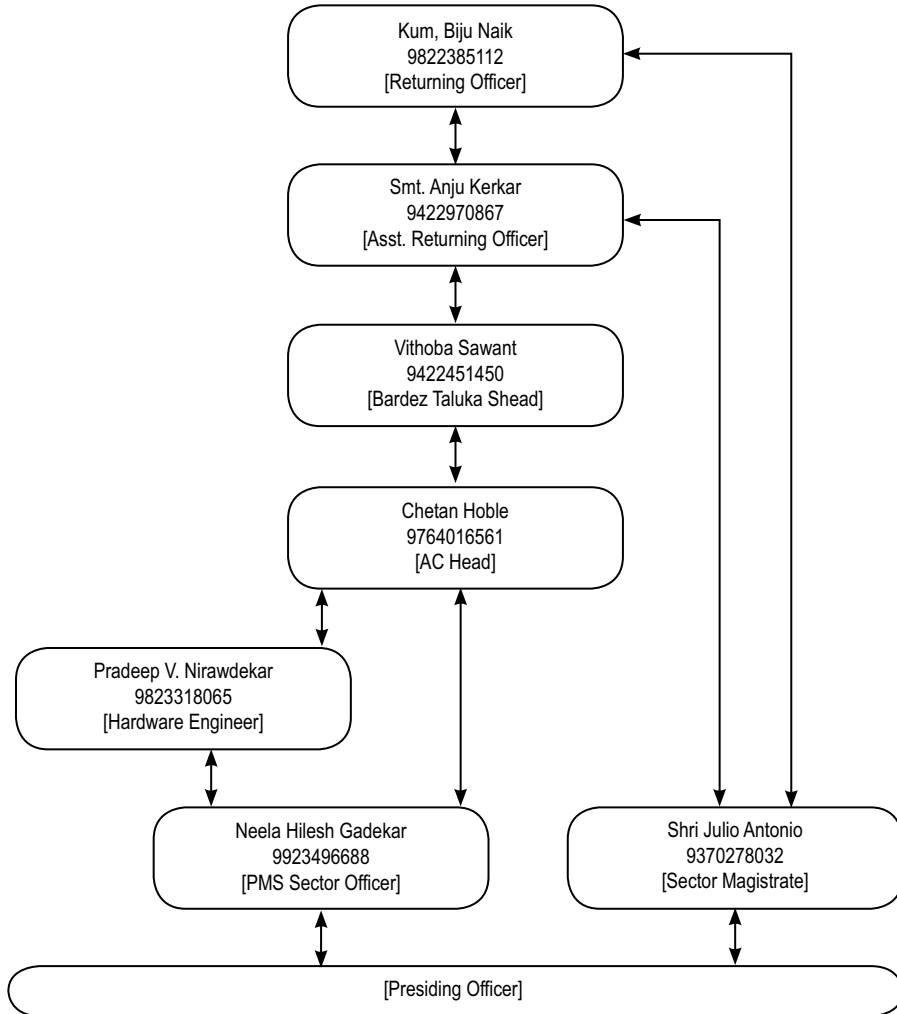
Taluka Head

There was one *Taluka* Head assigned to each *taluka*. The *Taluka* Head monitored PMS through the *taluka* centre on the pre-poll and poll day. He/she coordinated with the respective AC Heads and addressed any issues therein.

Communication Plan (PMS)

Ac. No. & Name: 4, Tivim

5, Mahatma Jyotiba Phule High School, Mushir Wado, Colvale

**Figure 1** Snapshot of the communication plan for Assembly Constituency 4 (Tivim)**Financial Model**

The poll monitoring system was entirely a government sponsored project. The amount was sanctioned by the Election Commission of India and was at the disposal of the Chief Election Office-Goa. The funds were used for the procurement of fingerprint reader devices, webcams, USB dongles, mouse, extension cables for power and hiring laptops on rent.

The government procured 1000 webcams. Around 800 webcam were borrowed from CEO Pondicherry and were returned after the elections.

3. Technology

ICT Solution Adopted

The application was hosted on SSL and was available for viewing to the concerned election authorities up to the level of the Election Commission of India through secured logins.

The Windows application which was installed on all the laptops provided to the Polling Officer II streamed only the counts and parameters like male–female voter, whether it was a no-vote or disqualified. Care was taken that no other details other than these were posted to the server.

Network connectivity was the most important aspect which determined the success of this project. The executive committee held a series of discussions with the various service providers available in the state as regards connectivity.

From the survey conducted by GEL and NIC officials, of the 1612 polling stations, 85% of the polling booths were covered by USB dongles of various service providers available in the state. 10% of the polling stations had weak signals and were connected using wired connectivity through BSNL. The balance 5% of the polling booths were connected using Goa Broadband Network (GBBN). In cases where it was not possible to connect the polling station, the voters count and other events at the polling station were communicated every 15 minutes to the *taluka* office through SMS based services by a mobile runner.

On the pre-poll and poll day, 90% of the booths streamed data to the server on a real time basis through a connected network. The remaining 10% booths updated the data on the server through SMS based service.

Security and Confidentiality Standards

The application was deployed on SSL. The data communicated between both Windows and web application was in encrypted formats and a proper data validation algorithm was carried out on the receiving ends.

Disaster Recovery and Service Continuity

The web application server ran in a clustered mode which on failure would be immediately taken over by another mirror. The web application was hosted at the state data centre of NIC within a fully secured environment.

At the booths (where a Windows PMS application was deployed), a standby PMS Kit (laptop, mouse, USB dongle, webcam, fingerprint reader,

USB hub, power extension) was kept for each cluster of 10–12 booths. These kits were available with the PMS Sector Officer, who on information could use the same at the booths if any of the devices had failed.

VALUE INDICATORS

1. Digital Inclusion

- The application was digitally included along all the levels of the stake holders. The project mainly focused on improvement of G2G services.
- All the users were provided with sufficient training for accessing the application. A better reporting UI was provided for all the stake holders with predefined privileges along with secured login credentials to view the information.

2. Green e-Governance

- Hardware components such as laptops and webcams were hired and not specifically rented for this project. Around 800 webcams were borrowed from CEO of Pondicherry. All the laptops which were used for the poll monitoring system (PMS) were hired for a period of one month and returned.
- The quantum of paper used in the process was considerably reduced as most of the reports were readily available in the application. Voting trends, two-hourly count reports could be directly seen by the concerned authorities from their offices through secured logins.

R Mihir Vardhan, District Election Officer, Goa, email: coln.goa@nic.in;
Anant Yende, Chief Technical Officer, IT Division, M/s. Goa Electronics Limited (GEL), Goa, email: anant@goaelectronics.co.in

Manav Sampada:

A Green Governance Tool for Human Resource Management, Government of Himachal Pradesh

Saurabh Gupta

PROJECT OVERVIEW

It was a chaotic situation in the departments of the Government of Himachal Pradesh before 2008 in respect to human resource management. The government did not even know the exact strength of employees serving various departments, let alone employee information regarding posting, education, promotion, salary, family, retirement, annual property, ACR (annual confidential reports), etc. The decision makers faced a huge challenge of taking the right decision at the right time—for that proper monitoring, manpower planning, recruitments, postings, promotion, transfer based on employee skill set were essential, but in doing so manually, there was wastage of government resources, and time, with no fruitful results. This created lack of faith in the government system. The National Informatics Centre, Himachal Pradesh developed ‘Manav Sampada’—a green governance tool for human resource management, which brought a breakthrough in managing human resource in government efficiently and effectively. Manav Sampada was not only the solution to manpower planning, but its integration with 17 more applications extended its ambit to various other government G2G, G2E and G2C services. The system was developed with the following objectives of good and green governance.

- To develop a complete HR solution for a massive manpower of 2,33,285 employees of 146 government departments posted in 27,918 offices of the Government of Himachal Pradesh and to provide integration with various applications such as e-Salary, e-Gatg, e-Samadhan, e-Sameesha, e-Attendance, e-Sanchalan, e-PDS along with user authentication and a master data of offices, vacancy position, employee strength, online transactions etc.
- To link with attendance management (bio-metric based attendance system) for collecting and analysing information about employees working hours and then using it to evaluate cost accounting for the departments
- For providing salary and compensation management to the departments to compute the payroll details of the employees by using inputs of employees working hours and attendance

- To develop HR related databases for analysing the skill set of each employee by collecting information like skills, compensation, personal details, demographic information, and other detailed relevant information
- To help the government in analysing the status of manpower by calculating the current and future status of recruitment and retirement
- To develop a benefits management system for calculating additional allowances and benefits provided to employees using details about insurance policies, pension plans etc.
- To preserve the employees most useful information currently available in their manual service book record in electronic form (e-Service book) and to create a Searchable Employee Service Book database through data entry of master service book and online transactions thereon.
- To make available the e-Service book on the internet to support the governments in bringing *transparency* in a user-friendly interface for use by both the department and government employees
- To reduce the manual effort in maintaining a service book by *decentralising* and timely updation of transactions such as transfer, promotion, joining, relieving etc.
- To *achieve the objective of the RTI Act* with regard to employee posting and transfers
- To develop a *workflow based product* to eliminate paper use in the government at various levels which will result in fast disposal of matters and thus improve the *carbon credit rating* of the state by saving paper.
- To develop outputs/queries (on various selection criteria) at all levels for *effective policy decision making* for manpower planning, deployment, financial cost, transfer and recruitment.

The project commenced on April 1, 2008. The beneficiaries of the project include the Department of Personnel, administrative secretaries, head of the departments, AG Office and all government officials who maintain and refer to the Employee Service Record time to time for manpower planning.

RESULT INDICATORS

Result Achieved/ Value Delivered to Beneficiaries of the Project

Number of departments/boards/corporations covered: 146

Number of offices (including field level establishment offices): 27,918 offices

Number of service book in digital form (e-Service book)

Number of service book master entry completed: 2, 33,285

Number of service book verified, locked and ready for online transactions: 1, 93,255

Number of online transfer/appointment/promotion order already generated: 3140

Number of employees covered under online orders: 7231

Number of annual property returns submitted online through portal: 7417
 Number of employees covered under bio-metric based attendance monitoring system: 3553

Number of applications linked master data for user authentication: 17

Number of transactions during a month: 45000 (approximately) in 12 different forms

Number of online orders/joining/relieving per day: 54

Total number of master trainers (146 departments and 26,053 offices): 1875

Total number of login/id passwords created in different departments: 51,098

- *e-Service books of 1, 93,255 employees* are available online on the World Wide Web and ready for online transactions.
- Issuance of standard software generated I-Card to all with a five year validity.
- *General awareness* already spread among all government employees through government notification, instructions and news in media (Figure 1) regarding the online availability of their service book and to complete the entries in mission mode.
- Official/Officers of 146 departments and 27,918 offices have already started using the software irrespective of their remote locations and are maintaining e-Service books on a regular basis.
- Service books master data entry has been completed in 146 departments and verification is in progress at the authority level.

Human resource management is not a 'one shot' function. It must be performed continuously to achieve objectives smoothly. Statistics generated by the system are shown in Figure 2.

Extent to which the Objective of the Project is Fulfilled

Considering the massive involvement of every department/corporation/board/government organisation/high court/assembly/ subordinate courts/deputy commissioner/ in the project's success, sincere efforts were made at all levels. The following objectives were fulfilled.

- Completion of master data entry of 146 departments which include details of their offices, designation, office hierarchy and their codification;



Figure 1 Article in a paper advertising online availability of employee records

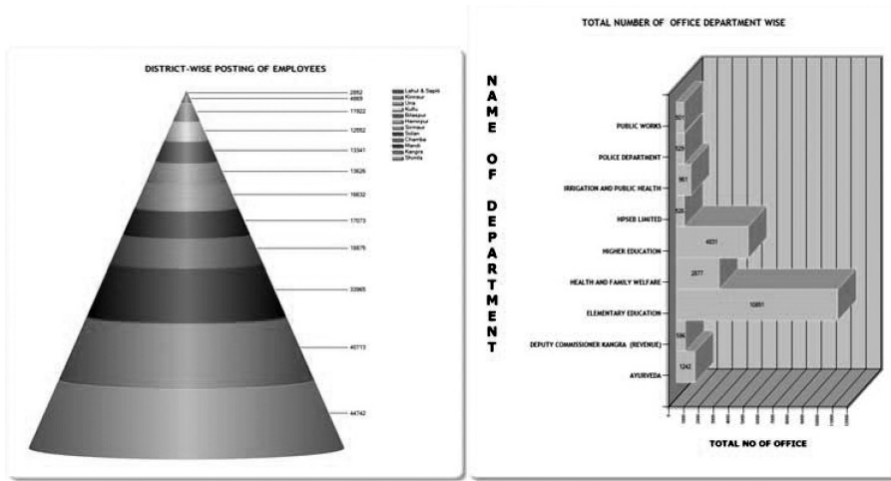


Figure 2 (a) District-wise posting of employees; (b) Number of offices covered by the system

identification of one nodal officer for managing PIS activities in all departments

- Training was imparted to 1875 employees of different departments who are working as master trainers for their departments
- Master data entry of 233K employees completed out of which 193K have been verified and ready for online transactions like transfer, promotion, joining and relieving etc.
- Department-wise unique identification number (employee code) allows user authentication in various e-governance software. There is no need to purchase specialised user management software
- Centralised database for mapping menu, roles and form level permission and to assign application to different departments; integration of eight different applications already covered
- Sharing of master data across different applications, presently 17 applications, and standardisation of master codes help in linkages of various databases
- Software generated id cards are being issued to individuals
- Generation of online transfer, joining, relieving orders by major departments
- Effective use of portal by all employees for submitting their APR, to update personal detail and service detail; queries and feedback were handled on priority
- A web portal available for all government employees to access personnel information (such as government notification, salary details, e-Service book etc.)
- A step in the direction of fulfilling the NeGP goal of more ICT penetration in the government sector has been achieved.

Other Features Covered and Future Scope

Digital Signatures: Digitally signing the e-Service book by department DDOs for authenticity and locking of verified service record

Liaison with AG Office: Provision to transfer employee e-Service book electronically to AG through integrated interface time for calculating retirement benefits by the AG office.

Online Drafting of Transfer/Promotion/Appointment Proposal: The service book data is used for implementing a transfer policy based upon the various criteria such as employee served in hard/tribal area, previous posting details, skilled area etc.

SMS Based Joining and Relieving: Himachal Pradesh being a hilly terrain, notification of employees joining and relieving can be send by SMS through registered official mobile numbers by giving the unique employee code, department id, date, transaction id and remarks

Linkage with CM-REFNIC: Provision to monitor transfer requests made by an individual to the Chief Minister Office; officers can view vacancy positions online before sending any recommendation; joining and relieving can be monitored online

1. Key Performance

G2E Services

- Employee search
- Monitoring of their grievance on e-Samadhan
- Employee personal and address information
- Transfer/promotion orders
- Annual property return
- Training and qualification details

G2G Services

- Vacancy position
- Sharing of master data (office, designation, retirees, vacany, strength etc.)
- Yearly retirement status
- Sanction and in position strength
- Integration with 17 applications like e-Salary, e-Sanchalan, e-Samadhan, e-Gatg, e-Parman, CM-refnic etc.
- Annual increment status
- Online joining and relieving
- Online submission annual property return
- Online transfer/promotion/appointment order
- Employee photo id cards
- Manpower planning—Recruitment, deployment, retiring and posting detail

- Tracking of employee transfer request—Office vacancy, last 3 postings, home town, and tribal/no tribal, with or without TTA, relieving and joining.

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency Improvements

- e-Service book of employees are instantly available on Manav Sampada web portal as entered by their establishment
- Citizen may search employee, orders, property return directly using the web portal
- Any transaction (transfer, promotion, joining, relieving) taken online are immediately available on Manav Sampada web portal
- Innovation of using SMS based confirmation of APR to registered mobile
- Employee can download transfer/promotion/appointment orders available online
- Various documents like training details, departmental examination passed, contact details and employee signature are uploaded online using own user id/password on Manav Sampada portal
- Online submission of the annual property return by employees using own employee id and password
- SMS based joining and relieving detail of employee from field offices, which were reflected in their service history

Impact on Working Culture in all 146 Departments

- Effective monitoring and planning of human resource
- Centralised data depository of all government employees
- Transparency and efficiency in the working of personnel department
- Reduction in the flow of manual statistical reports from lower offices
- Efficient delivery of government services to employees
- Helping in controlling malpractice in transfer, appointment and promotion
- Transfers as per the transfer policy and in public interest
- All service book records are now available online and tampering of data is not possible.
- Generation of employee electronic (e-Service) service book on the click of a button
- Enhancing professional skills of staff in field offices
- Ready-made information available for queries under RTI Act, court cases
- Availability of data for analysis of trends like retirement, vacancy position, previous posting, special training and important education
- Auto updation of service book on new online transactions
- Cadre wise seniority as per the seniority norms
- Office wise, designation wise staff vacancy position of all departments

- Employee code based authentication for all e-governance application
- Paper minimisation.

Direct Savings on Account of Digital Service Book

Table 1 shows the efficiency resulting from the use of e-Service book.

Table 1 *Savings on account of e-Service book*

Parameter	Savings
Paper cost saved on account of transfer/promotion order, joining/relieving and APR	20 lakhs per month (cost of paper, order printing and dispatch)
Time and effort of manpower	In place of 6 manpower deployed earlier, only 2 officials need carry out the job in the new system; surplus manpower redeployed in productive and revenue generating jobs
Duplicity of effort	New transactions are visible from the administrative head up to the lowest office hierarchy; the complete e-Service book can be generated at any point of time
Standardisation of service books	Standard format of service record is used across all the departments in the state
Manpower planning	Information is readily available at the secretariat and head office level for analysing, planning the human resources; it helps in quick and effective decision making at the government level
Savings in time and paper	On account of non-necessity of order printing, cyclostyling, covering letter, dispatching by post/ messenger/ vehicle—all can now be directly downloaded from the portal.

Other Assumptions

- Total of 2 manual service book, 24 pages each are maintained during 30 years of service of an employee.
- Total transfer/promotion, service history transaction in an office of 150 employee strength is 10 to 30 per month Therefore, on an average, 5 days' work for establishment branch.
- It has been assumed that 80% of the information related to staff strength, posting details, vacancy, position, ACR, property return flow to higher offices are contained manually in hard copy paper format. This can now easily be reduced through the common central portal for all departments.
- 50% of the orders are issued from offices located in Shimla (being the Secretariat/ HODs/ MDs situated at state capital). These orders are then dispatched by post to multiple offices for information and compliance.

Electronic orders are now available at the portal and can be viewed at all levels for compliance.

- At departments' level, A4 size paper printing cost is taken at 50 paise per page for paper, plus 50 paise per page for toner/HW etc.

Innovative Ideas Implemented

The project includes process flow based on easy to manage security at user levels. It significantly increased productivity of claims analysis and processing, enhanced employee service such as loan status, ACR, service history, pension case, leave status etc., although it was a challenge to generate motivation to change paradigms. Other benefits from these innovations are:

- Complete service book can be generated on click of a button
- Provision of tracking employee's complete service history along with duration of stay in hard, tribal and sub-cadre and home postings
- Quick search for employee in the complete employee database within or inter department
- Auto generation of unique employee id to all state employees to access the software
- Personnel information such as personnel, professional, address, nominee, family, education, training, leaves, loans, ACR, and service history etc. is available on a click of a mouse to all employees, thus helping all individuals to view their up-to-date service book from remote areas irrespective of their reporting office (Figure 3)
- Easy data availability for manpower planning at the higher levels
- Workflow system
- Anytime anywhere availability
- System transparency
- Reduction of work load in the department by elimination of repetitive work; implementation of workflow based package will eliminate the redundant paper work to be performed at various levels which will result in fast disposal of matters
- Transaction based system helps in system generated service history of all employees
- Transparency, upward compilation and downward drill down of information will be the major advantages if some extra effort can be put in by officials of the department in order to get used to the computerised online system
- Outputs/queries (on various selection criteria) generated through software are useful at all the levels for effective decision making and timely manpower deployment, transfer and recruitment

Social Impact

- Improved quality of government services
- No geographical limitation as portal is globally accessible
- Standardisation of forms and procedures

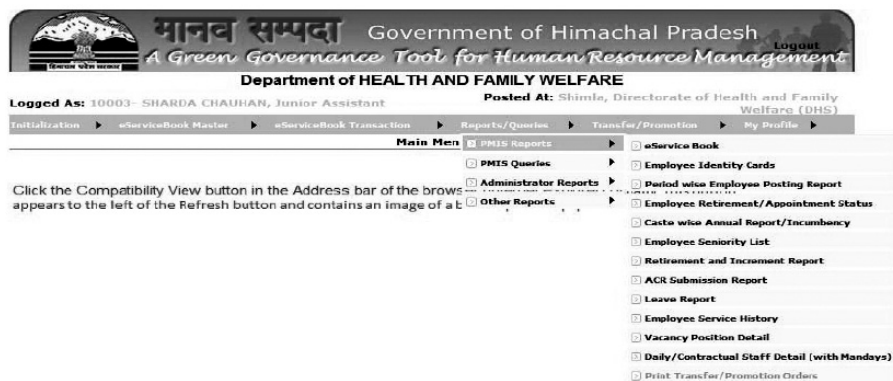


Figure 3 Snapshot of the webpage showing the e-Service book of an employee

- Integrated dashboard of employee to view attendance, salary, service record, all postings, leave, loan, ACR, APR and seniority detail
- Supporting carbon credit policy of the government
- Employee id based user authentication for multiple e-governance application
- Manpower planning, employment, placement, training, appraisal and compensation of employees

Economical Impact

- The initiative saved unproductive expenditure of all departments.
- The department has improved the carbon credit rating of the state

Level of Integration

The state government is concerned with the efficient and effective use of both human as well as non-human resources and managing employees in the form of a collective relationship between government and employees.

1. Integration with 17 different e-governance applications like e-Salary, e-Samadhan, e-Attendance, e-Sanchalan, employment, e-PDS, e-Gateg, e-Dispatch and e-Sameesha and other web applications for user authentication, application role and permissions (Figure 4). It allows the application developer to create application specific menus, roles, form level permission and to authenticate users with their unique id and password.
2. The various *stake holder departments* having their own websites can link it to this central employee database to search their employees and information related to their service book. This data can further be used for making decisions related to manpower planning, postings, sanction post, cadre strength, seniority list, transfer list etc.

SOFTWARE ADMINISTRATOR		Back to Main
Customize Your Application		
Create Menu Create Master Role		
SECTION - 1 : Create Roles		
Select Application	-Select-	#
Role	-Select- Personal MIS Works MIS	
Role For	e-Samadhan e-House Allotment e-Mantirmandal e-Sameeksha eAttendance eEMIS Pathkar ePayments eBudget ePehchan Inventory eParman REFNIC G Order HimPDS	
SECTION - 2 : List Of Role Items		
New Role Description		#
Items		
Department of Personnel, Government of Himachal Pradesh		
Disclaimer: Content on this web site is designed by Himachal Pradesh .		

Figure 4 Snapshot of webpage to link various applications with Manav Sampada

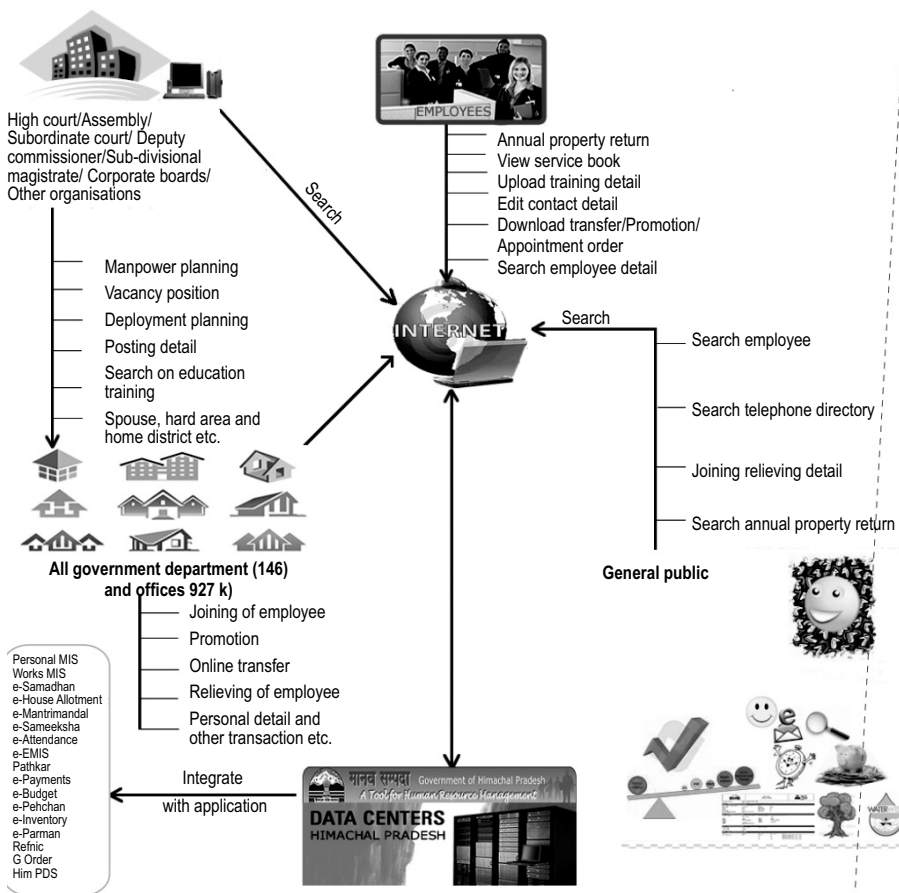


Figure 5 Integration with other e-Governance application

3. Scope for replication of the project in other states
4. Special role for administrative secretaries to view various queries and reports of all departments
5. Sharing of department specific master data across other e-governance applications such as office detail, office hierarchy, designation, employee current posting, unique employee id and password
6. *Telephone and e-mail directory*: This feature enables departments to have a system generated searchable telephone and e-mail directory of its employees with details like name, current designation, contact numbers and email id
7. *Online submission of annual property return*: Any employee having valid user id and password can create and submit their annual property return directly in the system; it is available to all; confirmation is sent through SMS on his/her mobile number
8. *Online leave management and bio-metric based attendance*: Workflow based system to manage employee leave and attendance in the Himachal secretariat

ENABLER INDICATORS

Situation Before the Initiative

Human resource management is an important and routine job of all departments of all establishments. Presently, an employee service book record is being maintained manually by the respective establishment staff and in most cases, it remains incomplete with important entries missing in between.

The following problems were observed in this system:

- In the existing manual system, it is *difficult to maintain* a service book of all employees because each entry was recorded by the concerned establishment section.
- The *workload* is so huge that manual entry along with orders detail is not possible for all service books and it hinders manpower decision making related to planning due to lack of correct and verified database.
- Once the service book is misplaced, the entire process of creating and updating is totally dependent on the dealing hand and lot of corrupt practices prevails as it is *not possible to restore or recover* it again.
- There is *no door open for the concerned official* to view his/her service book entries. On transfer, the service book goes on moving along with the employee posting and it becomes *difficult to recollect* all actions. The service book *remains incomplete* all the time and only gets updated at the time of the employee's retirement.
- *No search mechanism* for searching an employee's current posting and service details.

- *No accountability* of staff; one could easily blame the delay on the postal department on a routine basis, or to the local diary/dispatch system of the department.
- *Delay in receiving of orders* by the head office which often leads to incomplete entries.
- *Indirect costs in terms* of postage, record keeping, correspondence, reports related to sanction and actual staff strength. The number of trees required to be cut every year was a very high price to pay in today's environment conscious world. Hence, the process was *not eco friendly*.
- *Specialised manpower required to be retained* who could handle the establishment job.
- *Non-standardised format resulted* in different styles of maintaining the service record within and outside the department. Information received manually from lower offices is difficult to compile and analyse at the head office level.

Strategy Adopted

All processes were covered after a lot of discussion at the higher and middle level state government officials. Standardisation of service book information was done, which resulted in more transparency in the maintenance of service book record; the accuracy of information has improved and seems to have resulted in better decision making at the higher level. Standardisation has reduced the cost of interfaces and links and led to improved data quality.

It evolved into a process by which effective decisions can be implemented and encompasses the entire process of public administration, the process underlying the formulation of policies, the HRD efforts required for re-skilling the government machinery, prioritisation and efficient management of public resources and above all re-designing the various instruments used to realise the concept of a welfare state. The concept was presented in the Committee of Secretaries chaired by the Chief Secretary in December 2007 and the decision was taken to complete the entries on priority.

Discussions were held with secretaries, department heads and workshops were conducted in liaison with the Department of Personnel, Government of Himachal Pradesh. The Department of Personnel issued instructions to all concerned through an Office Order No. Per (AP-B) A(8)-3/2008 dated July 16, 2008 (full Office Order, *extract given in Figure 6*) for implementing the newly developed software and to make entry of service record of all officer/officials. In addition, it must cut down on the costs and time involved in maintaining manpower planning. This will meet the objective of the RTI Act too as all information of the government will be available to the citizens instantly without any cost or delay on the internet.

Considering the involvement of each department/ corporation/board/ government organisation/ high court/ assembly/ subordinate courts/deputy commissioner/in the project success, the following norms were agreed upon:

PERSONAL ATTENTION
MOST IMMEDIATE

No.Per(AP-B)A(8)-3/2008
Government of Himachal Pradesh
Department of Personnel (AP-II)

Dated Shimla-2, 16th July, 2008.

From

Chief Secretary to the
Government of Himachal Pradesh.

To

1. All Administrative Secretaries to the Government of Himachal Pradesh.
2. All Heads of Departments in Himachal Pradesh.
3. All Divisional Commissioners in Himachal Pradesh.
4. All Deputy Commissioners, Himachal Pradesh.

Subject: Utilization of PMIS - Entry of service details of all officers /officials.

Sir,

I am directed to refer to this department letter of even number dated 15th July, 2008 on the subject cited above and to say that now the date of commencement of the training programme is 29-07-2008(copy of schedule is enclosed). Training will be given in Room No. 613A, Armsdale Building, H.P.Secretariat, Shimla-2 at 11.00 AM to 5.00 PM every day with half

It is, therefore, requested that the following 3 officers/officials from Head Office of each department may be deputed for the said training as per schedule:-

1. Head of Office Administrator for giving permissions to the employees for entering the service book and verifying including the field offices and user management.
2. One person for data entry of service books.
3. One person for verifying the e-service books.

...2....

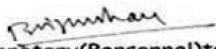
In addition, the officers/officials who attend the aforesaid training from Head Office should bring the following list/documents:-

1. List of all offices up-to the lowest level in the department.
2. List of all existing designations in the department.
3. Two service books for data entry.

The training schedule and other related information is available under top menu bar option "eService" (eServicebook- (Personnel-MIS)) at <http://himachal.nic.in> web site.

This may be treated as **MOST URGENT.**

Yours faithfully,


Deputy Secretary (Personnel) to the
Government of Himachal Pradesh.

No. Per(AP-B)A(8)-3/2008 Dated: Shimla-171002 16th July, 2008.

Copy alongwith training schedule is forwarded to:-

1. The SIO and Senior Technical Director, National Informatics Centre, 6th floor, H.P.Sectt. Shimla-2 for information and further necessary action.

2. The Additional Secretary (SA-R&I-II) to the Government of Himachal Pradesh, Shimla-2 for information and further necessary action. He is requested to please book the Room No. 613A, Armsdale Building for the training programme w.e.f. 29-07-2008 to 11-09-2008 and depute the officials for providing drinking water & cleaning the room etc for the aforesaid period.

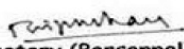

Deputy Secretary (Personnel) to the
Government of Himachal Pradesh.

Figure 6 Extract of the government order implementing the newly developed software

- Software to be internet based (not requiring heavy bandwidth requirements)
- Existing hardware available with different offices can be used as the software is web based and no separate installation is required at the user end.
- No specialised software to be purchased by departments for HR. Each department requires customisation of their master entries before software usage.
- Software to be extremely user friendly for both government officials and general public.
- For large departments, data entry operators can be provided to complete the initial voluminous master data entry of service books, after which the routine transactions can be made using e-Service book transactions.
- Most importantly, from the cut-off date, the department will update service books over internet and generate all transfer, promotion, relieving, joining and appointment orders online.

1. Process Reengineering

Table 2 highlights the positive features of the initiative under various important dimensions.

Table 2 *Process reengineering caused by Manav Sampada*

Highlights/features	Major front-end changes and current status	Major back-end changes and current status
1. Online transfer/promotions	- Department-wise online transfer, appointment and promotion orders are available in the notice board. - Earlier, orders were sent by post along with multiple copies to all the intermediate reporting offices for information and necessary action. - Using Manav Sampada, orders are available on web portal.	- Employees complete service record is accessible at the head office and secretariat level. Orders are drafted, finalised and published online on the portal. - No need to print multiple copies of the orders as all concerned officers can view orders by visiting the portal. - No need to send orders to all concerned by post. The employee can download his/her orders online using this portal.

Online orders published during the last 6 months

Number of orders published online	3140
Total number of employees transferred online	7231

The screenshot displays the 'Employee Draft Transfer List' web application. It features a search interface with dropdowns for 'Office Name', 'Designation', and 'Cadre'. Below the search filters, there are input fields for 'Employee Code', 'Employee Name', 'Current Designation', 'Current Office', and 'DOB'. A 'Transfer To' section includes fields for 'Designation', 'Remarks', and 'VIP Note'. At the bottom, there is a table titled 'Searched Employees' with columns for 'Code', 'Name', and 'Designation'. The table lists several employees, including PAVAN M KALINDAL, SUNIL SHARMA, and YASHWANT SINGH. A 'Copy Records to Draft' button is located at the bottom right of the table.

2. Online annual property return	Submission of annual property return (immovable, assets and liabilities, bank details etc.).	Each employee with authentic employee code/password can submit their APR for previous and current year.

Continues

Table 2 *Continued*

Highlights/features	Major front-end changes and current status	Major back-end changes and current status																		
	• Earlier employee need to submit their manually filled APR form to the respective establishment offices. It involved unproductive expenditure on papers and postage. • Difficult to analysis manual data on the basis of property income and value.	• The information related to employee APR directly available on the portal. • Year-wise detail of employee APR is available for citizen and the government at each level. • APR search mechanism on the basis of value of the property, total income, department and employee code. Search and View Employee Asset Property Details <table><tr><td>Select Year</td><td>2012</td><td>▼</td></tr><tr><td>Value of Property</td><td colspan="2">[] (Only Numeric Values)</td></tr><tr><td>Total Income from Property</td><td colspan="2">[] (Only Numeric Values)</td></tr><tr><td>Select Department</td><td colspan="2">[] Select Department ▼</td></tr><tr><td>Enter Employee Code</td><td colspan="2">[] (Only Numeric Values)</td></tr><tr><td colspan="3"> Search </td></tr></table>	Select Year	2012	▼	Value of Property	[] (Only Numeric Values)		Total Income from Property	[] (Only Numeric Values)		Select Department	[] Select Department ▼		Enter Employee Code	[] (Only Numeric Values)		Search		
Select Year	2012	▼																		
Value of Property	[] (Only Numeric Values)																			
Total Income from Property	[] (Only Numeric Values)																			
Select Department	[] Select Department ▼																			
Enter Employee Code	[] (Only Numeric Values)																			
Search																				
	APR submitted online during the last 6 months <table><tr><td>Number of APR online</td><td>7417</td></tr><tr><td>Amount of immovable property</td><td>72.8 crores</td></tr><tr><td>Annual income from the property</td><td>17.16 crores</td></tr></table>		Number of APR online	7417	Amount of immovable property	72.8 crores	Annual income from the property	17.16 crores												
Number of APR online	7417																			
Amount of immovable property	72.8 crores																			
Annual income from the property	17.16 crores																			
3. Electronic service book (e-Service Book)	• e-Service book is available online to all employees and citizens. • This has improved the process flow in the department. • Open new window for employees to access their personal data on internet irrespective of their current posting and establishment office.	• Various service book information are uploaded online using the portal, which is immediately available to all concerned offices. It also saved unproductive expenditure on papers and postage. • Online orders: Employees joining and relieving are entered online which keeps service history up to date. • Online staff strength and vacancy: It saved a significant amount to three major departments per annum as earlier, thousands of copies were to be distributed to various locations.																		
	Online e-Service Book <table><tr><td>Department using the application</td><td>146</td></tr><tr><td>Total number of service books: Master entry completed</td><td>2,33,285</td></tr><tr><td>Total number of service books: verified and locked</td><td>1,93,255</td></tr></table>		Department using the application	146	Total number of service books: Master entry completed	2,33,285	Total number of service books: verified and locked	1,93,255												
Department using the application	146																			
Total number of service books: Master entry completed	2,33,285																			
Total number of service books: verified and locked	1,93,255																			

Continues

Table 2 Continued

Highlights/ features **Major front-end changes and current status** **Major back-end changes and current status**

		eService Book HIMACHAL PRADESH			
Employee Code Name 10008-> SURINDER SINGH VERMA					
Designation Head Constable		Current posting At : DISTT. S.P. SOLAN			
Section - A (FORM-1) (Employee Personal Information)					
Father/ Mother/ Husband Name SH. DHYAN SINGH VERMA		Gender Male		Member Category General	
Date of Birth 29 Jan 1974		Caste RAJPUT		Blood Group B+	
Religion Hindu		Married		Height (in cm) 176	
Personal Identification Mark MOLE ON RIGHT SIDE FACE		Home State HP			
LYC Home Town SHIMLA					
Section - B (FORM-2) (Employee Address Details)					
Permanent Address VERMA NAWAS, NEAR HIMRAL NAWAS, LOWER		Permanent Address VILLAGE KISHOUR, P.O. DEHA, TEH. THEOG			
Block SHIMLA		Block SHIMLA			
District HIMACHAL PRADESH		District HIMACHAL PRADESH			
Pincode 9418040650		Pincode 9418040650			
Phone 9418040650		Phone 9418040650			
Email SURINDERVERMA@GMAIL.COM					
Section - C (FORM-3) (Employee Family Details)					
Member Name TAVISHI VERMA		Member Relation Daughter		Member Job Status	
MUSKAN VERMA		Daughter			
SMT. CHAMPA DEVI		Wife			
Section - D (FORM-11) (Employee Nomination Details)					
Name SMT. CHAMPA DEVI		Relation Wife		Share Percent 100	
		GRP		100	
		GDS		100	
				VERMA NAWAS, NEAR HIMRAL NAWAS, LOWER CEMETARY, SANJAULE-I-G	
				VERMA NAWAS, NEAR HIMRAL NAWAS, LOWER CEMETARY, SANJAULE-I-G	
				VERMA NAWAS, NEAR HIMRAL NAWAS, LOWER CEMETARY, SANJAULE-I-G	

4. Online joining/relieving

- On transfer/promotion
- No proper recording of employee relieving and joining. Now online relieving and joining; it is a must to transfer employee service record to new office.
- Non-availability of latest staff position to administrative officers.
- Every month, manually compiled information is sent by post which becomes obsolete due to intermediate delay.
- Online joining and relieving keeps record up to date and staff position is available on the click of a mouse.
- Effective and quick decision making is now possible at head office and secretariat level.

EMPLOYEE JOINING AND RELIEVING ORDER DETAILS

Select Employee

Department: HEALTH AND FAMILY WELFARE Enter Employee Code/Name: 10003 Search

First Name: SHARDA Middle Name: Last Name: CHALHAN Date of Birth: 02/11/1969

Add/Update Joining Orders Detail

☒ Backlog Entry ☐ Online Entry (In Online Current Posting Details of an Employee will be Changed)

Reason for Joining: -SELECT REASON- Order: Join Date: Join Time: ☐ FN ☐ AN

Select Date: At Department: HEALTH AND FAMILY WELFARE At Office Name: Shimla, Directorate of Health and Family Welfare (DHS)[NA][010000000000] Branch: -SELECT BRANCH- Designation at the time of Joining: Junior Assistant Home District: ☐ Yes ☒ No

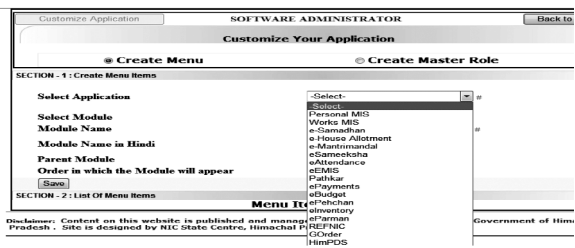
Posting Area: Employee Type: ☐ Hard ☐ Tribal ☐ Sub Cader ☒ None ☐ Gazetted ☐ Non-Gazetted Class: -SELECT- Remark (if any):

Join At: Shimla, Directorate of Health and Family Welfare (DHS)	Join Date: 28/08/1997	Designation: Clerk/Junior Assistant (Regular: Non-Gazetted)	Join Remarks:	Lock: ☒

Continues

Table 2 *Continued*

Highlights/ features	Major front-end changes and current status	Major back-end changes and current status
5. Integration with other user applications	• Earlier no provision of sharing similar data between different applications. • Master data was application dependent and maintained separately in each application	• Application management allows application menus, roles and form level permission • User management specifies employee application role and password • Master data is maintained of all departments (offices, designations, employees, sanction strength, vacancy etc.)
	Application integration	
	Number of application integrated	17
	Total number of offices	27,918
	Total number of users created	51,098



2. Capacity Building

Leadership Support

1. A steering committee was formed under the chairmanship of the Secretary (Personnel) Himachal Pradesh who was directly involved in the development, design and effective implementation of application and regular monitoring. The committee has planned to promote professionalism and make the department functioning more transparent so that all the department are able to provide state- of- the-art services to public.
2. The administrative secretaries, department heads and National Informatics Officer, Himachal Pradesh directly started monitoring the verification progress, staff strength, online transactions in their respective departments by using daily reports/queries and dynamic graphs.
3. As consulting with key stake holders is an important factor in achieving ultimate success, one-to-one meetings and multi-stake holder consultations were done at each stage of software development. For example, while developing the annual property return, a study of

requirements was conducted in which department heads, DIT and senior officials were queried about the module. After satisfaction of all the concerned individuals, software modules were finalised by a state level committee. The Manav Sampada is an 'investment' which continues to produce a 'return' and is sustainable.

4. Helpdesk on Manav Sampada is set up on the portal which provides information and assistance resource that troubleshoots problems with department related information. Questions and answers can be delivered by using any one of the following services as feedback service—online telephone directory containing details such as e-mail ids, telephone numbers of officials up to the level of field offices.

Capacity Building Plan

As sustainability of the ICT project is affected by the human resources available to undertake the ICT activities, many workshops/trainings were conducted at state level on Manav Sampada. Initially 5 master trainers for each department had been created. These master trainers had further provided the necessary training to the field staff of police departments

A complete *action plan* was prepared for the user department to implement the project.

Action required at Secretary/ Managing Director/ Deputy Commissioner Level/ Department Heads

- i. Nominate minimum three officials from the department head office who maintain the records manually.
- ii. The nominated official has to undergo a two-day training on the software which will be organised by the Personnel Department and NIC. The officials will also get their user id created for the head office administrator, office administrator and for data entry and verification user during the training itself.
- iii. They will bring the list of all offices, designation, levels and branches to the complete master data entry of their department and customise the software as per their specific requirement.
- iv. Ensure the availability of at least one computer with updated anti-virus protection, internet connectivity (broadband) for each establishment section.
- v. To make training more effective and interactive, the official will complete the service book master data entry of 2 officials during the training. Valuable suggestions provided by the officials at this stage further helped the department in incorporating more options to the application.
- vi. All departments will identify a nodal officer to monitor the day-to-day progress made and liaise with NIC for any clarification or customisation of the application. He/she will also work as head office administrator and will do the job of role assignment and master creation.

vii. Monitoring of progress is made from application generated reports on a weekly basis and training will be imparted to their sub-office staff.

The following factors were quite important to the success of the project:

- Taking into confidence officers from the level of chief secretary/principal secretary/department heads to the establishment user of all departments
- Due to state tele high-density internet is present in remote locations
- Proper accountability through authorised user account based transactions and audit trail at all levels
- Training material was prepared and distributed to users for use
- Web-enabled user friendly software requiring
 - No end user support
 - No software installation
 - Minimal training requirements
 - Faster software development

Change Management Strategy

1. The major challenge had been the traditional mind-set of government personnel. For many years, computer had been an object inspiring awe and fear. The department is progressively changing that mindset and has been able to train a sizeable part of employees in handling computers.
2. Connectivity is another major issue for implementation of any ICT project and that too in difficult terrain with snow covered areas. The department has achieved 100% computerisation of all field offices. A majority of government offices have already been connected through broadband and HIMSWAN. Some of the offices are located in far flung areas where connectivity is through VSAT only.

Policy environment

As ICT activities cannot be in isolation from the policy environment, the Personnel Department has made a suitable policy environment for implementation of the project and making it sustainable.

Steps taken by the Department of Personnel

Training to Staff of User Department

The Department of Personnel, Government of Himachal Pradesh took the responsibility of conducting training and invited 5 officials from department head offices along with their service book for training at NIC state centre in Shimla. It was scheduled for almost 6 months and included participants from all major departments. The training was provided in small batches as and when required by the TSP at NIC. Training of around 1875 official of different departments was completed in a phased manner and they were asked to impart the same to their lower establishment offices. (extract given in Figure 7)

Following lists are mandatory to attend the training: -

1. List of office levels in the department.
2. List of all offices (Office Name, Office Address, District, Constituency, Designation of Office Head and Telephone Number) of the department.
3. List of all existing designation in the department.
4. Two service books.

Training Schedule for Personnel MIS Software (w.e.f. 29-07-2008 to 11-09-2008) Organized by National Informatics Centre, Himachal Pradesh, Government of India. and Department of Personnel, Himachal Pradesh.			
Sr. No.	Date	Name of Department	Participants: (3 persons from Head Office of each departemnt)
1	29/07/2008 30/07/2008	1 Advocate General 2 Agriculture 3 Animal Husbandry 4 Ayurveda 5 Revenue	1. Head Office MIS Administrator 2. Data Entry of eService Book 3. Verification of eService Book

Figure 7 Extract of the office order given to make training mandatory

NIC, HP State Centre and District offices

- Develop a user friendly software with necessary security features and host the software on the internet for use by departments
- To enroll and create head office administrator (super user) for each department
- Impart training to the head office staff of all departments (as per the schedule provided by the department of personnel) in using the software. These act as master trainers and impart further training to field office staff.
- Workshops and trainings were conducted by DIOs at NIC district centres for different departments. DIOs are technically assisting the staff of all departments in using the application.
- The appropriate material, for example, booklets, brochures etc. on the software were also provided during training to the officials.
- The data entry progress were monitored by respective DCs and kept as agenda item in the monthly review meeting of the chief secretary on video conferencing.
- Software modification/enhancements were carried out as per requirements, if any.

Financial Model

Maintaining service book record is the main job of all establishment branches/offices of the departments. The employees themselves are the best users for it. So there is no scope for revenue generation but this goal can be achieved in term of indirect benefits as part of effective department wise manpower planning and the financial overhead involved thereof.

Efforts at Sustainability

The model is self-sustainable as the project execution has been done by NIC state centre with zero paisa investment and is available to the Government

of Himachal Pradesh on a 24×7 basis. In the field, this is executed by the officials of the department, thus incurring no cost to the Government of Himachal Pradesh. Manav Sampada is hosted on NIC data centre. Thus the department does not invest on security and safety of the data.

User Privacy

The office administrator will generate a unique employee ID for an employee before starting his/her service book entry. In the software, the user is given flexibility to control module permission for each individual/user and access it through the MD5 hashing secured login id and password.

Application Customisation

The complete application is categorised under various functions and modules and they have been assigned a separate role (Figure 8). The software administrator can control his/her menu and roles through the software administration.



Figure 8 Snapshot of the window at application customisation

Role Based Access

The Super Administrator can create a number of roles for different users (Figure 9) as per their grouping and nature of official job. He/she can assign permission to various modules and sub-modules associated with each role.



Figure 9 Snapshot of window assigning roles to different users

Audit Trail

- The processes deployed in the software require user authentication of his or her department, login id and password. *Two kinds of logs are used—one for users and the other for each transaction.* The login date and time and logout date and time of every user is recorded automatically. In addition, every transaction is assigned a date and time to fix proper responsibility for various actions of the user.
- The government offices would be interconnected with one another and with external entities through connectivity infrastructure.

3. Technology

- Web enabled software on SQL server 2008/ ASPNet framework 3.5
- Verified service records are stored in columns of table as image data type of SQL server 2008. No PDF files have been kept on the server because management of these files becomes a problem and downloading is slow. Instead, they are stored in database tables (0 to 2 GB object can be stored) because storage and retrieval operation is fast as compared to storing files at some location. It is also secure as database security is inherently applied.
- Image data type is BLOB binary large objects. This type can store variable length from 0 to 2 GB in single object as variable length binary data with a maximum length of $2^{31} - 1$ bytes = 2,147,483,647 bytes. It has been stored in binary form.
- Security features embedded as per OWASP standards.
- IIS web server, Windows platform on NIC servers
- Acrobat writer/ reader for converting reports/queries, service book, APR into PDF format and reading purposes
- Any client computer system connected to internet using a web browser

Disaster Recovery and Service Continuity

Application is hosted at NIC state data centre which is managed 24×7×365 by technical professional and daily replication of complete database is done at disaster centre in Pune.

Security Audit The website was audited by a third party agency as per OWASP standards. Secure login/password based application access protect any mishandling of data.

VALUE INDICATORS**1. Digital Inclusion**

The whole state of Himachal Pradesh and the World Wide Web is covered by the system. This includes all 146 government departments covering

27,918 offices up to lower level (including Secretariat, IPH, PWD, Health and Education having maximum number of offices) who maintains the service records of 233K state government employees.

Step Taken to Reduce Digital Divide

- Provision of entering service detail in Hindi Unicode compliant font
- Special effort to provide computer and internet facility to dealing hands and verifying officers
- Department having massive manpower offline module to complete employee master entry backlog
- Deployment of DEO to assist office staff in entering employee master data
- Incentives for establishment offices to complete their service records
- Customisation of department specific requirement
- Training imparted to CSC-LokMitra Kendra to help staff of remote offices
- Workshops and trainings conducted at NIC District Centre for departmental user

2. Green e-Governance

Table 1 mentioned before gives details of the direct savings on account of digital service books in relation to paper saved. There are also indirect savings as mentioned in Table 2.

Table 2 *Approximate indirect savings at departments level*

Paper saved at department level	Rs. 0.50×7500 pages = Rs. 3,750 per annum (APR, service record, reports, orders)
Toner costs saved at department level	Rs. 0.50×7500 pages = Rs. 3,750 per annum (APR, service record, reports, orders)
Postage costs saved at department level	Rs. 30 per post $\times$ 1500 orders/reports = Rs. 45,000 per annum
Petrol/ diesel/ messenger costs saved	Rs. 50 per vehicle trip $\times$ 1500 orders/reports = Rs. 75,000 per annum
Trees saved	One standard tree for generating 7500 pages
Water saved (10 litres water required for one A4 paper sheet) *	7500 pages of orders/reports/service books $\times$ 10 litres water per page = 75,000 litres of water
Savings in time	On account of non-necessity of printing, packaging, covering letter, dispatching by post/ messenger/ vehicle and no re-typing of content.

What is the problem with paper use? (<http://www.threetreesdontmakeaforest.org/facts/paper.html>)

- *One standard tree*: 1 tree makes 16.67 reams of copy paper or 8,333.3 sheets (The data regarding trees used for making different kinds of paper has been taken from <http://www.conservatree.com/learn/EnviroIssues/TreeStates.shtml>, as there are no standards and different kinds of trees, process are used for different kinds of papers. We have taken standard office copier paper for computer printing)
- 10 litres of *water are required* to produce one sheet of A4 paper;
- The paper manufacturing industry is the world's third largest consumer of fossil fuels.

Dr Saurabh Gupta, State Informatics Officer and Senior Technical Director, National Informatics Centre, Government of Himachal Pradesh, e-mail: sio-hp@nic.in, nic.saurabhgupta@gmail.com

MGNREGS Audit and Financial Management System, Government of Madhya Pradesh

Neeraj Mandloi and Preeti Tiwari

PROJECT OVERVIEW

Financial transparency and accountability are important aspects of the financial reforms initiated by the Government of Madhya Pradesh. Accordingly, tracking of audit compliances is one of the most important monitorable indicators of a scheme's performance. Various types of audits such as CAG audit, local fund audit (LFA), chartered accountant audit, departmental audit, and concurrent audit by CA etc. are on board to check financial performance.

The Madhya Pradesh State Employment Guarantee Council, under the Panchayat and Rural Development Department has developed a web enabled software for online monitoring of the audit and financial process. The software application helps in making auditing more reliable and efficient. It is a humble step for tracking the sanctity of the audit procedure as a whole. The same has been welcomed by MoPR, GoI, New Delhi.

The council has been conferred 'Award for Excellence in e-Governance Initiatives in Madhya Pradesh, 2011-12' under the category of 'The Best Application Software Developed and Implemented in Madhya Pradesh' for its project 'MGNREGS-MP's Audit and Financial Management System' on July 10, 2012 at Bhopal.

The software covers various modules—the audit module for tracking audit objections, easy monitoring etc and the financial module for easy monitoring, keeping control on administrative expenditure—with different login and for different users.

Objectives

- For tracking of audit objections
- Bringing audit into the public domain for the sake of transparency
- For easy monitoring
- For easy glimpse of funds of PRI's and other implementing agencies
- Financial status on public domain
- For easy monitoring, analysis and maintaining transparency
- For controlling administrative expenditure, activity and sub-activity wise
- For stopping misuse of the funds allotted for administrative expenditure

RESULT INDICATORS

1. Key Performance

Government-to-citizen (G2C), government-to-government (G2G), government-to-employee (G2E) relationship is maintained and that too on the public domain through this online software.

Audit Module

For running and support of this software, a dedicated audit cell has been established in the Madhya Pradesh State Employment Guarantee Council. This Audit Cell will keep a watch on the different type of audits being performed and entered in the software. This software is very useful for futuristic planning and monitoring.

It has also been learnt (by the DO. No. M-11013/14/2007-trg/P&J (Vol V) dated March 2, 2012 of the Joint Secretary, MORD, GoI) that the Government of India, MoPR expressed its welcome for the Audit Software and intended to adopt the same as per demand of other states.

The software can be re-engineered in 'open source technology' and can be given to other organisations of the state, if they desire, for moving towards e-auditing. The salient features of the audit module include the following.

1. The concept of 'e-audit' compliance
2. Quick modus operandus of audit tracking system
3. Proactive information of audit on public domain in the spirit of RTI.
4. Transparency and accountability of 'audit'
5. Government-citizenship relationship for 'audit' issues

Financial Module

This module is helpful in keeping watch over the funds of implementing agencies. The financial status of the implementing agencies is kept in the public domain.

The software is useful for easy monitoring, analysis and maintaining transparency.

Administrative budgeting has been adopted in Madhya Pradesh for the implementation of MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act). In this context, through this software, control can be kept on administrative expenditure, activity and their sub-activity wise.

Through regular updation and monitoring of the software, misuse of the funds allotted for administrative expenditure can be stopped.

As such, there is no online audit para tracking system in MGNREGA comprising all the different types of audits. This software can provide a platform for interaction between different auditee and auditors. Th salient features of this module include the following.

1. e-Budgeting of the 'admin. exp.' of the flagship scheme, i.e., of MGNREGS
2. Budgetary control on 'admin. exp.'
3. Dynamic fund reporting and management
4. Transparency in terms of public money

Implementation Coverage

The software has been implemented in 50 districts of Madhya Pradesh and 25000 agencies including PRIs.

15440 para objections have been fed in the software against which 13413 compliances were fed.

For this software, the Madhya Pradesh State Employment Guarantee Council has been appreciated by the Ministry of Panchyati Raj, Government of India and the Department of Information Technology, Government of Madhya Pradesh.

The Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) is being implemented in 23,171 gram panchayats, 313 blocks and 50 districts in Madhya Pradesh, providing 100 days of wage employment to labourers every year across the state.

The process involved in the implementation of the MGNREGS in Madhya Pradesh is:

1. Identification of shelf of works at the grama sabha
2. Preparation of work estimates post approval by the gram sabha
3. Verification of work estimates by the AE and submission at the Janpad Office
4. Approvals by the Janpad office
5. Commencement of work and recording of labour attendance using muster rolls
6. Conducting regular verification of musters by Sachiv/ SE/ AE/ APO / PO
7. Recording of measurements by SE and submission in Janpad Office
8. Approvals of the measurement by Village Sarpanch and PO
9. Generation of pay order and issuance of cheques
10. Data Entry into the MIS for updations

2. Efficiency and Improvement Initiatives

- i. The auditing software helps to quickly locate transaction errors; it detects irregularities, and maintains compliance with accounting and financial propriety—this was not possible before the project implementation.
- ii. Quickly creates an audit trail that allows tracing the history of auditors, objections, transaction, etc.
- iii. Managers are able to monitor the entire audit process quickly and a copy of every type of audit can be saved. Knowing this, the fed entry in the software from different levels can be viewed and monitored.

- iv. The auditing software provides automated processes on financial data to locate and identify potential errors or instances of mishandling of government transaction money etc.
- v. It includes sophisticated security with password protection and role-based access to ensure that data remains secure.
- vi. Government-to-citizen relationship is maintained and that too on the public domain—this was not possible before the project implementation.

ENABLER INDICATORS

1. Process Reengineering

- Online software across the World Wide Web through which all concerning audits can be tracked.
- Similarly, the audit objections, observations and annexes, if any, can be fed in by the district and viewed online in the public domain. These audit observations and compliance can be accepted or rejected.
- If the compliance report is rejected, it has to be corrected and fed into the software again. If the report is accepted, the compliance cannot be changed in the software.
- This software helps in tracking the sanctity of the audit procedure as a whole.
- Administrative budgeting and expenditure are also linked up with the online monitoring software for the Road Convergence Scheme.
- Funds position can be determined at the implementing agency level, and thus budgeting can be done.
- Paperwork, correspondence and telephonic expenses and human interventions is reduced.
- Different type of reports, financial year wise, can be generated through software; planning for the future can also be done.

2. Capacity Building

The analysis/design/ development/ implementation/ maintenance of the software is taken care of by the administrative and technical team.

Administrative Team

- i. Neeraj Mandloi (IAS), Commissioner (MGNREGS MP)
- ii. Dr. Rajeev Saxena, Joint Commissioner (Finance)

Technical Team

- i. Preeti Tiwari, Assistant Manager (IT)
- ii. Anshul Agarwal, Programmer

A full-time programme management team is in place.

3. Technology

ICT Solution Adopted

- i. The entire application is developed in an N-tier architecture where the front-end is made in ASP.net using C# and in the back-end, SQL server is used as database with all its different objects/utilities for developing the application and reports.
- ii. Creation of various database objects like tables, views, procedures, functions, triggers, etc. is incorporated in the flow of the system.
- iii. Different checks/validation points are used in the application.
- iv. The data can be fed by the users at any instant of time.

Security and Confidentiality Standards

The 'audit and financial management system' has undergone security audit and has cleared all the levels of web enabled security audit done by an empanelled company of NIC.

Disaster Recovery and Service Continuity

Disaster recovery is done by maintaining a backup of the database.

VALUE INDICATORS

1. Digital Inclusion

The above e-governance system can be fed in and viewed in both Hindi and English. The software is versed with a conversion tool, which can easily be operated online for conversion of language.

The software is implemented in all the 50 districts of Madhya Pradesh where the major language used is Hindi and then English.

2. Green e-Governance

The system has reduced paper work, correspondence and telephonic expenses and undue human interventions.

Neeraj Mandloi, IAS, Commissioner, MGNREGS-MP, Panchayat and Rural Development Department, Government of Madhya Pradesh, Bhopal. e-mail: rddmp_it@yahoo.in

Preeti Tiwari, Assistant Manager (IT), MGNREGS-MP, Government of Madhya Pradesh, Bhopal. e-mail: rddmp_it@yahoo.in

End-to-end Delivery of Digitally Signed Certificates, Government of Rajasthan

Sanjay Malhotra and R K Sharma

PROJECT OVERVIEW

Introduction

The service for providing digitally signed certificates on an *end-to-end basis* through the online e-Mitra portal (www.emitra.gov.in) was inaugurated by the Hon'ble Chief Minister on May 12, 2011. Since then more than 9.73 lakhs of digitally signed certificates have been issued.



Digitally signed certificate services were inaugurated by the Hon'ble Chief Minister on May 12, 2011



Secretary, DeITY, Government of India appreciating the digitally signed certificates of Rajasthan at a ceremony in New Delhi on July 17, 2012

Objective

The objective of the system is to provide a centralised service delivery of digitally signed certificates through the online e-Mitra portal using the CSC/e-Mitra kiosk network across the State of Rajasthan.

Description of the Services

The following types of digitally signed certificates are provided *free of cost*, on an *end-to-end basis* through the CSC and e-Mitra network:

- i. Bonafide Certificate
- ii. Caste Certificate (OBC)
- iii. Caste Certificate (SBC)
- iv. Caste Certificate (SC/ST)
- v. Caste Certificate (General)
- vi. Solvency Certificate

Such services are provided free of cost to the citizens while the service charges for the same are borne by the Department of Information Technology and Communication (DoIT and C), Government of Rajasthan. These certificates are being delivered to the applicant on pre-printed stationery with high security features like holograms, watermark, logo, barcode etc.

The flow of provision of digitally signed services through the kiosks is as shown in Figure 1.

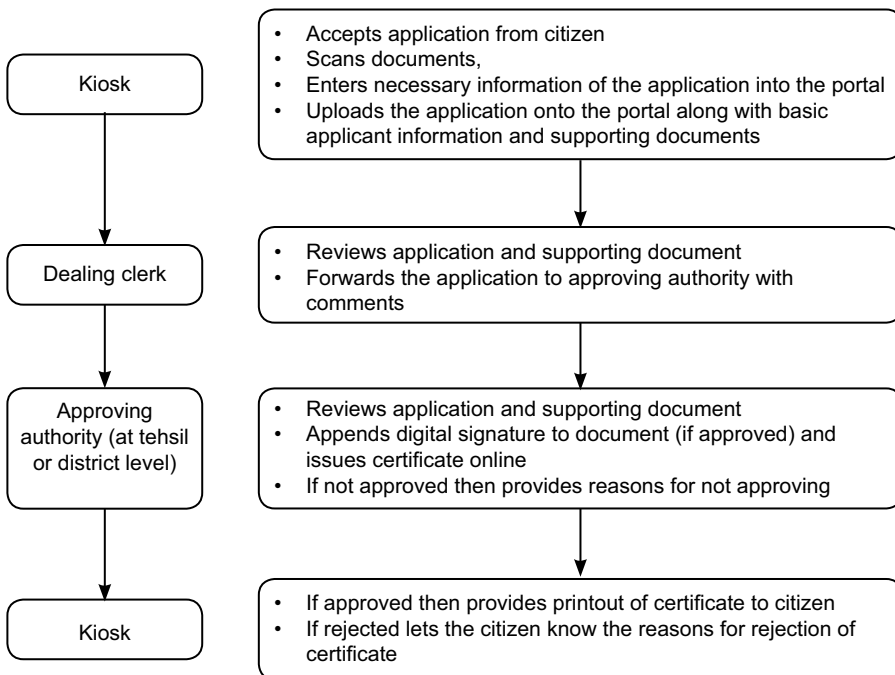


Figure 1 Flowchart of digitally signed certificate services

Since the launch of digitally signed certificate services in May 2011, there has been an increase in number of applications received for digitally signed certificates (Table 1).

Table 1 *Growth in number of digitally signed certificates being issued since January 2012*

Month	Certificates issued	Month	Certificates issued
January 2012	42258	May 2012	72981
February 2012	59441	June 2012	157670
March 12	78374	July 2012	429649
April 12	70001	Aug 2012	209693

Services related to digitally signed certificates (DSCs) have emerged as an important component of the basket of services provided through the CSC/e-Mitra kiosk network. DSCs have not only enhanced convenience to citizens but also has the advantage that the authenticity can be verified online.

These kiosks are ICT based, government authorised for efficient, effective, accountable and transparent delivery of G2C services to urban (e-Mitra) and rural (CSC) citizens in all 33 districts of Rajasthan.

The objective of such kiosks is to provide all government services to the citizen in his or her locality, through a one-stop shop (integrated service delivery). Other G2C services provided through such kiosks are:

- Utility bill payment,
- Online filling of application forms and exam fee deposition (PWD, panchayati raj department, RPSC etc.)
- Digitally signed copies of land records (Niwai, Tonk)
- Online RSRTC bus ticketing
- Payment of various dues/fees of the municipal corporation and Rajasthan Housing Board
- Sale of stamp paper, revenue ticket, deed writing
- NREGA (National Rural Employment Guarantee Act) services

Other than these G2C services, various B2C services are also provided through these kiosks to make them financial sustainable:

- e-tickets of railway and airline services
- Payment of land line and Cell One bills
- Western Union Money Transfer
- Bill collection of Airtel, Reliance, Tata Teleservices, Idea
- Financial and insurance services of ICICI Bank
- Online PAN card applications
- Online LPG gas booking
- Prepaid mobile recharges

- DTH recharges

Table 2 shows how digitally signed certificates have been beneficial to citizens.

Table 2 *Value proposition with the introduction of digitally signed certificates*

Situation: Pre-deployment	Situation: Post-deployment	Benefits: Post-deployment
Manual process: Citizens had to visit far away tehsil or district level offices to avail the services	Digitally signed certificate services are provided through more than 3000 kiosks	These services have become more accessible for the general public close to their home, thus benefiting the citizens
Citizens were provided an acknowledgement slip at the tehsil/district level offices to enable them to track the application status as per the provisions of the citizen's charter	Citizens get a computerised receipt with date and unique token number when they avail of services through the kiosks	Unique token number is all that is needed to trace the application status
A number of intermediate processes before the actual delivery of services with no clearly defined roles	Clearly defined roles and access to the IT enabled system and escalation matrix in place	Time-bound delivery of services
Initial resistance by citizens for digitally signed certificate services	Acceptability of IT as a tool for delivery of services amongst citizens	Ease of use of application with continuous increase in the number of application users
Manual tracking of application status/ multiple visits to concerned office for application status	SMS alerts/online tracking of application status	Better tracking of pending applications with reduced number of visits to various government offices
Manual application verification	Online application verification	Easier verification process
Difficult record keeping of all physical documents attached	Online storage of applications	Paperless offices, easier archiving process, MIS reports for review
Complete process to be repeated for duplicate certificate	Reprint facility available for the unique token number/application ID	Easier process for duplicate application
Discrete processes across districts	Same application throughout state	Standardised form and processes across districts in the state

RESULT INDICATORS

1. Key Performance

ICT Based Services

The DSC system provides a G2C service. Since the start of implementation, the number of applications for DSCs have been steadily increasing (Figure 2).

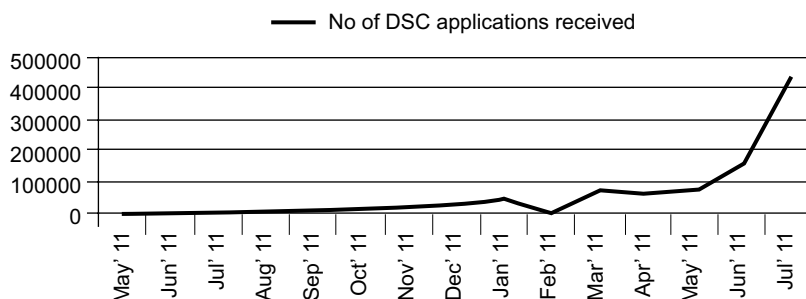


Figure 2 Number of applications received since launch

Implementation Coverage

These certificates are available through approximately 3860 kiosks (Figure 3) at district headquarters, municipal towns, tehsil headquarters, panchayat samiti headquarters, gram panchayat level. In addition to this network, citizens can also avail various services online through internet at their homes without the need to visit such kiosks.

Recent Initiative and Future Plans

DoIT and C has taken the initiative of issuing digitally signed copy of land records in Niwai, Tonk District. The future plans include:

- Replicating the service for providing digitally signed copy of land records across all tehsils of the state of Rajasthan. In this regard, notification has been issued to mandatorily initiate this service in one tehsil per district

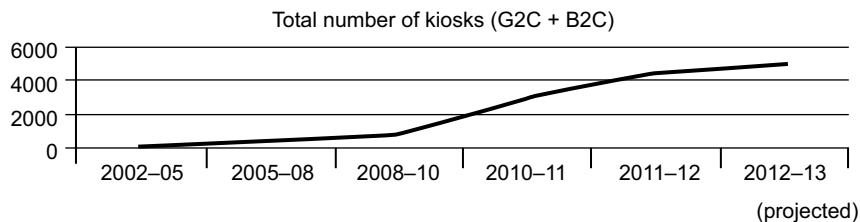


Figure 3 Total number of kiosks in towns and panchayats in Rajasthan

on a pilot basis on or before September 01, 2012.

- Providing digitally signed certificates for services of other government departments like: delivery of municipal e-services such as death, birth and marriage certificates; digitally signed certificates for RPSC (Rajasthan Public Service Commission) to provide digitally signed 'Certificate of Selection'.

Addition of such services to the service basket of the kiosks also increases the revenue of the kiosk holders.

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency Improvements

Online issuance of digitally signed certificates has drastically reduced the service delivery time for the issuance of such certificates. Citizens avail the services *under one roof*, thus saving their time in comparison to the old manual processes and transportation cost of running around several far-off government offices. This also improves the functioning of the government by facilitating government outreach to citizens.

Innovative Ideas Implemented

- *Time-bound delivery of services:* Delivery of digitally signed certificates (bonafide, caste and solvency) have been included in the 'Notified Services' of the Rajasthan Guaranteed Delivery of Public Services Act, 2011. Under this Act, the accountability of delivery of the said services in a timely manner has been fixed
- *Free of cost certificates* are being delivered to the citizens on pre-printed stationary with high security features like holograms, watermark, logo, barcode etc.
- *End-to-end digitised workflow* for the delivery of digitally signed certificates
- The status of the application can be *tracked and verified online* through the 'Online Verification' section on www.emitra.gov.in.
- Real-time MIS reports and dashboards showing pendency of applications at various levels are available.
- Provision of services at the citizen's doorstep through a *single window* (blank form, form filling, form submission and certificate collection)
- SMS alerts to citizens and government officials regarding status of applications
- Easy and economical reprint of certificates
- Re-submitted applications can be tracked
- Increase in the revenue to ensure self-sustained kiosks (with a minimum income of Rs. 3000–5000 in rural areas and Rs. 5000–10000 in urban areas), thus encouraging more and more women entrepreneurs.
- Integration of online payment gateway with e-Mitra portal for making payment for various services through e-Mitra portal.

ENABLER INDICATORS

1. Process Reengineering

The project aims at deploying information and communications technology (ICT) to provide convenience and transparency to the citizen by delivering services almost at their doorsteps. It aims to use an e-platform to provide all government information and services to rural and urban masses under one roof through kiosks on a PPP model. The scope of services that can be provided through the kiosks is not limited to the state government domain—it may also include services of the central government departments and also private sector organisations like LIC, BSNL, mobile phone service providers, internet cafes and many more. In the private domain, it will provide services like cable TV, insurance, ticket booking, *gram haat*, tele-medicine, tele-education, internet access, etc. The aim of this scheme is not to merely roll-out the ICT infrastructure but to build a network of urban businesses across Rajasthan. To this effect, the DSC scheme has been designed to create a value proposition for all stake holders and alignment of their economic interests.

ICT and Non-ICT Front-end Changes

- ICT based kiosks have been set up and implemented under PPP model.
- Notification providing recognition to digitally signed certificates has been issued by the Home Department and Social Justice and Empowerment Department. Various circulars have also been issued in order to disseminate information to all the concerned authorities and sensitise field level officers to give recognition to these certificates.

ICT and Non-ICT Back-end Changes

- The DSC scheme uses the e-Mitra web-based application: J2EE framework with Oracle 10G as RDBMS hosted at the state data centre (SDC), Yojana Bhawan, Jaipur.
- The kiosks are connected to the SDC through any of the connectivity options—broadband, data card, or services of other network service providers or internet or a combination of such options.
- Application forms and certificate formats has been designed in order to ensure standardisation of forms and delivery of certificates across districts in the state of Rajasthan.
- Escalation matrix mechanism is used to ensure time-bound delivery of services.

2. Capacity Building

Institutional Framework

A whole new administration system has been set up to ensure that the scheme works without fail (Figure 4).

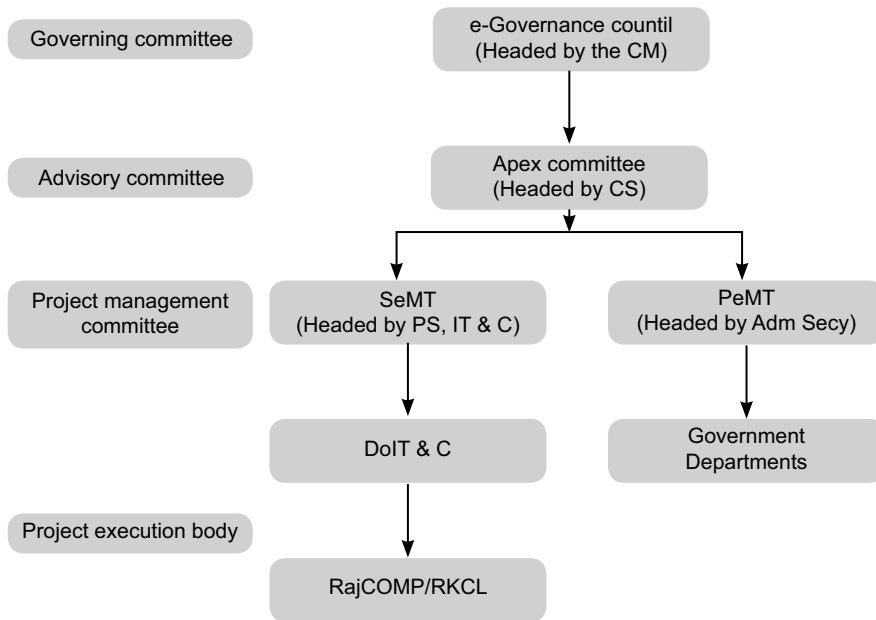


Figure 4 *Institutional framework established for the DSC scheme*

Capacity Building Plan

- Notification providing recognition to digitally signed certificates has been issued by the Home Department and Social Justice and Empowerment Department. Various circulars have also been issued regarding the same in order to disseminate information to all the concerned authorities and sensitise field level officers to give recognition to these certificates.
- Computer literacy related trainings
- Mandated clause for training to each kiosk holder at least once in a quarter in the Service Level Agreement (SLA)
- Sensitisation and awareness training sessions are conducted for all stake holders
- Operational and functional training sessions are being organised through video conferencing for all district nodal officers and other stake holders

Financial Model

The scheme focuses on creating effective market mechanisms for demand-driven delivery of services in a PPP (public–private partnership) framework.

Self-Sustaining Model

There is a provision for providing minimum revenue assistance/self-sustaining model based on permission to collect per transaction service charges—the service charges of which are borne by either the department/organisation/agency or the citizen, depending on the service concerned, so as to ascertain a minimum income level for the kiosk holders. The average income per kiosk in a month is shown in Table 3.

Table 3 *Average income per kiosk: Total number of transactions for July 2012*

Sl. No.	3 Major G2C services	Transactions (July 2012)	Commission rate (Rs.)	Income
1	Utility bill payment	1460848	4/-	Rs. 5843392
2	Digital certificates	429649	30/-	Rs. 12889470
3	RPSC	14543	10/-	Rs. 145430
Total income from three G2C services			Rs. 18878292	
Total number of kiosks			Rs. 4588	
Therefore, average income per kiosk by G2C services			Rs. 4114	

NOTE: The kiosks also earn additional income from B2C services (approximately Rs. 1500–2000/- per month).

Efforts at Sustainability

Continuous efforts are being made by DOIT and C to strengthen the kiosk's service basket by adding more and more services of various government departments and other B2C services. This is in order to ensure financial sustainability of the kiosks.

3. Technology

The Rajasthan state government, in synergy with NeGP, is undertaking a holistic approach to reengineer its business practices to facilitate a citizen centric system of e-governance that can overcome geographical, time and physical limitations and provide a $365 \times 24 \times 7$, anywhere, anytime access to the common citizen, particularly to those people living in rural areas.

In compliance to state IT and ITES Policy 2007, and to ensure long-term success of e-governance, a structured BPR process has been undertaken in all the key departments. External consultants have been hired to monitor

implementation of BPR and change management in key public dealing departments.

ICT Solution Adopted

Online Application

The web-based e-Mitra portal (www.emitra.gov.in) is hosted at SDC, Yojana Bhawan, Jaipur. All the G2C services at the kiosks are delivered through this portal. All the participating departments and service counters hook on to this portal for their day-to-day transactions. Other e-Mitra webpages are include mis.emitra.gov.in and reports.emitra.gov.in.

The application is based on Java platform using J2EE technology with hibernate and Linux Operating System platform. The server farm comprises of hardware for directory service, anti-virus software, DNS and DHCP service, backup service and server for enterprise management suite. Apart from the core infrastructure components listed above, hardware for database service, mid-tier application and front-end application is also deployed. Figure 5 illustrates the application infrastructure for e-governance application.

Features of the Application

- A dynamic application generating the content real time.
- User can create new services on the fly without any external interference through the modules given in the application
- Dynamic service creation
- User management of all stake holders
- Integration with online payment gateway through net banking and credit card (ICICI and Axis Bank)
- Integration mechanism (with different mobile phones) for SMS alerts to citizens and government officials regarding status of applications
- 24 × 7 helpdesk available, support on email
- Operational manual developed in Hindi for providing support to portal users. It is also available online at <http://doitc.rajasthan.gov.in/e-mitra.asp>
- Generates departmental and transactional reports
- Maintains credit limit of kiosk owners and LSPs/SCAs on a pre-paid basis
- Complete digitised workflow for the delivery of digitally signed certificates

The e-governance applications have a three-tier architecture—RDBMS software is used at back-end, in-house application or commercial application are at mid-tier, and web servers are at the front-end. Application at all levels of the architecture is in a highly available mode. All the servers' part of IT infrastructure are organised into different zones as per Figure 5 and the technical specifications given below.

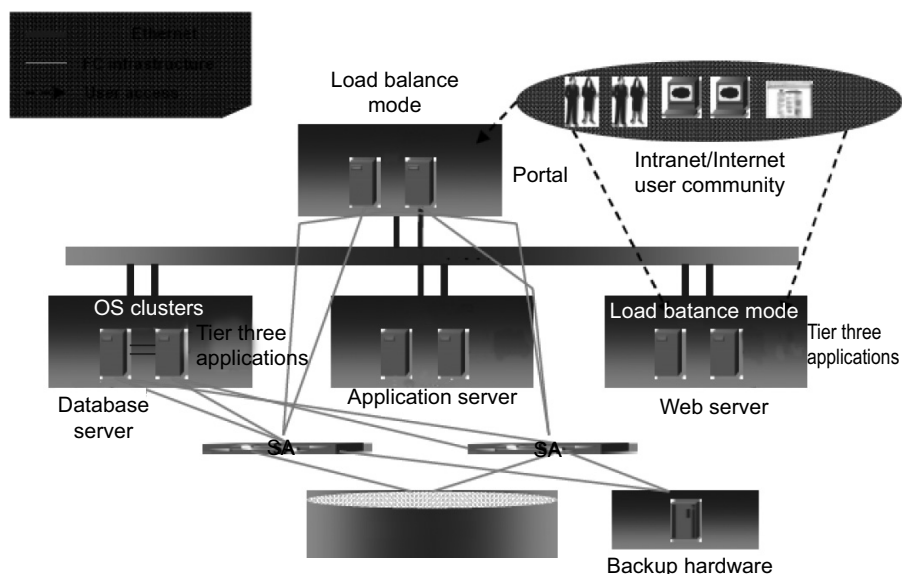


Figure 5 Application infrastructure for e-governance application

Technical Specifications

The e-Mitra web server <http://emitra.gov.in> is hosted in Rajasthan SDC in a cluster environment (active-passive mode). The detailed specifications of the hardware of the web server is given in Table 5:

Table 5 Specifications of the hardware of the application

Server name	e-Mitra	HDD	200*4
IP address	10.68.7.17	RAM	128 GB
Cluster IP (if any)	10.68.7.28 & 10.68.7.128	OS	RHEL 6.1
FMS	RSDC	Application installed	Jboss 5.1
Manufacturer	HP	Supplier	Vayamtech
Model No.	Proliant DL 580 G7	Project	RSDC
CPU Type	Intel Xeon E7-4807 1.86Ghz	Shared	Dedicated
No. CPUs	4*hexacore	Website/Application	e-Mitra application

Robust Technology to Handle Large Volume of Transactions

The National e-Governance Programme (NeGP), approved by the Government of India, aims to significantly transform and improve the way the government provides services to its citizens.

SDC is envisioned as the ‘shared, reliable and secure infrastructure service centre for hosting and managing the e-governance applications of

the state and its constituent departments'. SDC has been provided with a robust infrastructure to enable the government to deliver the services quickly and effectively to its stake holders. The existing state data centre, connected to the State Wide Area Network (SWAN), provides access to e-governance applications and services to government employees through intranet and to the citizens through public internet/e-Mitra /CSCs etc. The SDC facilitates consolidation of services, applications and infrastructure. It provides many functionalities and some of the key functionalities are central data repository, secure data storage, online delivery of services, citizen information/services portal, state intranet portal, disaster recovery, remote management and service integration.

SDC provides better operations and management control and minimises overall cost of data management, IT management, deployment and other costs. It acts as a mediator and convergence point between open unsecured public domain and sensitive government environment. It enables various state departments to host their services/applications on a common infrastructure which leads to ease of integration and efficient management, and ensures that computing resources and the support connectivity infrastructure (SWAN) is adequately and optimally used.

SDC have a high availability, centralised authenticating system to authenticate users to access their respective systems depending on the authentication matrix.

The application and servers are robust and support a high degree of concurrency. In the month of July 2012, more than 20 lakhs transactions were made on the online portal across all 33 districts.

Disaster Recovery and Service Continuity

Real time backup facility available at Jaipur, SDC and DRP with National Informatics Centre (NIC), GoI is under process.

VALUE INDICATORS

1. Digital Inclusion

- All the services are made available to the citizens *online* using the e-Mitra portal (www.emitra.gov.in) and through the kiosk network even in the far-flung areas of the State of Rajasthan, thus making it convenient for the citizens, reducing the number of trips to the various government departments and the transportation cost attached.
- The application software has a user friendly interface. The labels and the data entry on the form are *bilingual* (Unicode based), wherever required, i.e., in Hindi as well as in English. The digitally signed certificates are issued both in English as well as in Hindi.

- The kiosk owners are trained in public dealing and customer-orientation aspects, particularly while dealings with citizens—giving special consideration to the old, infirm, handicapped and women. Such training is a mandate given to the kiosk roll-out partners by the state government.
- The state government has also issued guidelines to choose only women as kiosk owners in order to promote women entrepreneurs. However, in case, no eligible woman entrepreneur is available, the district collector/ chairman of the District e-Governance Society may allow the selection of male entrepreneurs.
- The online portal is integrated with the web portal of line departments whose services are being provided through this online e-Mitra portal. Therefore, the citizen is able to access all information and fill up the forms online.
- The e-Mitra portal is also integrated with the payment gateway of various banks like ICICI, Axis Bank etc. to provide online payment services to the citizens thus making it convenient for them to make any kind of payment online like deposition of exam fees, etc.

2. Green e-Governance

Issuance of digitally signed certificates is another step towards 'green initiative', in order to cut timelines and promote paperless offices with features like:

- SMS gateway integration for providing application status updates to citizens eliminating the process of filling in various applications to track the application status
- Online report viewing facility available from the e-Mitra portal
- Copy of certificate that is already issued is available online so as to avoid reprinting

To enable the recovery and/or reuse of useful material from e-waste (waste electrical and electronic material), the state government has outlaid policies like e-Waste (Management and Handling) Rules 2010, Condemnation of IT Equipment and Disposal, thereby reducing the hazardous wastes destined for disposal and ensuring environmentally sound management/ disposal of e-waste.

Sanjay Malhotra, IAS, Secretary and Commissioner, Department of Information Technology & Communication, Government of Rajasthan. e-mail: sanjay.malhotra@rajasthan.gov.in

R K Sharma, System Analyst (Joint Director), Department of Information Technology & Communication, Government of Rajasthan. e-mail: rksharma@rajasthan.gov.in

Online Social Security Pension System, Government of Rajasthan

Veebala Joshi and I D Variyani

PROJECT OVERVIEW

Online Social Security Pension System is an e-governance initiative of the Rajasthan government 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 also facilitates the printing of money orders and generation of electronic money orders. The software is being used in treasuries, sub-treasuries, offices of sanctioning authorities, for example, Sub-divisional Officers (SDO) and Block Development Officers (BDO) and verification authorities, for example, Tehsildars. It covers various social security pension schemes of the Government of Rajasthan.

Goals and Objectives

The State Government of Rajasthan is committed to placing a high premium on providing social assistance to the 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, the state government has taken up this online system. It is an e-governance initiative for effective and timely disbursement of social security pension.

The requirement was initiated as a result of the e-governance initiative for effective and timely disbursement of pension. The project was entrusted to National Informatics Centre (NIC) by the finance department and Director, Treasuries and Accounts (DTA) was the nodal agency for executing it.

The objectives of the project were:

- Better access for citizens to information for transparency and public accountability
- Social security pensioners portal
- Efficient processing of pension sanction and disbursement
- Effective planning and monitoring
- Robust MIS as a tool for a better decision support system

- Hassle-free and timely pension payments
- Interface with banks and post offices for pension payments and reconciliation.

Since the project required an *online* social security pension system be developed and implemented and in view of the above objectives, it was decided to develop an integrated software for social security pension with the further objectives of:

- Preparing computerised money order for disbursement of pension payments
- Preparing a system for application receivers
- Facilitating verification and sanctioning of pension
- Delivering data in softcopy for electronic money order to post offices
- Delivering data to banks for crediting the banks accounts of pensioners
- Generating different monthly and annual reports
- Facilitating tracking of pension application status by the pensioner
- Facilitating monitoring of schemes by decision makers

RESULT INDICATORS

1. Key Performance

ICT Based Services

- Sanctioning (SDO, BDO) and verification (Tehsildar) authorities
- Treasuries and sub-treasuries
- Departments
- Pensioners
- Post offices and banks

Sanctioning and Verification Authorities

The project is a G2C (government to citizen) initiative aimed at timely and proper service to beneficiaries, besides maintaining accurate accounting.

- It covers offices of the Sub-divisional Officers and Block Development Officers as they are the application receivers and sanctioning authorities.
- It covers Tehsil offices as Tehsildars are verification authorities.
- The system facilitates the application receiver to capture all the basic data of pensioners who approach the receiver to get their pension.
- It facilitates sanctioning authorities to sanction and issue sanction orders to pensioners.
- It facilitates verification authorities to capture details of verifications.
- The system facilitates maintaining of a master data of pensioners, scheme-wise so as that it can be further analysed when required.

Treasuries and sub-treasuries

The online social security pension system would not have been useful, if the

treasuries and sub-treasuries had not effectively used it for disbursement of pension to beneficiaries. Since the system was implemented, all the treasuries and sub-treasuries accept only computerised sanction orders.

- The sanction orders are forwarded online to treasuries and sub-treasuries for further processing of pension payments.
- The treasuries and sub-treasuries prepare money orders using this system and send them to post offices for disbursement of pension payments.
- Treasuries generate a money order and bank account list, and send the lists to the post office and banks respectively with the help of this system.
- Treasuries generate various reports, for example, payment registers, money order returned register etc.
- The system facilitates feeding data in case of returned money orders.
- It facilitates generating electronic money orders.

Departments

The online social security system facilitates departments, for example, the finance department and social justice and empowerment department (SJED) in their MIS functions.

- The finance department uses the data generated by the system for further processing in different schemes.
- The system facilitates generation of various MIS reports used by the finance department and the SJED.

Pensioners

The social security pension system is a G2C initiative aimed at providing timely payments and sanctioning of pension to pensioners.

- The system helps pensioners track their application status.
- It facilitates timely disbursement of pension.
- It facilitates generation of money orders.
- It facilitates quick transfer of pension payments into the banks accounts of beneficiaries.

Post Offices and Banks

The social security pension system also facilitates post offices and banks because the system generates softcopy of data for electronic money order and bank list for banks. This facilitates banks for credit of pension information into beneficiaries' account.

Implementation Coverage

Over 13.50 lakhs pensioners covering around 250 sanctioning authorities' offices of the 34 treasuries and 211 sub-treasuries of Rajasthan are covered under this project. The system is running in treasuries and sub-treasuries, SDO and BDO offices of the Rajasthan.

Project Timelines and Milestones

Initiation: The finance department entrusted the project of developing a web-based application for social security pension to NIC in 2011. The scope of the application included application receiving, sanctioning of pension, verification of pension and disbursement of pension to beneficiaries along with the MIS module. The NIC immediately took up a feasibility and system study and the application was implemented in October 2011. The Hon'ble Chief Minister of Rajasthan inaugurated the application on October 19, 2011.

Acceptance Test: An acceptance test was conducted on the software developed by NIC. After carrying out the required modifications, the software was implemented at six locations as a pilot for a month. It was then rolled out for implementation in other treasuries and sub-treasuries.

Improvements: After roll out, some practical field problems were rectified and improvements was carried out. This included new requirements from the user and changes in existing modules. The application has now been stabilised and is being used at all locations.

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency Improvements

Availing Services

The project aims at providing all social security pension related services faster and more accurately to beneficiaries as well as the government department. The cost-to-benefit ratio of this project cannot be measured merely in terms of money incurred, spent, saved or earned, but in terms of improved efficiency leading to improved performance for pension processing and lowered cost of delivery of services for the government.

There was no cost involved in availing the services for the beneficiaries. The software was developed by NIC on cost plus basis. However availing the services saved significant time for the beneficiaries as well as the government.

Delivering Services

The cost of delivering services in the earlier system included the manpower cost involved in repetitive non-value added services and in writing money orders in thousands. In the current system, it was deliberately planned to keep technology simple, and use the internal resources and manpower to the maximum possible extent so that acceptance is high and risk due to change is minimal. This has been the biggest area of success in this project. The processing time has come down significantly as only minimum changes are required to process and print the money orders. Also, availability of the application status and other reports on the net made access easy and faster without the beneficiaries moving anywhere. Electronic data exchange with

banks and post offices, instead of bulky money orders, also saves cost of printing the money orders. Besides, printing of money orders save lots of time when compared to writing with hands.

Replication

The project is so simple and flexible that it can be replicated in any other state without involving much cost. Other states are not required to incur any expenditure on the part of software development. However, some customisation may be required depending upon the working of other states.

Implementation Model

The project is fully owned by the government. The Directorate of Treasuries and Accounts with the technical support of NIC implemented the project. The software was developed by NIC after a rigorous system study.

Level of Integration

The project is not directly interfaced with external ICT systems. However, it does provide data to external ICT systems, for example the post offices' so that the same may be uploaded into their systems to generate electronic money orders.

Sharing of Common Infrastructure

The common infrastructure being shared under the project are described below.

- NICNET services created by NIC are being used for net connectivity under the IFMS (Integrated Financial Management System) project.
- Departmental servers are hosted at NIC data centre. No additional data centre has been created.
- Technological services of NIC district centre are being used to provide the technical support and training services. No additional infrastructure for support services has been created by the department.
- The department is making use of state training institutes to provide training to users.
- Video conferencing studios created by the states are being used by the department for review and training programmes.

Major Outcomes and Achievements

The major outcomes and achievements of the project are:

- The software is being used by around 500 locations covering 13.50 lakhs beneficiaries.

- It has helped to identify duplicity of pension cases.
- Consolidated database of pensioners is available with the department.
- It is one of the widely used systems in the state.
- It has created an IT culture in the state as offices are spread over the state.
- Money order writing is a repetitive job as it is prepared on a monthly basis. Therefore, considerable manpower efforts are saved using this software, and staff can spend more time on other creative activities in the offices.
- Electronic money order would save paper and would make the department more green friendly.
- Business process re-engineering has been taken up by streamlining manual practices.
- Online status enquiries of pension cases would reduce physical movement by pensioners.
- There is faster payment processing and disposal of pension cases as data are available on line.
- It has helped decision makers as database is available online in various formats.

Key Lessons Learnt

- It was assumed that the project would have positive social impact so it will be implemented with minimal efforts but this theory did not apply. The lesson learnt from the project was that no project should be taken in a light way in the course of implementation. Developing a project is not as difficult as implementing it among masses.
- Use of the right technology in the right place with appropriate administrative decisions benefits the masses.
- Strong top level commitment and support is the key to success.
- Proper training and availability of documents to the user is a major issue in the success of the project.

ENABLER INDICATORS

1. Process reengineering

To implement the social security pension system in a sustainable manner, various government orders were issued and reforms carried out.

- Treasuries and sub-treasuries were asked to entertain only computerised sanction orders.
- Format of the pension application was changed and the receipt format was modified to cope with the use of technology.
- The team of the Directorate of Treasuries and Accounts, the Department of Social Justice and Empowerment and NIC finalised the format for various reports.

- A unified coding pattern was adopted. Uniform codes for states, districts, blocks, gram panchayats and villages were used in the software.
- Pattern for allotment of sanctioning orders were changed and made uniform.
- Electronic data exchange with post offices were finalised and electronic money order were emphasised.

2. Capacity Building

Project Teams

Director, Treasuries and Accounts (Project Implementation Coordinator w.r.t. administration) → State Informatics Officer (NIC), Project Manager → Scientist 'D' (Project Coordinator for Design, Development and Implementation (Technical)) → DIOs of NIC, SDO, BDO, Tehsildar, Treasury Officers and Sub-treasury Officers for Implementation.

Leadership and Support

At the Policy Level

Principal Secretary (Finance) → Director, Treasuries and Accounts (DTA) (Project Implementation Coordinator w.r.t. administration) → State Informatics Officer (NIC) (Project Manager)

On Requirements Basis

Director, Treasuries and Accounts (DTA) (Project Implementation Coordinator w.r.t. administration) → State Informatics Officer (NIC) (Project Manager)

Fulltime

Joint Director, Treasuries & Accounts (DTA) (Project Implementation Coordinator w.r.t. administration) → Scientist 'D' (NIC) (Project Coordinator for Design, Development and Implementation (Technical)) → DIOs of NIC and Treasury Officers.

Change Management Strategy

If any change is required in the software, the user department requests NIC for making the changes. The 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. 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 organised in case of major changes.

The project is running successfully since October 2011 and that speaks for the excellent top-level support for the project.

Capacity Building Plans

Various training programmes and workshops were organised to train and sensitise the workforce. Initially, four persons from each treasury consisting of one person from the treasury, one from the sub-treasury, one from the SDO office and one from the BDO office, i.e., 136 personnel were imparted training and declared as master trainers to impart further training at their respective locations to the rest of the users. Video conferencing sessions were also held to impart training to users. Refresher training sessions were organised for the master trainers to make them aware of the changes carried out time to time in the application. Training sessions were also organised at district locations.

Project Monitoring

Project monitoring is a major step for the success and sustainability of the project. The social security pension system is consistently being monitored with the help of treasury officers. Different information is sought from treasury officers regarding the use of software to monitor the project. This information in various formats is very helpful to assess the project. Regular workshops and meetings are also organised to make them abreast with the latest versions of the software.

Financial Model

At the Sanctioning Authority Level

No extra manpower was sanctioned. The existing manpower was trained to use the software. Hence the software did not put any burden on the offices.

At the Treasury Level

No additional manpower was provided, however technical manpower, provided on contract basis under the IFMS project, were used to impart the training. Existing hardware available at the sanctioning authority and verification authority offices were used to operate the application. No additional hardware were procured for these offices.

Additional hardware were already made available to treasuries—they were used for this application.

Efforts at Sustainability

To ensure sustainability of the project, the following procedures were adopted:

- Online sanctioning of the pension was made mandatory at the sanctioning authority level and treasuries were directed to entertain only online sanctions.
- Proper trainings were organised.
- Proper technical support was provided to treasuries, SDO and BDO offices.
- Refresher training programmes are being organised time to time.
- Video conferencing sessions are being held with the users.
- Review meetings for assessing progress are also being held.

Service Users' Feedback Mechanism

SDO, BDO and the department can directly give their feedback to the Director, Treasuries and Accounts (DTA), as well as treasury offices and anyone concerned can send their feedback through e-mail. Regular meetings are held at the DTA office to discuss issues related to feedback and changes of requirements. User feedback is also taken during the workshops whenever organised. A Help Desk facility was also established at the Directorate to directly interact with users.

Implementation Challenges

As the users at implementation locations, i.e., SDO, BDO offices, were not very acquainted with information technology, it required a lot of effort to implement the software. The main challenges were:

- To impart training of the software. As the users were located in a geographically wide spread area, imparting training was a big challenge.
- Users were not very acquainted with the computer system. It required a lot of effort to make them ready to use computers.
- Use of uniform code was also a big challenge.
- Changes in the existing proformas.
- Development of a uniform software for a large number of users was also a major challenge.

3. Technology

ICT Solution Adopted

The social security pension system is a web-based solution and has been developed using .Net with C# as front-end and SQL Server 2008 as back-end. Sanctioning authorities use this software for sanction processing of pension cases, verification authorities use it for verification of applicants, treasuries and sub-treasuries use it for pension disbursement.

Disaster Recovery and Service Continuity

Presently, primary servers are hosted in the state NIC data centre. It is planned that secondary servers would be hosted on the NIC DR data centre.

VALUE INDICATORS

1. Digital Inclusion

Although the application has been developed in English, some of the reports required for beneficiaries, who are not conversant in English, are provided in Hindi.

2. Green e-Governance

Payment is mostly being disbursed through money orders. Money orders are being printed in lakhs and it consumes lots of paper and power. It has been suggested to use electronic money orders for sending the payments to beneficiaries. The same facility has already been tested at one of the locations, and it was rendered successfully. It would save consumption of paper and power. It has also been suggested to make the pension payments through bank account. This would also save paper and power, as it would not require printing of money orders. The bank account option is also being used at some of the locations.

In this way, green governance is being implemented through this project.

Veerbala Joshi, Director, Treasuries & Accounts, Rajasthan, email: dir-ta-ra@nic.in
I D Variyani, Scientist 'D', National Informatics Centre, Jaipur, email: id.variyani@nic.in

Indian National Data Centre for Long Range Identification and Tracking, Government of India

S K Shukla and K H Mehta

PROJECT OVERVIEW

Introduction

Following the aftermath of the September 11, 2001 attacks, the United States Coast Guard (USCG) proposed a system for tracking ships entering the coast of a country from 2000 nautical miles (NM), at the International Maritime Organization (IMO) during the Maritime Safety Committee (MSC) 2002 meeting in London. The IMO worked through its MSC to introduce a system for tracking merchant ships. The long range identification and tracking (LRIT) of ships was established as an international system on May 19, 2006 by IMO as resolution MSC.202(81). This resolution amends chapter V of the International Convention for the Safety of Life at Sea (SOLAS), Regulation 19-1 and binds all contracting governments who are members of IMO. The scope of the project also included search and rescue operations. It was planned by IMO to operationalise the LRIT by January 1, 2009.

Although COTS (commercial off-the-shelf) solutions were available, DGS decided in 2007 to develop an indigenous solution with the objectives to develop national capacity for ICT utilisation in coastal surveillance and self reliance. DGS also extended the scope to provide value added services to the Navy, Coast Guard, port authorities and shipping companies. It was also decided to extend the LRIT service to other countries for strategic benefits.

DGS collaborated with ISRO in early 2008 for achieving this goal. Space Applications Centre (SAC), a centre of ISRO, took the responsibility for high level design, critical analysis and issue resolutions, and for ensuring thorough testing for LRIT standard compliance. Antrix, the commercial wing of ISRO coordinated to seek support from IT industries, CMC and Tata Communication for implementation.

Goals and Objectives

Any ship belonging to a flag country should proactively transmit its identification and position information to a coastal country as soon as it enters into LRIT boundary (1000 NM) of the country's coastal line. The details should be provided at intervals of six hours till the ship leaves the

LRIT boundary. The coastal country is empowered to demand tracking information at higher rates (maximum 15 minutes) from the flag country. Each ship should have defined destination port addresses before departure. Port countries, where a ship is likely to touch, have the right to track the ship any time during its voyage. A flag ship should provide this information on demand.

Search and rescue (SAR) operations were also considered as an integral part of the scope of LRIT. A country having SAR responsibility has the right to demand current and past positions of all the ships from all the countries within a specified area (square or circular) of the ship in distress.

Indian Objective

1. To develop an Indian national data centre (NDC) to identify and track Indian ships sailing across the world and disseminate identification and positional information to entitled countries
2. To collect information about foreign ships entering Indian boundaries and provide information through a rich GUI to stake holders (Navy, Coast Guard etc.) based on entitlement
3. To preserve data
4. To extend NDC to regional data centre (RDC) for providing services to neighbouring countries.

Benefits

The Navy and Coast Guard can easily track foreign ship movement around the Indian coastal boundary for identifying foe ships. They can also provide search and rescue aid to distressed ships quickly. They can solve hit and run cases. Ship owners can authentically track their own ship's movement. This solution also helps in handling pirate domain as well as in protecting marine environment.

Plan and Achievements

1. It was planned to make all IMO countries ready for LRIT compliance by January 1, 2009. India was one of the first countries to declare readiness for IMO testing in November 2008. However, the IMO test bench was not ready and hence the testing was delayed.
2. IMO testing was initiated in March 2009 and successfully completed in 10 days.
3. Immediately after the testing, the production environment of the Indian NDC was made ready and offered for testing. Production environment testing was initiated in May 2009 and the Indian national data centre for LRIT obtained International Maritime Satellite Organization (IMSO) certification in July 2009.
4. IMO/IMSO's first audit was completed in July 2010.
5. A rich GUI for Indian stake holders (Figure 1) was planned in October 2009. Iterative and incremental versions were released in June 2009, October 2009 and March 2011. The final version was delayed due to



Figure 1 GUI of the Indian LRIT

change in requirements—new requirements emerged from stake holders as well as IMO amendments from time to time.

6. RDC was planned in March 2011 and released in January 2012.

RESULT INDICATORS

1. Key Performance

ICT Based Services

International G2G

1. NDC provides data to all countries that are integrated into the LRIT production environment. Out of the 201 countries who are allotted the LRIT identity, 109 countries are integrated into the LRIT production environment.
2. Data is also provided to two virtual zones created for security forces: (i) European Union Naval Force Somalia and (ii) North Atlantic Treaty Organization.
3. Data will be provided to collaborating countries as an RDC service.
4. Indian LRIT NDC has also helped development testing of the data centres (DCs) of Chile, Azerbaijan and Iran for their integration into the production environment.

National G2G

1. The main stake holders, which include the DGS, Navy, Coast Guard and port authorities, have been given access to the LRIT login page via the web. These users are assigned various view, workflow and role rights depending on the restrictions by the main controlling body which is the DGS.
2. The DGS, Navy and Coast Guard have full map viewing rights.
3. LRIT information is provided to different government organisations for various purposes:
 - i. Map viewing rights is given to Satish Dhawan Space Centre, Sriharikota (SDSC– SHAR, the Sriharikota Launch Centre) when they prepare for launch of any vehicle to determine qualitative assessment of shipping density along their launch vehicle's trajectory.
 - ii. LRIT position data was compared with ship detection by space borne SAR ship location data extracted from EnviSAT-ASAR-WSM images for postulating an algorithm by SAC.

G2B

The LRIT project also provides G2B services as a spinoff. NDC provides the 179 Indian shipping companies (owners and managers) restricted access to LRIT monitoring through the web so that they can continuously monitor (only) their own vessels and report any shortcomings to the DGS. Further, the shipping companies can update the data required by the DGS about their vessels, company, CSO and ACSO details for maintaining information accuracy of the vessels registered in the LRIT database.

Services that were Enhanced

1. Enhancement of the LRIT software is a continuous process. New change requests (CRs) are incorporated through change management lifecycle. As further domain awareness and requirements are envisaged, the LRIT software is continuously upgraded.
2. MSC meetings where LRIT is part of the agenda are held yearly with representatives from contracting governments and service providers; multifarious problems and further improvements on multiple aspects involved in software compatibility with the International Data Exchange and Data Distribution Plans are discussed. Modifications in software with guidelines provided by MSC are time bound and have to be implemented.
3. NDC LRIT software has been modified so that it provides services to other foreign countries (neighbouring countries) or functions as a regional data centre.
4. CERT-IN Audit was carried out for software/web security.
5. The IMSO audit which is to be carried out yearly, was last carried out in August 2012.

Implementation Coverage

1. IMO Development Testing and Certificate was awarded in December 2008
2. IMO Production Testing and Certificate was awarded in March 2009
3. Indian NDC assisted in the developmental testing of Azerbaijan NDC in January 2010
4. Indian NDC assisted in the developmental testing of Chilean NDC for providing services to Mexico in March 2010
5. IMSO audit was carried out in June 2010
6. Went live off Version-2 LRIT web application in September 2010
7. Modification and Testing of MSC 88 as per IMO directives in February 2011
8. Went live off Version-3 LRIT web application in March 2011
9. DR site shifting from CMC Ahmedabad and installed at DNCO (Naval Headquarters), New Delhi in June 2011
10. Indian NDC assisted in the developmental testing of Iranian NDC in August 2011
11. IMSO Audit was carried out in August 2011
12. LRIT NDC software upgraded to work as RDC in April 2012
13. Deployment of software enhancement change requests with its related changes in ASP and web applications on April 26, 2012
14. IMSO audit was carried out in August 2012

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency Improvements

1. *Patrolling by Navy and Coast Guard*

Before the implementation of LRIT, the Navy and the Coast Guard had to do extensive patrolling for location of suspect/rogue vessels. Now, as LRIT is available, these vessels can be tracked remotely, saving effort/costs/manpower and time.

2. *SAR Support by Coast Guard*

When a vessel in distress initiates a SAR through the Global Maritime Distress and Safety System (GMDSS) via the MRCCs, with the availability of the LRIT SAR SURPIC (surface picture) view on the GUI, there is a better appreciation of the SAR scenario. This greatly helps in guiding SAR resources like air units, surface vessels, and diversion of only the closest merchant vessels to assist the casualty. These diversions are costly as fuel is the prime criterion. Furthermore, if the distressed ship is leaking any environmental hazardous item, then faster support reduces the environment damage very significantly.

3. Ship Tracking by Shipping Companies

Shipping companies used to track their own vessels by commercial options at a huge cost. This was an ad hoc process—Sat-C terminals could be switched off by ship owners to prevent tracking by charterers or other interests. LRIT has brought streamlining to the monitoring process by a compulsory regulation that vessels above 300 GRT (gross register tonnage) should be tracked, their tracking on-board equipments be compliant and always switched on. The tracking of vessels for shipping companies is provided without any charges by DGS through LRIT.

4. Automated Ship Registration

Manual registration was carried out and tracking was done at a very high cost. With LRIT, vessel registration is carried out automatically and tracking with very limited cost. Earlier, Indian vessels to other countries were tracked using the daily messages transmitted by the vessels. Now, this can be achieved by LRIT automatically. Vessels passing through Indian waters and bound for Indian ports can also be tracked the same way by LRIT.

5. Tracking of Foreign Vessels

With LRIT, tracking of foreign vessels (Figure 2) is achieved for a maximum limit of 1000 NM from the country's coastline. Besides the country's own flag vessels, foreign flag vessels can also be viewed within this 1000 NM area. The 1000 NM tracking area (standing orders) are opened for stakeholders, mainly the Navy and the Coast Guard, as per the necessity, which is threat perception, Naval exercises, hit and run cases, in adverse weather during the monsoon season and specific ships against whom intelligence reports are received.

6. Enhanced Monitoring as per Requirements

Additional smaller polygon areas (Figure 3) of inland waters, territorial sea and custom coastal areas from the Indian coast are also incorporated for enhanced monitoring by different stake holders for their specific requirements.

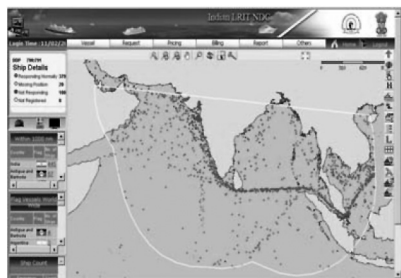


Figure 2 Indian and foreign ships within 1000 NM

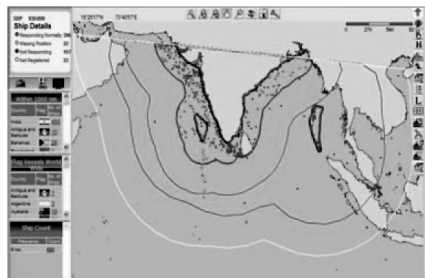


Figure 3 Different polygons

Innovative Ideas Implemented

1. LRIT enables stake holders to get required information very quickly and provides a variety of views as well as reports which can help them in analysing the information which leads to a proper dissemination of data and decision making. The GIS LRIT graphical user interface (GUI) is very rich in viewing, retrieving data for analysis and delivering information.
2. Easy icon based access and hyper linking of sub-menus makes this process more user friendly.
3. Every time new deployment happens at any of the application servers, there is a shell script executed to replicate the same at DR site.
4. NDC software was developed using a component base reusable adaptive architecture which enabled India to convert NDC to RDC very quickly for extending LRIT services to neighbouring countries and get a strategic advantage. The RDC software is made in such a way that incorporating any country for service provisioning is simplified and very easy.

Level of Integration

LRIT data string is to be integrated with the National Automatic Identification System (NAIS) which is a shore based system operating in the VHF frequency band for greater domain awareness. Under the Maritime Domain Awareness (MDA) which is a national security initiative, the LRIT data will be integrated with the Static Radar Chain (SRC) and also the NAIS.

ENABLER INDICATORS

1. Process reengineering

ICT and Non-ICT Front-end Changes

- i. When an LRIT SAR SURPIC is initiated, processes have been adopted where the NDC shares the LRIT information with the DGS, Navy and Coast Guard to get a full appreciation of the SAR scenario. The operator simply has to initiate a SAR SURPIC by selecting the area of the vessel in distress. The surrounding merchant vessel positions are provided by countries that are part of LRIT, making it totally authentic and eliminating dependency on positions sent by the master of the vessel. In the old process, when SAR was initiated, it was a very cumbersome, cost- and time-consuming process in which maritime and airborne assets had to be deployed to pinpoint and guide the SAR units. LRIT supersedes the old manual process with a completely automated e-process. The position of vessels is provided without any involvement of the vessels' personnel.
- ii. For ship registration, the data process is fully automatic once the ship-borne LRIT equipment is configured. The ship database is maintained

and updated very efficiently. The Indian shipping companies are given role based rights to register their own vessels and upgrade vessel data. The old process was manual registration.

- iii. Naval patrolling and tracking of suspect vessels used to be time-consuming and expensive; deployment was a strain on the available assets and resources. Tracking was restricted to 100 to 200 NM from the coast and it used to depend on the prevailing weather conditions. With LRIT, 1000 NM monitoring and tracking can be achieved irrespective of the weather conditions and without the deployment of patrolling units.
- iv. Further augmentation of the naval tracking resources like long range radar information is also achieved by LRIT. Recognition of friend or foe is also highly enhanced due to integration of LRIT data with radar information.

2. Capacity Building

Leadership Support

1. Solution providers like EMSA, POLSTAR, FULCRUM, CLS etc act as agents to contracting governments and have countries under their umbrella. However, DGS after consultation with the Ministry of Shipping took a decision to develop an indigenous solution for Indian NDC with the aim of building capacity and expertise for IT utilisation in coastal surveillance. DGS took the help of SAC, ISRO and Antrix for implementation. CMC helped in realisation.
2. Although India started indigenisation late in December 2007, it was one of the first countries to declare readiness on November 2008 for IMO testing.

Change Management Strategy

1. Well-defined change management plan is worked out and followed. The Change Management Board consists of experts from NIC, CDAC, SAC, Navy, Coast Guard and DGS. The Board deals with the requirements raised by national stake holders. So far, three versions have been released.
2. International requirements are handled by the LRIT *ad hoc* Committee. Experts from SAC and DGS represent India in the committee at IMO London. So far 10 *ad hoc* Committee meetings were held at IMO and six versions released.

Capacity Building Plan

1. The NDC's software has been upgraded to provide services to other countries and also act as a regional data centre (RDC). Negotiations are in progress to provide LRIT services to neighbouring and other countries like Sri Lanka, Maldives and Georgia.

2. LRIT software is being integrated to provide LRIT data to the National Automatic Identification System (NAIS) and a direct feed to Navy and Coast Guard in string format to enable them to incorporate the system in Maritime Domain Awareness (MDA).

Project Management

1. The Indian LRIT NDC is continuously manned 24×7 by experienced marine radio officers under the supervision of master mariners, senior radio surveyors, and the principal LRIT coordinator who is the Deputy Nautical Advisor to the Government of India.
2. The DR site is also manned by naval personnel 24×7 .
3. M/s CMC limited have been given the annual maintenance contract for the software and hardware.
4. An onsite system engineer for hardware is stationed at the NDC for continuous monitoring during business hours and on call during off business hours.
5. Handholding by SAC with a MOU has been processed.
6. Other annual maintenance contracts for accessories related with the LRIT NDC functioning are in place.
7. IMSO conducts yearly audits of all contracting government's data centres to ensure compliance of all rules, regulations and norms.

Financial Model

1. The LRIT project costs were initially borne by the Directorate General of Light Ships and Light Houses (DGLL), Government of India.
2. A budget head has been created for DGS Mumbai to cover the LRIT NDC costs.

Efforts at Sustainability

1. IMSO audits are carried out yearly and any non-conformity observed is promptly rectified. A completion report is made for their analysis.
2. CERTIN audit was carried out and the recommendations implemented.

3. Technology

ICT Solution Adopted

1. LRIT architecture (Figure 4) comprises of ship-borne equipment, INMARSAT-C satellite, communication service provider (CSP), application service provider (ASP), national data centre (NDC), disaster recovery site (DR site), international data exchange (IDE) and data distribution plan server (DDP).
2. IDE and DDP are common for all and developed by US and IMO jointly. Ship owners have ship-borne equipments which are tested by DGS with

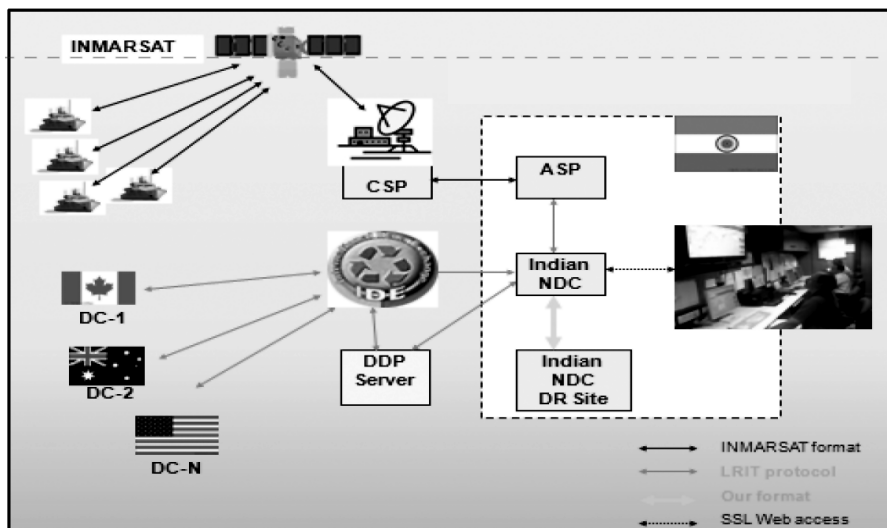


Figure 4 LRIT architecture

the help of Tata Communication for LRIT compliance. CSP service was obtained from Tata Communication. ASP, NDC/RDC and DR site were developed indigenously.

3. Each ship is registered with NDC during which ASP configures ship-borne equipment for default periodic position information transmission at the rate of six hours.
4. CSP receives the data transmitted by ships through INMARSAT. It sends the same to ASP through e-mail. ASP converts it into the LRIT compliant format and submits the data to NDC. NDC archives the data and processes it against the standing order received from DDP. DDP maintains complete information about entitlements, boundaries, standing orders etc for all countries. Updated DDP information are received by NDC every hour/day. During the process, NDC will disseminate the position information to the entitled countries.
5. NDC also processes special requests received from different countries for each receipt of position information from ships. There are different types of special requests like tracking based on time interval, distance interval etc.
6. Countries can send requests for tracking any ship at a higher rate than default. NDC will send the request to ASP if the country is entitled. ASP in turn configures the ship-borne equipment for the desired rate. NDC will also intimate ASP to revert back to default in case of expiry of request.
7. NDC receives data of foreign ships entering into Indian boundaries as per standing order defined by India or special request from India. The received data is archived and displayed on a rich GIS based GUI to the

national stake holders depending on their entitlement. GUI also enables the stake holders to submit special requests.

8. Search and rescue is a very special type of request which is mandatory for all countries to support irrespective of entitlement. SAR request comprises of a circular or rectangular area within which a distressed ship is found. NDC will check whether any ship is currently in the area. If found, NDC will transmit the last four positions of the ship to the requesting country.
9. The above steps are explained in very simple way but have high complexity in terms of satellite communication, heterogeneous types of ship-borne equipments, multiple permutations and combinations of requests as well as standing orders etc.
10. NDC, ASP and DR site comprises fault tolerant, secured and reliable infrastructure comprising servers, network, security application and indigenously developed software.
11. The NDC in Mumbai and the DR site in New Delhi are always in synchronisation.
12. Presently, the LRIT software is tracking 650 Indian vessels and when the standing orders are opened for the maximum limit of 1000 NM, the full density of the vessels tracked increases to approximately 2700 vessels. The software is developed to handle 5000 vessels.
13. NDC hardware architecture is shown in Figure 5.
14. Hardware is from MNC, the operating system is Red hat Linux, MySQL is used for database storage. UMN map engine is used for GIS, software is developed using Java, eclipse and AXIS. Rational Unified Process

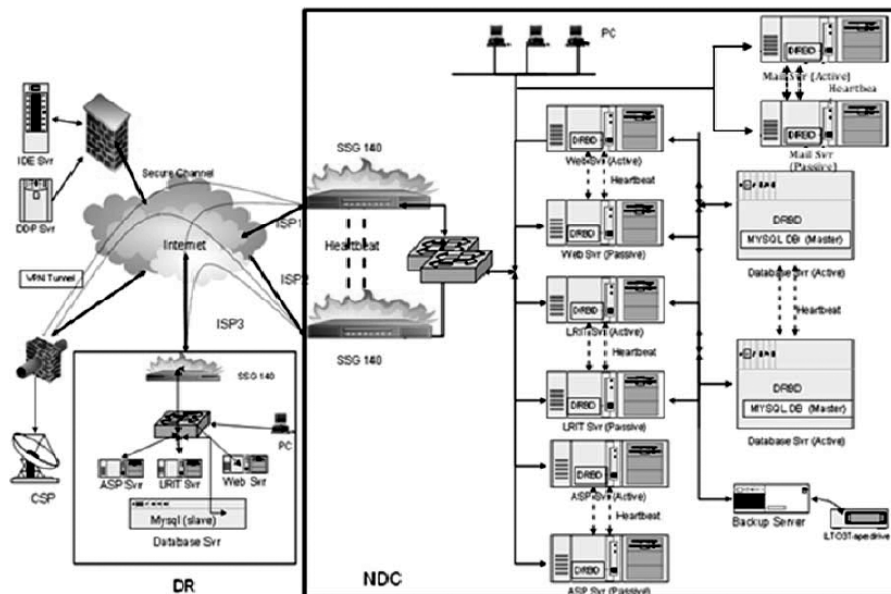


Figure 5 NDC architecture

was customised for software development lifecycle. Layer and BEC (boundary, entity, controller) pattern were used in software architecture for components and sub-system. An iterative and incremental model proved to be the right choice as there were frequent changes in the requirement specifications.

15. M/s CMC Ltd. and Tata Communications are awarded the integrated AMC for three years.
16. SAC will continue to provide technical expertise.
17. Following documents are available for reference from LRIT NDC:
 - i. Software analysis and architecture for ASP and DC
 - ii. Functional test plan (FTP) for ASP and DC
 - iii. Software requirement specifications (SRS) for ASP and DC
 - iv. Software design document for ASP and DC.
 - v. User manual
 - vi. Software installation guide
 - vii. Acceptance test summary
18. International specifications of LRIT
 - i. Technical specifications for IDE and DC
 - ii. Technical specifications in LRIT system
 - iii. Technical costing and billing standards
 - iv. Protocols for development testing and integration of LRIT DC
 - v. Guidance for setting up and maintaining of DDP
 - vi. MSC documents

Security and Confidentiality Standards

Physical Security

The LRIT NDC being the main repository of all Indian merchant vessels who are LRIT compliant (greater than 300 GRT), the physical access to the department is restricted by bio-metric entry and the same is applicable to the server room.

Perimeter Security

- a. Redundant firewalls are available to ensure required data integration with installed UTM (unified threat management) devices.
- b. Standard security guidelines are ensured for perimeter security.

Communication Security

- a. DR site is connected to the NDC via a virtual private network (VPN) connection.
- b. IDE and NDC communicate using TLS and PKI.
- c. Secured web access using SSL by Indian stack holders.

Data Security

- a. IMO have issued guidelines on LRIT integrity which have to be implemented by all contracting governments so that the confidentiality of the data shared is maintained at all times. This is strictly implemented.

- b. Standard security guidelines are implemented for server configuration, databases, internal communication, etc.
- c. There are well-defined access rights to different countries defined by IMO and the data distribution plan which are ensured.
- d. Access control rights are well-defined and implemented for national stake holders like Navy, Coast Guard, DG Shipping and shipping companies.

Security Audit

- a. IMO/IMSO carries out yearly audits which includes data confidentiality, availability, integrity, etc which are strictly complied.
- b. CMC experts carry out security audit before and after operationalisation.
- c. The process is defined for carrying out security audit through Indian CERT certified company. Recently, audit of the LRIT software was carried out by AAA Technologies Pvt. Ltd. whose recommendations have been implemented for further securing and enhancing the confidentiality standards of the LRIT software.

Disaster Recovery and Service Continuity

- 1. The Indian LRIT NDC has a full physical backup disaster recovery (DR) site at the Directorate of Net Centric Operations (DNCO), New Delhi. Though LRIT NDC is highly available, redundant and stable, at the time of any catastrophic situation when the main site is down, the DR site can be made available as a working LRIT NDC.
- 2. The DR site is synchronised so that it can be made operational when there is a failure of NDC. There is no need for automatic activation of DR site as NDC uptime criteria is 95% per day and 99% per month in a year. Processes are well defined to ensure faster activation of the DR site.
- 3. Besides the disaster recovery site, the NDC at DGS Mumbai has full redundancy with high available hot backup servers.
- 4. Indian NDC uses two ISP links for primary and backup connections with automatic fail safe mechanism.
- 5. The NDC and the DR site has UPS backup and secondary input power source from diesel generators.

VALUE INDICATORS

Green e-Governance

- 1. If a distressed ship is leaking any environmental hazardous item, then faster support reduces the environment damage very significantly. The LRIT SAR SURPIC view on the GUI leads to a better appreciation of the SAR scenario. This greatly helps in guiding SAR resources like air units

and surface vessels, and diversion of only the closest merchant vessels to assist the casualty.

2. Earlier, when a rogue or a suspect vessel has to be tracked, Naval and Coast Guard resources like air and surface units had to be deployed. But with LRIT available, the vessel can be tracked by these authorities saving fuel and resources.
3. The DGS has been audited by the Petroleum Conservation and Research Association (PCRA) and the LRIT department follows the guidelines and additional DGS initiatives for conservation of energy.
4. All LRIT documented data is electronically stored/filed on hard discs and external backup drives reducing paper printing and wastage.
5. The LRIT department has been installed with motion sensors so that power to unoccupied cabins is automatically switched off.
6. Placards have been placed in DGS as well in the department for environmental conservation.

Captain S K Shukla, Deputy Nautical Advisor to the Government of India, (Principal LRIT Coordinator), Nautical Branch, Directorate General of Shipping, Mumbai, e-mail: shukla@dgshipping.com

K H Mehta, Senior Radio Surveyor, Nautical Branch, Directorate General of Shipping, Mumbai, e-mail: mehta@dgshipping.com

Section VI

e-Governance Success Stories—G2C Initiatives

Mee Seva: A Citizen-Friendly G2C Delivery System, Government of Andhra Pradesh

Sanjay Jaju

PROJECT OVERVIEW

The Government of Andhra Pradesh (GoAP) has always been at the forefront of leveraging IT for development and governance. As part of that, GoAP initiated e-Seva project in 2001 to provide bill payment services for various government departments and private organisations, which served as a single-window solution for the citizens of the urban parts of the state. Subsequently, common service centres (CSCs) were established to extend similar benefits to the rural citizens of the state as part of the National e-Governance Project (NeGP) of the Government of India. However, while e-Seva succeeded in reducing the drudgery of bill payments at multiple counters, and became a nodal centre for applications of a variety of services like land records, passport etc., it was still serving as just a ‘post office’—accepting applications, sending them by post to the concerned office, receiving the required papers back and then handing them over to the citizen.

The power of IT was grossly under-utilised. Land records, registration records and other government records were lying in paper form in various offices and retrieval was a time-consuming, tedious process. These records are required for various purposes like claiming reservations, loans from banks, scholarships and other social benefits. In some cases, even if the records were digitised, there were chances of tampering of the records. Citizens had to run to the same office several times to get this information, were falling prey to touts and there was no stipulated timeframe of delivery, nor any system of monitoring their request.

In the admission season, there were students’ queues outside MRO offices, asking for income, residence and caste certificates. Due to heavy demand and short time, all these officers had to work overtime. The large demand and lack of transparency and monitoring in the processing of requests led to increase of corruption, presenting the government in a bad light. Kiosks for different types of agents, like RTO agents, passport agents, registration agents etc. had mushroomed, and it was very difficult to get the work done without the help of these touts. Public patience was getting exhausted and nation-wide mass movements against corruption had started. Hence

delivering G2C services in a faster, easier and transparent way was a major challenge before the administrators.

To achieve a faster, easier and transparent way of delivering services, a centralised system called Mee Seva, which means, 'at your service' was developed. Simply stated, Mee Seva is a system, by which documents and certificates, pertaining to individuals, are issued by the government through a common kiosk. The specialty is that most of these documents are issued across the counter to the citizen. So there is no waiting time, no multiple visits to the offices, no pleading, no frustration—it is a genuine silent revolution. Mee Seva adopted the concept of central pooling of all these records, digitally signing them with the digital signature certificates of the authorised officer, storing them in the database and rendering them using a web service. All the documents rendered were digitally signed and electronically verifiable. Mee Seva leveraged to the fullest extent, the IT infrastructure like the state data centre (SDC), the State Wide Area Network (SWAN) and common service centres (CSCs) created under the NeGP initiative of the Government of India.

RESULT INDICATORS

1. Key Performance

ICT Based Services

The Government of Andhra Pradesh has laid out a clear vision to create a knowledge society by using information technology in all aspects of development and governance. Pioneering efforts are being made to provide the benefits of information technology to the citizens—urban and rural, rich and poor, literate and illiterate—and this has created Mee Seva. In order to institutionalise these efforts, the Government of AP issued the Andhra Pradesh Information Technology (Electronic Service Delivery) Rules 2011. These rules make it mandatory for every head of the department to notify the G2C services that are to be delivered through electronic mode.

As stated earlier, Mee Seva is an end-to-end mechanism for delivery of G2C services. The department is targeting 0.1 million transactions per day, or 30 million transactions per annum in the year 2013. In this year itself, it is expected to reach 10 million transactions with the existing services. This will cover the entire ambit of major G2C services. At present, 34 G2C services are being rendered through Mee Seva and another 47 are under development. The services are categorised into two categories (Table 1)—Category A services are those services which are rendered across the counter with an SLA of 15 minutes, while Category B services involve workflow/field-level inspections etc. at the departmental level and are rendered as per citizen charter.

Table 1 *Category wise Mee Seva services*

Department	Category A	Category B	Total
Revenue department	7	18	25
Registration department	1	1	2
GHMC services	2	5	7
Total	10	24	34

Monitoring the project is done through customised daily SMS service. The details received in the SMS dated September 20, 2012 are as given below.

Mee Seva Status:

Total requests: 4539254

Category A: 1515602

Category B: 3023652, Total approved: 2656253, Total rejected: 159580,

Pending within SLA: 189897, Pending beyond SLA: 17921

The services offered under each category is listed in Table 2.

Table 2 *Category A and Category B Services*

Category	Department	Name of the service
A	Revenue	Extract of <i>Adangal</i> / <i>Pahani</i>
A		Copy of FMB
A		ISES-income certificate
A		ISES-residence certificate
A		ISES-integrated certificate
A	Registration	Certified copy of registration document
A	GHMC	Birth certificate
A		Death certificate
B		Extract of ROR 1B
B	Revenue	Income certificate
B		Residence certificate
B		Integrated certificate (caste–nativity–date of birth)
B		F-line petitions
B		Sub-divisions of lands
B		Mutation of entries in revenue records
B		No earning member certificate
B		Family member certificate (social security schemes and government employees / pensioners)
B		OBC certificate
B		EBC certificate
B		Agricultural income certificate
B		Copy of village map
B		Money lending licence
B		National family benefit scheme application
B		No objection certificate

Continues

Table 2 *Continued*

Category	Department	Name of the service
B		No objection certificate
B		<i>Apathbandhu</i> application
B		Pawn broker license
B		School registration
B		Allopathic medical care hospital registration
B	Registration	Issue of encumbrance certificate
B	GHMC	Birth certificate corrections
B		Death certificate corrections
B		Child name inclusion
B		Non-availability certificate: birth
B		Non-availability certificate: death

Additional services are also identified through the SSDG (state service delivery gateway) project (Table 3).

Table 3 *Services identified through SSDG project*

S l. No.	Department	Service
1	Registration	Pre-registration /Slot booking
2		Society registrations
3		Certified copy of bye-laws
4		Amendment of society
5		Submission of appeals
6		Certified copy of certificate of registration (birth)
7		Certified copy of certificate of registration (death)
8		Firms registrations
9		Firm name change
10	Municipality	Dissolution of firm/constitutional changes
11		Permission for water connections
12		Transfer of title deeds
13		Applying for trade license
14		Renewal of trade license
15		Applying for building permission
16		New assessment request
17		Sub-division request
18		Exemption request
19	Employment	Vacation remission
20		Registration with employment exchange
21		Application for adding additional qualifications
22		Renewal of the registration

Continues

Table 3 *Continued*

S1. Department No.	Service
23 Education	Application for issue of age certificate
24	Application for duplicate memo of marks
25	Application for re-counting of marks
26	Application for migration certificate
27 Police	Missing / lost documents / bank cards / credit cards / mobile phones etc.
28	Permission of <i>Bandhobust</i>
29	Issuance of certificates for character, antecedents, no objection for vehicle
30	License for hostels, lodges, theme, entertainment, restaurants, bars, <i>dhabas</i> and resorts
31 Election	Issue of voter certificate/id card
32	Application for inclusion of name in the electoral rolls
33	Application of change of details
34	Application of transposition
35	Application for deletion of name in the voters list
36 RTA	DL slot booking with fee payment
37	RC abstract
38	DL abstract
39 Labour	Registration of establishment / shop (Form I)
40	Renewal of establishment / shop (Form III)
41	Issuance of duplicate certificate for registered establishment / shop
42 Social welfare	Application for inter caste marriage incentive
43	Application for bright student scheme
44	Application for admission to hostels under various schemes
45	Application for post matric scholarship
46 Agriculture	Issuance of fertiliser licence (fresh/renewal)
47	Issuance of pesticide licence (fresh/renewal)
48	Issuance of seed licence (fresh/renewal)

Implementation Coverage

Mee Seva is operational over all the districts of Andhra Pradesh. With the centralised architecture, any service can be accessed from anywhere. A large number of Mee Seva delivery channels are situated in each and every district covering all *mandals* in the state (Andhra Pradesh). There are more than 100 centres in every district. It has been mandated that the service providers of the Mee Seva Centres establish the centres as per specific

norms (minimum infrastructure required in a centre and colour schemes) for common look and feel.

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency Improvements

Category A: Rs. 25 are the charges for the services under Category A. As described earlier, these are the services for which databases are available and the CSC operator accesses these databases, pulls the information, prints it and hands it over to the citizen within 15 minutes.

Category B: Rs. 35 are the charges for the services under Category B, which require workflow at the level of the issuing authority, including field enquiries etc. For printing of more than one page/copy, an amount of Rs. 2/- per page will be charged. Charge of application form is Rs. 2.

The impact can be quantified for some of the services, which are being targeted in the first phase as shown in Table 4.

Table 4 *Impact of Mee Seva on delivery of services*

Sl. No	Parameter	As is manual process	Mee Seva process
1.	Citizen satisfaction level for service	Poor	Very good
2	Time taken for delivery of services categorised under instant service	3–15 days	15 minutes across the counter
	Time taken for delivery of services involving departmental workflow	10– 60 days	As per the proposed citizen charter timelines
3	Service availability	Only at the issuing authority office	6000+ Mee Seva counters
4	Citizen time and money spent in availing service.	<i>Adangal:</i> Rs.300 to Rs.1000 (including multiple visits, brokerage etc.)	Rs.20/- within 15 minutes
		Certified copy of registration: Rs. 500 to Rs.1000	Rs.20/- within 15 minutes
		RoR 1B: Rs. 500 to Rs.1000	Rs.20/- within 15 minutes
		Birth certificate: Rs. Rs. 500 to Rs.1000	Rs.20/- within 15 minutes
5	Processing time of issuing authority: Services categorised under instant service	3 to 15 days	Nil

Continues

Table 3 *Continued*

Sl. No	Parameter	As is manual process	Mee Seva process
	Processing time of issuing authority: Services involving departmental workflow	10 to 60 days	As per citizen charter (3 to 45 days depending on the departmental verification and approval process)
6	Transparency in information	Nil or negligible	Citizens can verify the status of their data application/request on Mee Seva portal and at service delivery centre
7	Contribution to reduction of traffic congestion and pollution	As the citizen was travelling to different offices for different services, he/she contributes to traffic congestion and pollution	As travel to different offices is avoided, he/she contributes to reduction in traffic congestion and pollution, and saving in man-hours.
8	Procedure in availing service	Highly insulated, higher documentation and sometimes needs advice of third party	Simple: Very minimum information is required from citizen to avail service

The service-wise SLA adherence is given in Table 5.

Innovative Ideas Implemented

The entire concept of Mee Seva is unique and first-of-its kind in the country. It is the first time that the entire solution, right from the collection of applications, till the issue of final certificates is electronic. At each stage, the request can be tracked and monitored—be it tahsil, revenue division or district level. There is no interaction, whatsoever between the user and the issuing authority; hence there is no chance of corruption and other malpractices. As of now, the department has not started the first-in, first-out concept as it may delay the issuance. However in the future, in order to make the system more robust, it may be done. The unique features of Mee Seva are listed below.

Creation of New and Purifying Existing Databases

Databases, containing the information were purified and ported to the central departmental database server co-located at the state data centre.

It was expected that during the month of June–August, there would be a huge demand from students for certificates for social benefits such as

Table 5 Service-wise SLA requests from: 04/11/2011 to 20/09/2012

Sl. No.	Name of the service	Grand total of category A and category B	Total transactions in category A	Total transactions in category B	Approved within SLA	Approved beyond SLA	Rejected	Pending within SLA	Pending beyond SLA
1	Agriculture income certificate	1493	0	1493	734	131	596	0	32
2	Allopathic private medical care registration	30	0	30	25	0	0	4	1
3	Apathbandhu scheme	9	0	9	0	1	1	6	1
4	Birth correction certificate	1592	0	1592	474	150	964	0	4
5	Birth certificate	16747	7723	9024	6491	2398	96	0	39
6	Certified copy of registration document	9908	9890	18	9	0	6	0	3
7	Child name inclusion	16006	0	16006	13473	1606	886	0	41
8	Corrections in <i>adanga/pahani</i>	0	0	0	0	0	0	0	0
9	Current <i>adanga</i>	1320477	1282218	38259	12242	6912	18440	0	665
10	Death certificate	2795	1631	1164	768	384	9	0	3
11	Death correction certificate	42	0	42	15	7	20	0	0
12	Duplicate copy of certificate: income	159	159	0	0	0	0	0	0
13	Duplicate copy of certificate : integrated	104	104	0	0	0	0	0	0
14	Duplicate copy of certificate : residence	114	114	0	0	0	0	0	0
15	EBC certificate	47150	0	47150	31029	7696	8337	0	88
16	Encumbrance certificate	79152	0	79152	35308	39336	3880	0	628
17	F-line petitions	17616	0	17616	8221	5010	2719	1398	268
18	FMB copy	16310	16007	303	106	140	5	0	52
19	Family member certificate	12220	0	12220	5656	1871	4127	0	566
20	Income certificate	1462340	0	1462340	1210819	198904	51992	0	625
21	Integrated certificate	778005	0	778005	682605	25477	50609	17388	1926
22	ISES services: income certificate	88662	87462	1200	208	494	448	0	50
23	ISES services: integrated certificate	71169	70028	1141	154	520	395	0	72

Continues

Table 5 Continued

Sl. No.	Name of the service	Grand total of category A and category B	Total transactions in category A	Total no of transactions in category B	Approved within SLA	Approved beyond SLA	Rejected	Pending within SLA	Pending beyond SLA
24	ISES services:-residence certificate	20943	20613	330	23	171	95	0	41
25	Money lending	16	0	16	0	2	0	0	14
26	Mutation	23814	0	23814	5013	5703	7072	5390	636
27	NFBS application	223	0	223	36	16	31	85	55
28	No earning certificate	468	0	468	188	64	196	0	20
29	No objection certificate	267	0	267	1	20	0	0	246
30	Non-availability birth	531	0	531	26	12	487	0	6
31	Non-availability death	21	0	21	0	0	21	0	0
32	OBC certificate	58541	0	58541	46358	5344	6332	0	507
33	Pawn broker	11	0	11	0	0	0	0	11
34	Residence certificate	426418	0	426418	368020	41763	16432	0	203
35	ROR - 1B	63587	19675	43912	31690	5694	6309	0	219
36	School registration	44	0	44	1	0	0	0	43
37	Sub-division <i>patta</i>	1679	0	1679	372	273	209	578	247
38	Village map copy	550	0	550	98	78	0	0	374
Total		4539213	1515624	3023589	2460163	350177	180714	24849	7686

income, residence and caste certificates. This data was initially collected at school/college level for Class X and above students, and then verified and digitally signed by *tahsildars*. This signed data was kept in a new database, so as to deliver this service under Category A when the need arises.

State Electronic Certificate Repository (SECR)

All the certificates and documents issued by Mee Seva are being stored at a location called SECR. SECR is placed in the public domain for verification of the certificate (issued under Mee Seva) using the unique application number.

Digital Signing of Databases Including Bulk Signing

Using the newly developed web based application, the data ported to the central databases was signed digitally. For this purpose all the authorities, who are authorised to sign, were provided with Class 3 digital signature certificates and trained to use them. Bulk signing was adopted to increase the pace of signing manifold. This is tamper-proof and audit trail is maintained for all transactions.

Modification of Departmental Applications

The departmental applications were tweaked to render this data through a web service.

Development of Web Based Mee Seva Application

Web based application was developed to enable kiosks to render the services by accessing the departmental databases.

Single Sign-on

It was implemented so that the departmental user moves seamlessly between departmental and Mee Seva applications.

Usage of Secured Stationery

Secured stationery with 8 security features is being used to deliver the certificates, to make duplication difficult. Online verification, of course is possible by using the SECR.

Legal Framework

The Government of Andhra Pradesh has issued Andhra Pradesh Information Technology Rules (Electronic Service Delivery), 2011 in order to provide legal sanctity to the digitally signed certificates and make it mandatory for the departments to migrate to electronic service delivery within a period of three years. This has ensured that departments move to electronic delivery of services in a period of time.

Role of District e-Governance Society (DeGS)

DeGS have been made the nodal agencies for the implementation of Mee Seva. All the operational and technical issues in the district are being taken

up by the DeGS. The departmental user charges for the transactions being sent to them.

Future Modifications/Enhancements

In the next step, once public confidence is fully achieved, secured stationery will be removed, and these services will be rendered through the Mee Seva portal. PDFs of these documents will be delivered online, and may be printed by the user at his/her convenience. This will be followed by having a lightweight mobile version of this application, thereby bringing AP in line with the most advanced nations in terms of service delivery.

Level of Integration

Mee Seva is a true convergence of all the NeGP initiatives (Figure 1) in rendering G2C services in a transparent, fast and secure way. It has thus ended the 'tyranny of ink signatures'. Mee Seva has created a silent wave and with its sweep allowed many moribund processes and approaches to be revamped. Its effectiveness can be measured in the satisfied eyes of the citizen taking this hassle-free service, ensuring true democracy is ushered in and the emergence of a truly independent India. With Mee Seva in place it will also be possible to implement and monitor the Right to Services Act, which is in the offing.

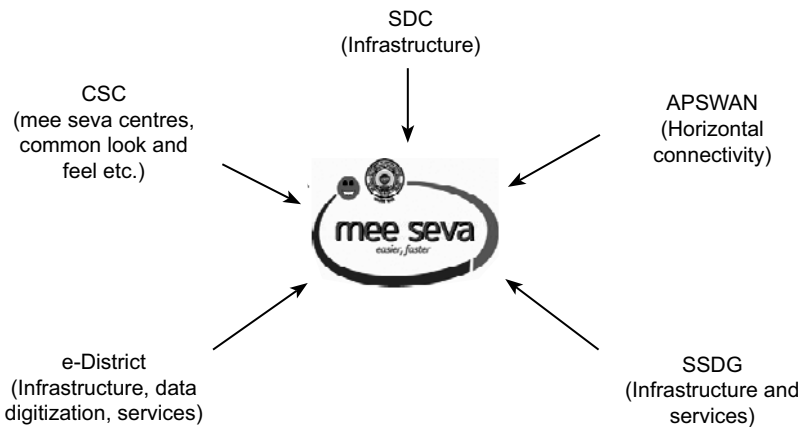


Figure 1 *Mee Seva at the heart of the NeGPs*

ENABLER INDICATORS

Delivery of services electronically has certain pre-requisites which are as follows

- Availability of databases in electronic form
- Back-end application to interact with the database and pull out information
- Front-end application to receive the citizen's request and communicate with departmental application
- Common service centres for citizens to approach and request for services
- Connectivity for connecting the delivery channels to the database and application.

In AP, all these pre-requisites were being satisfied to some extent, and the atmosphere was ripe for applying this concept. However the most important issues to be considered were whole-hearted stake holder participation and change management. Once this concept was formulated and discussed with the Chief Minister of Andhra Pradesh, the idea appealed to him and he became the main driving force in roping in all the departments for this initiative.

1. Process reengineering

The following strategy was adopted for implementing the Mee Seva Project

Categorisation of Services: Those services which are most desired by the citizens are categorised as high volume and high impact services. Since the first priority is to deliver these services across the counter, these services are categorised into Category A and Category B services. Category A services are to be delivered across the counter by accessing the departmental databases. Category B are services that shall not be delivered across the counter as they involve workflow to the department and approval of the concerned authorities, sometimes with physical verification.

Establishing Delivery Channels: Delivery channels like e-Seva centres, CSCs etc. are equipped to cater to these services. Wherever shortfall is noticed, new CSCs are established. More than 6000 Mee Seva counters are made available across the state, both in rural and urban, with a uniform look and feel. All these counters are established as per certain specifications and guidelines issued by the state.

Development of Web Based Mee Seva Application: Mee Seva is a web based application and offers the highest level of transparency in extending G2C services. The robust IT mechanism enables a tamper-proof way to service delivery mechanism.

Improving/Establishing Connectivity: Since many of the transactions require substantial flow of data, connectivity is provided or improved to all the government departments as well as the kiosk. The horizontal connectivity scheme of the GOI is used for this purpose.

Digitisation of Records: Records are digitised, wherever digital databases is not available.

Creation of New Databases for Social Services: New databases were created in a proactive mode. For example, it was expected that during the month of June–August, there would be a huge demand from students for certificates for social benefits such as income, residence and caste certificates. This data was thus initially collected and the signed data kept in a new database, so as to deliver this service under Category A when the need arises.

Centralising Databases: Databases, containing the information are purified and ported to the central departmental database server co-located at the state data centre.

Digital Signing of Databases Including Bulk Signing: Using the newly developed web based application, the data ported to the central databases is signed digitally. Bulk signing is also adopted to increase the pace of signing manifold.

State Electronic Certificate Repository (SECR): All the certificates and documents issued by Mee Seva are being stored at SECR.

Establishing Back-end Hardware: Back-end hardware is procured, wherever required to support centralised databases and high transaction applications.

Legal Framework: The Government of Andhra Pradesh has issued Andhra Pradesh Information Technology Rules (Electronic Service Delivery), 2011 in order to provide legal sanctity to the digitally signed certificates and make it mandatory for departments to migrate to electronic service delivery within a period of three years.

Delegation of Powers to Field Functionaries: In order to have better administrative control, the powers of Director, ESD is delegated to the Joint Collector, who is called Addl. Director, ESD.

Creation of District e-Governance Society: District e-Governance Societies are created and made the nodal agencies for the implementation of Mee Seva.

Secured Stationery: Secured stationery with eight security features is being used to deliver the certificates, to make duplication difficult. Online verification, of course is possible by using the SECR.

Call Centre for Receiving Feedback/Grievances/Complaints: 24 × 7 Call centre is active to get feedback from citizens.

Customised SMS: Customised SMS for different levels of administrative officers for their own level of jurisdiction are sent daily so that they know the transactions taking place in their jurisdiction, and what is the pendency within and beyond SLA.

Automatic Payment Gateway: The payment collected from the applicant at the kiosk will be distributed online automatically to the various stake holders in real time. This solves the problem of reconciliations, late payments, embezzlements and audit paras.

Reward/Penalty for Non-delivery: A system of awarding positive marks for good performance and vice versa is being evolved and this will be used during the ranking of individuals before administrative transfers.

2. Capacity Building

Capacity building is an integral and very crucial part of any project. Since many new IT application based work processes were involved at various levels, it was decided to have a comprehensive capacity building plan. Trainings were conducted for all the stake holders in basics of computing and operating applications. Training on soft skills were also made mandatory as there was a large citizen-interface and kiosk operators, being the visible face of Mee Seva had to put their most amicable self on while delivering services.

Change Management Strategy

Major challenges in this entire process can be classified as technological, logistical, legal and change management. Of all these, irrespective of the technology used, the biggest challenge is change management—most importantly weaning away officialdom from corruption. It is an old joke, satire, but fact of life, that in the marriage market, the official salary of the prospective groom was not as important as his ‘unofficial salary’ or ‘*Oopar ki aamdani*’. Bureaucrats, in general, do not like to discuss this topic, and the issue has been traditionally swept under the carpet. However, it has attained monumental proportions now. It is felt that when we try to improve the system by making it fast, responsive, transparent, the biggest challenge will be from the lobby, which has been feeding on this malaise till now.

Other challenges like technological, legal and logistical can be overcome with some diligence and systematic planning.

Capacity Building Plan

All the stake holders were duly identified and a capacity building plan was prepared for all of them so that there is no hitch in implementation. Regional level workshops were conducted, in which the Joint Collectors (Addl. Director, ESD) and their entire team participated for experience sharing and feedback. The trainings conducted so far are listed in Table 6.

Table 6 *Capacity building report on Mee Seva*

Sl. No.	Stake holders	Category	No. of officers envisaged	No. of officers trained	Status
A	Departments				
1	Revenue	Dy. Collectors (Mee Seva)	23	23	Complete
		RDOs	81	81	Complete
		Tahsildars	1108	1108	Complete
		District superintendent	23	23	Complete
		Revenue handholding persons	81	81	Complete
		Computer operators	1108	1108	Complete
2	Registration	District registrars	38	38	Complete
		Sub-registrars	432	432	Complete
3	GHMC		18	18	Complete
B	Kiosk level and SCAs				
4	Kiosk operators		4886	4000	Balance 886

Project Management

The entire project was divided into two components—service development and hardware procurement. Director e-Seva was made the nodal agency for overall project management and service development. Andhra Pradesh Technological Services became the nodal agency for hardware procurement. Both these officers were duly supported by the in-house experts in information technology and communications. A new project management unit (PMU) was created for duly focusing and managing this project.

Immediate problem resolution has helped a long way in building confidence and stabilising the application. The following problem resolution techniques have been adopted in Mee Seva.

- 1100: This is the call centre number. Customers can call this number and register their complaints or seek information.
- Discussion Forum with FAQ (<http://meeseva.gov.in/in/APSDCDeptPortal/UserInterface/DiscussionPage.aspx>):
This forum is open to the Mee Seva users, kiosk operators etc. In this discussion forum, all the frequently asked and recently asked questions are listed. New queries are also being asked and answered across this forum.
- Helpdesk (<http://meeseva.gov.in/APSDCDeptPortal/UserInterface/HelpDesk.html>): e-mails can be sent directly to this helpdesk mail id for suggestions, complaints and grievances. Kiosk owners can also seek technical support from this desk.

- PMU mail id (pmu.meeseva@gmail.com): This e-mail id has been available from the beginning of the project, and has been very useful from the beginning itself for inter-departmental communication and resolving SCA-CSC problems.
- Mee Seva Request Tracking System: This system has been introduced for automatic tracking of requests. It is a web based ticket and change request raising and tracking tool. The tool is designed and developed by M/s APOne Limited and is built using .NET framework. The tool provides the following advantages:
 - Accessible from anywhere across the web
 - Easy and user friendly
 - Supports and maintains role based requests and workflows
 - Single window to track and trace any requests/issues raised
 - Reduces the issue/request resolution time and increases overall productivity
 - Helps management for better assessment
 - Brings collaboration

The system was made to track who requested what and when they requested it, what was done to address the request, who handled the request and how much time it took them. Request Tracker is easy to use—one screen records all information about a single request. Extensive search capabilities allow one to use the programme's database to identify similar problems or requests that were handled in the past, making the solutions instantly available.

Financial Model

Mee Seva works on the public-private partnership (PPP) mode wherein Mee Seva Centres are maintained, operated and run by authorised agents (AAs) who are appointed and managed by authorised service providers (ASPs). These ASPs and AAs are government approved agents mandated with proper terms and conditions for delivering the service.

In order to maintain the self-sustainability of the project, user charges are being collected from applicants who are availing services under the Mee Seva project. User charges are fixed considering the sustainability for various stake holders involved in the project and the fact that citizens are not to be burdened while providing quality and timely services as committed. User charges are being shared among various stake holders, viz., 7.4% of the service charge is shared with respective departments (to maintain the databases, necessary infrastructure, capacity building), 16.3% shared with Director, Electronic Service Delivery (to maintain Mee Seva infrastructure/application maintenance), 8.6% shared with authorised service providers (capacity building, monitoring authorised agent performance, maintaining necessary infrastructure), 57.7% shared with CSC (to run the Mee Seva Centre and to provide quality services to the applicants). Since the

sustainability of CSC is crucial, maximum share is being given to him/her, besides supporting him/her with other bill-collection services.

The sharing pattern of user charges (in Rs.) is as shown in Table 7.

Table 7 *User charges for services provided in Mee Seva*

SI. No.	Cate- gory	Type of service	Kiosk	SCA	Infra	Depart- ment	Total user charges with service tax	Remarks
1	A	Certified copies delivered at kiosk	8	3.6	6.4	7	25	For printing of more than 1 page / copy an amount of Rs. 2/- per page will be charged.
2	B1	Application data entry + scanning the documents + certificate delivery manual/post	20	3	5	7	35	
3	B2	Application data entry + scanning the documents + pass book /certificate delivery manual / post	20	3	5	7	35	

Efforts at Sustainability

Besides transaction-based support, the state is also boosting the income of the kiosk operators by taking new initiatives, for example, introducing new services and attaching high-volume, easy gain services like bill collections etc. with Mee Seva.

3. Technology

ICT Solution Adopted

The entire solution is hosted in a state-of-the-art state data centre with a robust infrastructure (Figure 2). As the developed system is a web based one and deployed at a central location, it is easily accessible by all the stake holders, anytime anywhere.

The n-tier web based solution, i.e., web based application was developed on Microsoft .NET (Framework 4.0) technology using ASPNET for application development with MS SQL server 2008 R2 as the database platform, along with PKI engine and payment processing systems. The current system can be scaled up horizontally or vertically based on future needs and requirements of the government as well as departments.

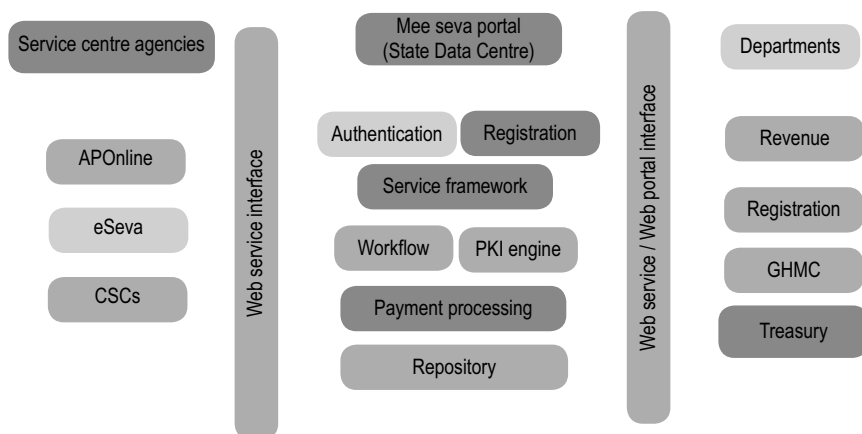


Figure 2 *Mee Seva functional architecture*

At the kiosk or SCAs end, citizens request for services (Figure 3). These requests are routed through the web services to the respective departments.

For the services offered by any department, the department user has to log into Mee Seva with secured user id, password and digital certificate wherein he/she can see all the requests submitted by the citizens at various kiosks like APOne/eSeva/CSC.

The department user processes all the requests by conducting field verification and updates the status and remarks accordingly on the Mee Seva portal.

This application for implementation of all these programmes reduces a lot of manual efforts in consolidating the data and makes decision making fast and easy.

Security and Confidentiality Standards

The entire ownership of the data vests with the department itself. All the data is located in a co-located departmental server in a highly secured environment at SDC, where all the security policies are under implementation. Additional hardware has been provided to some departments from the Department of Information Technology and Communications on a need basis. NMS is in place and firewalls are functional.

At the application level, Mee Seva application has been security-audited initially by a CERTIN certified agency and by STQC and the deficiencies rectified.

Class 3 digital signatures have been issued to all departmental officers and kiosk operators for accessing Mee Seva portal for delivery of services.

All the certificates issued are being stored at the SECR for future online verification through the portal. SECR also serves as a repository, where certificates issued under Category B (involving departmental workflow and field level verification) are stored and can be re-issued second time across the counter (Category A).

The Mee Seva portal is integrated with PKI components such as Form Signer and Form Signer Pi for authenticating the respective individual for accessing the portal as well as for processing the requests through digital signatures. Mee Seva portal uses standard web technologies and techniques such as secure sockets layer (SSL), HTTP redirects, cookies, JavaScript, and strong symmetric key encryption to deliver the single sign-in service. The sign-in, sign-out, and registration pages are centrally hosted in the Mee Seva portal.

- All critical servers accessible via internet must be protected by a router or firewall approved by the Information Technology and Communications Department.
- All internet commerce servers including payment servers, database servers, and web servers must be protected by firewalls in a demilitarised zone.
- All connection between APSDC internal networks and the internet must only be through an approved firewall and related access controls.
- Intrusion detection systems should be installed at the firewall to monitor external hacking attempts and to monitor changes within the firewall itself.
- All systems within APSDC must have static IPs.

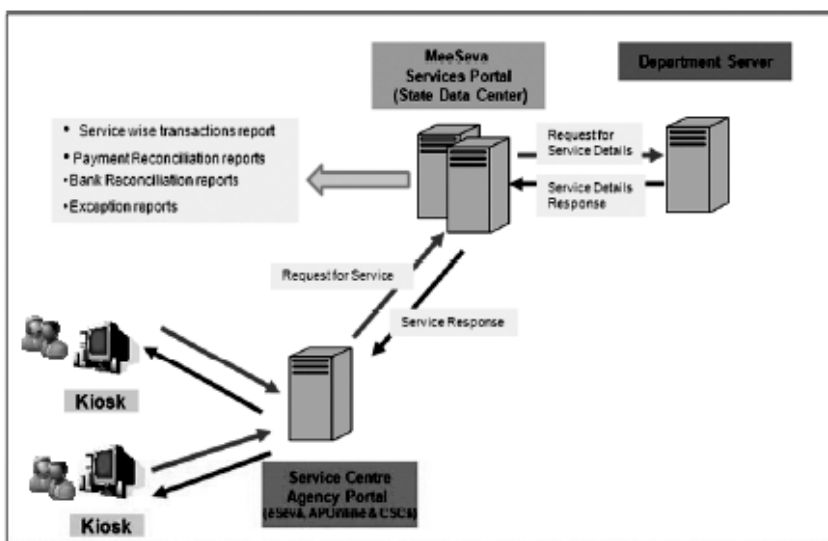


Figure 3 Mee seva service delivery

- All suspicious network activities have to be monitored and blocked.
- Bandwidth utilisation reports should be generated and logged.
- The gateway has to be integrated with the anti-virus wall.

Disaster Recovery and Service Continuity

The DR for AP state data centre is at NIC-NDC, Delhi. DR for Mee Seva will also be along with the DR of APSDC. Twelve servers will be required for DR site along with Windows OS and MS SQL licence. In addition, 100 TB of SAN storage is required with replication capability with the existing EMC SAN storage at APSDC. Connectivity will be provided through NIC. The approximate cost for this setup will be Rs. 1.8 crores.

Initially it is planned to test host based DR at NIC-Data Centre, Hyderabad, and then after proper testing, it will be implemented at NIC-NDC, Delhi.

VALUE INDICATORS

1. Digital Inclusion

Mee Seva is an all-inclusive programme, and has vastly benefited all sections of the society, and especially the poorer section, who rely heavily on welfare schemes for their well-being. On analysis it can be seen that approximately 35% of the services pertain to integrated certificates pertaining to income, residence, DOB and nativity. This has made it very easy for students, who are applying for college admissions under different reservation quotas, to timely submit their applications.

Mee Seva has also leveraged creation of a centralised land records database, its purification, digital signing and a web based application that allows functionaries to take up necessary updation, etc. The unique feature of this application and database is that it is in Telugu and has been developed through Unicode fonts provided by C DAC.

2. Green e-Governance

The government of AP is fully committed to its environmental responsibilities. IT has been used to enable paperless transaction to the extent possible. Besides this, due to the changed process, multiple visits of the citizen to the government offices are avoided resulting in huge saving of time for the citizen as well as savings in fuel/transportation charges. This has indirectly caused the reduction of extra GHG (green house gases) that would have been released, had the citizen travelled multiple times to avail the service. Besides this, other green practices like using TCO compliant LCD monitors, LED lighting and glow-sign boards are being implemented this year.

APPENDIX

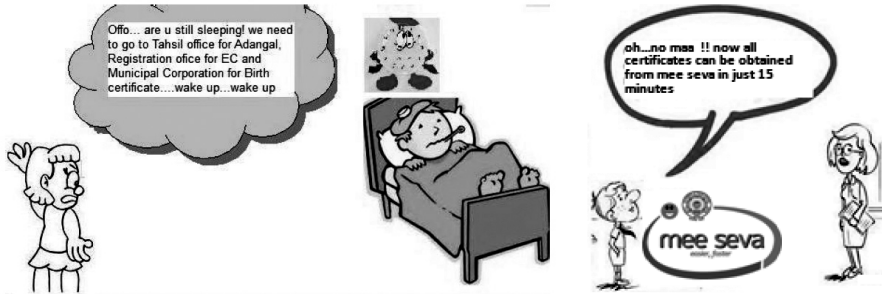


Figure A1 Advertisement showing the benefits of Mee Seva

 SERVICES OFFERED అందించు సేవలు 					
S. No. క్ర.సం.	Service సేవ	Service Level సేవ అందించే స్థాయి	Service Charges (₹) సేవ చార్జీలు (రూపాయ)	Statutory Charges (₹) చట్టబద్ధ చార్జీలు (రూపాయ)	Total (₹) మొత్తం (రూపాయ)
18	Money Lending License పని మొదటి రోజు	Fresh - 45 days Renewal - 30 days రోజు - 45 రోజులు మొదటి - 30 రోజులు	35/-	Fresh - 1000/- Renewal - 750/- రోజు - 1000/- మొదటి - 750/-	Fresh - 1035/- Renewal - 785/- రోజు - 1035/- మొదటి - 785/-
19	Allopathic Medical Care Registration అలోపతి వైద్యశాల రిజిస్ట్రేషన్	90 Days 90 రోజులు	35/-	As stipulated చట్టబద్ధ చార్జీలు	35/- + Statutory charges 35/- + చట్టబద్ధ చార్జీలు
20	Ayurvedic Scheme ఆయుర్వేద చట్టం	10 Days 10 రోజులు	35/-	0/-	35/- + Statutory charges 35/- + చట్టబద్ధ చార్జీలు
21	NRE Application ఎన్.ఆర్.ఎ. అప్లికేషన్	1 Week 1 వారం	35/-	0/-	35/- + Statutory charges 35/- + చట్టబద్ధ చార్జీలు
22	No Objection Certificate (Land) అనుమతి లేకుండా భూమిని విక్రయించే హక్కు (సర్టిఫికేట్) - భూమి	30 Days 30 రోజులు	35/-	2,000/-	2035/-
23	Pawn Broker License కాపుల వ్యాపారం అనుమతి	Fresh - 45 days Renewal - 30 days రోజు - 45 రోజులు మొదటి - 30 రోజులు	35/-	Fresh - 1000/- Renewal - 750/- రోజు - 1000/- మొదటి - 750/-	Fresh - 1035/- Renewal - 785/- రోజు - 1035/- మొదటి - 785/-
24	School Registration స్కూల్ రిజిస్ట్రేషన్	1 Week 7 రోజులు	35/-	As stipulated చట్టబద్ధ చార్జీలు	35/- + Statutory charges 35/- + చట్టబద్ధ చార్జీలు
25	Birth Certificate - GHMC జన్మ ధృవీకరణ పత్రం - జి.హెచ్.ఎం.సి.	15 Mins. (Category A) 15 నిమిషాలు (A-కేటగిరీ)	25/- per transaction + 5/- per additional copy ఒక్కసారి 25/- + ప్రతి అదనపు కాపీ 5/-	20/- per copy of certificate ప్రతి కాపీ 20/-	25/- + 25/- per additional copy 25/- + ప్రతి అదనపు కాపీ 25/-
26	Death Certificate - GHMC మరణ ధృవీకరణ పత్రం - జి.హెచ్.ఎం.సి.	15 Mins. (Category A) 15 నిమిషాలు (A-కేటగిరీ)	25/- per transaction + 5/- per additional copy ఒక్కసారి 25/- + ప్రతి అదనపు కాపీ 5/-	20/- per copy of certificate ప్రతి కాపీ 20/-	25/- + 25/- per additional copy 25/- + ప్రతి అదనపు కాపీ 25/-
27	Birth Certificate Corrections - GHMC జన్మ ధృవీకరణ పత్రం సవరణ - జి.హెచ్.ఎం.సి.	6 Working Days 6 పనిరోజులు	35/- per transaction + 5/- per additional copy ఒక్కసారి 35/- + ప్రతి అదనపు కాపీ 5/-	60/- + 20/- per copy of certificate 60/- + ప్రతి అదనపు కాపీ 20/-	95/- + 25/- per additional copy 95/- + ప్రతి అదనపు కాపీ 25/-
28	Death Certificate Corrections - GHMC మరణ ధృవీకరణ పత్రం సవరణ - జి.హెచ్.ఎం.సి.	6 Working Days 6 పనిరోజులు	35/- per transaction + 5/- per additional copy ఒక్కసారి 35/- + ప్రతి అదనపు కాపీ 5/-	60/- + 20/- per copy of certificate 60/- + ప్రతి అదనపు కాపీ 20/-	95/- + 25/- per additional copy 95/- + ప్రతి అదనపు కాపీ 25/-
29	Child Name Inclusion - GHMC బిచ్చి పేరు చేర్పడటం - జి.హెచ్.ఎం.సి.	6 Working Days 6 పనిరోజులు	35/- per transaction + 5/- per additional copy ఒక్కసారి 35/- + ప్రతి అదనపు కాపీ 5/-	20/- per copy of certificate (within one year) ప్రతి కాపీ 20/- (ఒకే ఏడాదిలోపు) 10/- + 20/- per copy of certificate (after one year) 10/- + ప్రతి కాపీ 20/- (ఒకే ఏడాది తర్వాత)	35/- + 25/- per additional copy (within one year) 35/- + ప్రతి అదనపు కాపీ 25/- (ఒకే ఏడాదిలోపు) 45/- + 25/- per additional copy (after one year) 45/- + ప్రతి అదనపు కాపీ 25/- (ఒకే ఏడాది తర్వాత)
30	Non Availability Certificate - Birth - GHMC జన్మ ధృవీకరణ లేదని తెలియజేయు పత్రం - జి.హెచ్.ఎం.సి.	3 Working Days 3 పనిరోజులు	35/- per transaction + 5/- per additional copy ఒక్కసారి 35/- + ప్రతి అదనపు కాపీ 5/-	20/- per copy of certificate ప్రతి కాపీ 20/-	35/- + 25/- per additional copy 35/- + ప్రతి అదనపు కాపీ 25/-
31	Non Availability Certificate - Death - GHMC మరణ ధృవీకరణ లేదని తెలియజేయు పత్రం - జి.హెచ్.ఎం.సి.	3 Working Days 3 పనిరోజులు	35/- per transaction + 5/- per additional copy ఒక్కసారి 35/- + ప్రతి అదనపు కాపీ 5/-	20/- per copy of certificate ప్రతి కాపీ 20/-	35/- + 25/- per additional copy 35/- + ప్రతి అదనపు కాపీ 25/-

NOTE :

- Postal charges extra.
- *Subject to availability of online digital records, otherwise the request will be processed within 7days.
- Printing of additional pages at ₹ 2/- per page.

గమనిక :

- పోస్టాల్ ఛార్జీలు అదనం.
- *అనుబంధంలో ఉన్న డిజిటల్ రికార్డులు అందుబాటులో ఉన్నప్పుడు, లేకపోయినట్లయితే, అదనపు 7 రోజులలో పరిష్కరించబడుతుంది.
- అదనపు పేజీల ముద్రించడం ప్రతి పేజీ రూ.2/-.

1100

www.meeseva.gov.in

Figure A2 Snapshot of the webpage showing the services offered



Figure A3 Snapshot of the homepage of Mee Seva portal

ఆంధ్ర ప్రదేశ్ ప్రభుత్వము, రెవెన్యూశాఖ, భూమి రికార్డుల కంప్యూటరీకరణ
పట్టాదారుని ండంగలు / పహడీ కాపీ

Application No:
ADL06196532
Date : 08/06/2012

శిల్ప : ఖమ్మం గ్రామము : ముద్దానపేట
మండలము : ఖమ్మం తాలూకా విస్తీర్ణము యూనిట్లు : ఏ.గె.అ./ఏ.ఎం.

వరుస నెం.	సర్వే నెంబరు	మొత్తం విస్తీర్ణము	ఏ.ఎ.అ.వి/ ఏ.ఎ.ఎ.వి.వి. విస్తీర్ణము	భూమి విస్తీర్ణము / శిల్పం	భూమి వివరణ / జలాధారము	అయత్తు విస్తీర్ణము	ఖాళా నెంబరు	పట్టాదారు పేరు (తండ్రి/భర్త పేరు)	అనుభవదారు పేరు (తండ్రి/భర్త పేరు)	అనుభవ విస్తీర్ణము / అనుభవ విస్తీర్ణము
1	2	3	4/5	6/7	8/9	10	11	12	13	14/15
1	61౪	0.27	0.02 0.25	పట్టా 17.68	మూలశీ చెరువు	0.00	349	పేదేరి విజయరామిరెడ్డి చెరువు	పేదేరి విజయరామిరెడ్డి చెరువు	0.27 పట్టాదారు

Certified By


 Name: L. Kishore Kumar
 Designation: TAHSILDAR
 Mandal: ఖమ్మం రూరల్

Verified by LAKKINENI KISHORE KUMAR

Note: This is a Digitally Signed Certificate, does not require physical signature. And this certificate can be verified at <http://www.mee seva.gov.in/> by furnishing the application number mentioned in the certificate.

Figure A4 Public verification of certificates on Mee Seva Portal



Figure A5 Screen-shot of Dash Board of Mee Seva Portal

COREPDS (Centralised Online Real time Electronic PDS), Government of Chhattisgarh

Vikas Sheel and A K Somasekhar

PROJECT OVERVIEW

Computerisation of the PDS supply chain management was successfully implemented in Chhattisgarh in 2007–08. The system has been fully operational in the state since January 2008 and stocking of PDS commodities in 10,880 fair price shops (FPS) has been closely and effectively monitored since then. The implementation of a computerised system has led to increased transparency, accountability and significant reduction in diversion of stocks. The present project COREPDS is an FPS automation to address the problems faced by the beneficiary at FPS. COREPDS proved to be a game changer in PDS operations as it empowers the beneficiary to choose the FPS of his or her choice to take PDS commodities as against the earlier situation of binding beneficiaries to a fixed FPS whether they like the service at that FPS or not. *The convenience that technology has given to a bank account holder to withdraw money from any ATM, is being offered to a poor BPL beneficiary in COREPDS.*

In COREPDS, FPS are equipped with a POS (point of sale) device having GPRS connectivity. The Hon'ble Chief Minister of Chhattisgarh has named the POS device used in COREPDS as 'AnnapoornaATM', as it works like an ATM for food grains (Food grains are given manually by FPS, but authentication and record of transaction on the server is done through this POS. Each BPL beneficiary is provided with a smart ration card (SRC)). The BPL beneficiary can take his or her rations (as per entitlement) at any FPS by producing his or her SRC. The FPS sales person inserts the SRC in the POS device. The POS reads the ration card number and sends it to the server through GPRS to get the beneficiary's entitlement balances. The FPS sales person enters the quantities to be issued to the beneficiary and submits it. The server updates the transaction and gives the success report. Thereafter, a receipt is printed and the commodities are then issued to the beneficiary. For the next transaction, the beneficiary can choose to go to another FPS as his or her food account balances are maintained on the server.

The same portability has been offered to an APL beneficiary with the help of a one time pin (OTP) authentication through his or her mobile phone. APL beneficiaries are not given smart cards, but asked to register their mobile numbers at the time of issuing the computer generated paper ration card. The APL beneficiary can now go to any FPS in COREPDS and claim

his or her entitlements. The FPS enters the ration card number in the POS application and submits it to the server. The server sends the beneficiary's food balances to AnnapurnaATM and the OTP (a 4 digit random number) to the registered mobile number of the beneficiary. After receiving the OTP, the beneficiary shares the same to the FPS and the FPS enters the OTP along with the quantities being issued in the POS and submits it to the server. If the OTP entered matches the OTP sent to the registered mobile number, it proves that the beneficiary is present at the transaction with his or her mobile number, and hence the transaction is genuine.

COREPDS is designed for bio-metric authentication of the beneficiary using either the Aadhaar infrastructure or Rashtriya Swasthya Beema Yojana (RSBY) bio-metrics. As Aadhaar enrolment has been paused in Chhattisgarh, COREPDS is presently not using Aadhaar authentication. COREPDS shall work with the smart cards issued by the Food Department as well as with the RSBY smart card issued by the Health Department just by linking the RSBY-URN (unique relationship number) and the ration card number. This not only leads to savings in precious time and money for the government but also relieves the beneficiary from the burden of carrying multiple cards.

After the implementation of COREPDS, there are clear evidences of improvement in the service delivery and savings to the government.

Objectives

To Improve Service Delivery: The primary purpose of the initiative is to improve service delivery at FPS in terms of quality of the commodities, quantity of commodities and behaviour of FPS sales person with beneficiaries.

To Reduce Diversion: To check diversion of PDS commodities by checking proxy issues. Diversion in the PDS supply chain at any stage (while procuring, storage, at the time of movement from warehouse to FPS or at FPS) is possible only when proxy issues can be recorded in the system. COREPDS is targeted towards elimination of diversion by using 'online real time mechanical authentication', at the time of service delivery, at the FPS.

To Empower Beneficiary: The objective of COREPDS is to empower beneficiaries with the facility to pick up their rations from the FPS of their choice. This in turn introduces competition among the FPS, for a larger share of beneficiaries, leading to improved service delivery at the shop. As a result, the beneficiary is not solely dependent on the monitoring done by departmental officials. In fact, the beneficiary, in COREPDS, becomes a partner of the government in the process of monitoring.

To Weed out Bad FPS The past system of inspection of FPSs to identify bad FPS for cancelling them had proved ineffective as inspections can attract

corrupt practices and the inspectors can be managed with grafts. COREPDS creates a system where bad performers would automatically be weeded out as a result of competition.

To Create Transparency: The transaction data recorded at the shops would be put in the public domain and hence COREPDS enables public scrutiny and social auditing of the FPS.

Project start date	April	1, 2011
Planned completion date	January	1, 2012
Actual completion date	March	1, 2012

RESULT INDICATORS

1. Key Performance

ICT Based Services

G2C Services

- Delivery of PDS commodities after mechanical authentication at FPS, offering portability of FPS
- Information through SMS about withdrawals to whoever registered their mobile numbers
- Display of entitlements and mini statements of transactions at FPS on request

Benefits to the Citizens

Reduced Waiting Time for Service Delivery: Due to equal distribution of beneficiaries in all nearby FPS, the average waiting time has reduced to half an hour from 2 to 3 hours before implementation of COREPDS.

Behavioural Change in FPS Personnel: The portability offered in COREPDS creates fear in the FPS of losing customers which brought a drastic change in behaviour of FPS personnel while dealing with the beneficiary.

Reduced Number of Trips of Beneficiaries to Take Different Commodities In COREPDS, a beneficiary is able to get all the commodities at one time. Even when one commodity is not available in an FPS, the beneficiary can take the same from a nearby FPS. This has led to a drastic reduction in the number of trips of the beneficiary (to two trips as the beneficiaries generally do not take kerosene with other food grains even when it is available).

COREPDS has been advantageous to the migrated labour from one part of the city to the other because of portability.

Entitlements have become clear to the beneficiaries as they are seen on the Annapoorna-ATM.

G2B Services

- Replenishment of PDS commodities based on actual sales (even though FPS exceeds its allocations) rather than based on the number of ration cards attached.
- Easier grievance lodging through POS device on the quantity and quality of PDS commodities delivered by the transporter to FPS

Benefits to FPS

- FPS with better service attracts more and more beneficiaries and thus is incentivised by getting more commission
- Bad FPS are automatically punished in the system as they lose beneficiaries
- Performance of an FPS is now objectively calculated, not dependent on the inspection reports of Food Inspectors, which are sometimes influenced by other parameters

G2G Services

- CGSCSC (Chhattisgarh State Civil Supplies Corporation) need not wait now for the allocation released by the Department of Food to send commodities to an FPS, as it is based on actual sales. Not getting timely allocation was the general complaint for the delayed lifting of PDS commodities before COREPDS was implemented.
- The Department of Food shall receive Form C 'monthly sales details of FPS automatically from the server. Form C is required to be submitted to the Government of India every month.

Benefits to Government

- *Reduction in Diversion:* Mechanical authentication at the time of delivery completely checks the record of proxy issues and thus reduces diversion.
- *Bribe Money Stopped at the Root:* As FPS in COREPDS cannot record proxy issues, it cannot black market any commodity. When the FPS does not get any illegal money, it cannot pump the money upward in the chain.

Planned in 2013-14

- Delivery of PDS commodities using RSBY card
- Delivery of PDS commodities based on Aadhaar authentication

Implementation Coverage

- 151 FPSs of Raipur City are included in COREPDS as of today benefiting 1.5 lakh ration card holders whose details are given in Table 1.
- It is proposed to cover 108 more FPSs in Durg and Rajnandgaon cities by November 1 2012, 108 more FPSs in Bhilai, Bilaspur cities and 3 rural blocks by January 1, 2013.
- It is proposed to cover all the remaining 9 corporations of the state in 2012-13, if GOI plan scheme is approved and funds are released.

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency Improvements

How efficient the system is can be seen by comparing various parameters before and after implementation (Table 1).

Table 1 Comparison of various parameters before and after implementation of COREPDS

Sl. No.	Indicator	Earlier to COREPDS	After COREPDS	Remarks
Objective: <i>To reduce diversion</i>				
1.	Sale of PDS commodities to BPL beneficiaries	99–100%	94.50%	Prior to COREPDS, FPSs used to record proxy issues and declare 99 to 100% sale. After introduction of smart card/OTP authentication, the sales figures have reduced. Savings of 5.5% in the case of BPL food grains, 40% in the sale of kerosene and 30% in the case of APL food grains is evident.
2.	Sale of kerosene	100%	60%	
3.	Sale of PDS commodities to APL beneficiaries	80%	50%	
<i>Objective: To empower beneficiary</i> —this indicator shows what percentage of beneficiaries have actually used their new right				
4.	Churning effect: The % of beneficiaries who took commodities from FPS to which they were not attached	0%	14.0%	These are beneficiaries who were forced to take rations from their fixed shop prior to COREPDS. Obviously, they were not satisfied with the services and have moved to other shops. This is a direct indicator of improved service delivery.
<i>Objective : To improve service delivery</i>				
5.	Average number of trips to FPS to take different commodities	4–5	2–3	As there is no way to count the number of trips made prior to COREPDS, the figure given is a guesstimate after surveying a small sample.

Better beneficiary's feedback:

- Beneficiaries are now welcome at the FPS. Often, somebody from the FPS stands in front of the shop and welcomes beneficiaries passing by to take commodities from the shop.
- Informal conversations with the beneficiaries have confirmed that they derive a sense of satisfaction when they decide to visit an FPS of their choice and reject another FPS.
- Beneficiaries are happy to get all the commodities at one time, which was not the case earlier.

Continues

Table 1 *Continued*

Sl. No.	Indicator	Earlier to COREPDS	After COREPDS	Remarks
Objective : To weed out bad FPS				
6.	% of FPS lost more than 25% of their business	0%	20%	This is an indicator to prove that COREPDS can automatically weed out bad performers.

Innovative Ideas Implemented

1. Portability

Portability of FPSs in PDS is first being offered in COREPDS in the history of PDS.

2. One Time Pin (OTP)

The penetration of mobile telephony is increasing every day in the country. Authentication of a beneficiary can easily be done by sending a one time pin to the beneficiary's registered mobile phone number. The beneficiary is then required to provide the OTP sent to his or her phone at the time of transaction. The OTP provided by the beneficiary is then confirmed from the data available at the server through the POS device. COREPDS uses this type of authentication for issue of commodities to APL beneficiaries. Though the APL beneficiaries in COREPDS have the option of either registering their mobile phone or taking an SRC (at a nominal cost), the convenience in using OTP has led to savings in spending on smart cards for APL beneficiaries.

3. RSBY Smart Card as a Smart Ration Card

RSBY is a scheme of the Government of India. The scheme targets at providing health insurance cover to all BPL families. A smart card is provided to each family in the scheme and bio-metric data of the head of the family and four other members is stored on the card. 18 lakh RSBY cards have already been issued in Chhattisgarh. The Government of Chhattisgarh has further decided to universalise this scheme to cover all the families of Chhattisgarh. COREPDS is designed in a manner so as to allow the beneficiary to use his or her RSBY smart card as a ration card. A mapping of the database of existing RSBY cards with the ration card database is underway. The state government has also taken the initiative to ensure linkage between PDS and RSBY by providing for ration card data of the beneficiary to be stored in the RSBY smart card at the time of issue of RSBY smart card. The Ministry of Labour, Government of India, has already accorded its consent for the initiative. This is the first successful experiment in the country that provides for a synthesis between the efforts of two departments of the government to provide services to common beneficiaries through the same instrument (RSBY smart card). It also leads to significant savings for the government on account of time and money required to duplicate the efforts in the absence of the synthesis.

Level of Integration

COREPDS is tightly integrated with the 'PDS supply chain management software' and the 'paddy procurement software' operational since 2008

ENABLER INDICATORS

1. Process Reengineering

ICT and Non-ICT Front-end Changes

Authentication at the Time of Service Delivery

Prior to COREPDS, there was no mechanical authentication of the beneficiary in the FPS at the time of issuing PDS commodities. Hence, there was a problem of recording proxy issues (recording an issue without actually issuing to the beneficiary).

COREPDS introduced three kinds of mechanical authentication at the time of service delivery, out of which any one can be used.

Through Smart Ration Card (SRC) Given to the Beneficiary Production of SRC and insertion of the same in the POS device establishes the fact that the smart card holder is present at the time of transaction and that it is not a proxy issue.

Using Rashtriya Swasthya Bheema Yojana (RSBY) Cards COREPDS allows the use of RSBY card as a ration card.

Through One Time Pin (OTP) Authentication APL beneficiaries have not been given any smart cards but are registered with their mobile numbers. When a ration card number is entered by the FPS for issuing commodities to the beneficiary, the server sends a secret 4 digit random number (OTP) to the registered mobile number of the beneficiary, which should be shared with the FPS to get commodities. This OTP authentication also ensures that the commodities have reached the right beneficiary.

Portability

Prior to COREPDS, a beneficiary is linked to one FPS. She or he had to take commodities only from that FPS whether she or he liked the service or not. COREPDS offered portability of FPS. Now the beneficiary can go to any FPS which are in COREPDS and claim his or her entitlements by producing the smart ration card or OTP at the FPS.

ICT and Non-ICT Back-end Changes

Delivery of PDS Commodities at FPS by CGSCSC

The delivery of PDS commodities/lifting was earlier based on the allocation given by the Food department. The process has been reengineered to meet

the new requirement after COREPDS was implemented with portability. Now, CGSCSC sends commodities whenever the stock levels reach below a reordering level and thus ensures that all the commodities are available in sufficient quantities at all the FPSs at any point of time.

Sales Declaration by FPS

Prior to COREPDS, declaration of sales was submitted by the FPS by filling a paper form. The Department was bound to accept the sales figures declared by the FPS as correct as cent per cent verification was not possible. In COREPDS, sales declaration is generated by the server as every sale transaction is recorded on the server. The declaration generated by the server is printed, signed and submitted to the department by the FPS at the end of every month.

Inspection of FPSs

Prior to COREPDS, FPS inspection was done with the help of a stock register and other different registers maintained by the FPS. Now the inspection authority can take stock and sale details from the server and inspect the FPS.

Electronic Panchanama

Prior to COREPDS, the receipt of commodities (Panchanama) was manual. Now the receipt is entered in the POS device and server updated.

2. Capacity Building

- Three rounds of training are given to each FPS on COREPDS operation. Video training material has been created and distributed to all FPS. Beneficiaries need not operate anything—they only need to bring their smart card or mobile to the FPS. Necessary awareness have been created to the beneficiaries through publicity campaigns.
- National Informatics Centre provides technical support for the implementation and maintenance of COREPDS by deploying a dedicated team hired from the industry under the supervision of NIC.

Project Management

- Responsibilities have been fixed to the respective stake holders
- Nodal officer for COREPDS has been appointed
- NIC has been given the responsibility of technical maintenance of COREPDS
- Full time PMU (project management unit) is established

Financial Model

- The funding is from the state government budget
- Total cost of ownership is about 90 lakhs

Efforts at Sustainability

Performance indicators have been established for each stake holder for effective monitoring (Table 2).

Table 2 *Responsibilities and performance indicators of various stake holders*

Stake holder: Department of Food	
Responsibilities	Performance Indicators
• Policy making • Introduction of good performers • Smart card distribution • FPS inspection	• Number of FPS sponsored • Number of inspections taken • % of smart cards distributed in total cards created • % of signed FPS declarations uploaded (monthly)
Stake holder: Chhattisgarh State Civil Supplies Corporation	
Responsibilities	Performance indicators:
• Delivery of PDS commodities to FPS • Operation of mobile FPS	• Number of FPS days with zero stocks of any commodity (–ve indicator) • Number of beneficiaries benefited through mobile FPS
Stake holder: National Informatics Centre, Chhattisgarh	
Responsibilities	Performance indicators:
• Providing technology solutions • COREPDS technology maintenance • Capacity building • Addressing day-to-day technical problems	• Server up time percentage—95% of server up time is SLA • % of offline transactions in the total transactions (–ve indicator) • Number of hours of training • Number of FPS visits
Stake holder: Fair price shop	
Responsibilities	Performance indicators
• To sell PDS commodities to any valid PDS beneficiary of COREPDS ensuring dignity and convenience of the beneficiary • To submit signed declaration in time • To deposit money with CGSCSC in time	• The % of net addition of beneficiaries over the total beneficiaries attached to that FPS who received PDS commodities from any FPS

3. Technology

ICT Solution Adopted

- Point of sale (POS) device with 2 smart card slots, finger print scanner, thermal printer, GPRS module, with Linux operating system and application in C.
- High end server which can take care of 6 transactions per second, web services in .Net platform under Windows 2008 operating system.

- A typical transaction in COREPDS which involves 2 server hits, takes 50 seconds. At peak time COREPDS receives 30 transactions per minute on an average. The existing sever can take 6 transactions per second and hence, is capable of scaling up the project 6 times. When COREPDS will be rolled out throughout the state, it will need 8 servers connected in a grid, with load balancing.

Security and Confidentiality Standards

Every request and service is digitally signed using a symmetric key. The key is given at the start of the business in a day randomly, to every POS device.

Disaster Recovery and Service Continuity

Solutions for various kinds of system failures have been worked out as can be seen in Table 3.

Table 3 *Business continuity plan (BCP)*

Sl. No.	Failure scenario	Solution
1	Smart ration cards distribution is not complete due to operational issues. Some genuine beneficiaries do not have SRCs with them.	They can take their ration from the attached FPS without a SRC using FPS card only. They however do not get the benefit of portability.
2	Some genuine beneficiaries have lost their SRCs and have not yet received a duplicate due to some operational delays.	They can take their ration from the attached FPS without a SRC using FPS card only, till they get a duplicate. They do not get the benefit of portability
3	Annapoorna-ATM is not working at one FPS	Beneficiaries can go to a nearby FPS and take their ration
4	FPS in one area are not operating Annapoorna-ATM due to some reasons	Mobile FPS operated by CGSCSC can go to that area and serve the beneficiaries
5	Connectivity is not available temporarily or server is down for some time	Beneficiaries can take their ration using offline issue mode of COREPDS
6	Server crash	Business continues with the mirror server
7	Total failure of technology in an area for a few days	Director, Directorate of Food, is authorised to permit manual operations on the recommendation of the district collector and the manual transactions are captured in the system through the Food Inspector's module.

VALUE INDICATORS

1. Digital Inclusion

The POS application as well as web reports are in Hindi. There is voice out facility for the commodities entered.

2. Green e-Governance

Currently, the system follows no specific environment friendly plan. In the future, the department may stop maintaining manual paper records saving lots of carbon footprint. Currently, paper records are maintained in parallel.

Vikas Sheel, Secretary, Food, Civil Supplies and Consumer Protection,
Government of Chhattisgarh, Chhattisgarh, e-mail: iamvikassheel@gmail.com
A K Somasekhar, Scientist, National Informatics Centre, Chhattisgarh, e-mail:
som@nic.in

m-Governance: An Efficient Way to Meet Citizen's Expectations, RMC, Government of Gujarat

Ajay Bhadoo and Mahesh Gohel

PROJECT OVERVIEW

The Rajkot Municipal Corporation (RMC) has always tried to keep pace with time and technology. After successful implementation of e-governance in almost all service areas, the corporation has concentrated on elimination of queues and providing instant information. This can be easily achieved by putting all the information on the website—this too has been completed. All the information related to property tax, water charges, profession tax, birth and death registration, RTI is now on the corporation's website—www.gov.in. We all know the reach of the Internet. A city like Rajkot has less than 10% penetration of Internet. The main question is what to do with the remaining 90%. To address this issue, RMC has decided to use mobile technology and ICT as a tool to reach to them. Nowadays, almost all families have at least one mobile phone for communication.

Necessity is the mother of innovation. Earlier, people used to stand in queues for 1–2 hours to get tax details and then they have to stand in another queue to pay their property tax. Thus, paying municipal dues was a tough job for any citizen. This also resulted in low recovery of property tax. An interest of 18% is charged on pending dues of property tax/water charges by the municipal corporation and hence, every day, the total due is different. So if the working hours of RMC is over, after wasting 1–2 hours, the citizen has to stand in the queue again next day, just to determine his or her pending dues. With the implementation of m-governance, this problem is answered effectively. RMC now provides more than 25 m-governance services. The m-governance services have the following general features:

- i. It covers more than 1.3 million people.
- ii. The coverage area of service is beyond geographical limits.
- iii. m-Governance offers point-to-point delivery of government services in a personalised manner, which has reduced the distance a citizen has to travel to avail municipal corporation related services.
- iv. With m-governance, transparency/credibility is increased, searching time is reduced, queues are eliminated and wherever possible human intervention is removed.
- v. The impact of the service is noticed in different areas like

1. Vaccination alert
2. Birth and death registration
3. 24 × 7 Call centres
4. Payment reminder service
5. Collection efficiency

In this way, the corporation has made the citizens' life much easier in every aspect of services.

RESULT INDICATORS

1. Key Performance

ICT Based Services

Table 1 lists the G2C, G2B and G2G services offered by the corporation.

Table 1 *ICT based services offered by the corporation*

Sl. No.	Department	Services for	Impact	Remarks
G2C				
1	Property tax	EMI details for payment by EMI using ECS method Transaction alert through SMS Receipt cancellation alert Cheque return alert	Deployment of staff who were responsible for providing property tax details to the citizens to other work. Cost savings in manpower, electricity and man management: Rs. 10 lakhs/ annum. Citizens get information immediately.	Unique service to the citizen—the citizen sends an SMS mentioning ECS Property Tax No and number of instalments in which they want to pay. They receive a return SMS with the instalment amount.

Continues

Table 1 *Continued*

Sl. No.	Department	Services for	Impact	Remarks
		Property tax outstanding dues through SMS Property tax name change details through SMS Registration of mobile no for transaction alert Name transfer alert		This service was started in the current financial year. It has brought transparency in the administration. Earlier, citizens had to visit the office frequently to check whether the name is changed or not.
2	Professional tax	Transaction alert through SMS	Helps to bring transparency	
3	Birth/death registration	Birth/death registration details through SMS Vaccination alert through SMS	Frequent visits of the citizen is reduced as they do not need to visit RMC until they receive the birth/death registration alert Vaccination preventable decease is almost nil. Continuous decrease in dropout ratio	Considered best practice at the national level

Continues

Table 1 *Continued*

Sl. No.	Department	Services for	Impact	Remarks
4	Awas Yojna instalment (housing scheme)	Instalment transaction alert through SMS	Helps to bring transparency	
G2B				
1	Property tax	Payment reminder service	Due to this service, the corporation was ahead by Rs.32 crores and 45000 more citizens have paid their dues as compared to last year	Started in the last financial year
2	FAS	Account payment SMS to vendors and contractors	Help to bring transparency	
3	Property tax	Assessment request	Man power is saved and citizens can request for an assessment through SMS. There is no need for a request on paper. Registered number of property and revenue property increased	Started in the last financial year
G2G				
1	General	Daily income-expenditure SMS to higher officers Department-wise daily cheque return details to the Commissioner Daily grievance statistics to higher officers	Higher officials are aware of the financial status and grievance status of the municipal corporation.	Effective monitoring is possible

Continues

Table 1 *Continued*

Sl. No.	Department	Services for	Impact	Remarks
	NOD service	A unique service—an officer sends an SMS to the corporation's SMS gateway. This is automatically transferred to their personal account on the website. Later on they can follow up with their subordinate	Excellent tool to organise day-to-day working of officials	
	Employee presence	Every day at 11.30 AM, the department head is provided presence information of their employees registered on Face Detector by SMS	Presence of employees become more regular	
2	Call centres	Running of call centres through SMS	The impact of call centres can be felt by the RMC as well as the citizens. Each complaint can be traced using this system.	

G2C Benefits

1. Speedy execution
2. Lesser response time
3. Search time for service is reduced
4. Interaction becomes more result oriented
5. Earlier, more than 200 people used to visit the RMC office for birth/death certificates and property tax. Now it is reduced to merely 20 people
6. Lesser vehicle usage resulting in lesser fuel consumption which in turn results in lesser pollution and lesser traffic and parking congestion and most importantly, saving of the national resource of human time

7. Elimination of touts
8. Equal quality of service regardless of social or economic status
9. Least expensive transaction cost (as low as 1 paise/transaction)

G2B Benefits

1. Speedy execution
2. Establishment of a proper system in place
3. Effective integration of back office and citizen-centric service
4. Increase in revenue
5. Complaint registration is totally out-sourced, resulting in cost-effective solution
6. Reduced expenditure on running different control rooms
7. Least expensive transaction cost
8. Reduction of paper usage

G2G Benefits

1. Reduction in direct interaction with citizens resulting in lesser grievances and increase in transparency
2. Citizens become more loyal to RMC
3. Grievance management become more efficient
4. Fully automated process
5. National immunisation programme become effective
6. Every transaction is registered electronically
7. Complaints go directly to the concerned officer, which reduces the response time of the officers responsible for the specific work
8. Officers become more productive
9. All information on local intranet and is just a single click away

Service Coverage

Table 2 provides facts and figures of the services in all four categories.

Table 2 *Coverage of services provided by m-governance at RMC*

Sl. No.	Department	Services for	Bene- ficiaries
Alert services			
1	Property tax	Transaction alert through SMS	76926
		Receipt cancellation alert	1456
		Cheque return alert	197
		Name transfer alert	5470
2	Professional tax	Transaction alert through SMS	20450
3	Birth registration	Birth registration details through SMS	44176
		Vaccination alert through SMS	434863
4	Death registration	Death registration details through SMS	18841

Continues

Table 2 *Continued*

Sl. No.	Department	Services for	Bene- ficiaries
5	Awas Yojna instalment	Instalment transaction alert through SMS	38123
7	FAS	Account payment SMS to vendors and contractors	12048
8	Dues reminder	Payment reminder services	228026
Interactive services			
1	Property tax	EMI payment by ECS	77
		Property tax outstanding dues through SMS	32925
		Property tax name change details through SMS	1001
		Registration of mobile no for transaction alert	320
		Property tax assessment request through SMS	244
2	Water charges	Water charges outstanding dues through SMS	1859
3	General	Details of RMC services	12738
4	Call centres	Registration of light pole complaints through SMS	2087
Management Services			
1	General	Daily income–expenditure SMS to higher officers	7042
2	General	Daily grievance statistics to higher officers	9335
3	Call centres	Running of call centres through SMS	729873
4	Staff presence	Presence on Face Detector	1694

Implementation Coverage

Till date, the whole city of Rajkot is covered for m-governance services. People who belong to Rajkot but live outside are also covered, i.e., individuals who either have property in Rajkot, or the birth or death of their family is in Rajkot. As of now, the corporation sends more than 1000 monthly SMSes outside Gujarat for vaccination or reminders of property tax due.

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency Improvements

Tables 3–5 show how the m-governance system followed by the corporation have improved the time and cost efficiency of various services.

Table 3 *Time and cost efficiency in interactive services*

Sl. No	Service name	Improvements in working	Cost efficiency	Delivery of services
1	Property tax outstanding dues	Elimination of queues	Deployment of staff who were responsible for providing such information to other work. Cost savings in manpower, electricity and man management (Rs.10 lakhs/annum)	Immediate
2	Water Charges outstanding dues	Elimination of queues		Immediate
3	Property Name Change	Elimination of queues		Immediate
4	Property tax assessment request	Citizen on their own send request; no need for paper applications. Request registered in the database. The tax inspector has to follow up	Manpower is saved	Service is supported by proper back-end process of property tax assessment
5	Registration of mobile no for property tax	Citizens gets quick response on their mobile regarding property tax dues, receipts etc.	Manpower is saved	Immediate
6	Registration of street light complaint	It will be easier for people to complain.	Human intervention is removed for complaint registration	Immediate

Table 4 *Time and cost efficiency in alert services*

1	Vaccination	Fulfilling social responsibility	Implementation of national immunisation scheme	Immediate
2	Property tax transaction	Citizens are more informed about their transaction	Cost of delivery is almost negligible	Immediate
3	Professional tax transaction			
4	Awas Yojna instalment transaction			

Continues

Table 4 *Continued*

Sl. No	Service name	Improvements in working	Cost efficiency	Delivery of services
5	Birth and death registration	Reduces citizens' queries about the status of registration	Makes RMC's functioning more effective and demonstrates positive impact on citizen's lives	Immediate
6	Bill payment to vendors/contractors	Reduces vendors/contractors queries about the status of payment	Deployment of staff who were responsible for providing such information to other work. Cost savings in manpower and man management (Rs. 3 lakhs/annum)	Immediate

Table 5 *Time and cost efficiency in management services*

1	24 × 7 call centres	Single contact point for all types of complaint.	Earlier 10 different 10 complaint centres were maintained by RMC. Cost savings of Rs. 60 lakhs/annum	No delay in transfer of complaint to concerned officer. Perfect communication
2	Daily income–expenditure SMS to higher officers	Higher officers are better informed. They get up-to-date and comprehensive information about income and expenditure	This allows the higher officers to focus on better fund management	Immediate
3	Daily grievance statistics to higher officers	Higher officers are better informed. They get up-to-date and comprehensive information about grievance management	This allows the higher officers to focus on better grievance management	Immediate
4	Daily cheque return details to the Commissioner	The Commissioner can discover financial irregularities and other wrong	Results shows that monitoring of cheque return has resulted in less number of cheque returns	Immediate

Continues

Table 5 *Continued*

Sl. No	Service name	Improvements in working	Cost efficiency	Delivery of services
5	Employee presence details	practices in the organisation Employee presence details are provided at 11.30 AM to department heads by SMS based on presence registered on the Face Detector	Absenteeism of employees and regularity is in control	Regular follow up
6	Status of complaint, details of complaints pending with officers	One can determine the status of complaints in his or her area immediately and accurately	This allows the officer to focus on providing better management	Immediate

Innovative Ideas Implemented

Table 6 shows how implementation of m-governance has impacted services.

Table 6 *Impact of m-governance on services*

Innovative ideas	Without m-governance	With m-governance
Property tax and water charges outstanding dues	The citizen had to stand in long queues to know their municipal dues	With just one SMS, immediate information is available in the mobile. Citizens are free from the queue system. This has also increased municipal dues collections to almost double.
Grievance management (24 × 7 call centres)	Different call centres for each type of complaints. The citizen had to remember different phone nos for different services	24 × 7 call centres; all complaints are registered at one place; the citizen has to remember only one phone no.
	Registration of complaints was manual; high overhead costs of running different complaint centres	Only one centre, fully computerised
	Not 24 × 7 service	24 × 7 service

Continues

Table 6 *Continued*

Innovative ideas	Without m-governance	With m-governance
	Monitoring of services not possible	Continuous monitoring; details easily available online; 90% complaints are solved within 72 hours
Birth/death registration	No mechanism to determine details about registration of birth/death	SMS is sent to parents/relative for birth or death registration. Citizens visit the City Civic Centre only after receiving alert SMS, so their visit to RMC is 100% successful.
Property tax/water charges alert service	Tax payers get transaction information of their property tax/water charges only by visiting the RMC office	When any transaction occurs in property tax/water charges, owner gets transaction alert SMS.
Professional tax alert	Professional tax payer gets transaction information only by visiting the RMC office	Professional tax payer gets transaction alert SMS when any transaction occurs.
Property tax receipt cancellation alert	Transparency is very important while making any kind of payment. After paying property tax/water charges or professional tax, people do not get any information if the transaction is cancelled.	Alert SMS sent to property tax/water charges or professional tax payers if receipt is cancelled
Daily income-expenditure SMS	No details of daily income-expenditure provided to higher officials	Every day, higher officials receive SMS of daily income-expenditure
Grievance statistics SMS	No details of complaints to higher officials	Every day, higher officials receive SMS for daily solved/registered complaints
Payment reminder service for property tax	Not available	When compared to last year, more than Rs. 33 crore was collected while 45000 more citizens have paid their dues.

Level of Integration

m-Governance services is backed by effective implementation of e-governance. This is a totally automated services characterised by:

- Truly online operations
- Effective back office integration with all citizen-centric services
- Centralised server architecture
- Integrated services

Table 7 shows actual messages which are generated based on the online database.

Table 7 *SMS messages generated for various services*

Service	Message
Alert services	
Property tax	<RMC-eGov> Received Rs. 3004 Discount Rs. 263 for Property No 09 /01710/000/000 vide rec. no 001/000/2010/0114615 Pending Amount is 0
Awas Yojna	<RMC-eGov> Received Rs. 430.00 for Awas No 002/000/0897 Vide Rec No 2010/27563 for 01-08-2010 To 31-08-2010
Vaccination	<RMC-eGov> Reminder for vaccination-It is time to give <<TT-10>> Vaccination to your child. Born on 26/06/2000 <RMC-eGov> Reminder for vaccination-It is time to give <<OPV-0>> Vaccination to your child. Born on 21/07/2010 <RMC-eGov> Reminder for vaccination-It is time to give <<Measles & Vitamin-A (Dose 1)>> Vaccination to your child. Born on 30/10/2009
Birth registration	<RMC-eGov> Your child Birth Reg.id-2010/0016248/0000 RMC Congratulate you & your family. We suggest you to plant a tree let tree grow with your child.
Death registration	<RMC-eGov> Death Registration of your relative is completed vide Death Reg.id-2010/0006669/0000 You can collect Death Certificate
Profession tax	<RMC-eGov> Received Rs. 2306.00 for RC No PRC0401584 Vide Rec No 2010/05376 for 01-06-2010 to 30-06-2010>>RMC-e-Governance
Account bill payment	<RMC-eGOV> Payment of -Jnnurm Mission Expenditure of Rs.14800.00 is done by ECS Dt 27-07-2010 Will be credited in yr acc in 3 days
Receipt cancellation	Your receipt no 000/000/2009/0150447 is cancelled due to INSUFFICIENT AMOUNT now your pending amount is 3199
Management services	
Call centre summary	<RMC-eGov>Call centre summary for 30-07-2010 Pend Comp 295 Solved 196 Total Pend 1116 Total Solved 38036... Total Comp 48073
Income–Expenditure	<RMC-eGov> Income for 27-07-2010-> Rs. 95.57 lakhs and Exp->Rs.118.95 lakhs Income Till Dt-> Rs. 16330.86 lakhs
Interactive services	
Water charges dues	Outstanding dues for 14 /000050176 is: Rs. 9025.00 Discount: Rs. 3385
SMS Format: Water <13 digit connection no>	

Continues

Table 7 *Continued*

Service	Message
Property tax dues SMS Format : Bill <17 digit PropNo>	Outstanding dues for 13 /11939/000/000 is: Rs. 86610 Discount: Rs. 1686 Net Payable Rs. 84924
Property tax registration	Your Property No 22 /06020/000/x00 is linked with your mobile no 9624701175
SMS Format: Reg <17 digit Prop No>	
Property name SMS Format : Name <17 digit PropNo >	Owner Name for 06 /00930/000/000 is: RASHMIBEN RAMESHBHAI VASANT
Street light complaint	Your Comp. for TL Not Functioning is registered by SMS at RMC Call Centre. Your Comp. No is 104610
SMS Format : Light <Pole no with Wardno>	
Payment reminder service	
Property tax	<RMC-eGov> Outstanding dues for 10 /01657/000/000 is: Rs. 434 Pay Before 28/02/2011 and Avail Benefit of Rs. 9 Amount Payable till 28/02/2011 Rs. 425

ENABLER INDICATORS

1. Process Reengineering

ICT and Non-ICT Front-End Changes

All front-end processes are successfully implemented by the Rajkot Municipal Corporation. These services were enhanced with point-to-point delivery of services in a personalised manner with the help of m-governance. RMC provides m-governance services in all the service areas governed by the city. It also tries to remove/reduce human intervention for service delivery, i.e., any process where a citizen is involved should be utmost transparent. To achieve such levels of transparency, more than 25 different services are covered under m-governance. All these services are fully functional without the need of any attendant. The services provided by RMC are listed below.

Alert Services

- Vaccination
- Property tax transaction
- Professional tax transaction
- Birth and death registration
- Bill payment to vendors/contractors
- Avas Yojana instalment transaction

Interactive Services

- Property tax outstanding dues
- Water charges outstanding dues
- Property name change details
- Property tax assessment request
- Registration of mobile no for property tax
- Details of SMS services

Management Services

- Call centre
- Daily income–expenditure SMS to higher officers
- Daily grievance management statistics to higher officers

Payment Reminder Services

- Property tax dues
- Water charges dues
- Awas Yojna (housing scheme) instalment dues

Extension of current m-governance services is sought. The corporation is planning to introduce some more services under m-governance like

1. Collection of penalty and other dues through mobile and blue tooth printers (under implementation)
2. Mobile application for m-governance services
3. To strengthen m-governance, the corporation is planning to encourage citizens to send photographic image of
 - i. uncollected garbage,
 - ii. encroachments,
 - iii. road problems and
 - iv. any other problems

through a specially designed software which will be available to citizens from our website. This software can be used in any mobile and through this, citizens can send photo images to RMC along with longitude and latitudes details to identify the location.

ICT and Non-ICT Back-End Changes

The following non-ICT back-end process changes have been planned.

1. Primary solid waste management (presence details of sweeper by Face Detector, trial run completed; planned to implement in next January)
2. Secondary waste management
 - i. Vehicle tracking system (early stage)
 - ii. Availability of data regarding weight, no of trips, ward-wise garbage collection etc directly using GPRS data transfer (under implementation)
3. Estimation and costing
4. SCADA (supervisory control and data acquisition)
5. File tracking
6. Document management system
7. Water distribution data

2. Capacity Building

Leadership Support

1. Political leadership with a clear vision is essential to ensure successful implementation of e-governance and efficient change management. Organisational and cultural inertia can only be removed by strong leadership. These organisational and cultural changes are often more difficult to execute than the technological challenges. Ultimately, change management is necessary to make e-governance implementation successful. It is also equally important to get support from all levels of government offices. The backbone for the successful implementation of e-governance is back-office integration. It is of no use if only citizen-centric services are implemented. Another aspect of strong leadership is integration of all e-governance services to reduce redundancy in day-to-day routine work.
2. e-Governance in Rajkot has received full support from the local urban political body. They have seen a lot of advantage in providing e-governance services. Communication among all levels, from wards to zone,—necessary to successfully implement these initiatives—have been made possible by local political leaders. The awareness of citizens towards m-governance services, which RMC is providing is appreciated at all levels.
3. m-Governance is an important policy in the context of a highly traditional governance which hesitates to opt for new steps. It leads to technological enhancement in the functioning of governance. The corporation have not faced any problem of derailment or blockage of services where decisions made by one incumbent are overturned by the next.

4. Strong leadership is also apparent when working with the problem of IT illiteracy among the staff. Regular IT training is set up by the local government to improve IT literacy especially among young public servants and key personnel. Lack of adequately trained personnel is one of the main critical failure factors of e-governance implementation. As per the Government of Gujarat guidelines, an employee gets promotion or higher grade only if he or she has cleared the CCC examination which is a preliminary computer knowledge programme intended to provide first-hand experience of computer fundamentals and Microsoft Office. The corporation staff is almost 100% computer literate. So implementation of any IT initiative is not a problem for RMC.

Change Management Strategy

RMC has a clearly defined change management strategy. It is intended to avoid errors and minimise the impact of changes. It also minimises the consequences of unprepared and unrecorded changes and enables approved changes with minimum disruption. The main stages defined under this strategy are

- i. Planning the change
- ii. Designing the change
- iii. Gap analysis of change if services is existing
- iv. Defining the process of re-engineering
- v. Involvement of parent department before implementing the process of reengineering
- vi. Implementation of change through the communication of the vision
- vii. Highlighting the strategic significance of the change
- viii. Clearly formulating a vision for the change
- ix. Application of transformational leadership principles by leaders
- x. Providing plenty of communication messages focused on what the change would entail for all stake holders going forward
- xi. Sample survey after implementation of changes

Capacity Building Plan

The corporation has many plans to build its capacity and they are in different stages of completion. Table 8 gives a bird's eye view of these plans.

Table 8 *Capacity building plan and its implementation status*

Sl. No.	Planned	Implemented
1	Computer training to Class 3 employees and above	Successfully given training to all the staff for module 1 as per guidelines of the Government of Gujarat

Continues

Table 8 *Continued*

Sl. No.	Planned	Implemented																				
2	Integrating m-governance with e-governance	Integration modules developed for – Birth registration – Death registration – Property tax – Water charges – Profession tax – Housing scheme instalment collection – Financial accounting system – Right to information Operating training given to all the concerned department staff																				
3	Registration of mobile no. for different service (the target is 2,00,000 registrations)	As on date, the no. of citizens registered for different services are <table><tr><th>Service</th><th>Numbers</th></tr><tr><td>Property tax</td><td>99542</td></tr><tr><td>Water charges</td><td>4026</td></tr><tr><td>Birth</td><td>43160</td></tr><tr><td>Death</td><td>18574</td></tr><tr><td>Awas Yojna</td><td>5088</td></tr><tr><td>Profession tax</td><td>5173</td></tr><tr><td>RTI</td><td>3119</td></tr><tr><td>FAS (vondor)</td><td>1496</td></tr><tr><td>Total</td><td>180178</td></tr></table>	Service	Numbers	Property tax	99542	Water charges	4026	Birth	43160	Death	18574	Awas Yojna	5088	Profession tax	5173	RTI	3119	FAS (vondor)	1496	Total	180178
Service	Numbers																					
Property tax	99542																					
Water charges	4026																					
Birth	43160																					
Death	18574																					
Awas Yojna	5088																					
Profession tax	5173																					
RTI	3119																					
FAS (vondor)	1496																					
Total	180178																					
Awareness creation for capacity building (citizens)																						
1	Services promoted by different modes	1. Print media, news paper 2. Printing details on how to access m-governance services on tax receipts 3. Printing how to access m-governance services on tax demand bills 4. Encouraging citizens to register their mobile no. at the time of payment of dues, master data creation, registration of birth and death																				

Project Management

All m-governance initiatives are developed and maintained by an in-house team of IT experts. The team members are regular employees of RMC.

The team comprises four members, headed by the EDP Manager. It has the following members with experience of more than 700 man months in the information technology field.

1. EDP Manager, M S Gohel, BE (CE), MCSD, PGDBM, 20+ yrs exp.
2. Dy.EDP Manager, S.M.Gohil, BE (IT), 7+ yrs exp.
3. Programmer, B K Shah, PGDCA, MBA, 18+ yrs exp
4. Programmer, D S Sharma, PGDCA, MCom, 12+ yrs exp

Financial Model

This project, indirectly, is a major source of revenue. After the project was started, RMC's revenue collection increased by approximately 53%, while the number of payers have increased by roughly 35%. This means that the project is financially sustainable on its own through increase in revenue. In addition to that, the project has the following financial characteristics:

- i. Financially very economical
- ii. Running cost is very less
- iii. Becoming less expensive with advancement in technology
- iv. Sharp increase in the level of satisfaction as revenue compensates the expenditure
- v. Project further envisages many revenue generation avenues in future
- vi. Reduces paperwork and thereby saves huge cost
- vii. Plenty of scope for improvement in cost savings in all functional activities
- viii. Has the potential to improve urban life in India

Using the public-private partnership model, RMC has a unique tie-up with the Indian Postal Service whereby the post offices in Rajkot Municipal Corporation area collect municipal dues on behalf of RMC. This is truly an online process, where only the manpower, computer, printer and Internet connectivity is of the post offices. The post office has to log in to the RMC server for collection of dues. Stationery is also provided by RMC. For each transaction, RMC gives either Rs. 5/- or Rs. 12/- based on the type of collection.

For IVRS, mobile and net banking, RMC has an agreement with Atom Technology to provide interfaces for all three applications, while integration for these services is carried out by RMC.

Efforts at Sustainability

The Rajkot Municipal Corporation believes in implementing innovative initiatives which are sustainable. The main benefit to RMC for maintaining sustainability of various e-governance efforts is that they are not dependent on external manpower for their needs. They have their own team of in-house IT experts—the whole e-governance and m-governance system has been designed, developed and implemented by this team. In addition, once a department's activities are computerized, the whole routine operation is handed over to the department. This has helped the corporation to distribute the responsibility of management implemented software. It also ensures sustainability of the e-governance efforts. The m-governance service which sits on e-governance is also a driving force for sustained e-governance at RMC.

3. Technology

ICT Solution Adopted

To cover almost all the citizens of Rajkot with m-governance applications and to make the citizen's life hassle-free, the Rajkot Municipal Corporation

has started four types of m-Governance services.

1. Alert services
2. Interactive services
3. Management services

Technically, m-governance services involves the following steps.

1. Creation of a database for integration with e-governance services. This includes registration of mobile nos at the time of creation of master record. For example at birth and death registration.
2. For property tax and water charges, the mobile no. can be registered at the time of payment of dues.
3. We have also provided a facility for registration through SMS and from the website.
4. Whenever any transaction occurs for registered payers, the birth and death registration system will automatically check for a registered mobile no. If a mobile no. is found, then the system will generate an SMS based on the data and send it to the SMS gateway, which will deliver the message to the citizen.
5. The SMS gateway is a GSM based modem, which works as a transmitter and receiver of SMS. For the alert system, it will deliver a system generated SMS, while for the interactive service, the software will check for keywords in the SMS. Based on the keywords, the system will check the database, find out the required data and send an SMS based on the data to the information seeker.

RMC fulfils all the service level benchmarks mentioned in the National Mission Mode Project (NMMP) e-Governance. The eight essential services mentioned in the NMMP e-Governance for the ULBs (urban local bodies) have been covered by RMC for a long time.

Security and Confidentiality Standards

No direct data access is allowed while providing an m-governance service. Therefore, database security is not required. Yet, the corporation has established a security system—a hardware firewall, software level password protection and database level password protection which gives limited access to the system.

Disaster Recovery and Service Continuity

The success of m-governance depends on e-governance implementation. The corporation has set up a disaster recovery of e-governance separately. Every day, data is transferred to the other zonal office, 5 km away from the main office.

In addition to that, incremental backup is maintained as a security measure.

Basically, m-governance services depend on the mobile services provided. GSM technology is used to transmit and receive SMS. From the RMC end, GSM modem is used to maintain service continuity and a standby modem is kept.

VALUE INDICATORS

1. Digital Inclusion

m-Governance messages are sent to citizens in the English language. Technical limitations prevent the sending of such messages in local languages. A technical solution is available—local messages can be sent to Unicode supported mobiles. However, the percentage of such mobile penetration is less than 20%. To solve this problem, we have designed a specific format for messages which can be read by a majority of citizens. The result is encouraging, particularly in vaccination alerts and payment dues reminder messages.

Demographically, this project is practically boundary-less. Indian citizens can send and receive information related to city governance without any limit. The only limitation is that the citizen belongs to Rajkot—he or she can reside in or outside Rajkot. Earlier, replies to queries were supported only within the state limit but now it is extended to the national level. Now for vaccination and other alerts, the corporation is sending more than 1000 messages outside Rajkot every month.

2. Green e-Governance

The m-governance project at Rajkot Municipal Corporation is aimed at a paper-less office. RMC not only promotes this practice in routine office administration, but also encourages citizens to go for Green e-Governance. The corporation's website is a dynamic one—every transaction is immediately reflected online immediately. The services range from complaint registration to payment, and from form downloads to application filling. Instead of writing a complaint, the corporation encourages citizens to register the complaint in the call centre by phone, SMS or website. To participate in decision making, providing suggestions to RMC for solving any problem, or development suggestions, the citizen can visit the Citizen Forum website and write in either in English or Gujarati.

The paper work in the call centre's office administration is totally removed. The officer has to respond to complaints only by SMS. The corporation has identified 17 different status based on which the call centre works. Each complaint is registered electronically and available on RMC's intranet.

In office administration, majority of office correspondence is by email. Even department heads normally send their request/demand etc by email only.

Ajay Bhadoo, Commissioner, Rajkot Municipal Corporation, Gujarat, e-mail: mc_rmc@yahoo.co.in

Mahesh Gohel, EDP Manager, Rajkot Municipal Corporation, Gujarat, e-mail: msgohel@rmc.gov.in

Using Technology for Strengthening Targeted Public Distribution System, Government of Gujarat

Raj Kumar and Kiran Oza

PROJECT OVERVIEW

Targeted public distribution system (TPDS) is an instrument of public policy to provide food security to the poor and vulnerable sections of the society from either price shocks or supply shortages. Under this scheme, the Government of India (GoI) supplies essential commodities, viz., wheat/millet, rice, sugar and kerosene, while the state government has the option to add other items as considered essential. However, the outcome of PDS depends on the efficiency and effectiveness of the governance framework of TPDS. Over the years, TPDS functioning has come under severe criticism due to high level of leakages/diversion in the system. One study of the Planning Commission concluded that 58% of subsidised food grains do not reach the below poverty line (BPL) families because of *identification errors*, *non-transparent operations* and *unethical practices* in the implementation of PDS.

Recent advances in technology have enormous potential to improve not only the efficiency but also ensure delivery of subsidised essential commodities to the targeted population. All stake holders including central and state governments, economists, public policy specialists, social activists etc. believe that TPDS reform is a must and several states have been working with various pilots. Since 2010, Gujarat has moved ahead and developed its own model of a TPDS reform solution that is simple, scalable and cost effective. Gujarat's TPDS solution is essentially a closed loop governance framework which utilises database(s), computational and local National Informatics Centre's technical resources that are readily available with the state government. Consequently, roll out of Gujarat's TPDS reform process has, so far, been a non-disruptive, gradual and yet comprehensive exercise benefiting key stake holders such as ration card holders and the government. The Transparency Portal of PDS has not only made its functioning transparent but also aims at involving the citizen for improvements in its operational efficiency.

TPDS in Gujarat

Vital Statistics

• Districts	26 in number
• Population	6.03 crores
• Ration card holders	110 lakhs
• BPL (below poverty line)/AAY (Antyodaya Anna Yojana) card holders	32 lakhs

TPDS Infrastructure

• Fair price shops	16,557 Nos.
• FCI godowns	46 (in 17 districts)
• Civil Supply Corporation godowns	192 (in all districts)
• Annual turnover of essential commodities:	16 lakh MTs
• Annual subsidy borne by the state government	In excess of Rs 200 crores

Vision

- Empowerment (of beneficiary)
- Transparency (in TPDS)
- Innovation (in governance)

Objectives

Beneficiary	Identification (to eliminate bogus/duplicate cards) Classification (minimising exclusion/inclusion errors) Ensuring delivery of food grain (minimising diversion/leakages)
Fair price shop (FPS)	Transaction capturing Updated record keeping
Logistics	Efficiency improvement (of food grain storage and movement)
Accountability	At all levels
Transparency	Across supply and delivery chain At all times

Solution Matrix

Issue	Solution approach
Identity	Elector's photo identity card no. + Bio-metric data of at least one member of the beneficiary family
Classification	Convergence of beneficiary family's socio-economic data, for example, BPL data, electricity connection no., LPG no., land holding status etc.
Delivery	Through food coupons based upon online bio-metric verification of the family member

Continues

Continued...

Issue	Solution approach
Record keeping	Capturing of transaction data embedded in the food coupon
Logistics efficiency	Commodity-wise aggregation of supply and demand data at various stages, i.e., FCI depot, godown, FPS, kerosene agent/dealer etc.
Transparency	SMS alerts, web site
Accountability	Bio-metric authentication by decision makers
Stake holders' participation	Appropriate risk-reward system particularly for the FPS dealer and the card holder.

Implementation Strategy Design

No technology at FPS level: Lesser resistance to change

Authentication: Of data creation and transaction through bio-metrics of card holders, supply staff, godown manager, FPS dealers etc.

Differentiation among card holders: No bio-metric of those APL card holders who voluntarily forego their food grain entitlements.

Demand aggregation (bottom up approach): Card holders and FPS as building blocks.

Market orientation: Freedom of choice: (i) Choice between food coupon and cash coupon; (ii) choice of FPS.

Outcomes

- Elimination of more than 15 lakh duplicate/ bogus ration cards (>10% of the total) since 2011, resulting in marked improvement in the distribution efficiency of the subsidised commodities
- Proof of concept established through pilots in more than 200 FPS areas across the state @ 1 FPS per taluka (since April 2011)
- Digitisation of 1.09 crore ration cards (March 2012)
- Online permit system has minimised discretion and rent seeking by supply staff
- Improvement in viability of CSC, i.e., e-grams
- Innovation (technology orientation) in the governance of citizen-centric delivery programme
- PDS Transparency Portal and state call centres have strengthened the grievance redressal mechanism.

RESULT INDICATORS

1. Key Performance

ICT Based Services

G2C Services

TPDS aims at ensuring food security of the poor through distribution of subsidised food grains. Introduction of ICT in the distribution has empowered the beneficiary, strengthened and expedited the transaction (of delivery) capturing process while making TPDS transparent (through the transparency portal).

G2G Services

Every year, both the central and state governments spend a large sum (several thousand crores) on procurement, storage and distribution of food grains. Leakages, diversion and wastage of food grain is a crime against the nation and society. Bogus ration cards are the principal instruments of wrong doing committed by corrupt and non-accountable cutting-edge bureaucracy at the block level. On the other hand, higher bureaucracy is largely helpless as it has very few means to access any meaningful information about millions of transactions occurring each month. Introduction of ICT in the administration of TPDS has benefited the government and the governance of TPDS. Using the elector's photo identity card (EPIC) has largely addressed the identity issue and helped in eliminating a large number of bogus/duplicate ration cards. Introduction of bio-metric authentication has infused accountability among cutting-edge bureaucracy and reined in corruption. ICT has enabled online monitoring and supervision.

Implementation Coverage

Since the commencement of the project implementation process in 2010, digitisation of ration card holders database has been completed. This has become the basis of the online monthly permit system for issuing subsidised commodities through FPS dealers to the card holders. Further, more than 200 pilots have been launched across the state @ 1 FPS dealer in each taluka. These pilot FPS dealers are required to issue subsidised commodities against food coupons obtained by the card holders using their thumb print (bio-metric details) at e-grams/cyber cafes. The food coupons so collected by FPS dealers during the month, are produced at e-grams/cyber cafes. This helps in transaction capturing and maintaining the centralised sale register of that FPS dealer.

Expansion of implementation coverage in terms of food coupon based delivery depends upon prior availability of bio-metric data of at least one member of the card holders' family. This process is in progress. So far, bio-metric data of more than 500 FPS has been captured. It is hoped that the complete process will be completed by 2012–13.

Future Roadmap

The government provides a plethora of services for the welfare and well being of citizens particularly those who really need it. However, there is a big question mark on the identification and identity management of the needy. The existing mechanism and processes have, so far, produced sub-optimal outcomes. In this context, the Gujarat model of TPDS reforms can be extended to other welfare services such as MDM (the Mid-Day Meal scheme) and ICDS (the Integrated Child Development Services).

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency Improvements

There has been savings in food grain and other essential commodities as shown in Table 1.

The system has also led to online monitoring of performance parameters, for example, issue of permits, coupons, disposal of applications etc.

Innovative Ideas Implemented

- Citizen empowerment in terms of bio-metric based transaction authentication
- Market orientation in delivery of government services, for example, choice of FPS, quantity of food grains has been built into the software application. Later, if permitted by the government, using reverse engineering, food coupons could also be used as cash coupons.

Level of Integration

Integration of electoral roll data with ration card database would be a mutually rewarding experience for both the organisations. Similarly, convergence of LPG/ PNG data with ration card database would help in preventing duplication in the supply of subsidised petroleum products and savings to the government.

ENABLER INDICATORS

1. Process Reengineering

ICT and Non-ICT Front-end Changes

- During June 2010 to September 2010, about 1.25 crore existing ration card holders were asked to submit their application in a new format, i.e., Form 1 to avail bar coded ration cards. At the end of this exercise, only 1.12 crore card holders exercised their rights and submitted duly

Table 1 Comparative analysis of key result areas in respect to 225 pilot FPS areas

Sr. No.	Item	Pre-pilot project implementation, March 2011	Post-pilot project implementation, March 2012	Difference (%)	Remarks
1	Total no. of ration cards	85572	76192*	-10.96	Before commencement of the project in 2010, these pilot FPS dealers had reported a total of 126,532 ration cards of which 39,244 were poor families.
2	Out of these, total AAY + BPL cards	28398	23179*	-18.38	
3	Food grains allotted for AAY + BPL card holders	787 MT	779 MT	-0.97	Poor families are entitled to 35 kg food grains per month. As against 32 lakh BPL/AAY families identified by the state government, GoI allocates food grains for only 21.2 lakh poor families. Despite these constraints, the ratio of food grain allotment raised from 82% to 99.8%.
4	Sugar (for BPL + AAY Card holders)	54.5 MT	46.2 MT	-15.37	GoI allocates sugar for 21.2 lakh poor families only. Therefore, entitlement reduced from 500 grammes to 350 grammes/person/month. At the same time, the ratio of monthly sugar allotment raised from 67% to 95.4%.
5	Kerosene (for all categories of card holders)	560 kl	376 kl	-32.79	Due to 27% cut in SKO allocation by GoI in June 2011, the ratio of monthly SKO allotment reduced from 100% to 93.83%. Card-wise allotment also reduced from 2 litres to 1.5 litres/person/month subject to a maximum of 6 persons per card.

filled forms. Since January 2011, allocation of PDS commodities has been limited to 1.12 crore ration cards only.

- *Issue of bar coded ration cards:* To ensure delivery of commodities to real beneficiaries, Gujarat has started issuing ration cards with 2D bar codes. At the time of issue of such bar coded ration cards, there is a provision to capture photo and bio-metric details of at least one adult member of the beneficiary household. So far, more than 8 lakh ration cards have been distributed. Hopefully, distribution of bar coded cards would be completed by March 2013.
- *Food coupon based delivery mechanism:* In order to take delivery for the month, any one of the family member of the card holder whose bio-metric details have been captured has to first visit the designated e-gram centre (common service centre). After online verification of bio-metric details, individual coupons for each commodity that the beneficiary is entitled to are generated. Each coupon has details of month, price, commodity, quantity, FPS dealer etc. While an APL beneficiary bears the cost of the coupon sheet, a mechanism has been established so that BPL card holders obtain the coupon free of cost.

The card holder then goes to the FPS along with the bar coded card and hands over the coupon and the price as printed. The FPS dealer provides the commodity in return with due entry in the ration card as per the usual practice, while the coupon is retained by the dealer. Thus, the coupon becomes the proof of transaction and the dealer would get replenishment of commodities in the subsequent month only against those coupons that he submits for reading at the e-gram centre, thus completing the feed-back loop. In this way, the beneficiary is empowered to authenticate each transaction. Since April 2011, this strategy has been adopted in more than 200 FPS on a pilot basis. State-wide coverage of the food coupon system would take another year to implement and stabilise.

ICT and Non-ICT Back-end Changes

- Digitisation of Form 1 in excess of 1.09 crores has been completed by March 2012.
- Based on card holders' database, from November 2011 onwards, all FPS dealers have been availing monthly permits *online*.
- A godown module has been developed and its pilot launched in August 2012.
- The PDS Transparency Portal has been launched in February 2012.

2. Capacity Building

Leadership Support

Since the commencement of the project implementation process in June 2010, the state government, the secretary of the department, the NIC team

under the guidance of SIO, Gujarat has provided full support to the project in administrative, financial and technical aspects.

Change Management Strategy

- For each component of the project implementation process, detailed guidelines in the form of government resolutions were issued from time to time.
- Detailed reviews in the District Supply Officers' monthly meetings provided much needed feedback and helped in mid-course corrections in the project implementation process.

Capacity Building Plan

- Private agencies have been hired to provide necessary support for data digitisation, card printing and distribution etc.
- NIC organised a large number of e-learning sessions for their DIOs as well as supply staff at the block (taluka) level.

Project Management

Since PDS is an ongoing scheme, the transition from the existing manual system to a computerised one needed close monitoring and supervision. Therefore, the secretary of the department doubled up as head of the Project Management and Monitoring Unit with solid support and backing from the state NIC team.

Financial Model

So far, the entire cost of project implementation has been met from the state government's resources. Due to the innovative design of the project, costs have been kept to a minimum while infrastructure components set up under NeGP (the National e-Governance Plan) have been utilised to the extent possible. Consequently, the cost of project ownership is expected to be within Rs. 80 crores while actual cost incurred so far is about Rs. 25 crores.

Efforts at Sustainability

Though project implementation has been partial so far, substantial benefits have already accrued in terms of elimination of more than 10% ration cards, infusion of transparency and accountability. Official discretion has been minimised while strengthening rule-based administration. In particular, customer satisfaction has improved considerably. These aspects have been observed and appreciated by independent observers from GoI, the World Food Program and the Central Vigilance Committee headed by Justice Wadhwa.

3. Technology

ICT Solution Adopted

The system is an online end-to-end solution obtained by connecting live web-services which provide real time data to the end-user. Users can see information relating to any of the FPS areas, for example, how many ration cards are allotted in the given FPS area or what is the quantum of monthly authorisation of various essential commodities provided to the FPS dealer(s) etc.

Similarly, the user can determine whether the card holder has LPG/PNG connections or is availing kerosene for domestic fuel and lighting. One can also scrutinize the gas connection status of non-gas card holders in a given FPS area by simultaneously accessing the list of LPG/PNG connection holders in that area. In due course, public feedback would help in avoiding duplication of fuel subsidies being availed by individual card holders and that would reduce the subsidy burden of the Government of India.

Software and Hardware Technology Used

- It has been developed with Microsoft .Net and MSSQL server based CMS system with the usage of AJAX.
- Inclusion of 2D PDF 417 bar code in various documents like new ration card, e-permit, food coupons etc.
- Fingerprint captured as per ISO standard (ISO 19794-4 and 19794-2 (minutiae))
- Single sign-on facility

Performance

The system is based on CMS architecture which is based on template and thin structure mechanism—clicking specific information only fetches that specific information from the portal database, the rest of the operations, like navigation, is loaded in the template for fast execution and easy management. Even information is operational in widely available major browsers and platforms.

Security and Confidentiality Standards

The portal is hosted at SDC Gandhinagar after complying with Cert-in Security Audit by a Government empanelled Security Auditor. It is safe from OWASP Top 10 Vulnerabilities.

VALUE INDICATORS

The present governance system has been inherited from the British colonial era. Since independence in 1947, a democratic government and

gradual decentralisation of the governance structure has been the norm. However, government–citizen interface has remained largely unchanged. The underlying philosophy of this interface is built upon *lack of trust*. Therefore, all citizen–government interfaces are through intermediaries, i.e., inspectors or government authorised agents/ agencies that has a definite role in any or all the activities relating to selection, identification, certification or delivery of the service. Consequently, the intermediary wields enormous discretionary authority vis-a-vis the citizen and quite often exploits a given situation for rent seeking. The challenge before all of us is to introduce reforms in the governance framework that empowers citizen and the society such that they build their own destiny, i.e., be *Bhagya Vidhata*, literally.

Vision

Governance structure and processes should maximise citizen welfare in a *market friendly manner*.

The market's potential as an agent of change for maximising participants' welfare has been recognised, long back, particularly in economics. On the other hand, by its very nature, the government is a monopoly institution. Since governance is different from government, there exists scope for market orientation of governance that provides *choices* to the citizen. *Technology* can play a vital role in empowering the citizen as well as providing market orientation to the governance structure of citizen-centric programmes.

Objectives

- Minimise government–citizen trust deficit.
- Introduce market orientation in government–citizen interface, to the extent possible.
- Minimise disconnect between policy making and implementation.
- Improve efficiency in targeting and resource utilisation.
- Transparency and accountability at all levels and at all times.

Strategy

- Citizen empowerment can make up for the *trust deficit* to a large extent.
- Market orientation of governance can improve the quality of various delivery processes.
- Convergence of beneficiary profiles can improve governance efficiency.
- Use of technology can bring about transparency and accountability in the governance.
- Online transaction capturing coupled with business intelligence can help in fine tuning of policy formulation as well as its implementation.

The Gujarat model of PDS reforms has been largely guided by the aforesaid vision, objectives and strategies. Various component of this project seek to empower the citizen while improving the overall governance efficiency of PDS.

1. Digital Inclusion

As stated earlier, optimum utilisation of NeGP components is one of the salient features of implementation of this project. In particular, Common Service Centres (CSCs) play a very critical role. In case of Gujarat, e-grams at village panchayats would be the backbone of the digital inclusion process. These would become operationally viable while bridging gaps in languages, demographic and cultural differences, if any.

2. Green e-Governance

As such the centralised processes of project implementation have minimised addition of hardware. Except for the elaborate usage of food coupons in the customers' larger interest, mostly green practices have been adopted during the course of project implementation.

Raj Kumar, IAS, Principal Secretary, Food, Civil Supplies and Consumer Affairs Department, Gandhinagar, Gujarat. e-mail: secfcs@gujarat.gov.in

Kiran Oza, Under Secretary, Food, Civil Supplies and Consumer Affairs Department, Gujarat, e-mail: us-pds-fcs@gujarat.gov.in

Dynamic Integration of Property Registration, Land Records and Cadastral Maps, Government of Haryana

Ashok Khemka, Ghan Shyam Bansal and Gurpreet Singh Saini

PROJECT OVERVIEW

A citizen cannot be more concerned about anything than land because it is his or her source of income, valuable immovable property or a place of dwelling. Even institutions, corporate bodies and societies are equally concerned about land. The fact that this concern affects citizens very deeply and almost universally increases the importance of land administration. Moreover, manipulation of revenue records hurts both rich and poor alike. In reality, the image of governance is created by the performance of land administration, which is facilitated by the state revenue department through maintenance of land records, registration of property transactions and updating of records through mutations and cadastral maps.

To improve accessibility, stop manipulation and enhance efficiency of the land record system, the Government of India has launched NLRMP (National Land Record Modernisation Programme) with a primary objective of end-to-end computerisation of land records, and subsequently migration from the existing presumptive titling system to a conclusive titling system.

Goals and Objectives of the Project

1. Integration with HARIS to check frauds at the time of registration
2. To provide details of sellers from the Jamabandi database, directly to the process of property registration system, to help stop re-selling of property without mutation
3. Acceptance of mutation request at HALRIS centre for all type of mutations including the mutations written on the basis of Roznamcha entries
4. Reduce the dependency of the farmers on the Patwari (village accountant)
5. Automatic generation of new Jamabandi at the time of consignment
6. To provide authenticated and secure ROR (Nakal or Record Of Right) services a citizens.
7. Improve the overall efficiency of the revenue officials.

8. Improved delivery of government to citizen (G2C) services related to land administration.
9. To implement a complete integrated solution for the management of land records and property registration work in the state
10. Online maintenance of *Jamabandi* using an integrated mutation module
11. Maintain double view of *Jamabandi*, i.e., online *Jamabandi* and intermediate *Jamabandi*

In Haryana, the workflow based property registration information system (HARIS) and land records information system (HALRIS) were standardised, stabilised and dynamically integrated to reflect the impact of registration of land on *Jamabandi* and to provide authenticated and secure ROR (*Nakal* of Record Of Right) services to the citizens. Thereafter, the cadastral maps (Mussavies) of Sirsa and Ambala districts were also digitised. It was observed that unless the two data sets (textual records of rights and spatial cadastral maps) were also integrated and the entire information taken into public domain, the real benefits to the citizens from ICT interventions will be limited. With these objectives in mind, a complete integrated end-to-end solution was developed for delivery of a bucket of e-services to the citizens (the services include issuing of computerised RORs along with a digitised map of the land, registration of documents, mutations, calculation of stamp duty, online photo capturing of buyers, sellers, witnesses etc), with greater transparency, authenticity and ease of e-service delivery. This kind of integration is one of the major requirements for migrating from the existing presumptive land titling system to the proposed conclusive land titling system of land records.

Haryana Property Registration Information System (HARIS)

The NIC Haryana State Centre developed the Haryana registration information system (HARIS). As of today, HARIS is implemented in all the tehsils and sub-tehsils (a cluster of villages, also known as a taluka) in Haryana.

Salient Features of HARIS: The characteristic features of HARIS include usage of local language and provision to prepare deeds through software. Twenty-two types of applicable deed registration templates were also studied, standardised and converted into XML documents. These templates were made available in all HARIS centres in the state to facilitate the general public. There are segment wise collector rates for each area. Online photo capturing of buyer, sellers and witnesses is a must, and there is provision for bio-metric authentication.

HARIS Implementation Model: Initially, district Red Cross societies were found handy, for implementing HARIS, in Haryana as the Dy. Commissioner is chairman and controller of its functions. The District Red Cross societies took service charges from each applicant as budgetary support for sustaining

the project. Later on, the District IT Society (DITS), which are headed by the Dy. Commissioner, were formed in each district. The DIO, NIC Haryana Centre is the Technical Member of DITS. The service charges, collected from the HARIS, are now shared by the Red Cross (40%), DITS (50%) and the remaining 10% are sent to the State Revenue Department for sustainability of the project and further IT initiatives of the department.

Benefits Accrued to the Citizens: (a) HARIS has improved the quality of service in tehsils, by reducing the total time taken by the tehsil staff for registration. Now registered deeds can be returned to the public the same day; earlier, it sometimes took weeks/months to get a registered deed. (b) HARIS use land rates, fixed by the collector, as reference rates, for computing the stamp duty. So, it does not allow the registration of land below collector rates. This feature of HARIS has eliminated the requirements of pre-registration audit. The state government has now stopped pre-registration audit of documents, which has saved the general public from harassment at the hands of auditors. (c) The facility to generate ROR with 2D bar code and verification service has been made available at district headquarters level tehsils. This solution has created a feeling of trust among the landowners. With the increasing land prices, potential buyers can use this system of ROR verification before entering into any sale and purchase of land. Bank and other financial institutions can use this service before disbursing loan to the landowners. (d) In HARIS, the photographs of witnesses are also taken along with the sellers and buyers. This has reduced incidences of wrong witnesses, which was very prevalent before the implementation of HARIS. (e) The district Red Cross society uses the HARIS service charges for running social welfare programmes for the weaker sections of the society.

Benefits to the Government: (a) HARIS has forced collectors to make their collector rates uniform. Earlier, there was a big difference between the collector rate and the open market rates of the property. In HARIS, it is possible to fix a separate rate for different parts of the same locality by dividing it into a number of segments. This has reduced the practice of concealing the exact location of property to save stamp duty. (b) In HARIS, it is not possible to register a document below the collector rate. This has stopped revenue leakage caused by the registration of undervalued deeds. (c) HARIS has also reduced cases under section 47-A of the Registration Act, to a considerable extent. It was a common practice to register an undervalued deed in the first instance; thereafter, the parties get these impounded from the *Tehsildar*. Later, they were able to get the deed back, by paying a bribe or a small amount of fine. (d) The HARIS project has been generating funds from more registrations as service charges, making HARIS a self-sustainable project.

New Initiatives taken on HARIS: (a) Transmission of registered deed's data daily from the tehsils/sub-tehsils to the NIC state data centre using

automated web services and state wide area network/NICNET. The Revenue Department uses this data to prepare summary reports related to revenue collections. (b) Token system is implemented in tehsils where registration load is high like Gurgaon, Faridabad, Hisar etc. This system helps in the management of queues for registration work. (c) Old data from all the tehsils/sub-tehsils is being consolidated at the state data centre for establishing a data warehouse. (d) HARIS has been dynamically linked with HALRIS (a unique pioneer feature in the country)

Haryana Land Records Information System (HALRIS)

After the successful implementation of HARIS, it was decided to convert the computerised land records system into a workflow based, integrated system with the following goals and objectives:

- a. To link registration with mutations, so that mutation notice can be generated immediately after the registration of the document, thereby, doing away with the second visit by citizens to the tehsil office for mutation entry
- b. To generate *Nakal* (copy of record of right) online and issue it to the general public at tehsil level
- c. To generate new *Jamabandies* automatically
- d. To dynamically link land registration and land records for the transactions related with agricultural property, using a workflow based approach, so that complete solution can be provided to the citizens through a single window.

Standardisation and simplification: All type of reported cases related to the writing of *Jamabandi* (ROR) and mutations were studied, standardised and simplified, so as to maintain uniformly across the state. The cases, which could not be simplified, were incorporated in HALRIS through suitable customisation and enhancement of HALRIS. There have been continuing enhancements.

Salient Features of HALRIS: (a) Dynamic integration of registration and mutations. (b) Automated mutation workflow. (c) Online mutation incorporation facility. (d) Automatic updating of remarks in the *Jamabandi*. (e) Generation of new *Jamabandies* and consignment in the e-record rooms. (f) Usage of Hindi language. (g) Bio-metrics and role based security. (h) 2D Bar coded copies of record of rights (RoR). (i) Web enabled access to ROR data through <http://jamabandi.nic.in> and touch screen based kiosks interface.

Impact of HALRIS: (a) Availability of updated copies of ROR to the public through information kiosks added new dimensions to the delivery of services in the state. (b) Reduction in litigations, due to on-line availability of updated record. (c) Low manual intervention and data capturing at source, leading to less errors. (d) Web enabling to bring land records from the hands of the *Patwari* to the whole world and to bring transparency in

accessing the ROR on anytime, anywhere basis. (e) Dynamic integration of HARIS and HALRIS in an integrated workflow environment has provided a unified and complete system, which has been appreciated at the national level, Revenue Secretaries Conference of SAARAC (South Asian Association for Regional Cooperation) countries and visiting teams of World Bank.

Digitisation of Cadastral Maps (Spatial Records)

The digitisation of cadastral maps of Sirsa and Ambala district were taken up through HARSAC (Haryana Space Application Centre), Hisar. HARSAC has digitised all available cadastral maps of Sirsa and 346 villages of Ambala. There are about 68,000 village maps (known as Mussavies/cadastral maps) in the state. The process of digitisation of cadastral maps and methodology adopted is briefly discussed below.

For every village, there are cadastral maps having parcels of land (popularly known as *Khasra*), which form the basic record of revenue administration.

The following steps were followed: (1) Collection of village maps of the districts from the *Patwaries*. (2) Cleaning/correction of the maps to make them scan ready. (3) Scanning of village maps at minimum 200 dpi gray scale mode in *.tiff format. (4) Noise removal of the scanned maps. (5) Printing the scanned map on 90-micron transparency sheet with 100% matching on 1:1 scale output and matching them with the original maps; if it matches with the original maps then a final printout of the same is taken. (6) Conversion of scanned map to vector format—in the on-screen digitisation process, the scanned maps are converted from raster to vector using software. (7) Quality assurance of digitised maps—the digitised data of each feature is assigned along with appropriate feature code and symbols, finally leading to the arrangement of data as per the layering scheme. The line, point and polygon features are classified. Polygons are created and problems like undershoot/overshoot and duplicate lines etc are edited. Manual checking is done by the revenue staff ensuring matching of each and every plot. Corrections are done by following the required quality standards. (8) After completing all the checks, the final printout of the digitised maps is taken; in the process of map composition, a standard template is created wherein different layers such as point, text, line, area etc are used. The final composition is done from a particular layer including various non-map features such as letter boxes, railway lines etc. (9) The final output map is the completely composed map, which is identical to the original map with the plot numbers printed over them. (10) The individual vectorised sheets are converted into shape file (.shp) format, which is used for integration with the records of rights. The programme of digitisation of cadastral maps of the remaining districts has been outsourced to four GIS companies, through open tenders by the state Revenue Department, with the technical support of HARSAC and NIC Haryana State Centre.

RESULT INDICATORS

1. Key Performance

ICT Based Services

The integrated HARIS and HALRIS system provides many services to the citizens (Table 1).

Table 1 *e-Services to citizens*

1. <i>Nakal</i> of record of right (<i>Parat Patwar</i>)	2. Registration of property deeds
3. <i>Nakal</i> of RoR (<i>Parat Sarkar</i>) e-record room	4. Issuance of copy of registered deed
5. Copy of <i>Khasra Girdawari</i>	6. Issuance of mutation notice
7. Verification of <i>Nakal</i> of RoR	8. Information on registered deeds
9. Web based RoR query service	10. Token based queue management
11. Copy of mutation order	12. Query on village map
13. Collector rates of property	14. Map of the selected <i>Khasra</i>
15. Stamp duty calculations	16. Division (<i>Tatima</i>) of <i>Khasra</i> during the mutation entry
17. Deeds writing: Standard deed templates	18. Theme based queries
19. Buyers/sellers photographs and finger print capturing	20. Copy of <i>Sajra Aksh</i> (plot/parcel map), showing dimensions of each side, area and the adjoining plots and textual RoR data

2. Efficiency and Improvement Initiatives

1. The system has improved the quality of service in tehsils by reducing the total time taken by the tehsils staff for registration. Now documents are returned the same day to the public—earlier, it sometimes took weeks/months to get a registered deed.
2. Online photographs of witnesses are also taken along with sellers and buyers. This has reduced the incidences of wrong witnesses, which was very prevalent before the implementation of this system.
3. Online availability of updated *Nakal* of ROR (record of right) to the public helped in reduction of litigations and frauds, as now it is not possible to sell the same piece of land to multiple parties/peoples.
4. The system has also helped in generation of around 500 jobs for the local Haryana boys and girls, as all the operators have been appointed from local areas.

5. The middlemen, who were the main source of corruption, have been eliminated from the process.
6. After the implementation of the system, there was a 40% increase in the stamp duty collection. The increase was even recorded during the period when the state government had reduced the stamp duty. This increase has been possible as the system has forced collectors to make their collector rates uniform. Earlier, there was a big difference in the collector rate and the open market rates of the property.
7. Further, now it is not possible to register a property below the collector rate. This has stopped revenue leakage caused by the registration of undervalued deeds.
8. The system has also reduced 47-A cases to a considerable extent. It was a common practice to register an undervalued deed. The parties would then get it impounded by the *Tehsildar*. Later on, they would get the deed back by paying a bribe or a small amount of fine.
9. The project has been generating Rs. 5–6 crores rupees per annum from registrations as service charges. Till date, more than Rs. 60 crores have

[illegible]

Figure 1 *A copy of the sample record of right*

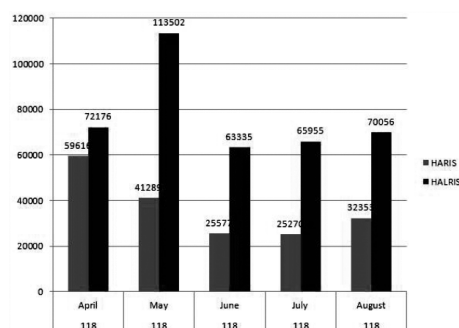


Figure 2 *e-Services statistics from April 2012 to August 2012*

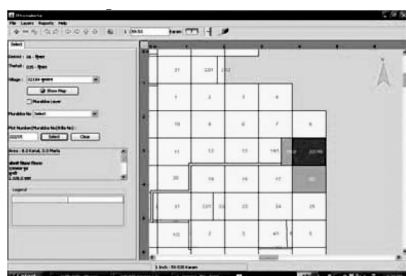


Figure 3 *A sample digitised cadastral map*

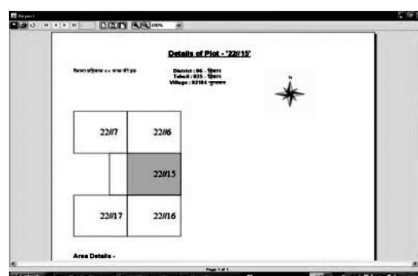


Figure 4 *A sample map of individual land parcel (record-of-right)*

been collected as service charges, which is enough for executing other e-governance projects related to Revenue Department.

10. The district Red Cross societies and IT societies are using a part of this fund for running social welfare programmes for the weaker sections of the society and rural masses in their district.
11. The citizens know beforehand what charges they are required to pay.

Figures 1–4 show some samples of documents generated by the system.

ENABLER INDICATORS

1. Process Reengineering

The software development team and domain experts studied various types of deeds, registration work, writing style of *Jamabandies* by Patwaries in different areas of the state. Mutations types and sanctioning were also studied across the state. It was found that each *Patwari* used multiple ways of writing the shares of owners/cultivators in the same *Jamabandi*. The challenge was to standardise the system across the state.

Online Village

An online village is one for which *Jamabandi* data has been updated by applying all the sanctioned mutations and red entry remarks. Some of the challenges in making land records online were as follows: (1) Acceptance of mutation request at HALRIS centre for all type of mutations including the mutations written on the basis of *Roznamcha* entries. (2) Reducing the dependency of the public on the *Patwari*. (3) Automatic generation of new *Jamabandi* at the time of consignment. (4) Integration with HARIS to check frauds instantly at the time of registration—the challenge was to pick the details of sellers from the *Jamabandi* database so that without doing the mutation, the new owner cannot sell the land. (5) Integration of two data sets (textual records of rights and spatial cadastral maps) so as to take the entire information into the public domain.

Process Standardisation and Simplification

(1) All applicable deed types were studied and standardised into 22 types of deed registration templates. These templates were converted into XML documents and made available to all HARIS implementation centres in the state. (2) All type of reported cases related to the writing of *Jamabandi* (ROR) and mutations were studied, standardised and simplified so that they could be handled under HALRIS uniformly across the state. The cases which could not be simplified were incorporated in HALRIS through suitable customisation and enhancement of HALRIS. (3) HARIS and HALRIS were dynamically integrated in a workflow environment to facilitate online

availability of record of right (ROR) on an anytime, anywhere basis with security and transparency.

Operational Flow in Online Scenario

In case of online villages, HARIS immediately posted the remarks in col. 12 of the *Jamabandi* of the *Khewats* transacted in the registry. This remark shows the name of the seller and date of registry, and is done to alert the prospective buyer regarding multiple sale of land. As every registry seller had to take a fresh *Nakal* of ROR from the tehsil centre, after registration, ROR of affected *Khewats* clearly show that some transaction has already been initiated on this *Khewat*. Documents after the signatures of sub-registrar come to the mutation window for mutation entry. Request for mutation is not generated from the registration process like inheritance etc which directly come to the mutation entry window. The *Patwari* sitting at the window examines the papers and helps the data entry operator for mutation entry. Registration remarks automatically disappear after mutation entry and pencil remarks as written by the *Patwari* in the manual process, come automatically. A printout of the mutations is given to the office *Kanungo* (*Tehsildar* revenue clerk) for verification and he or she records a verification report in the mutation verification module. If verification report is fine, the mutation can go for attestation. The CRO takes the computer-generated hard copies of mutation to Jalsa-ai-Aam. All mutations decided by the *Tehsildar* come to the tehsil centre. The CRO uses the mutation sanctioning module to sanction or reject the mutations. Remarks in the col. 12 change to red for *Khewats* of sanctioned mutations. The tehsil centre *Patwari* then executes the incorporate mutation module to implement the sanctioned mutations. This turns the mutation remarks from red to black in the online *Jamabandi* whereas in the Parat Patwar they will remain in red.

Delegation of Authority

Collectors has been authorised to declare any tehsil online. Since the project is being implemented through district Red Cross societies /district IT societies, collectors has been empowered at the local level to appoint operators, out-source data entry and verification, procure requisite hardware. The Collector can spend the funds collected as service charges as per local requirements. The *Patwari* posted at the HALRIS centre can issue a signed copy of ROR. Standard deed templates have been provided in the system. Now another option is available with the citizens to get the deed written directly at the HALRIS Centre without paying any extra cost.

2. Capacity Building

Leadership Support

The Financial Commissioner Revenue constituted state level standardisation and a Monitoring Committee. A full paper on this e-governance initiative has been included for newly recruited *Patwaris* in the state.

Change Management Strategy

NIC Haryana state centre constituted a dedicated team of professionals for the project. Workshops were organised at division commissioner level, where all stake holders were called and various re-engineered processes were discovered and discussed. At the field level also, detailed discussions were held at the *Patwari* level, private deeds writers, panchayats, retired revenue officials and at the level of district revenue officers, *Tehsildars*, *Kanoongos* etc. Each type of cases in writing *Jamabandi* and incorporating mutations were studied and standardised across the state.

Capacity Building Plan

Two capacity building centres—one at Panchkula and the other at Patwar Training School Hisar—have been established. These centres are provided with the latest software and survey equipment.

Project Management

At the district level, the District Revenue Officer is designated as the nodal officer. Project implementation and service delivery is regularly reviewed by the Deputy Commissioners. At the state level, Financial Commissioner Revenue (FCR) holds video conferencing meetings at regular intervals to review the project. A dedicated team of NIC including the officers at the state level and district informatics officers at district level provides the required support for project management and monitoring.

Financial Model

District IT societies (DITS) provide the budgetary support for the project implementation. User charges are fixed for citizen services. 50% of the revenue collected from user charges is retained by the DITS, 40% goes to the Red Cross Society and 10% goes to the Revenue Department at state headquarters to carry out further IT initiatives in the department. Digitisation of cadastral maps is being done on a PPP basis by allocating the work to four private companies.

Efforts at Sustainability

To ensure long-term sustainability of the initiative, participation of the field staff and general public is enhanced slowly. New services and features are continuously being added to the initiative to make it more people friendly.

3. Technology

Integrated HARIS and HALRIS software is being used all across Haryana for maintaining RoR and for registration of land deeds. After digitisation of Musavies (cadastral maps), the need was felt to integrate the digitised maps with the mutation process of HALRIS so that maps can be updated automatically as a result of mutations.

ICT Solution Adopted

(1) Automatic remarks column updating of *Jamabandi*. (2) Online mutation incorporation. (3) Consignment of *Jamabandi* in e-record room. (4) Role based security. (5) Web enabled access to *Jamabandi* data. (6) Touch screen module for providing *Nakal* and query service with the touch of a finger.

(7) Bio-metric based user authentication. (8) User interface in Hindi.

Security and Confidentiality Standards

1. Village wise and tehsil wise backup and restore option.
2. Security solution developed had two main components—the first one was a 2D bar code generation modules and the other, a bar code verification module. Both these components use 2D bar code, XML and hashing technology.

To integrate the digitised maps with the mutation process of HALRIS, so that maps can be updated automatically, the Bhu-Naksha software, based on open source GeoTools developed by NIC in Chhattisgarh, was studied for its replication and customised as per Haryana requirements. The primary objective was to create a database of cadastral maps in digitised form and link the same into the existing HALRIS software, facilitating display, updating and printing of the cadastral maps.

The system provides the following functionalities:

- a. The system imports digitised and verified cadastral vector data to a spatial database. The system has the provision of importing geo-referenced spatial data.
- b. The software displays the complete cadastral map or single plot/multiple plots along with appropriate scale and north direction. The system displays the linear dimensions of plot boundaries. There is a provision to overlay other layers like canal layer, road layer etc.
- c. The standard symbols (alamaths) can be attached wherever required.
- d. The software allows the user to split the plots into multiple parts as per the mutation process. It further assigns new plot numbers to divided parcels. The system also has the provision to merge plots.
- e. On selection of the *Khasra* (land plot) number, the system shows the cadastral map along with the neighbouring plots. It also shows the

names of the owners of the plot. The system converts the output to print friendly version/pdf for citizen services.

- f. The software can provide spatial outputs based on queries on plots, ownership, government land, forest areas, and crop type as per the textual data availability.

The mutation process of HALRIS was customised and integrated with the *Bhu-naksha*. In case of mutations involving the *Tatima* (division of plots) of *Khasras* (plots), the mutation entry component of HALRIS was enhanced to display the map of the selected *Khasra* and division of the plot on the basis of the map prepared by the *Patwari*. After dividing and assigning the plots to the new owners, the mutation was saved in the two sets of databases (HALRIS and *Bhu-Naksha*). Mutation incorporation process of HALRIS was enhanced to update the cadastral map in case of mutations involving the division of plots. The mutation incorporation effect was reflected simultaneously in the *Jamabandi* and the cadastral map database.

The pictorial workflow of integrated property registration, *Jamabandi*, mutations, cadastral maps and RoR e-service delivery is depicted Figure 5.

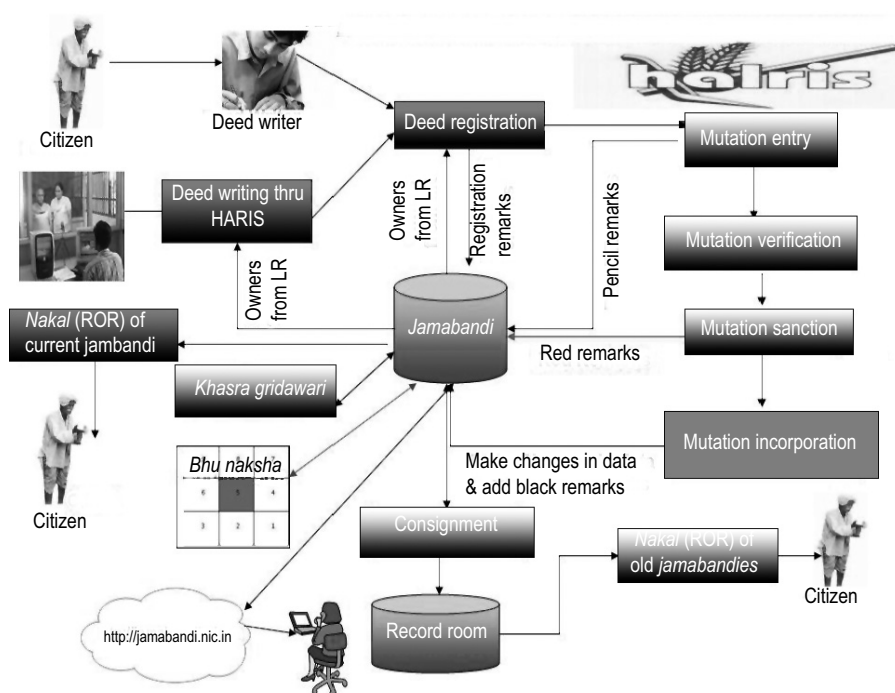


Figure 5 Dynamic integration of property registration, land records and cadastral maps

VALUE INDICATORS

1. Digital Inclusion

The system is developed and implemented using the local (Hindi) language.

2. Green e-Governance

SWAN and HSDC common facilities are used to minimise the burden of extra ICT resources at the service delivery points. Old records are scanned to create space in records rooms. Obsolete hardware is being replaced as per government policy. UPS batteries are replaced under the buyback scheme. Online payment gateways are being standardised for collection of stamps duty through e-stamping/payment gateway modes, which will reduce the paper consumption.

Dr Ashok Khemka, IAS, Director General, Haryana Land Records Department, Haryana, e-mail: Dir_consol@hry.nic.in

Ghan Shyam Bansal, State Informatics Officer, National Informatics Centre HRSC, Haryana, e-mail: sio-hry@nic.in

Gurpreet Singh Saini, Sr. Systems Analyst, NIC-Haryana State Centre, Haryana, e-mail: saini.gs@nic.in

Financial Inclusion in Haryana: Remittance of Social Security Benefits Using Electronic Benefits Transfer, Government of Haryana

A K Yadav and G S Bansal

PROJECT OVERVIEW

Background

The Haryana government provides financial assistance under various social security schemes for the old aged (old age samman), widows, disabled persons, destitute and non-school going disabled children, ladli (girl child), eunuch, dwarfs of the State and to Kashmiri migrants in the form of monthly pensions. This is provided to those who are unable to sustain themselves from their own resources and are in need of financial assistance. There are more than 20.59 lakhs such beneficiaries in the state. The Department of Social Justice and Empowerment, Government of Haryana at the state and district level is responsible for handling this large number of beneficiaries and their records for monthly disbursement of pension at their doorstep. For one reason or the other, there have been reports and grievances of non-disbursement of pension, disbursement to wrong persons, errors in beneficiaries' list and delayed availability of requisite data/information as and when required by the government. Therefore to improve upon the services and benefits of the delivery system and to have better administration while handling such a large number of records, a district level software/database system (HaPPIS) was developed and implemented nine years back for updation of pensioners records, processing and printing of bulky APRs (annual performance reports) village and pension scheme wise for monthly disbursement of pension by revenue officials/ PRI members. Initially, a static website was also hosted for publishing of required information of pensioners and forms, procedures and welfare schemes.

The above system needed radical changes and process re-engineering due to the following reasons.

- Lack of transparency in handling of beneficiaries data/records
- There was no centralised control on deletion of dead, ineligible, duplicate beneficiaries and insertion of new beneficiaries in the database list; also there have been reports of non-disbursement of pension, disbursement to wrong persons, errors in beneficiaries' list and delayed availability of requisite information

- New applications receipt, processing, approval and enrolment was at district level only; there was a need to expand it up to the level of block/MC (municipal committee) offices
- No mechanised channels for taking feedbacks, grievances receipt and addressing
- No effective mechanism for data compilation at state level and dissemination of required information electronically
- No effective methodology for filtration of duplicates and ineligible beneficiaries
- Considerable delays in disbursement of pension

In view of the above, for strengthening the pension/benefits disbursement system and to overcome the other problems of the old system, it banks across the state of Haryana for remittance of benefits directly to bank accounts was planned to introduce the EBT (electronic benefit transfer) scheme to the beneficiaries. The solution development work started in-house in the month of October 2010 and EBT started with effect from April 2011.

Objective of Introducing the EBT System

The objective of the system was to remit pension allowances directly into the bank accounts of beneficiaries using the EBT scheme of RBI under financial inclusion and disbursement to the right beneficiaries at the right time (*first of every month*) using a bio-metric based smart card from the nearest CSP (customer service point) manned by BCs (business correspondent) of the designated bank, and de-duplication of ineligible beneficiaries.

The system should also ensure addition of valid and deletion of dead and ineligible beneficiaries online in order to keep the database up-to-date along with other features like migration of beneficiaries inter-district or locally.

Approach Adopted for Implementing the EBT System

- Migration of existing district level databases of pensioners to the centralised database and making it accessible to each district through a dynamic website using a respective user ID/password
- Each beneficiary assigned a state level unique pensioner ID
- Audit trail log generated on server to track the change made in the beneficiary data; district social welfare officers (DSWOs) made responsible and accountable for data updation
- Receipt of new applications at block/MC level offices, their approval and data entry at district level by DSWOs on the central website
- Banks were engaged district wise for enrolment of beneficiaries in the centralised database, opening of no-frill, single, without ATM/debit cards saving bank accounts as per KYC (know your customer) norms and issuance of smart cards to the beneficiaries
- Bio-metric based de-duplication of beneficiaries and integration of valid accounts on the website.
- Issuance of bio-metric based smart cards to beneficiaries for withdrawal

- Generation of district wise XML files (digitally signed) every month for carded and non-carded pensioners as per the up-to-date data available on the website and transmission to banks for remittance of pension to the accounts of carded beneficiaries, while enrolment and opening of accounts continued for non-carded beneficiaries
- Establishment of CSPs at village/block/MC levels and manned by bank/BCs for enrolment, disbursement of pension as well as addressing of grievances and taking feedbacks of beneficiaries
- Banks shall update the website (<http://socialjusticehry.gov.in>) with 'inactive' accounts (where there is no withdrawal for the last 60 days) and 'dead accounts' for stopping remittance of pension to such accounts.

Other Distinctive Features

- Pension amount was remitted directly to the accounts of beneficiaries; interest was also earned on that as applicable to saving bank accounts.
- Beneficiary can track all months pension amounts paid to him or her (through account or manually)
- Withdrawal was only through bio-metric based smart card from the nearest CSP on any banking working day, i.e., benefits do not fall into wrong hands.
- Pension remittance to such accounts was stopped where there was no withdrawal up to 60 days or were marked as dead/ineligible etc and termed as 'dead accounts'. Balances of such accounts were credited back to the account of the government/department.
- Due to inadequate banking infrastructure in rural areas, EBT has started to 6145 accounts of panchayats and MCs to ensure disbursement on the first of every month to each eligible beneficiaries.

Major Benefits

Besides being more effective cost wise and time wise, the system has the following benefits.

- Filtering out of duplicates and ineligible beneficiaries due to bio-metric based identification and disbursement system
- Reducing burden on the government exchequer to a considerable extent
- Availability of required data/information with respect to beneficiaries on the website
- Centralised and secure databases with controlled access using IP addresses and individuals user ID/passwords.

Project Statistics Before and After Project Implementation

The project implementation started in April 2011. Table 1 shows how the system has improved the delivery of benefits.

Table 1 *Comparison of database before and after project implementation*

Sl. No.	Data item description	Database before start of the project	Database as on Sept 2012
1	Number of districts	21	21
2	Blocks headquarters	118	118
3	Villages coded in database	7013	6942
4	Panchayats	Not coded	6066
5	Panchayats accounts integrated	0	6066
6	Municipal committees	71	79
7	Number of social security schemes	9	9
8	Number of beneficiaries	2116539	2058411
9	Bank accounts opened	0	1825827
10	*Monthly total disbursement	130.02 Cr	126.40 Cr
11	Monthly average of data updation of last 6 months	No transaction log was maintained	36,440
12	Number of banks involved	0	10–17
13	Number of CSPs established	0	179
14	Deployment of BC	0	1 BC / 700–800 beneficiaries

*Because of deletion of ineligible and dead beneficiaries

Current Status

- Due to inadequate banking infrastructure, specially in rural areas and non-functioning of bio-metric cards of a significant number of beneficiaries, the grievances of such affected beneficiaries started increasing day by day, and administrative work increased many folds. Therefore the state government has temporarily suspended the remittance of pension allowances to the accounts of individual beneficiaries in the month of April 2012 and directed the remittance to the newly opened pension accounts of 6066 panchayats and 79 municipal committees. *These local bodies were further empowered to distribute pension at the doorsteps of the beneficiaries on the 1st of every month.*
- Directly remitting to the accounts of panchayats and MCs have removed a time gap of around 15–20 days in transferring of pension funds from the state level to the panchayats for disbursement.

RESULT INDICATORS

1. Key Performance

Achievements and Outcomes

- More than 20.60 lakhs records of beneficiaries of all 21 districts have been made centralised and accessible through the public and intra website

- Deletion/addition/updation of a beneficiary has been controlled, and accountability of DSWOs has been fixed; *changes can be tracked by the audit log generated at the server level*
- Enrolment and opening of around 18.30 lakhs accounts of beneficiaries, de-duplication and integration of accounts on the website for remittance of pension allowances to bank accounts
- No cases of disbursement to wrong/proxy beneficiaries due to bio-metric identification, thus filtering out the duplicates and the ineligible
- Establishment of CSPs at the village/block/MC level manned by BC of banks (local youths) for enrolment, disbursement, taking feedback and grievance addressing
- Withdrawal by beneficiaries at their convenience; they also earn bank interest as applicable on their saving accounts.
- Up-to-date beneficiaries list available on website
- Savings to government exchequer due to timely deletion of dead and ineligible beneficiaries

ICT Based Services

G2C

- Pension benefits are remitted directly and in time to the bank accounts of beneficiaries; withdrawal through bio-metric based smart cards which has stopped proxy or wrong withdrawal
- Establishment of CSPs manned by BCs in a cluster of 700–800 beneficiaries for enrolment, opening of accounts, disbursement of pension benefits and addressing of grievances
- Up-to-date list of beneficiaries available on the website for reference as well as copy of the same made available in blocks/MC panchayats for the beneficiaries to look for corrections if any in their records
- New beneficiaries shall be able to submit their application requests at their block/MC offices—earlier it was at district level
- A beneficiary can track the payments made to him or her and apply for corrections if any

G2B

- Digitally signed XML files containing beneficiaries and their pension amount are transmitted to banks to credit their accounts directly with the required summary reports for reconciliation
- Web services are available for downloading the incremental data of beneficiaries and uploading the bank accounts on the website.

G2E

- Facilities of online data updation, processing, retrieval, transmission, generation of required reports and dissemination of information.

Major Benefits Derived from the Services

The system has become *citizen-centric* after the establishment of permanent CSPs (customer service points) at blocks/MC where enrolment and addressing of grievances take place.

- Timely remittance of pension to the accounts of beneficiaries
- Beneficiaries earning interest as applicable to saving bank accounts
- Withdrawal as per the convenience of the beneficiary on any bank working day from CSP
- Beneficiaries can track their monthly pension amounts paid to them
- Only bio-metric identified beneficiary can withdraw pension
- Filters out duplicates and ineligible beneficiaries
- Saving towards exchequer of the government
- Availability of required beneficiary information on the website

The services are planned to be delivered through ICT in times to come as an *SMS alert to the beneficiaries*. It is also planned to link beneficiary databases through web services with other state-owned or central databases having provision for other social benefits for reference etc.

Implementation Coverage

The project is implemented across the state in all 21 districts for more than 20.60 lakhs beneficiaries; pension disbursement under EBT scheme through bank/BCs was implemented in 20 districts; enrolment, opening of accounts, addressing of grievances has become a regular activity

- Permanent CSP (customer service points) has been established *in all 118 blocks* for rural beneficiaries and in all 79 MC (*municipal committees*) for urban area beneficiaries for enrolment as well as for withdrawal of pension by the beneficiaries using bio-metric based smart cards
- One BC (business correspondent) of the bank along with POT (point of transaction) machine has been deployed for a cluster of 700–800 beneficiaries for enrolment and disbursement using bio-metric based smart cards
- More than 6942 villages and 6066 panchayats have been covered under EBT
- BCs are local youths trained in the required operations; website data entry/update is the responsibility of DSWOs and their trained staff
- More than 18.30 lakhs accounts of beneficiaries opened and integrated on the website.

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency Improvements

- Disbursement on the first of every month to all available beneficiaries
- Timely remittance of the pension in the bank accounts of the beneficiaries as well as earning of interest as applicable to saving bank accounts

- Beneficiaries can withdraw required amount as per their convenience within 60 days
- No cost to the beneficiary for availing services
- No cost to the department for solution development as NIC Haryana supports it technically for all required ICT support. However, notional cost to NIC is estimated to be Rs. 30 lakhs per annum
- For providing obligatory services, the designed banks, may be paid as per the RBI norms
- Beneficiaries can track their monthly pension without spending too time.
- Up-to-date beneficiaries list made available in villages /panchayts/MC for the reference of beneficiaries

Innovative Ideas Implemented

- Flash of ineligible and defaulter beneficiaries on the website enabling the administration to check and verify the individuals to prevent them from subsequent enrolment process
- De-duplication of beneficiaries based on finger prints (bio-metric), firstly in district level data and subsequently on state level database.
- Opening of no-frill, single saving bank accounts without ATM/debit cards for beneficiaries and withdrawal of amount only by using smart card after finger print identification. *It will fully stop the disbursement to proxy or wrong beneficiaries. Namberdar/Sarpanch may help in identification in rare cases where bio-metric identification is not successful.*
- SMS alert of remittance of pension amount shall be done to the account holder.

Level of Integration

It is planned to integrate the initiative with the *birth/death certificate system* of the state so that dead beneficiaries could be automatically marked as dead in the database of beneficiaries. Secondly, it is planned to integrate the project with the system of issuance of Unique Identification Number.

ENABLER INDICATORS

1. Process reengineering

ICT and Non-ICT Front-end Changes

For strengthening the new system of pension processing and disbursement using the EBT scheme through banks under financial inclusion (FI), the following process re-engineering have been done/is being done relating to beneficiaries at the front-end.

New Applications Receipt/Handling and Data Updation on Website

- Respective block offices/municipal committees in the state are authorised to receive new applications—earlier, it was directly received by the concerned District Social Welfare Officer (DSWO) at the district level
- Online data entry/updation/deletion of pensioner's applications/records by respective DSWO directly on the dynamic website of the department, using user ID/passwords and IP based access

Enrolment and Opening of No-frill Saving Bank Accounts by Banks

- Covered as per the Service Level Performance Standards (SLPS) for EBT through designated banks
- Downloading of incremental beneficiary data by banks from the website of their respective area using web services for enrolment and opening of no-frill, single saving bank account without ATM/debit cards accounts and again integration of such accounts with the website database
- Issuance of bio-metrics based smart card to the beneficiary

Generation of XML Files for Banks Transfer

- XML (digitally signed) files generated and transmitted to respective banks to credit the accounts of beneficiaries/panchayats/MCs from the savings bank account of the department. The credit-debit transactions take place on the same day.
- Banks further transfer the required data to respective CSPs for disbursement to the beneficiaries.

Pension Disbursement and Establishment of CSPs

- The bank/BC disburses the pension from CSPs (customer service points) on all bank working days
- Disbursement to the beneficiary is done after bio-metric identification using his/her smart card and POT machine available at every CSP with BC
- BCs at concerned CSP address grievances relating to pension
- In case, funds transferred to their accounts, panchayats/MCs distribute the amount on the first of every month

ICT and Non-ICT Back-end Changes

- Verification of facts mentioned in the application by officer concerned at the block/MC level at the time of receipt—earlier it was done by the DSWO only at district level.
- Addition, deletion and updation of beneficiary records have been made centralised and audit trail log of each change is maintained at the server to track any changes made in the data.
- District wise pension is processed along with arrears and interest, if any, using the centralised up-to-date database of beneficiaries, updated by the respective DSWO.

- APR.pdf files sent to each district for disbursement.
- Bio-metrics based de-duplication of the beneficiary data for removing duplicates.
- Beneficiary pension files transmitted to banks in the form of digitally signed XML file for remittance of benefits directly to the accounts of beneficiaries.

2. Capacity Building

Leadership Support

- All required political and bureaucratic support is available for the project. The Chief Secretary of the state himself keeps on issuing guidelines as well as monitors the project progress time to time with all concerned commissioners by calling meetings.
- For monitoring the project effectively, FC and PS (Financial Commissioner and Principal Secretary) level Sr. IAS officers (one officer—one district) have been allotted. Officers make field visits as and when required, but at least once a month and submit their report to the Chief Secretary.
- Since the project delivers social security benefits to more than 20.60 lakhs beneficiaries of the state, it is a sensitive matter—any malfunction hampers the benefits delivery. Hence the project implementation has the consent of the minister concerned and the Hon'ble Chief Minister of Haryana—it is progressing under their leadership.

Change Management Strategy

There are three types of changes.

1. District level officers are authorised to go online with required changes on the website under controlled access
2. Changes can be proposed from the district level officers of the department and banks in the form of online transactions, but they are sanctioned and committed into database at the level of Directorate at the state level.
3. Software/report related changes are received at the directorate level and are reviewed with NIC Haryana. As per approval, changes are incorporated when needed and are for the betterment of the project.

Capacity Building Plan

- State and district level trainings have been organised. As and when any change takes place, they are also imparted on site at the district level.
- District level officers are trained in software operations by NIC for updation of beneficiary data online.
- BC are hired, deployed and trained by banks for delivery of services, enrolment and disbursement.
- Other staff members of the department are also trained in handling allied related tasks.

- Demonstrations are conducted in high level meetings with ministers and Sr. officers.
- Creation of an IT cell and deployment of skilled regular manpower for sustainability of the project by the department is under consideration

Project Management

All required efforts are being done to achieve the set objectives of the project at the earliest within the scope of the system and within the cost and time framework. The major scope of the project is enrolling and opening of accounts of beneficiaries, de-duplicating and integrating the accounts with the website data, processing and transmission of pension XML files to banks to credit the accounts of beneficiaries and disbursement through CSPs using bio-metric based smart cards by the beneficiaries.

The Department of Social Justice and Empowerment, the designated banks, NIC Haryana (solution development) and beneficiaries are the main stake holders of the project.

The project core teams at the state level (all regular officers), besides the nominees are

1. Susheel Kumar, Technical Director, NIC Haryana
2. Dharampal Saini, Sr. Systems Analyst, NIC Haryana
3. R S Budhwar, Jt. Director, Social Justice and Empowerment Department

The project data preparation/handling team at each districts are

1. District Social Welfare Officer
2. Section Officer
3. Computer operator (contractual)

The responsibilities for the proper working of the project are assigned to all stake holders; progress is monitored by calling meetings and by viewing website and field visits. Impact of tardy progress in this project like non-opening of accounts, non-receipt of pension etc, if any, is reflected by the beneficiaries to the government and by show ups to Dy Commissioners. All possible risks relating to resources of manpower, ICT and others relating to law and orders are covered. The respective Deputy Commissioners monitor and manage all type of law and order situations.

Financial Model

- No cost to the beneficiary
- No cost to the department for solution development as NIC Haryana provides all ICT resources. However, notional cost to NIC is estimated to be Rs. 30 lakhs per annum.
- For providing obligatory services of enrolment and opening of accounts of beneficiaries at CSPs, banks may be paid as per the RBI norms.

- Minor cost towards procurement of development tools and hardware etc is borne by the department
- Notional cost of the project is more than 25 lakhs per annum

Efforts at Sustainability

Keeping in view the nature of the project, no additional efforts have been made as such because there is no cost burden on the beneficiary. It is treated under the category of social welfare.

3. Technology

ICT Solution Adopted

So far, the ICT resources of NIC Haryana have been utilised for solution development, testing, hosting and implementation. The IT cell in the premises of the user department is under establishment. MS SQL server 2008 is utilised for database handling and business logic is developed in the .NET framework version 2.0 on Windows platform. The solution is hosted on IIS server. There is no maintenance burden on the department, yet. The solution is compatible with NeGP standards as it could run on SWAN also. The department is planning to shift the website to the state data centre.

Security and Confidentiality Standards

Application level security features namely, user ID/passwords, authentication, hashing/MD5 techniques of passwords, encryption of data and client-server side validation checks, protection from SQL injections have been incorporated. IP based access of the website on the network made it more secure. Moreover, the application is hosted on NIC's server located in IDC at NIC headquarters, New Delhi, which is highly secure and has the latest security features inbuilt.

Disaster Recovery and Service Continuity

Since the application is hosted at NIC data centre and the NIC, IDC comply with the standard web policy of the Government of India, all issues relating to data security and disaster recovery are well addressed. To the department's knowledge, the offsite online back up is also created.

VALUE INDICATORS

1. Digital Inclusion

All stake holders and beneficiaries are equally benefited from the project; none of the beneficiaries are deprived of services because of language, demographic and cultural differences.

- The project database of beneficiaries is *bilingual*, i.e., Hindi and English. Banks are comfortable with English and beneficiaries are comfortable with either language.
- Each and every village/MC is covered under the project, and benefits are delivered to all on the same pattern. There is no constraints because of demography.
- No cultural differences are entertained. All the beneficiaries included in the project are Hindi speaking and writing.
- To ensure maximum digital inclusion, all stake holders dispense with their responsibility through e-participation, for example, the beneficiaries withdraw their benefits using smart card, web services are available for banks to access incremental data and integration of accounts on the website. Digitally signed XML files for remittance of pension are generated and transmitted to banks. Department people at district and state level are responsible of online data updation etc.

2. Green e-Governance

ICT facilities created under the project have taken care of green e-governance to the extent possible i.e.

- No e-waste has been created except used printer ribbons, toner cartridges and UPS batteries which are sold for re-use or recycling purpose.
- Other methods of e-waste treatment namely incineration (burn) or landfilling are not required to be used due to negligible e-waste generated from the system.
- Obsolete P4 computer machines are utilised for normal word processing tasks
- Paper, resources and energy savings due to electronic banking transfer (EBT)
- To save towards resources and power, the existing ICT facilities like data centre of NIC are shared.

A K Yadav, IAS, Director General, Social Justice and Empowerment, Government of Haryana, e-mail: akyadavias@gmail.com

G S Bansal, State Informatics Officer, National Informatics Centre (NIC), Haryana, e-mail: sio-hry@nic.in

Loka Mitra Kendra Project, Citizen Service Centre, Government of Himachal Pradesh

Subhasish Panda and Anil Semwal

PROJECT OVERVIEW

The common services centres (CSCs) project was conceptualised as front-end service delivery outlets to enable smooth and transparent governance at the village level to touch rural India. The objective of the CSC project is to deliver, and make accessible all government, social and private sector services in the areas of agriculture, health, education, entertainment, banking and financial services, utility payments, etc. to citizens at an affordable cost and at their doorsteps. As per the scheme, these centres are to be set up in *PPP (public-private partnership) mode*. The PPP model of the CSC scheme envisages a three-tier structure consisting of the CSC operator (called the village level entrepreneur or VLE); the service centre agency (SCA), that will be responsible for a division of 500–1000 CSCs; and a state designated agency (SDA) identified by the state government responsible for managing the implementation over the entire state.

The Three-Tier Implementation Model

The CSC project is implemented under the PPP model. This creates a conducive environment for the private sector to play an active role in implementation of the project, by becoming a partner of the government in development of rural India.

The implementation at the three levels (Figure 1) are described below:

Level 1: A village level entrepreneur (VLE—loosely analogous to a franchisee) sets up a CSC in the nodal village to provide service to rural consumers residing in a cluster of 5–6 surrounding villages.

Level 2: The service centre agency (SCA—loosely analogous to a franchiser) is an operator which manages, trains and builds the VLE network across the district. An SCA can service one or more districts in a state.

Level 3: The state designated agency (SDA) facilitates the implementation of the CSC scheme within the state. It is primarily responsible for providing policy, content, financial and other support to the SCAs in the state.

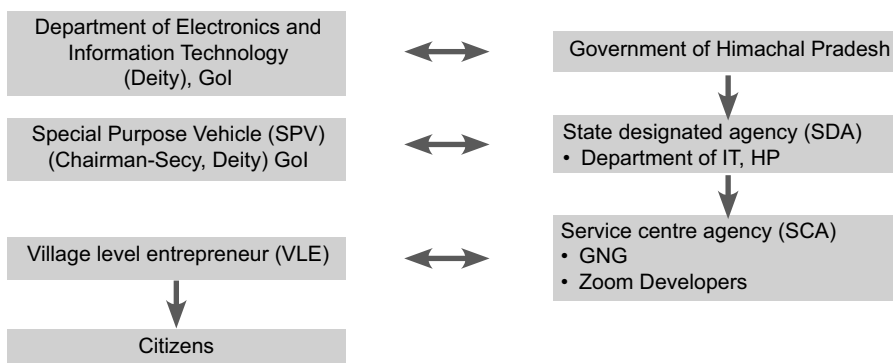


Figure 1 *Three-tier implementation model*

Objectives of the Project

The project envisages various direct/indirect social as well as economic benefits to the rural masses:

- Better and efficient delivery of government and non-government services in the rural areas in an integrated manner under a single roof.
- Reduction in response time by the concerned departments and increase in their accountability to people of the state.
- LMKs can act as a link between the community and the government.
- These centres can act as virtual extension counters for the government to get departmental data entered and transmitted from time to time.
- Increased business opportunities and direct employment for the local youth of the panchayats by becoming village level entrepreneurs (VLEs) in the CSC scheme.
- Savings in time and cost of the people visiting departmental offices time and again for availing services, getting information, lodging complaints and inquiring about the status of their applications etc.
- Additional income opportunities from LMKs by using them for general training, Word processing, data entry jobs and extending Internet access.

The Department of Information Technology (DIT), Himachal Pradesh has facilitated the integration of the existing ICT-enabled and other government schemes into the CSC portfolio. It has also coordinated and facilitated the interactions between various state government departments and service centre agencies, thus implementing Lok Mitra Kendra, a project which makes a bouquet of G2C services available to rural people under one roof.

Services Offered through Lok Mitra Kendras

Tables 1 and 2 provide the list of services being offered in Himachal Pradesh through the Lok Mitra Kendras.

Table 1 *Government services offered*

Sl. No.	Services	Department
1.	Electricity bill collection	HPSEBL
2.	Copy of Nakal Jamabandi (land record)	Revenue Department
3.	Copy of Shajra Nasab	Revenue Department
4.	e-Samadhan	Redressal of Public Grievances Department
5.	Bus ticket	Himachal Road Transport Corporation
6.	Water bill collection	Irrigation and Public Health Department
7.	BSNL bill collection	BSNL
8.	Online police complaint	Police Department
9.	AGRISNET advisories	Agriculture, Horticulture, Animal Husbandry and Fisheries Departments
10.	Salary slip	All departments
11.	Pensioners Helpline	All departments
12.	State government employees transfer orders	All departments
13.	Examination results	HP University, HP Education Board, HP Public Service Commission, HP Subordinate Services Selection Board
14.	Application of inclusion of name in electoral roll	Election Department through State Services Delivery Gateway (SSDG)
15.	Application for seeking deletion of name in electoral roll	Election Department through SSDG
16.	Application of transposition of entry in electoral roll	Election Department through SSDG
17.	Application for correction to particulars in electoral roll	Election Department through SSDG
18.	Application for relief for injury death by wild animals	Forest Department through SSDG
19.	Application for issuance of BPL Certificate	Rural Development Department through SSDG
20.	Application for registration under NREGS	Rural Development Department through SSDG
21.	Application for work under NREGS	Rural Development Department through SSDG
22.	Application for soil testing	Agriculture Department through SSDG

Continues

Table 1 *Continued*

Sl. No.	Services	Department
23.	Application for establishment of poultry farms	Animal Husbandry Department through SSDG
24.	Application for establishment of ram centre or sheep breeding	Animal Husbandry Department through SSDG
25.	Application for old age financial assistance—an application for providing pension to non-pensioners who are aged above sixty years	Sainik Welfare Department through SSDG
26.	Application for Gallantry Award Winners Pension	Sainik Welfare Department through SSDG
27.	Application for providing bus pass for award winners and war widows	Sainik Welfare Department through SSDG
28.	Application for providing employment to ex-servicemen	Sainik Welfare Department through SSDG
29.	Application forms	Various government departments

Table 2 *Private or business services offered*

Sl. No.	Services
1.	Telecom SIM selling
2.	Mobile recharges
3.	DTH recharges
4.	Telecom bill collection
5.	Spice-value added services
7.	DLF Pramerica Life Insurance
9.	PAN card
10.	Resume Builder
11.	Telecom data card selling
12.	Solar lights selling
13.	Typing and printing
14.	Data entry
15.	CD burning
16.	Online shopping
17.	Internet surfing

Service Bouquet Framework through CSCs

The service bouquet offered by the CSCs are explained in Figure 2.

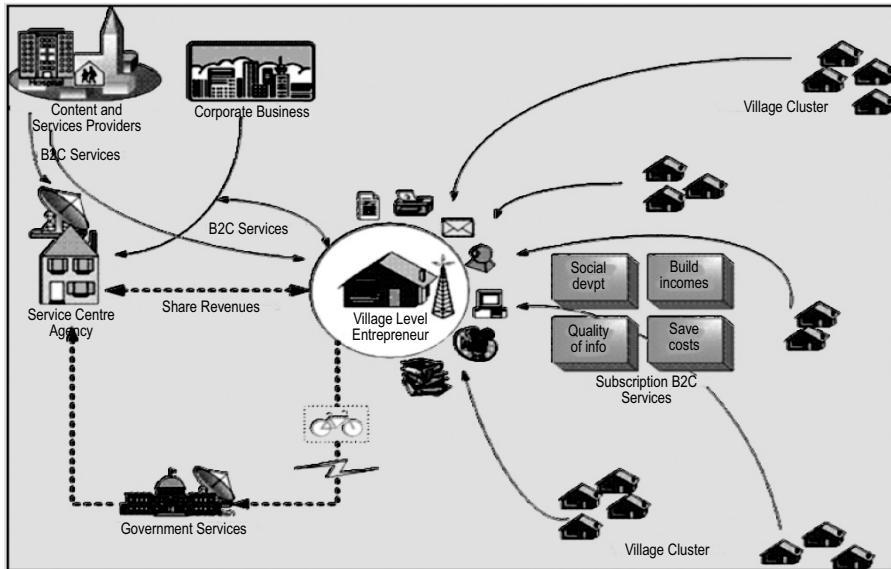


Figure 2 Service bouquet framework

Business Model

The VLE at the Lok Mitra Kendra has to invest one time in infrastructure to be created for delivering electronic services. The minimum required infrastructure is a computer, printer, scanner, UPS, webcam/ digital camera and Internet connectivity. The LMK must have a space of 15×10 feet to install the above-mentioned infrastructure. The VLE also has to pay a nominal franchisee fee to the concerned SCA to start the services.

A working capital has to be maintained by the VLE with the SCA which is reflected in the portal to provide services (G2C—government to citizen and B2C—business to citizen), and for each transaction, the VLE gets service charges as finalised by the concerned department. The SCA gets revenue support from the state government for smoothly running, managing and reporting the status of LMKs. Plus they also get income as commission from the services being delivered through LMKs as per the Master Service Agreement (MSA). The SCA has to deploy minimum manpower as per the MSA signed with the government for smooth implementation and operation of the project. It has the responsibility of training the VLEs regarding the process of delivery of various services to be delivered through LMKs.

For each G2C service there is tripartite Service Level Agreement (SLA) between the concerned department, SDA and SCA. For each service, the SCA also has to deposit a bank guarantee as security to the state department for smooth delivery of G2C services.

RESULT INDICATORS

1. Key Performance

ITC Based Services

The services that are currently being delivered using ICT are explained below.

Electricity Bill Collection for the HPSEB

A tripartite agreement was signed between DIT HP, HPSEB Ltd. and SCAs for collecting HPSEB electricity bills through LMKs in May 2010. This service was the first G2C service provided by the state, and was rolled out through LMKs in the state in October 2010. HPSEB and citizens pay service charges for each transaction to the VLEs. The revenue generated (in Rs.) per month is depicted in the bar graph shown in Figure 3.

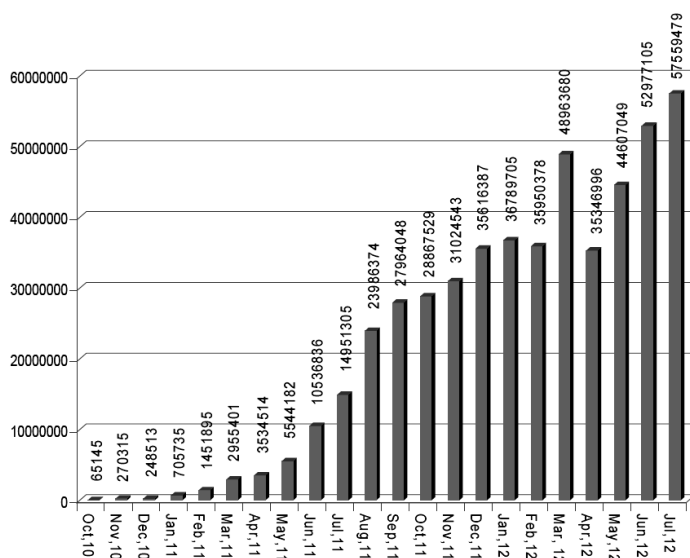


Figure 3 Revenue generated by electricity bill collection

Land Records—Providing a Copy of Nakal Jamabandi

The service of providing a copy of the *Nakal Jamabandi* was rolled-out in February 2011 through LMKs. The number of *Jamabandis* provided is depicted in Figure 4.

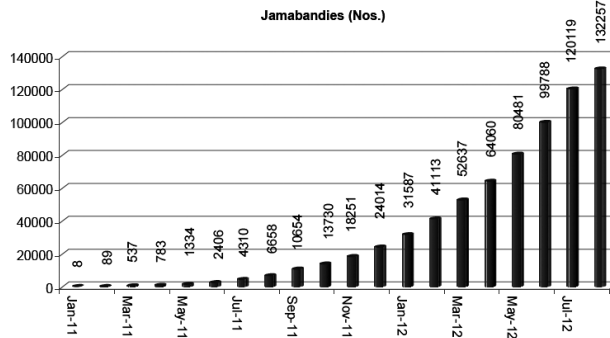


Figure 4 Number of Jamabandies provided

I & PH Water Bill Collection

The service was rolled out through LMKs in September 2011. The revenue generated (in Rs.) per month is depicted in the bar graph shown in Figure 5.

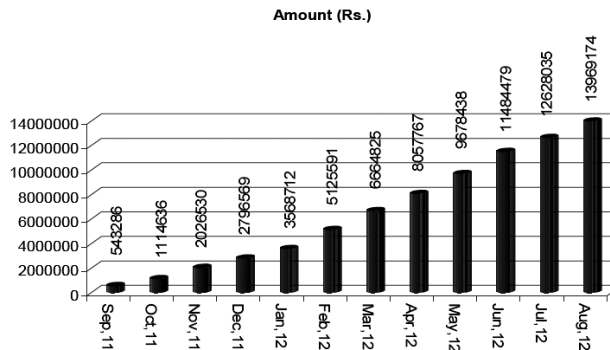


Figure 5 Revenue generated by water bill collection

HRTC Tickets (Himachal Road Transport Bus Tickets)

The service was rolled out through LMKs in August 2011. The revenue generated (in Rs.) per month is depicted in the bar graph shown in Figure 6.

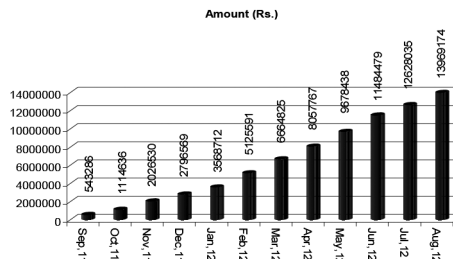


Figure 6 Revenue generated by providing bus tickets

BSNL Bill Collection

The service was rolled out through LMKs in March 2012. The revenue generated (in Rs.) per month is depicted in the bar graph shown in Figure 7.

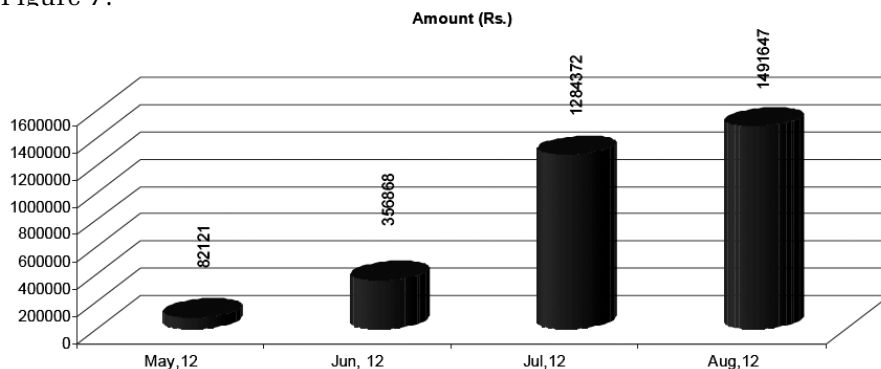


Figure 7 Revenue generated by BSNL bill collection

These bar charts clearly show that transactions of G2C services through LMKs are increasing month by month, and thus resulting in increased returns to the VLE.

2. Efficiency and Improvement Initiatives

The efficiency improvement and benefits realised are as follows.

- Utility bills collected, land records generated and other services being delivered through LMKs are online, thus paper work is reduced which results in better, faster and more accurate reporting at any time at any level;
- The citizen now has the convenience of availing government services available through LMKs at his/her panchayat as per his/her suitability and time;
- There is no additional financial burden on the Revenue Department, as the service charges are to be borne by the users for availing the facility of G2C.
- Availing G2C services through LMKs are optional for citizens. In case, a citizen wishes to visit the government office (or any alternative service delivery point), then it is his/her choice. So, LMKs are basically just expanding the delivery channels;
- The availability of services through LMKs provides a convenient and cost-effective platform to citizens. Services at LMKs are generally available beyond the normal office hours as the VLEs operate their service centers even after 5 pm. This is a convenience for which the citizen is willing to make a nominal payment.

ENABLER INDICATORS

1. Process Reengineering

As per the Master Service Agreement (MSA), the working hours of LMKs are between 10 AM to 6 PM on working days and 10 AM to 1 PM on Sunday, but LMKs remain open beyond 6 PM on working days and the whole day on Sunday. This not only facilitates citizens but also increases the business opportunities for VLEs. Table 3 shows how the process of delivering a service has changed with the entry of LMKs.

Table 3 *Process reengineering with the entry of LMKs*

Service name	Earlier process	Present process
1. Electricity bill collection	Citizen visits the temporary extension counter of HPSEB on a fixed date. In case the citizen fails to deposit the bill amount on that date, he/she visits the sub-division counter to pay the bill by travelling 0–30 kilometres distance.	Citizen visits LMK in his/her panchayat at any time between receipt of electricity bill and last date of payment.
2. Water bill collection	Citizen visits sub-division counter to pay the bill by travelling 0–30 kilometres distance.	Citizen visits LMK in his/her panchayat at any time between receipt of water bill and last date of payment
3. BSNL bill collection	Citizen visits BSNL Citizen Service Centre (only in urban areas) or post office (not in every panchayat) to deposit the bill and hence he/ she has to travel 0–30 kms distance to pay the bill.	Citizen visits LMK in his panchayat at any time to pay the BSNL bill.
4. Copy of <i>Nakal Jamabandi</i>	Citizen visits the Patwari's (village accountant's) office or Sugam centre at the district/ sub-division/block/tehsil headquarters. The <i>Patwari</i> issues copies of <i>Jamabandi</i> of his/ her <i>Patwar</i> circle only.	Citizen visits LMK in his/her panchayat at any time. LMK can issue a copy of the <i>Jamabandi</i> of any tehsil in the state through the web-based application.
5. Copy of <i>Shajra Nasab</i>	Citizen visits the <i>Patwari's</i> office or Sugam centre at the district/sub-division/block/ <i>tehsil</i> headquarters. The <i>Patwari</i> issues copies of <i>Shajra Nasab</i> of his/ her <i>Patwar</i> circle only.	Citizen visits LMK in his/her panchayat at any time. LMK can issue a copy of the <i>Shajra Nasab</i> of any tehsil in the state through the web-based application.

Continues

Table 3 *Continued*

Service name	Earlier process	Present process
6. Grievance registration	Citizen visits the concerned office or MLA or Minister's office or Chief Minister's office to register his/her grievance.	Citizen visits LMK in his/her panchayat at any time. LMK registers the citizen's grievance on the online portal 'e-Samadhan'. The portal routes the citizen's grievance to the concerned office of the concerned department for resolution.
7. SSDG services	Citizen visits the concerned office to submit his application. The department processes the application and the citizen visits the office again to collect his/ her certificate.	Citizen visits LMK in his panchayat at any time. LMK submits the citizen's application in the online SSDG portal through an e-Form. The application is routed to the concerned office of concerned department. The department processes the application and uploads the certificate on the SSDG portal. The citizen gets application status updates through SMS. He/she visits LMK and LMK provides the printout of the certificate to the citizen.

All service provider departments have issued notifications/orders for rolling out these services through LMKs.

2. Capacity Building

The implementation of the project started in August 2008 when the SCAs initiated the identification of VLEs after signing the agreement with the state government. The process of identification and setting up of LMKs took a lot of time for the SCAs and they could be set up only by the end of 2010. There were very few B2C services (no government services) available to the VLEs during this period. Due to the non-availability of government services, lot of doubts started to creep into the minds of the VLEs. Moreover, as there were no services, there was no communication between the VLEs and SCA. As a result, VLEs started to lose faith in the project and it was just on the verge of failing.

Lack of cooperation from the government officials especially those at the lower level: Initially, field level staff of different service provider departments were not aware of the scheme. They were not ready for the re-engineering

of government processes, thereby resulting in non-cooperation and negative publicity by these officials.

Lack of connectivity: Himachal Pradesh is a hilly state and due to the tough geographical terrain, there are problems of Internet connectivity.

Connectivity and establishment cost: Since the provisioning of G2C services requires Internet connectivity and IT equipment, a typical VLE has not only to incur fixed establishment costs (rent of the kiosks, computer hardware and equipment etc.), but also a recurring connectivity cost in terms of broadband/ GPRS connection, electricity charges etc.

Transaction and opportunity costs: For providing G2C services, a VLE has to provide printed copies of Jamabandi, send MIS reports to HPSEB authorities, generate paper print receipts etc which involves transaction costs—all of which has to be borne by the VLE. Moreover, by engaging in LMK activities, a VLE also incurs opportunity cost for the time devoted to providing such activities.

Less service charges: Initially, commission for HPSEB domestic bill was 1% of the bill amount to Rs. 2.5, whichever was lower; and for non-domestic bills it was a fixed price of Rs. 2.50. For a copy of the Nakal Jamabandi it was Rs. 5 per page and for registration of a grievance through e-Samadhan, it was just Rs. 4 per grievance. VLEs were not willing to provide the services due to the very less service charges on G2C services.

Lack of awareness: Citizens of the state were not aware about the availability of government services at LMKs.

Change Management Strategy

DIT HP is creating awareness among the citizens about the availability of new services at LMKs by using various modes of publicity such as advertisements in newspaper, press notes in newspaper, involvement of representatives of local bodies etc.

Capacity Building Plan

In order to eliminate the disconnect with the VLEs and interact with them directly, and to instil faith in the project from the government side, it was decided that block level trainings would be organised by the IT Department in which senior officers of the department would address the VLEs. Accordingly, block level trainings were provided to VLEs and the issues raised by the VLEs were addressed on the spot. As a result, more and more VLEs became active and started delivering the services through their LMKs. Now, video conferencing facility has been provided at block level and trainings are being imparted through video conferencing. During these training sessions, field level officials of service provider departments are also trained which has resulted in improved coordination between these officials and VLEs.

Setting up of LMK Helpdesks: For resolving day-to-day issues of the VLEs, the IT Department has set up a helpdesk for the LMK project. Three operators deployed at the helpdesk resolve VLEs issues and in case, any issue remains unresolved at their level, they escalate the issue to higher authorities/ SCAs for resolution. All the queries, issues and problems of VLEs are resolved on priority basis.

Updates through SMS District-wise SMS groups of the VLEs have been created. All information, new updates of project and training schedules are passed on to the VLEs through SMS.

Project Management

The Apex Committee constituted for review of state e-governance projects under the Chairpersonship of the Chief Secretary reviews the status of LMK projects on a time-to-time basis.

Financial Model

In order to cater to the problem of low service charges, the state government has increased the service charges of existing G2C services and fixed reasonable service charges of new G2C services as given in Table 4 and 5.

Table 4 *Change in service charges of existing G2C services*

Sl. No.	G2C service	Previous service charges	Updated service charges
1.	HPSEB electricity bill collection	1% of bill amount, maximum Rs. 2.50 per bill	Rs. 5 per domestic bill (Rs. 2. 50 by HPSEBL and Rs. 2.50 by citizen) Rs. 10 per non-domestic bill (Rs. 2.50 by HPSEBL and Rs. 7.50 by citizen)
2.	Issuance of copy of <i>Nakal Jamabandi</i>	Rs. 5 per page	Rs.10 per page
3.	Grievance/demand through e-Samadhan	Rs. 4 per grievance/ demand	Rs. 10 per grievance/ demand
4.	Issuance of copy of ShajraNasab	Rs. 10 per page	
5.	IPH water bill collection	Rs. 2 or 2% of bill amount whichever is higher	
6.	BSNL bill collection	Rs. 5 per bill	
7.	Services available through State Services Delivery Gateway	1. Rs. 10 for submission of online application. 2. Rs. 2 for scanning and uploading one page 3. Rs. 10 for downloading and printing of 1 page certificate issued by the concerned department	

Table 5 *Service charges of upcoming G2C services*

Sl. No.	Name of service of Excise and Taxation Department	LMK service charges
1.	Sign-up on portal	Rs. 5 per sign-up
2.	Filling of VAT and allied services registration application	Rs. 35 per application, inclusive of printout of acknowledgement and 2 printouts of filled application.
3.	Downloading of check post declaration Form 26A	Rs. 20 per form (inclusive of department charges of Rs.10 and a printout of the complete declaration form)
4.	e-return filling of VAT Act (where ITC is claimed from up to 50 dealers)	Rs. 50 per return (charges include data entry of return form, LS1 and LP1 and printing of 2 copies of complete return without LS1 and LP1)
5.	e-return filling of VAT Act (where ITC is claimed from more than 50 dealers)	Rs. 50 per return + Rs.10 per extra 50 dealers (including printing of 2 copies of complete return without LS1 and LP1)
6.	e-return filling of other Acts	Rs. 25 per return (charges include data entry of return form and printing of 2 copies of complete return)
7.	Entry of date/time of crossing HP borders with fully downloaded Form 27	Rs. 10 per form including one copy of printout
8.	Submissions of suggestions/grievances	Rs. 10 per suggestion/grievance

Waiving off of penalties of SCAs: Huge penalties were due by the SCAs due to non-performance. Keeping in view the ground level hardships and the aim to make the LMK project a success, these penalties were waived off after the approval of the Apex Committee and the State Cabinet.

Efforts at Sustainability

The state government has created a bouquet of services to be delivered through the LMKs so as to make LMKs financially viable to the VLEs. Apart from the services being delivered through LMKs, which are listed in Table 1 and 2, additional services (Table 6) are being finalised in consultation with concerned departments.

Table 6 *Services which will be offered by the LMKs in the future*

S.No.	Services
1.	Employment exchange registration
2.	Copies of various revenue certificates
3.	Return filing of the Excise and Taxation Department
4.	Issuance of Learner Driving Licenses

Continues

Table 6 *Continued*

5.	Issuance of HRTC concessional passes
6.	Sale of HRTC discount cards
7.	Cancellation of HRTC bus tickets
8.	Booking of goods and couriers (HRTC)
9.	More services (35 in number) through State Services Delivery Gateway (SSDG)
10.	Disbursement of social security pensions
11.	Submission of Education Board's online application
12.	Education Board's examination hall entrance tickets
13.	Education Board result cards
14.	Online application of HP Public Service Commission
15.	Online application of HP Subordinate Services Selection Board
16.	Online Result Card of HP Public Service Commission
17.	Online Result Card of HP Subordinate Services Selection Board
18.	HP Public Service Commission examination hall entrance tickets
19.	HP Subordinate Services Selection Board examination hall entrance tickets
20.	LPG booking

With all these remedial measures put in place, the number of active VLEs have been increasing over the years (Figure 8). Apart from the VLEs shown in Figure 8, there are about 500 VLEs who are providing only B2C services.

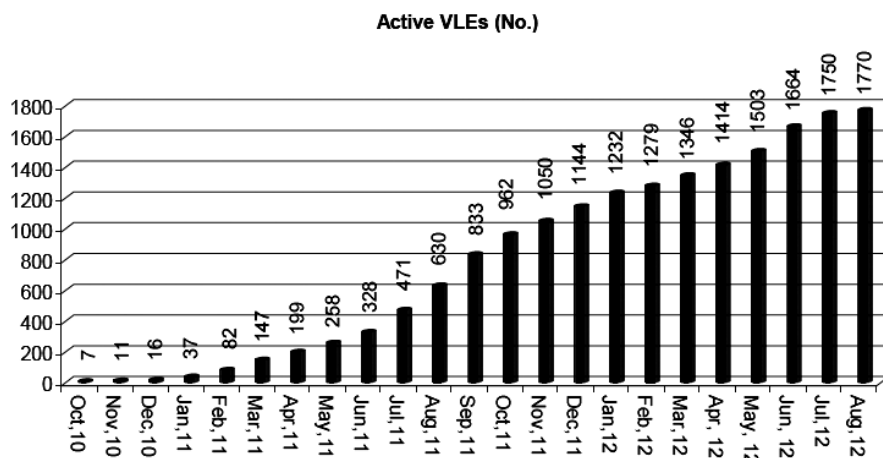


Figure 8 Month-wise Active VLEs providing G2C services in Himachal Pradesh: A journey since October 2010

3. Technology

- i. The IT Department has a dedicated development team to develop G2C services web applications for CSCs using Microsoft Technologies (.Net Framework 2.0, ASPNet, C#, MS SQL 2005). Customised CSC application development is required as, most of the time, separate accounting of financial transactions is needed to calculate the commission/fee of the VLE as well as to customise the user interface so that the VLE can easily use it.
- ii. The CSC applications are developed (Figure 9) either by using web services provided by different departments from existing IT applications or developing all together new applications for service provider departments.
- iii. The developed IT applications are hosted in the IT Department's data centre, which is managed by well-trained professionals following best practices of the IT industry such as security, patch management, data backup etc.

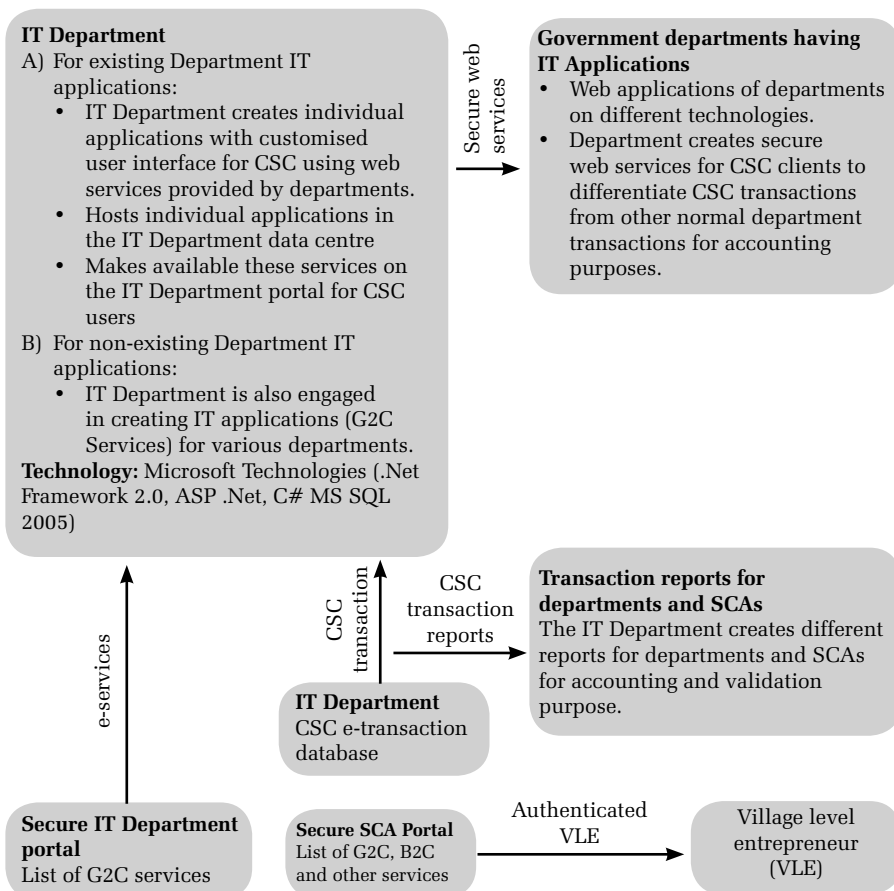


Figure 9 CSC transactions block diagram

- iv. The IT Department has developed a web portal which contains all the e-services (G2C) for the use of authenticated VLEs.

VALUE INDICATORS

Himachal Pradesh has a very challenging topography (hilly areas) making travelling for various services a time-consuming, labourious as well as expensive proposition. Citizens need to travel up to the service point where a particular service is available either at the government office or at a private office. Through CSCs, various services (G2C, B2C etc) are available at the panchayat level at a single point of delivery, which helps the citizen in a big way as it reduces travel (number of trips), time and travelling costs.

Internet connectivity is a key for providing e-services through LMKs along with back-end computerisation of various government departments. The IT department is engaged in integration of different departmental applications and back-end computerisation of various government departments to make more G2C services available for the LMK project along with providing various connectivity options to LMKs such as broadband, VSATs etc.

1. Digital Inclusion

There are a number of local level languages in the state but most of the citizens can speak and understand Hindi. In view of this, the copies of Nakal Jamabandi, ShajraNasab being issued through LMKs are available in Hindi. The SSDG portal is also bilingual, i.e., in English and in Hindi.

2. Green e-Governance

For adoption of green computing practices, instead of paper-based receipts, the IT department and the service provider departments have agreed to provide SMS-based and stamps-based receipts (wherever required) to citizens for the services being delivered through LMKs.

Subhasish Panda, Director, Department of Information Technology, Government of Himachal Pradesh, Shimla. e-mail: dirit-hp@nic.in

Anil Semwal, Deputy Director, Department of Information Technology, Himachal Pradesh, e-mail: anil.semwal@hp.gov.in

e-District, Government of Kerala

C Jayasankar Prasad and K P Noufal

PROJECT OVERVIEW

e-District Kerala is a mission mode project under NeGP (National e-Governance Plan). The objective of the project is to make government services available to the citizens nearer to their home. Common service centres (CSC) shall be the point of contact for the citizens to avail different department services, wherein the CSC operators shall access the e-district application offering various departmental services online. It is planned to implement 46 services of different departments under the project. Twenty-three certificate services of the Revenue Department are already implemented in two pilot districts of Kerala. Under the project, all village offices and taluka offices, the RDO office and the Collectorate are connected on VPNoBB /KSWAN/NICNET. More than 300 Akshaya centres have been designated as CSCs for service delivery. Under this project, more than 9 lakhs applications for various certificates are presently received online in the village offices (<https://www.edistrict.kerala.gov.in/>). All these applications are processed through the workflow built into the system and digitally signed certificates are issued through the CSCs. The objective of bringing government services to the doorstep of the citizen is being achieved through this implementation.

Citizens can apply for services from nearby CSCs. They need not go to the village offices/taluka offices. The citizen perceives the government to be more approachable as there are more CSCs in place than village offices. Besides this, the applications can be filed in any CSC irrespective of the geographical location of the village office, thus saving cost and time. Approachability also increases as the CSCs, which are run by entrepreneurs, work beyond office hours. The government has a fixed fee of Rs. 20/- for each service. Out of this, Rs. 10/- is collected by the entrepreneur running the CSC and the remaining Rs. 10/- is submitted to the government for project sustenance.

Village officers are free from typing/writing the certificates. The certificates are generated on the basis of a verification report by the Village Officers/ Village Assistants on the data entered by CSCs. Thus, officers can save time and utilise the time saved for other core activities. Online database verifications supports fool-proof decision process. Verification reports from village to taluka offices are handled in the workflow thus saving time, paper and postage.

The project was inaugurated in Kannur district in December 2010. During 2011–12, it was implemented in all village and taluka offices in the pilot districts. It is planned to be rolled-out in the remaining 12 districts in 2012–13 in three phases. The first phase includes the rolling

out in Pathanamthitta, Malapuram and Kottayam districts (by September 2012), the second phase involves rolling out in Ernakulam, Alapuzha and Kozhikode districts (by December 2012) and the third phase involves the rolling out in the remaining six districts (by March 2013).

RESULT INDICATORS

1. Key Performance

ICT Based Services

G2C Services

e-District delivers 23 services through CSCs. The citizen can apply for these 23 services from nearby CSCs and need not go to village offices/taluka offices. As mentioned before, for the citizens, approachability of the government increases as more CSCs are in place than the number of village offices. The applications can be filed in any CSC irrespective of the geographical location of the village office, thus saving cost and time. Receipts are issued to applicants wherein the registration number and application numbers are printed for further access. SMS are sent to the applicant at each stage of processing and on approval for collecting the certificate.

G2B Services

Established Akshaya Centres in Kerala are designated as CSC. With the introduction of government services, the earnings of the entrepreneurs have increased. The acceptance of the system by the citizen demands more CSC in every locality. This will create more opportunity for entrepreneurs.

G2G Services

The workflow defined in the e-district project provides the facility to forward the enquiry report on the applications from village to taluka or from one village to another. Statistical reports are available for review. Dashboards are introduced for monitoring. Administrative modules are available for assigning charges/privileges. Supervisory roles can monitor the office-wise performance thus improving the performance of the village and taluka offices. SLA (Service level agreement) is built into the system to monitor and comply with the citizen charter and ensure timely delivery of services.

Services Planned to be Delivered

Right to information (RTI) services and public grievance (PG) are planned for the next phase. In RTI, the applicant can submit the application online from any CSC to any office where the state Public Information Officer (PIO) is functioning. Similarly, RTI appeal applications can also be submitted online through a CSC.

PG service can handle any type of PG addressed to a department. The workflow will take care of the redressal till the Action Taken Report (ATR) is prepared and approved.

After the RTI and public grievance services roll out, the various services under public distribution system (PDS) (such as issue of new ration card, issue of duplicate ration card, addition of name, deletion of name and modification of name) shall be rolled-out along with the revenue court cases and various utility bill payments. The software application for these services is ready and is in its final stages of deployment.

Implementation Coverage

The total geographical area of both the pilot districts is covered under the project. It is implemented in 285 village offices and 8 taluka offices. Infrastructure has been created for all these offices. Implementation in all the offices in the pilot districts was achieved during the year. 300+ CSCs spread over 171 grama panchayats and 10 municipalities in the pilot districts are participating in the process. The category of stake holders covered includes all citizens residing or having property in the respective districts, including students.

The geographical roll-out of the project shall be carried out in three phases, as explained earlier. The first phase shall include the rolling out in Pathanamthitta, Malapuram and Kottayam districts (by September 2012), second phase shall involve rolling out in Ernakulam, Alapuzha and Kozhikode districts (by December 2012) and the third phase shall consist of the rolling out in the remaining six districts (by March 2013).

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency Improvements

Before the implementation of the project, the citizens have to travel long distances to the village offices/taluka offices, etc., since the particular services are delivered only from the respective village office/taluka office—this involved a lot of time and cost. However, now, since the CSCs are open beyond office hours, the citizen can submit applications without visiting the respective village/taluka office, and also without disturbing their daily schedules, thus saving wages in case of workers/employees etc. Time is saved in the village offices also, because only the verification details needs to be entered—the certificates are auto generated with the data entered by the CSC. The extra manpower can be utilised for other core activities.

Innovative Ideas Implemented

Before the introduction of the e-district project, various application forms were used for providing various services. Different pre-printed forms were available for each certificate. Also, there was no provision to re-utilise the details of a

citizen captured earlier for providing a services, to provide other services to the citizen later. Hence, a citizen had to submit the same data over and again to avail various services from a single office. As part of the e-district project, a common application form has been introduced to apply for any of the 23 certificate services. An incremental database of the citizens was also developed with a unique e-district id for each citizen registered with the e-district application. Hence, the citizen needs to furnish the basic details only once in order to register and generate an e-district id. From the next time onwards, he or she needs to provide only the service-specific information thus eliminating duplication of data and also saving time for entering various details.

Every certificate can be verified by the receiving department through the e-district portal by entering the certificate number and security code. It can also be verified through GPRS enabled mobile devices using the 2D bar code printed on the certificate.

The introduction of digital signature for approving certificates by the Village Officers and Tahsildars was an innovative step taken up with a vision to enable Government Officers capable of using IT with legal validity.

Level of Integration

Ration card, driving licences and SSLC certificates are some of the enclosures that are required as supporting documents along with the application. These need not be scanned and uploaded as provision is given to “verify online” from respective departmental databases based on the details entered in the application. This way, inter-operability is achieved in the e-district portal. Once the citizen furnishes any of these details as part of availing an e-district service, the CSC operator can verify with the respective department database whether the details furnished by the citizen is correct or not. The CSC operator can then accept or reject the application based on this verification. This helps to prevent fraud at the time of accepting the application. Currently, driving licences are enabled; permission is awaited from two other departments.

e-District CSC interface is integrated with the payment module of FREES, an enterprise enabled, anywhere, any payment system. This integration facilitates CSC to remit the government share of the service charges collected. Challans can be generated and the payment made by CSC through Internet banking reconciled.

ENABLER INDICATORS

1. Process Reengineering

ICT and Non-ICT Front-end Changes

Extensive government process reengineering (GPR) activities were taken up for implementing the certificate services under the e-district project. The

traditional procedure for the issue of various certificates from the village and taluka offices was hard for the citizens as he/she has to visit the taluka/village offices multiple times. The number of people involved in receiving, processing and approving the various certificates has been reduced drastically, and the timeline for the processing and issuing of various certificates has improved considerably. Proper service level agreements (SLAs) were put in place at each of the levels, and the adherence to the same has been ensured by the higher authorities. The concerned authorities can view where the issuance of certificates is pending and can take immediate action to address the same.

For the e-district project, the government has come up with EDS (electronic delivery of services) rules which enable citizens to approach any CSC to apply for and also to receive services. This has been fully implemented for 23 services in the two pilot districts. Also, as part of the EDS rules, the various input and output formats were introduced with a unified framework and adequate built-in security features.

ICT and Non-ICT Back-end Changes

The entire workflow of the services was envisaged. Database verification with other departmental databases was planned with respect to ration card data, SSLC data and voters ID card.

The workflow has been fully implemented as planned. Solution for online database verification has been successfully tested for all the proposed databases. It has been fully implemented with respect to driving licence database of the motor vehicle department. Departmental permission is awaited for other databases.

2. Capacity Building

Leadership Support

Political will and continuous bureaucratic support has been and is available for the project. The government has constituted a State Project Committee chaired by the Chief Secretary, state level technical committee chaired by Director, KSITM (Kerala State IT Mission) and district level committees at Kannur and Palakkad chaired by the District Collector. NIC has imparted sufficient training to master trainers and they in turn have trained a large number of users. This was augmented through multiple workshops under the leadership of NIC.

Change Management Strategy

Necessary government orders were issued to implement the new service delivery architecture. Workshops were conducted for internal and external stakeholders. Awareness programmes were aired through Akashvani to make

the public aware of the changes in service delivery. Receiving departments were communicated regarding the new digitally signed certificates that was to be submitted before them.

Capacity Building Plan

For officials, 7-day training programmes were arranged in two phases. In the first phase, the programme covered computer basics in 5 days. The emphasis was to enable the village office staff and the taluka staff to use computers and understand basic operations. In the second phase, the e-district application was covered in two days with hands-on experience for each participant. More than 350 officials were trained in both the pilot districts.

For CSC operators, separate training programmes were arranged to familiarise them with domain knowledge and the application software.

Workshops were arranged for village office staff and CSC operators together to familiarise each other with their roles and find out about the problems faced by each other. This could help in moderating the procedural issues, if any, between them.

Onsite training by the handholding staff is planned for new officers and is being given on demand inline with the new services rolled out.

Project Management

The government has constituted a state project committee chaired by the Chief Secretary, a state level technical committee chaired by the Director, KSITM and district level committees chaired by the District Collector.

Kerala State IT Mission (KSITM), the state designated agency (SDA) for the e-district project, is taking care of the implementation aspects.

In order to assist the KSITM in project implementation within the defined timelines, National Programme Management Unit (NPMU) consultants consisting of 2 fulltime resources are in place along with the State Programme Management Unit (SPMU) consultants, also consisting of 2 resources. The NPMU as well as the SPMU resources are deployed by DIT, GoI.

DeGC (District e-Governance Committee) constituted as per the guidelines of NeGP manages overall implementation of the project in the districts under the guidance of the District Collector. The District Revenue Administrator manages administrative activities like user creation, privilege settings etc. The Akshaya Assistant District Coordinator and his or her team looks after the CSCs. Five fulltime handholding staff are appointed in each district to help the Village Officers in their day-to-day issues, if any.

KSITM is also in the process of deploying District Project Managers (DPMs) along with 3–4 handholding staff in each of the districts for successful project implementation within the defined timelines.

NIC is the primary consultant for ICT projects in the districts. Two Scientific Officers of NIC are available in the districts for implementation support.

Weekly review meetings through video conferencing is scheduled with the implementing districts, in which stake holders from the state and district participate. The progress is reviewed, suggestions are discussed and corrective measures proposed during this meeting.

Financial Model

e-District is proposed as a self-sustainable model. The cost for the pilot implementation was met by the funding from DIT, Govt. of India. The funding for the roll out of the project in the remaining districts is also being provided by DIT, GoI. For sustenance of the project, an application service charge of Rs. 10/- is collected as government share which shall be used for the maintenance of the system. This money collected as service charges is shared with the District e-Governance Committee (DeGC). DeGC would be able to sustain the project and be in a position to ensure sustainability of various future e-governance efforts in the district with this fund.

Efforts at Sustainability

Once more services are rolled-out in more geographies, an impact assessment shall be carried out by a reputed institution/by the project consultants. As more services are added with more geographical reach, the project shall become more financially viable and self-sustainable.

3. Technology

ICT Solution Adopted

e-District software is developed at the state level by National Informatics Centre (NIC). Web technologies are used for the solution. The software has been developed using J2EE technologies. Platforms include Spring framework, JBoss Application Server, PostgreSQL RDBMS, Hibernate, JasperReports, XForms etc. The application development team is in place at Thiruvananthapuram.

The deployment architecture include two web servers (apache) on NLBS, 3 App servers (JBoss cluster) and two database servers configured as primary and secondary through streaming replication. The solution is hosted at the state data centre.

A system administrator and a database administrator are posted exclusively to manage the servers. As such the solution is NeGP compliant.

Security and Confidentiality Standards

The application and data is hosted at the state data centre (SDC) and all security measures are taken care of by SDC. In addition, necessary security measures have been built at application level, database level and network level. The access is restricted for Village Officers through VPNoBB/KSWAN. The access for DBA and system administrators is as per the data centre norms.

Disaster Recovery and Service Continuity

The Government of Kerala has already brought out a backup policy and the same is being followed in this project. It include full backup and incremental backup of database, application and the logs with respect to web access and database. Database replication is in place. The backups are scheduled and being copied to tapes as well.

VALUE INDICATORS

1. Digital Inclusion

All services are available in English and Malayalam. The website content, application formats etc. can be accessed in Malayalam. All the necessary supporting documents pertaining to the project such as the EDS rules, various government orders etc. are also published in the local language (Malayalam).

The Kerala government has carried out e-literacy campaigns in 2007 with the objective of making at least one in every family e-literate. At least one CSC is present in every panchayat, and more CSCs are approved by the government on demand. All stake holders are in a position to avail the benefits of e-governance initiatives.

2. Green e-Governance

Paper consumption is reduced to the minimum by introducing certificate services. The applications can be filed online. The supporting documents are scanned and uploaded. Online database verification facility will also reduce the usage of paper. The workflow based system contributes to less paper consumption, as all verification reports and official noting prior to the approval of the application is digitally entered and stored.

Dr C Jayasankar Prasad, Director, Kerala State IT Mission, Kerala, e-mail: director@keralaitmission.org

K P Noufal, Mission Coordinator, Kerala State IT Mission, Kerala, e-mail: noufalitm@gmail.com

Passport Seva Project, Government of India

Muktesh Kumar Pardeshi and Golok Kumar Simli

PROJECT OVERVIEW

Introduction

Over the last few years there has been an increase in the demand for passport and related services. The existing infrastructure, systems and processes were falling short of meeting the growing demand and heightened expectations of the citizens with respect to this service delivery. Besides, there was also a need to comply to international travel standards which could not be met with the existing systems.

Thus to augment and improve the delivery of passport services to Indian citizens, the Ministry of External Affairs (MEA) launched the Passport Seva Project (PSP). With the Passport Seva Project, the Ministry's aim was to:

- Provide better reach and accessibility to applicants
- Provide a comfortable environment with best-in-class facilities to applicants
- Make available multiple channels for providing the latest information and status to passport applicants
- Bring in transparency and efficiencies with improved, standardised and automated processes
- Provide better inter-operability with other departments and government agencies
- Introduce a scalable and extendable model to handle growing demand and inter-operability needs
- Provide a real time centralised repository of passport applicants accessible to all passport offices, missions/posts, immigration and other government departments
- Comply with international travel standards
- Provide a platform for issuance of e-passports in the future
- Have up-to-date information and data at any time for effective decision making

The Passport Seva Project is one of the largest mission mode projects of the Government of India under the National e-Governance Plan (NeGP). The project, being executed in the public-private partnership (PPP) mode has the following vision statement:

'To deliver all passport-related services to the citizens in a timely, transparent, more accessible, reliable manner and in a comfortable environment through streamlined processes and committed, trained and motivated workforce'

Approach

As a first step, a complete study was conducted on the business processes and the re-engineering required. Subsequently, through an open tender RFP (request for proposal) process, a service provider was selected to execute the project in PPP mode. Tata Consultancy Services (TCS) was selected as the private partner. The project runs in the build–own–operate–transfer (BOOT) model wherein the initial investments are made by the private partner. There is minimal investment from MEA. Revenue for the private service partner is transaction based, depending on the volumes and type of service rendered, subject to stringent service delivery levels.

The project was implemented in the following stages (many of them in parallel and not necessarily in the order given below):

- Establishment of IT and non-IT infrastructure
 - Set up of a state-of-the-art tier III data centre and an active–active disaster recovery site
 - Set up of Passport Seva Kendra (PSK) infrastructure for 77 centres
 - Setup of IT infrastructure at 37 RPOs (regional passport offices)
 - Set up of the central passport print facility (CPPF)
 - Set up of the network operations centre (NOC)
 - Set up of the security operations centre (SOC)
 - Set up of the passport seva call centre
 - Set up of a dedicated development centre
- Requirements analysis, design, development and implementation of the passport seva software application
- Requirements analysis, design, development and deployment of the passport seva portal (<http://passportindia.gov.in>)
- Recruitment, training and deployment of staff for citizen service delivery at the 77 Passport Seva Kendras (PSKs)
- Data migration from existing system
- Set up of the information security system (network, application and database, remote authorised user over internet/intranet, personnel and physical security)
- Set up of the 24 × 7 call centre operations in 17 languages including English, Hindi and 15 regional languages.
- Set up and operations of e-mail based helpdesk for managing citizens queries and grievances
- Change management, communication management and training for staff of service providers, RPOs, police, India Security Press (ISP) Nashik and India Post
- Service Level Agreements (SLAs): Development of procedures, systems and tools for the monitoring and measurement of the same. The project monitors and controls 27 SLAs across parameters measuring external efficiencies, internal efficiencies, external, internal and technical effectiveness, environmental parameters and customer relations.

Current Status

All activities under the above scope have been fully implemented. The project is currently in the ongoing operations and maintenance phase.

The project was initiated in a PPP mode with Tata Consultancy Services (TCS) as the private partner in 2008. It was first implemented at 7 pilot PSKs covering 2 RPOs in March 2010.

After a successful run in the pilot locations, a country wide rollout spanning 70 PSKs across 23 states and 63 cities was completed. The project was also verified by a third party audit agency in three stages—pre-pilot, on completion of pilot and on completion of rollout.

Important Dates

Some of the key dates in the Passport Seva Project journey are as follows:

October 2008 (Project initiation)
 March 2010 (Commencement of pilot),
 May 2010 (Launch of first Passport Seva Kendra)
 January 2011 (Certification and completion of pilot)
 June 2011 (Commencement of rollout)
 May 2012 (Completion of all 77 Passport Seva Kendras)
 June 2012 (Certification and completion of rollout)

The project plans have had some re-schedules as well as some overruns along the way due to the complex nature and multiplicity of tasks involved across various stake holders. The commencement of the pilot was delayed by approximately five months and the rollout was delayed by approximately six months.

Table 1 gives the data for some of the key parameters.

Table 1 PSP Facts and Figures

	Upto 31-8-2012	Daily average
PSKs operational	All 77	
Total number of associates deployed by TCS in the project	3000	
Average citizen satisfaction (CSAT) score	99.5%	
National call centre fully functional in	17 languages	
Footfall	50+ lakhs	30K+
Applications processed	42+ lakhs	28K+
Passports issued	32+ lakhs	23K+
Appointments released	NA	36K+
Passport application fee collection	Rs 430+ crores	Rs 3+ crores
Calls received at call centre	50 lakhs+	25K+
Citizen queries handled at helpdesk	93K	250

The key beneficiaries of the project are:

1. The citizens of India—applicants for passport and related services
2. Staff and management of the Ministry of External Affairs
3. State police involved in the passport issuance process
4. Indian missions and posts abroad
5. Immigration and other government departments requiring passport related information

The Passport Seva Project provides an innovative approach to delivering passport and related services to the citizens of India. It also demonstrates how innovative use of information and communication technology (ICT) can transform the way citizens receive services from government institutions. In an ICT enabled e-governance framework, passport and related services are rendered in a transparent manner, improving the reach, accessibility, security, accountability and efficiency, and setting new benchmarks in citizen services delivery.

RESULT INDICATORS

1. Key Performance

ICT Based Services

The services provided under the Passport Seva Project fall in the G2C and G2G category.

Passport Issuance

In the new ICT enabled system, the entire passport issuance process has been automated with complete digitisation of the application and supporting documents. As the first step in the passport issuance process, the application is entered online through the portal <http://passportindia.gov.in>. The applicant needs to visit the Passport Seva Kendra (PSK) with all original documents. These supporting documents are scanned and uploaded into the system along with the applicant's photograph and bio-metrics which are captured at the PSK. At the next stage, namely, the verification stage, the original documents brought by the applicant are verified for originality and completeness. The verifying officer checks the documents against those scanned and submitted in the system and ensures that all required documents are available in the system. The next stage of granting of passport also happens online. The requisite online checks for duplicity, the decision to grant with or without police verification, the validity period of passport, the decision to grant with or without 'emigration check required' are all taken with the help of information available online. Most importantly, the granting decision is taken in front of the applicant who is informed of the decision in writing. This has brought in transparency and streamlined the process resulting in faster and error free issuance of passports.

At the Passport Seva Kendra, an electronic queue management system ensures first-in–first-out based smooth flow of citizens across the various stages of processing.

The interface with other stakeholders involved in the passport issuance process—namely, police for verification of an applicant’s personal particulars, India Post for getting the delivery status of a passport and ISP Nashik for booklet requisition—have been automated too.

Police Verification

In the Passport Seva System, the *police* have been made an integral part of the ICT enabled process. The applicant’s personal particulars (PP) along with the required attachments are digitally sent to the district police headquarters where the PP forms are printed and sent to respective police stations. On completion of the home visit, the police station sends in the physical police verification report (PVR) to the district police headquarters. Here the report is entered into the Passport Seva System. In case of a clear PVR, the passport application directly moves into the passport print queue. No intervention is needed by passport office staff. In case of adverse PVR cases, passport office staff needs to review the report. The system has a provision and is being extended to the police station level in those states where the infrastructure for downloading PP form and data entry of PVR is available at the police stations. The PVR will be approved at the district police headquarters post which the application will go into printing in case of clear PVR—thus, further reducing the time taken in police verification, in particular and the entire passport issuance process, in general.

Passport Dispatch

Further, ICT enablement of the passport dispatch process and integration with India Post as part of the Passport Seva Project has brought in transparency and ease of tracking the status of dispatch of an applicant’s passport.

In the new system, a Speed Post tracking number is assigned to each passport and printed on the envelope along with the address of the applicant. The dispatch data is generated through the system and electronically sent to the respective Post Office once the passports (to be dispatched) have been collected by the India Post officials. The applicant too receives an SMS informing him or her that the passport has been dispatched with tracking number. Once the passport is delivered, the status of the passport is updated online by India Post.

Booklet Requisition

As part of the Passport Seva Project, India Security Press, Nashik (supplier of passport booklets) has become an integral part of the system. The requisition for additional booklets is made by the respective passport offices to RPO Mumbai who consolidates all requests and submits a single requisition to ISP. Booklets are assigned against this request through the system and

dispatched to Mumbai. RPO Mumbai further dispatches the booklets to the respective RPOs, based on their request which is updated real time with the booklet series dispatched. Receipt of booklets by RPOs takes place online. Store inventory of the respective RPO is automatically updated.

The ICT enablement of this simple process has brought in transparency in the flow of booklets and better tracking /monitoring of booklets. Booklets lost or misplaced can be immediately tracked through the system.

Services to Missions/Posts

Though the issuance of the passports at missions and posts abroad is outside the current purview of the Passport Seva System, real time passport data is available to missions and posts via the PRIDE (Passport Related Information Data Exchange Online) sub-system. Missions and posts are also able to update the PSP database with information on damaged/revoked/impounded or lost passports.

Information Services to Immigration

Immigration (and any potential government department) seeking citizen information based on passport number or vice versa can do so using the online real time centralised repository of passport holders—PRIDE.

Information Services to Citizens

In the earlier system, there were limited channels for the citizen to obtain information on the application process or the status of his or her application. There were limited enquiry counters at the 37 passport offices which were open only for four hours in a day. Information was available on the portal but scattered as each passport office had its own website.

With the launch of the Passport Seva System, the citizen touch points have increased with additional 77 PSKs across the country. The number of enquiry counters has gone up and citizen service hours increased to 7. A single portal across passport offices ensures consistency in information dissemination. Apart from these traditional channels, the citizen also has the flexibility of calling the call centre using a toll free number. As part of the Passport Seva System, call centres have been set up to address applicant queries in 17 languages, including English and Hindi. An online helpdesk facility is also available to the citizens.

Figure 1 summarises the key benefits of the Passport Seva System.

The Passport Seva System has been completed with respect to the original scope and is currently in the operations and maintenance phase—the duration of which is six years.

The future roadmap includes:

- i. As an extension to the Passport Seva Project, the Ministry proposes to open up 15 Passport Seva Laghu Kendras across the country.
- ii. It is also proposed to extend the passport issuance process to all the 178 missions and posts abroad.

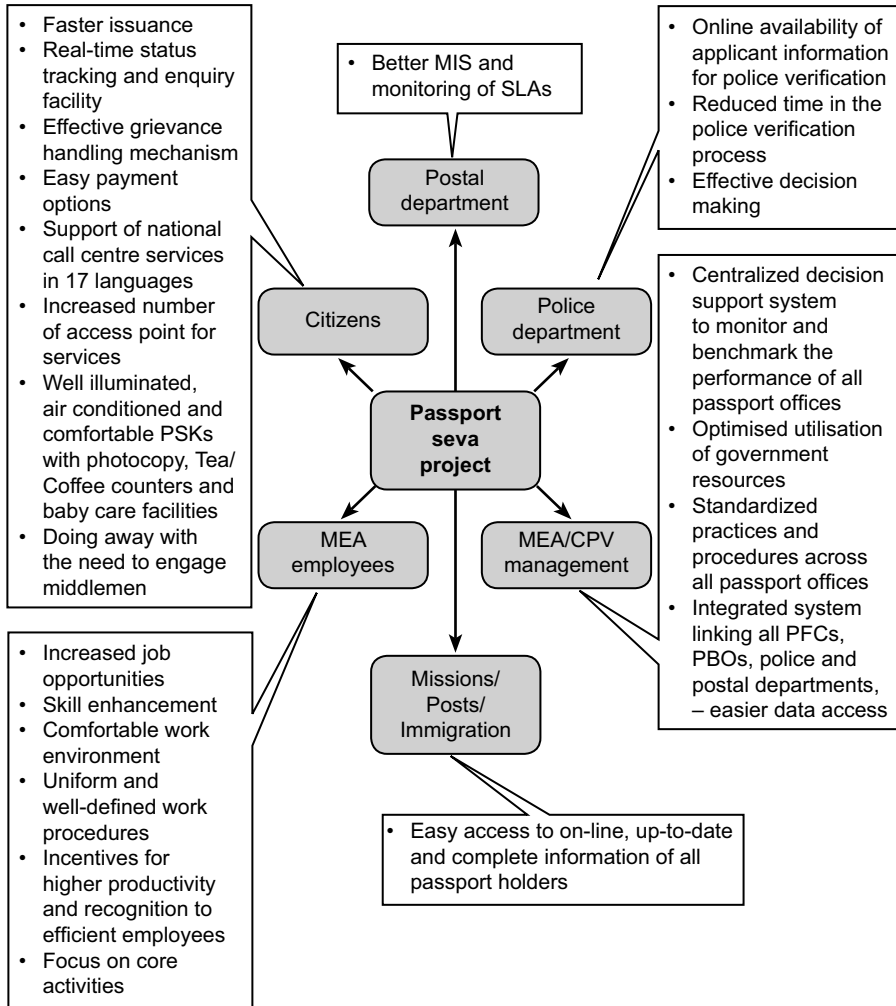


Figure 1 Key benefits of the Passport Seva System

- iii. The police verification process is being extended beyond the state and district level to the police station. In those districts where the police stations are IT equipped, the personal particulars of applicants can be directly downloaded at the police station. Similarly, the police verification results can be directly uploaded from the police station itself. This will further reduce the total elapsed time taken for police verification.
- iv. Online integration with other government departments for verification of documents submitted by applicants, such as ration card, PAN card etc. For this to happen, the corresponding service needs to be provided by the concerned department.

Implementation Coverage

The Passport Seva Project is a pan India project covering the end-to-end process of passport issuance in the country. The implementation took place across all 37 passport offices, spanning 23 states and 63 cities. As part of the Passport Seva Project, 77 Passport Seva Kendras have been set up across the country as extended arms of these 37 passport offices. The processing of applications collected at the District Passport Cells (DPCs) and Speed Post Centres (SPCs) has also undergone a change.

The Passport Seva Project enables simple, efficient and transparent processes for delivery of passports to the citizens of India. The project involved creation of a countrywide networked environment—integrating not only the Passport Seva Kendras and passport offices, but also providing access to a number of external stake holders, viz., Immigration, India Post, Missions, India Security Press (ISP) Nashik and Police.

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency Improvements

Table 2 indicates the difference in various parameters pre and post implementation of the Passport Seva Project

Table 2 Comparison of the passport service pre-and post-implementation of the Passport Seva System

Passport services parameter	Earlier	Now
No. of passport processing locations	48	129
No. of citizen service counters at various passport processing locations	350	2000
Citizen service hours per working day	4	7
Waiting period to submit passport application	More in crowded conditions	Reduced and is measured through SLAs; waiting is in a comfortable, air conditioned environment
Application submission	Citizens had to bring in photographs and documents along with manually filled forms	Single point PSK counters equipped with digital cameras for photograph, scanners for document upload and fingerprint scanners for bio-metric capture making the application submission more convenient; unique citizen identity can also be recorded via bio-metric capture.

Continues

Table 2 *Continued*

Passport services parameter	Earlier	Now
Scalability	Limited; could be time-consuming	Expandable vertically and horizontally on the basis of requirements
Accountability of stake holders	Difficult to monitor across the country in a manual system	Completely ICT enabled with digital signatures and end-to-end audit trail of activities
Training of stake holders	Limited and scattered	Effective training in a fully simulated production-like training environment
Information for applicants	Only through website; limited features	Effective through enhanced website and national call centres through a toll-free number
Grievance handling	Limited	Immediate through multiple channels like phone, online and e-mail; electronic routing of the grievances to the concerned authority with built-in escalations
Paperwork	Application processing involving manual paperwork	Application processing completely ICT enabled with end-to-end tracking
Days for police verification	Time consuming due to transit delays; average: 60 days	Online download of applicant information and upload of police verification report; real time access to pendency at the various districts and the exact stage at which an application is pending; average: 45 days
Management information system	Limited; mostly manual and involved paperwork	Wide range of centralised information available to the management for effective control; efficient analytics and reporting in place
Days for passport dispatch	Average: 75 days	Average: 30 days

Innovative Ideas Implemented

The Passport Seva System is one of the largest e-governance initiatives that ride on the effective use of state-of-the-art technology to bring about convenience, speed, accuracy and transparency in delivering passport and related services to Indian citizens.

Any Time Access

The Passport Seva System provides documents, forms, instructions, general information and business services over the web. Applicants can check the documents required, fill applications online and track the status of their application. The system also allows the applicants to plan their visit to the nearest PSK by taking an appointment for a date/time as per their convenience, thus avoiding long queues and uncertainty. External entities like police, missions and India Post also access the system for performing their role in the processing of the passport application.

Bio-metrics enabled login

The system uses centralised bio-metrics enabled login for allowing users to logon to their workstations. This is in addition to the user id and password based authentication

Digital Signature Certificate

The system uses digital signature certificates for authentication which ensures integrity and non-repudiation of critical transactions

Passport Seva Kendra

The Passport Seva Kendra is an ICT enabled state-of-the-art facility for providing passport services to the citizens in a convenient and efficient manner.

Self-Service Kiosk: Each PSK is equipped with self-service kiosks for filling up forms online and accessing passport related information

Electronic Queue Management System (EQMS): An electronic queue management system has been built in for issuance of tokens to applicants, regulating entry into the service area through the turnstile. The EQMS also ensures the first-in-first-out principle in application processing. It takes care of priority dealing for senior citizens, women with children and people with disabilities.

Single Point Enrolment: The system provides single point enrolment facility within the Passport Seva Kendras (PSKs), where applications are accepted and entered into the system. Besides the applicant data, provision for on-the-spot capture of bio-metric data and scanning/uploading of the documents is also provided. This is possible through an integrated peripherals system which allows the core application to interact with multiple devices in a seamless manner.

Tamper Proof Document Repository: The Passport Seva System uses a content addressable policy based storage for long-term archiving of documents. These include scanned documents for applications that have been granted, notices issued to applicants and attachments uploaded as part of the police verification report.

Interactive Voice Recognition Service (IVRS): A multi-lingual state-of-the-art IVRS and call centre operating in 17 Indian languages enables citizens to obtain passport service related information and receive updates about their passport applications, round the clock, seven days a week by dialling a toll free number. An e-mail based helpdesk also provides information on passport services.

Integrated Staff Attendance System: An integrated staff attendance system has been developed to track staff entry and exit centrally. All PSKs are equipped with IP enabled physical access control system, comprising of bio-metric/access card readers. These in turn connect to the central access control system.

Centralised Business Operations Portal: This is an intranet portal which serves as a strong communication medium across the 3000+ staff of the service provider in all the 77 PSKs and RPOs. It also has various data management and control systems which will help in central monitoring and control.

Automated Software Lifecycle Management: The project uses an in-house developed tool named the 'delivery management portal' that facilitates the delivery management throughout the entire software development lifecycle of the project. It tracks and manages the code build and releases, change requests, defects and production Issues.

Business Analytics: The system provides a fast, accurate and drill down analytics framework for various stake holders to arrive at meaningful inferences. This is possible due to several number-crunching algorithms and a dedicated information repository provided for this purpose.

Level of Integration

The system is available to 178 missions and posts abroad providing them access to real time passport data. Immigration counters at airports all over the country access the Passport Seva System to establish the validity of passports for citizens travelling out of the country. The system also integrates with the state police for physical verification of applicant particulars and antecedents as well as with India Post for delivery of passports. Interface with the India Security Press (ISP) in Nashik enables the passport offices to raise real time requests for blank passport booklets as and when needed.

The Passport Seva System is enabled to provide relevant data to various external government agencies, like the Ministry of Overseas Indian Affairs, Ministry of Home Affairs as may be necessary for their own functional requirements. These agencies, using a valid digital certificate, can connect to the Passport Gateway via the National e-Governance Services Delivery Gateway (NSDG) interface and access the relevant data using a service delivery model. The Ministry of Overseas Indian Affairs is one such department with which trial runs have already been successfully conducted.

It is planned to use the same mechanism to get data from other departments as well, for the validation of the information rendered by the applicants such as PAN number, voter ID card etc.

ENABLER INDICATORS

1. Process Reengineering

The project has brought in a radical shift in the way passport services are delivered to the citizens of India. The earlier system was decentralised with variations across passport offices and little visibility of data across these offices. The new system is centralised with standardised processes implemented across the country providing complete data and information visibility, making it a powerful tool in the hands of MEA (Ministry of External Affairs) for planning, analysis and MIS.

The two major processes re-engineered and ICT enabled are described below.

Passport Issuance Process

The most significant process to have undergone a change is the passport issuance process. The passport issuance process, as it existed prior to implementation of PSP, required the applicant to ensure his or her physical passport application form was submitted to the passport office directly or through District Passport Cells (DPCs) / Speed Post Centres (SPCs). At the passport office, the applicant's physical file moved from desk to desk for processing—verification of documents, checking applicant's credentials—whether he is already holding a passport, checking against the PAC (pre approval category) and then printing and dispatching. The digitisation of the application as well as scanning of the supporting documents took place post facto and was primarily for record purposes. The process had limited automation and hence was prone to errors. Besides, the decision making for the granting officer was cumbersome as this took place in isolation without the applicant in front of him. He or she could not seek answers to queries, if any, and these needed to be addressed through letters to applicants and their response. This led to delays.

Figure 2 gives a view of the earlier passport application process. The process is the same for issue of fresh or reissue of passport as well for miscellaneous services.

As can be seen from the figure, traditionally, paper applications were submitted and the entire process for granting of passport was manual. The digitisation was done post facto mainly for record purposes. This led to lack of transparency, delays and errors in passport issuance.

In the new ICT enabled system, as explained before, the entire process has been automated with complete digitisation of the application and supporting documents. The revised processes are described in Figure 3.

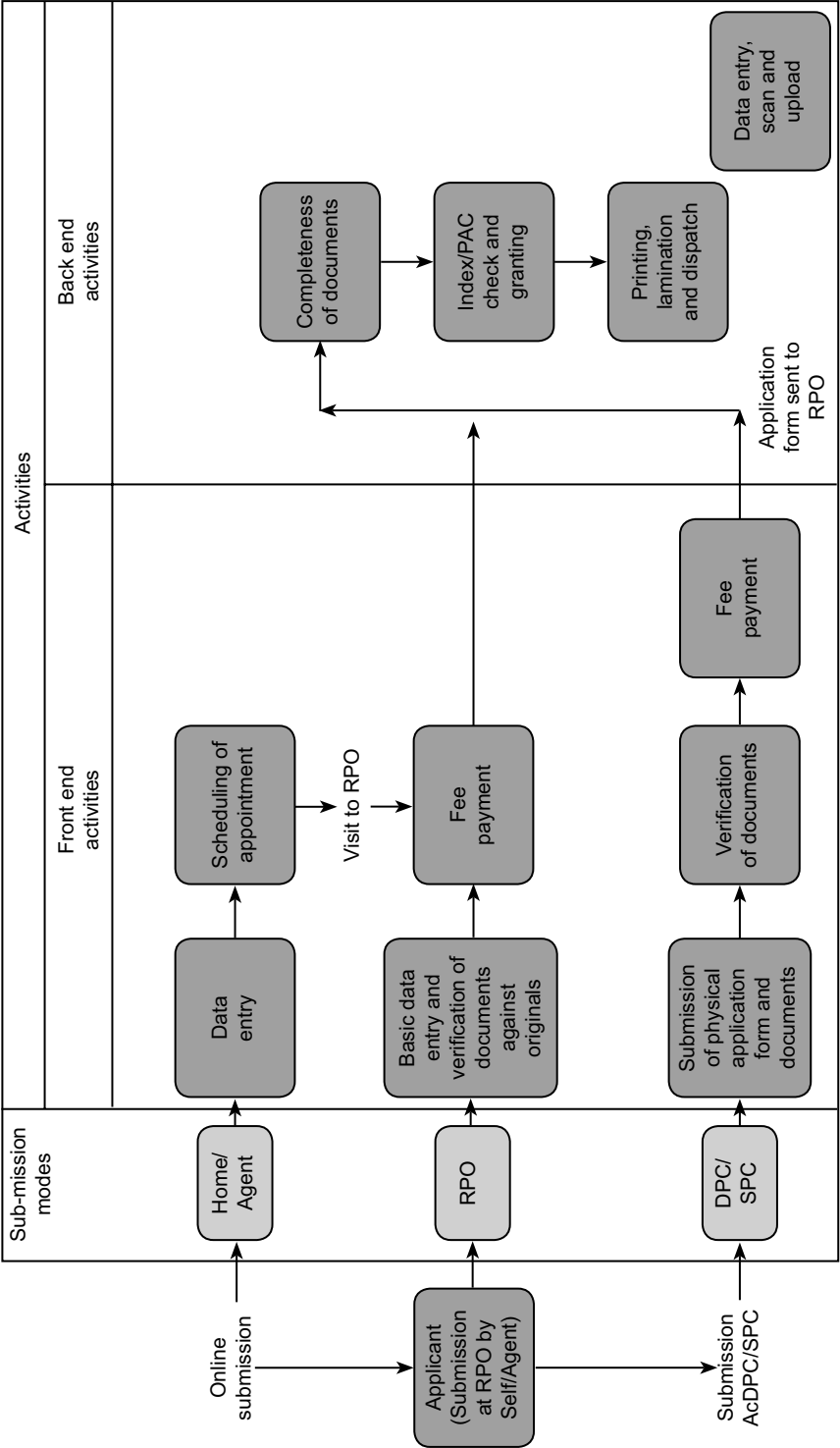


Figure 2 Earlier process flow of passport issuance process

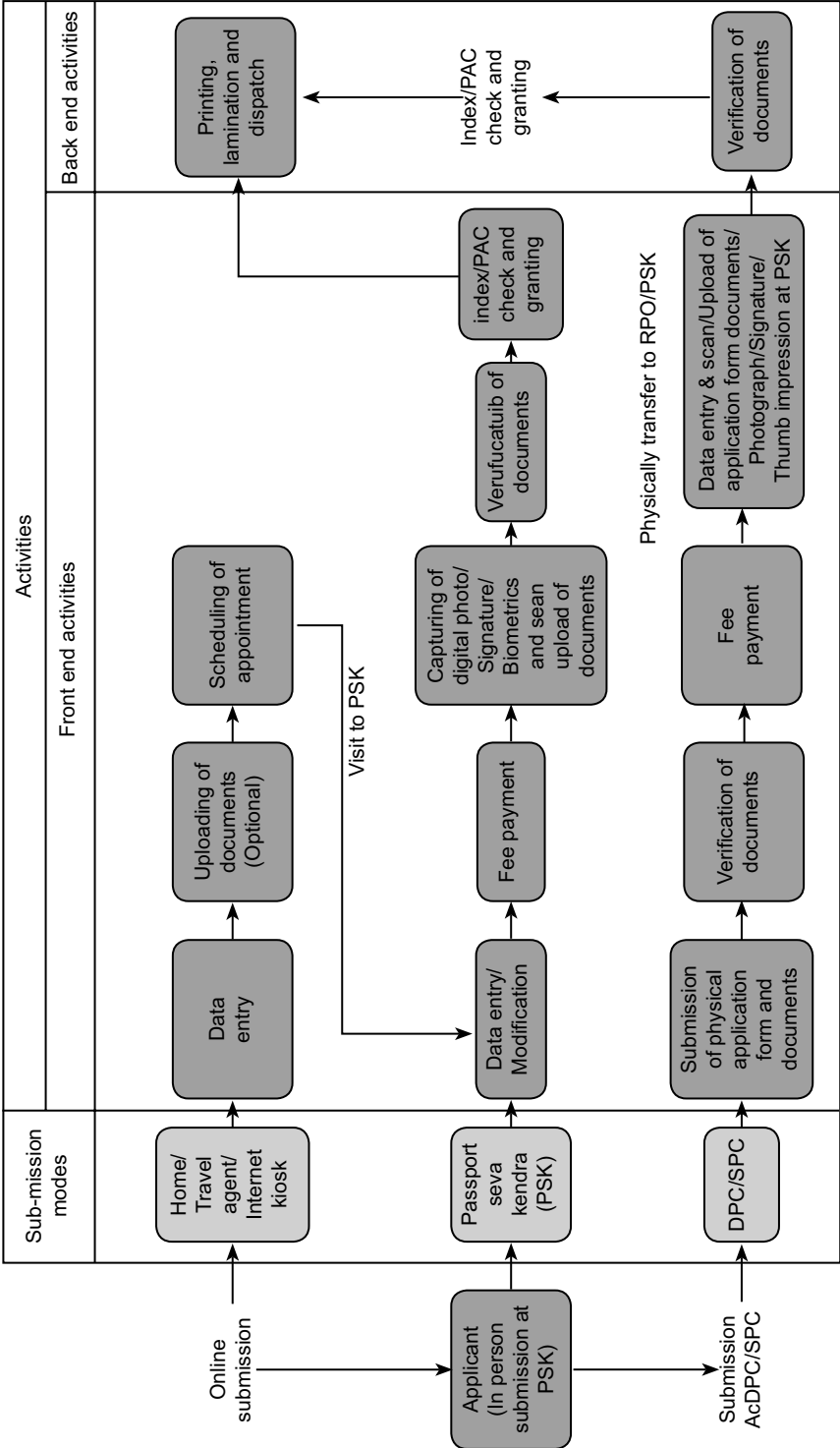


Figure 3 Current process flow of passport issuance process

Police Verification Process

Another key process to have undergone a change is the police verification (PV) process. In the earlier system, physical forms of the personal particulars of the applicant were dispatched to the district police headquarters who in turn dispatched the forms to the various police stations based on applicant address. Once the home visit was completed by the police official, the physical copy of the police verification report was sent to the district police headquarters and from there to the RPO. The entire process was time-consuming and could lead to misplaced personal particulars forms and reports. The police verification report was scanned into the system post facto.

The earlier manual process is described in Figure 4.

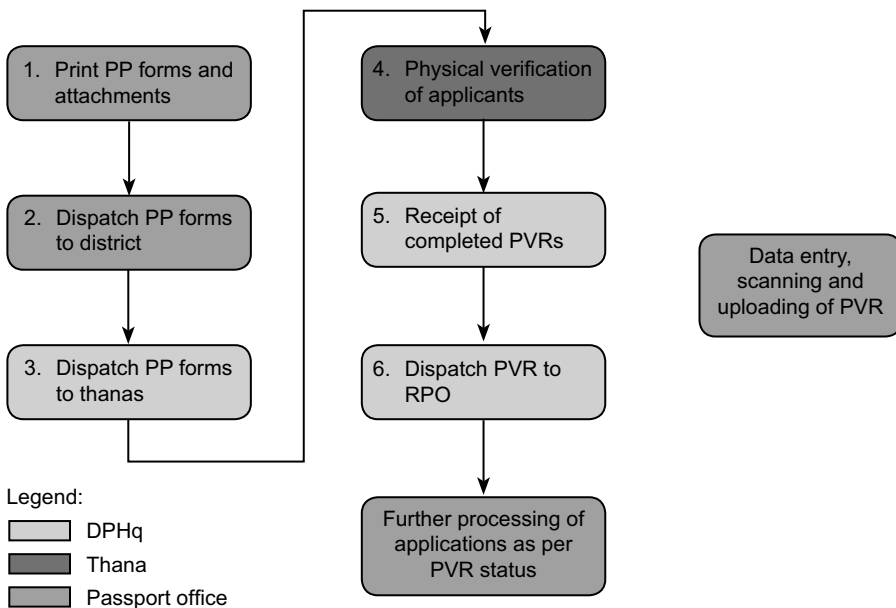


Figure 4 Earlier process flow of police verification process

In the Passport Seva System, police have been made an integral part of the ICT enabled process, as explained before. The reengineered ICT enabled PV process in PSP is described in Figure 5.

2. Capacity Building

Reengineering the various processes involved and implementing the new ICT enabled processes as part of the Passport Seva System has involved the following steps:

- Selection of a service provider

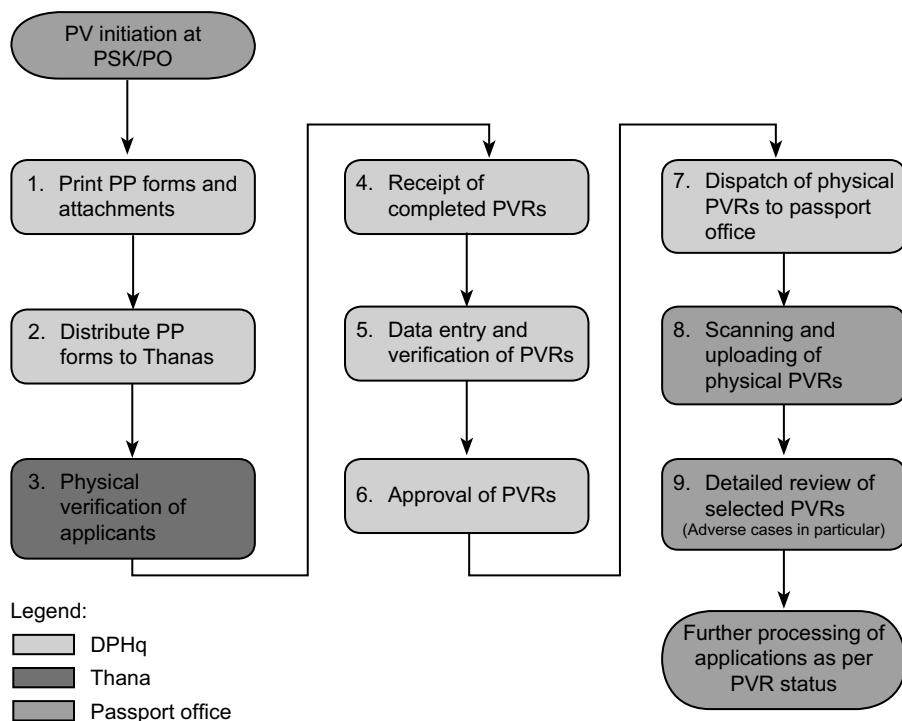


Figure 5 Current process flow of police verification process

- Site selection for data centre/disaster recovery centre
- Site selection for the central passport print facility
- Definition of the new processes and outlining of the roles and responsibilities of various stake holders involved in the passport issuance process
- In-time approvals to the service provider for site selection, application and portal requirements, technical solution, security solution and so on
- Change management for the 1700+ staff across the 37 RPOs
- Bringing on-board the police in 35 states and district police headquarters
- Bringing on-board the missions and posts abroad
- Bringing on-board India Post as well as ISP Nashik
- Retaining strategic control over the newly implemented PSP system

Leadership Support

Each step in the journey of implementation, as described above, needed active participation from the senior officials at MEA.

The implementation at each passport office needed complete involvement of the passport officer and his or her staff. The staff had to imbibe the new

processes and systems as they moved from the old to the new. A well-defined change management plan including a comprehensive training programme coupled with handholding by the service provider and mentoring by the senior officials ensured that the migration to the new system was smooth and seamless. Over 1700 staff from the RPOs were trained over a period spanning more than a year.

Senior level meetings with heads of police in states ensured that the project received the appropriate support from the police department in rolling out the new system. Over 1700 police personnel were trained on the new system.

It is important to mention here that the ownership and strategic control of the core assets including data, information and processes is with the Ministry.

Change Management Strategy

A comprehensive change management plan including communication management and training was drawn up. Over 3000 PSK staff of service providers, 1700 staff of RPOs and 1700 police personnel were trained as part of the Passport Seva rollout. Training was also imparted to the concerned users in ISP Nashik and India Post. Change management included awareness and training in the new processes and application as well as soft skills trainings for the citizen-interacting staff of the service provider. As part of the communication management of the programme, a *Passport Patrika* is released every quarter which gives information on the latest news and events related to the CPV division of MEA, the RPOs as well as Passport Seva Project updates. Apart from the Patrika, media releases, advertisements as well as the Passport Seva portal are used effectively to communicate with passport information seekers and applicants.

Capacity Building Plan

The private service provider has hired and trained 3000 best-in-class skilled staff for maintaining and running the entire passport system—at the Passport Seva Kendras, at the network operating centre, the security operations centre, the data centre, the disaster recovery centre, the call centre as well as the IT development centre. This has more than doubled the manpower capacity of MEA.

MEA has also consistently reviewed the staff position at various roles across locations and augmented them as per the requirement of the programme

Project Management

Program management and monitoring has been core to the success of the project. A programme management unit (PMU) has been set up to carry

out the administrative and facilitation steps, and the tasks to support the implementation and stabilisation of the project. The (PMU) comprises of functional and technical consultants as well as experts handling HR and related matters. The team has been instrumental in finalising the system functional and technical requirements, providing approvals for PSK sites, finalising the location of the data centre, the disaster recovery centre, the CPPF as well as the co-located PSK sites to be provided by MEA. The team has ensured that sufficient staff across roles are available at all RPOs. The PMU proactively monitors the project plan and identifies /handles any risks perceived.

Financial Model

PSP has been implemented in the PPP mode under the BOOT model. This effectively means that the private service provider (SP) has built, owned, and is operating the entire delivery network required to execute the project in all aspects. The private SP will transfer the assets to the ministry at the end of project period of 6 years. The SP has leased and built the physical facilities (PSKs, data centre etc.), developed the software application, deployed its own staff and is operating the centres by taking care of all administrative, operational and financial responsibilities. As per the terms of agreement between MEA and SP, service charges are being paid by MEA on the basis of total applications processed and the same are driven by a stringent set of SLAs which are monitored by MEA very closely. From the ministry's perspective, this model is extremely sustainable as it is liable to pay a fixed per transaction charge only for the number of transactions processed—all costs, be it capital or operational, are being incurred by the SP. By doing so, the government has also insulated itself from the uncertainty of demand behaviour for passports which would have otherwise required it to make heavy investments and operate an all India network irrespective of level of demand, thereby making it financially unviable. Now the entire risk has been transferred to the SP who has a financial model encompassing the entire project life of 6 years and is paid an all-inclusive per application fixed price.

Efforts at Sustainability

The National Institute of Smart Government (NISG) has been involved in the complete project lifecycle starting from RFP formulation to final rollout of all the 77 PSKs, providing the necessary technical and managerial guidance required for the success of this project.

The Ministry has also engaged an independent third party audit agency—Standardisation, Testing and Quality Certification (STQC) Directorate—DeitY. STQC has conducted the verification activities for compliance in areas including but not limited to functional and technical requirements, change management, testing, security, availability, performance, manageability and scalability.

3. Technology

ICT Solution Adopted

The Passport Seva system has been developed on J2EE architecture and deployed on a redundant set of network components, storage components, web, application and database servers.

It follows a multi-tier model as shown in Figure 6. There are three key sub-systems of the Passport Seva System—the Passport Seva front office sub-system, Passport Gateway sub-system and Passport Seva back office sub-system.

The *Passport Seva front office sub-system* is the user interface and delivery channel for providing access to passport services to external users. These include citizens, PSK staff, and other web users like missions, immigration and police. The transactions initiated by this sub-system are routed to the back office system via the Passport Gateway.

The *Passport Seva back office sub-system* provides user interface to internal users. Internal users are primarily MEA/CPV users. This sub-system hosts the processing logic and the repository of passport related data.

The *Passports Gateway* is a critical element of the passport system architecture, which provides secured and reliable message routing between passport services delivery channels and the back office system.

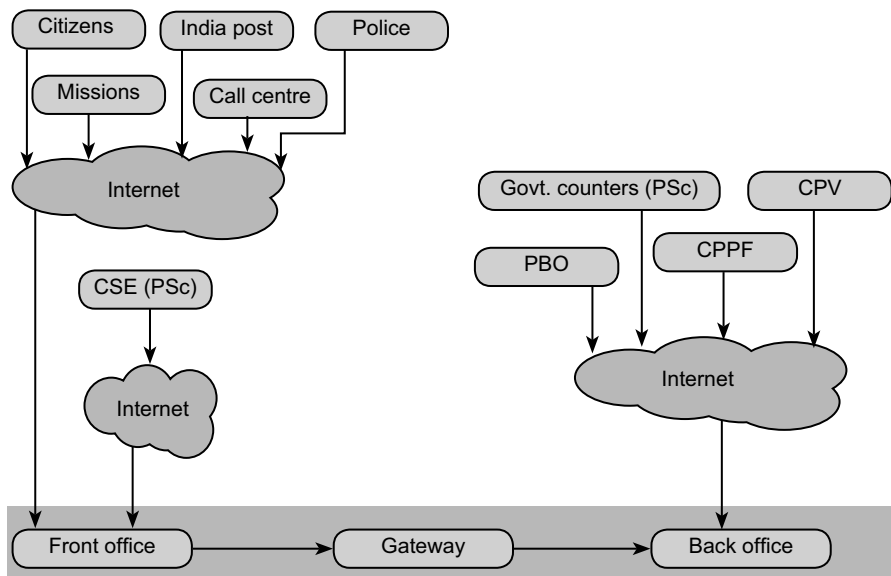


Figure 6 PSP technical architecture

Security and Confidentiality Standards

A layered security approach has been implemented to enable enterprise information security framework covering distributed entities countrywide. The Passport Seva security framework deployed for the project is derived from an extensive threat modelling exercise across project environment components. Derived from a security solution architecture, it includes multiple phases, namely design, deployment, implementation and integration, monitoring and security event management at different layers namely physical, application, database, system and network from multiple security threats originating from intranet and internet.

Best-in-class security technologies have been deployed to implement controls as per project specific requirements:

- i. Filtering mechanism devices to filter unauthorised sessions/traffic (application and network) from internet and intranet
- ii. Intrusion prevention system to detect and prevent unauthorised activities or sessions from internet and intranet
- iii. Advanced application and database security deployed to secure application code against top security vulnerability detected and published world wide
- iv. Host security; comprehensive logging and audit trail of sessions and transactions
- v. User authentication using bio-metric mechanism, usage of DSC (digital certificate) for application authentication and submission of critical data
- vi. Electronic surveillance system provisioned at premises using physical security requirements namely bio-metric and smart card based access to facilities to prevent unauthorised access, damage, and interference with information services
- vii. Security compliance requirements by formulation of security policies, procedures and guidelines based on ISO27001 security standard; security operations using security information and event management technology to detect and manage 24×7×365 real time malicious packets in production from internet and internet.

Disaster Recovery and Service Continuity

The Passport Seva system operates from two geographically distant locations—a data centre (at Delhi) and a disaster recovery centre (at Chennai). Each location, an exact replica of the other in terms of the IT infrastructure, is capable of catering to 100% of the full user load at any given point of time.

This is an active-active deployment wherein there is equal load distribution across the two locations—both of which operate simultaneously. Such a deployment architecture provides seamless business continuity in

case of failure of one of the sites. This is unlike a conventional DR site which becomes operational only in case of a disaster.

The project being mission critical, has a well-defined business continuity plan across each entity which ensures that critical business can continue in case of an emergency and quickly recover from the emergency with minimum impact to business operations.

Periodic drills are conducted to verify the efficiency and effectiveness of the business continuity plans and procedures.

VALUE INDICATORS

1. Digital Inclusion

The Passport Seva project encompasses the entire country and is spread across 23 states and 63 cities. All the 37 regional passport offices (RPOs) are now part of the new system. The staff selected by the service provider for the 77 PSKs, are locals from the area in which the Passport Seva Kendra is located. This enables them to service the citizens in the local language keeping in mind the cultural nuances of the area. The project has thus served the larger social objective of providing employment to over 3000 citizens located in different regions.

A multi-lingual call centre operating in 17 languages including English and Hindi has been set up to enable citizens to obtain passport service related information and receive updates about their passport applications. The call centre services are available round the clock, seven days a week using a toll free number.

The Passport Seva Portal, available in English and Hindi, provides anywhere anytime access to up-to-date information on passport and related services.

All PSKs are equipped with special facilities for senior citizens, women with children and physically challenged applicants. Priority queues are set up for applicants falling under these categories thus leading to lesser time spent at the PSK. The PSK also has provisions for wheel chair, washrooms for physically challenged citizens and ramp and lift for easy access to the facility for availing service.

2. Green e-Governance

The project is committed to environmental protection by ensuring proper e-waste management. E-waste in the context of the Passport Seva System refers to electronics waste as per the WEEE (Waste Electric and Electronic Equipment) directives.

The project has an e-waste management policy which reflects the objectives and measures to manage e-waste in an environment friendly

manner. This policy affects the way the project team handles, disposes outdated electronics and electrical equipments and procures new ones. Through this policy, the project team seeks to:

1. Procure computers/hardware and other electronic and electrical equipment from energy star compliant vendors.
2. Minimise generation of e-waste by extending the useful life of computers/hardware, till the support is available from the OEMs (original equipment manufacturers) and other vendors.
3. Achieve 100% environmentally responsible disposal of e-waste.
4. Carry out e-waste disposal as per the standard SP's guidelines of disposal only through the e-waste handlers/recyclers authorised by the Ministry of Environment and Forest/Central or State Pollution Control Boards.

A list of e-waste applicable in the Passport Seva Project as per WEEE directives is given in Table 3.

Table 3 *e-Waste generated by the Passport Seva System*

1.	Main frames/ servers
2.	Printer units and toners
3.	Personal computers
4.	Laptop
5.	Notebook computers
6.	Notepad computers
7.	Scanning and copyingEquipment
8.	Pocket and desk calculators
9.	Audio/video conferencing system
10.	Lighting equipment
11.	LCD TVs /plasma screens
12.	Photocopying machines / toners
13.	Refrigerators /deep freezers
14.	Smoke detectors /heat regulators
15.	Automatic dispensers for hot drinks
16.	Air conditioners
17.	Telephone, telex and other telecommunications systems
18.	Other products and equipment for the collection, storage or processing of information by electronics means.

Muktesh Kumar Pardeshi, JS (PSP) and Chief Passport Officer, CPV Division, Ministry of External Affairs, New Delhi, e-mail: jscpo@mea.gov.in

Golok Kumar Simli, Principal Consultant and Head-Technology, CPV Division, Ministry of External Affairs, New Delhi, e-mail: princontech@mea.gov.in

Intelligent Advisory System for Farmers, Government of India

Zia Saquib and Ranjan Yengkhom

PROJECT OVERVIEW

This project aims at developing an intelligent advisory system (expert system) for answering queries related to farming activities carried out in the Northeastern states of India. The system can be extended with any other type of crops in any other state of India. The project handles five major farming activities in a farming process which required expert's advice to get more yield.

It started with the belief that the existing agriculture extension services can be improved by integrating IT and mobile services. Sharing of knowledge among experts, farmers, students and research scholars are very important in the growth of the agriculture sector. The farmers' queries are stored along with its solution (called CASE) in a database. A farmer can ask a question related to farming activities supported by the IASF (Intelligent Advisory System for Farmers) and the system produces a highly probable solution from a large database containing a collection of queries and expert opinions given to them. IASF is a self-learning system that acquires new problems and corresponding solutions. The system can help farmers on time in the physical absence of an agricultural expert. Actual field photos collected by experts, NGOs, progressive farmers, etc are uploaded into IASF. This makes accessing IASF easier to farmers. The photos can also be used by any registered user of IASF.

The experts in the agricultural domain, including the Department of Agriculture, Government of Manipur; Central Agriculture University (CAU), Imphal; Krishi Vigyan Kendra (KVK) are playing the role of knowledge engineers and building the knowledge component of the advisory system.

Objectives

- Provide improved services to the farming community through use of ICT
- Advise and help farmers to solve problems related to their farming activities
- Provide information to farmers so that they become aware of important/ useful information
- Update farmers on latest technology in the agriculture sector for improved productivity and quality

- Develop an advisory system which can be extended to any other type of crops in any other state of India
- Improving the agricultural extension service by using mobile devices so that farmers can send queries about their farming problem from their mobile device
- Develop educational materials to be used by students for their practical experience in the real scenario

Beneficiaries of the Project

- Manipuri farmers
- Agricultural experts from Manipur
- Department of Agriculture, Government of Manipur
- Students from the Central Agricultural University, Imphal and other students pursuing a degree in the field of agriculture
- Research scholars from the Northeast region of India
- Krishi Vigyan Kendra and NGOs of Manipur

Farmers from Manipur: Farmers can get direct or indirect advice from agricultural experts for their query related to farming activities supported by IASF namely, insect management, disease management, fertilizer management, crop and variety selection. So far, approximately 600 queries have already been received from Manipuri farmers.

Agricultural Expert: Experts advise farmers on queries related to their farming activities supported by IASF. They can advise farmers from anywhere using internet or mobile SMS. So far, 566 queries have already been replied by 30 registered agricultural experts from Manipur. Experts can share knowledge among themselves by suggesting other experts' advices to farmers.

Research Scholars from Northeastern India: Once the project is over, research scholars will be able to study diverse farmers' problem across the Northeast region of India and how agricultural experts solve them.

Department of Agriculture: Agricultural experts from the Department of Agriculture, Government of Manipur are building the knowledge component of IASF. The Department of Agriculture, Government of Manipur can now send alert and useful information to registered users (farmers, students, experts, etc.) via mobile SMS and e-mail. It has already uploaded contents on new experience and technologies invented by progressive farmers after examining and verifying them. Information on new technologies and innovative ideas are also provided by the department. Newly recruited 50 subject matter specialists (SMS) and block technology managers (BTM) under the Agricultural Technology Management Agency (ATMA) are trained with the help of this IASF.

Krishi Vigyan Kendra (KVK): Agricultural experts from KVK, Thoubal, Manipur also have important roles on developing IASF. They are also using data stored in IASF to support farmers.

Students: One of major objective of IASF is to develop educational materials that can be used by students for their practical experience with the real scenario. Students from the Central Agricultural University, Imphal and other institutes are gaining knowledge by using IASF. The IASF team has conducted a one-day IASF training programme on March 3, 2012 at the Institute of Cooperative Management (ICM), Imphal as part of the ‘Two months training programme on setting up of agri-clinic and agri-business centre’. More than 50 BSc/BSc(Agri) students also come to the Plant Health Clinic, Directorate of Agriculture, Imphal and get the benefits of this project.

NGOs : Some of the NGOs of Manipur (RNBA, Langol Tarung Imphal; IFAD Senapati; WSDC office, Khang-sim village; AMPFA, Keishampat Junction; YPFA, Sagolband Meino Leirak; ARDWE, Keinou; Green Foundation office, Bishnupur Bazar) are trained in how to use IASF so that they can support farmers directly with the help of IASF.

The project is under the sponsorship of the Department of Electronics and Information Technology (DeitY), Government of India, under the national vision for development of Northeast (NE) region for a period of 3 years (June 2012 to May 2013). The project has been appreciated and is adapted by 5 NE states namely Manipur, Meghalaya, Mizoram, Sikkim, and Tripura. At present, IASF is deployed only for Manipur state in English and Manipuri. IASF will cover 4 more states (Sikkim, Meghalaya, Mizoram, Tripura) by the end of May 2013. IASF will be localised into Khasi, Mizo, Bengali and Nepali languages.

RESULT INDICATORS

1. Key Performance

ICT Based Services

Farmers of Manipur: They can send queries related to their farming activities using IASF portal or via mobile SMS. As on August 18, 2012, 260 farmers and 49 students from Manipur have registered. Around 600 queries are received from Manipuri farmers.

Agriculture Department: The department provides dissemination of alert and useful information through farmers’ e-mail and mobile device (via SMS). They share experience and new technologies invented by progressive farmers after examining and verifying them. Information on new technologies and innovative ideas are also provided.

Agricultural Expert: As mentioned before, experts can advise farmers from anywhere using internet or mobile SMS. They can also share knowledge among themselves by suggesting other experts’ advices to farmers.

Services that were Enhanced

Due to several reasons, the majority of the farming community do not get the upper bound yield despite successful research on new agricultural practices like inventing new crop varieties, crop cultivation and pest control techniques. One of the reasons is that the present agricultural extension services employed is limited. The traditional information dissemination follows a push model which fails to share information where and when needed, or are constrained by time slots, etc (committing human experts). Farmers, who do not have direct access to scientific knowledge about farming often rely on peers for the same and hence, may get incomplete and/or distorted information. Furthermore, the complexity of the whole farming process is growing because it is constrained by many factors such as requirements, goals, regulations, etc that farmers must satisfy or consider. Thus, a manual evaluation of all possible combinations of factors that affects the farm planning is impractical and prone to errors. Because of these complexities involved in achieving an optimal crop plan, computer-based systems such as the advisory system is required to automate many activities like pest control, weed control, crop variety selection, crop rotation, irrigation scheduling, etc. in the planning process. An advisory system for farmers provides expert advices to farmers on many activities in the farming process. With this system, farmers can access virtual agricultural experts as and when needed.

Farming Problems

- Expert/scientific advice may not reach farmers on time (agricultural extension)
- Number of expert is comparatively low
- Non-availability of experts
- Time and cost

Services

- *Farmers of Manipur*: They can send queries related to their farming activities using the IASF portal or via mobile SMS.
- Registered experts answer to farmers' new queries which could not be answered by IASF automatically. They also monitor the answers given by IASF. Any required modification of the answer given by IASF can be done through mobile SMS or the IASF portal. Thirty experts from Manipur monitor the IASF regularly for new queries.
- *NGOs*: Some active NGOs of Manipur are trained to provide IASF service to farmers directly.
- *Messaging*: The Department of Agriculture, Government of Manipur is now able to send alerts and useful information to registered users (farmers, students, experts, etc.) via mobile SMS and e-mail.
- Once the project is over, research scholars will be able to study diverse farmers' problems across the Northeast region of India and how agricultural experts solve them

- Students from Central Agricultural University, Imphal and other institutes also use IASF.

Farming Activities Covered

- Insect management for eight major crops (rice, potato, brinjal, mustard, green pea, cabbage/cauliflower, chilli, and tomato)
- Disease management for eight major crops (rice, potato, brinjal, mustard, green pea, cabbage/cauliflower, chilli, and tomato)
- Fertiliser management for rice crop
- Rice variety selection
- Weed management in rice field
- Innovative farming techniques and ideas provided by the Department of Agriculture, Government of India
- Sharing of experience and new technologies invented by progressive farmers after they are examined and verified by the Department of Agriculture, Manipur

Implementation Coverage

At present, IASF is deployed only for Manipur state. Eight IASF access points have already been opened in Manipur (Plant Health Clinic, Department of Agriculture, Imphal; RNBA, Langol Tarung Imphal; IFAD Senapati; WSDC office, Khang-sim village; AMPFA, Keishampat Junction; YPFA, Sagolband Meino Leirak; ARDWE, Keinou; Green Foundation Office, Bishnupur Bazar).

- Seven NGOs located at six different district of Manipur support the system for Manipuri farmers to have better reach. More than ten Agricultural related NGOs and about 200 progressive farmers are also trained using IASF on their request in the hill districts of Manipur.
- As on August 18, 2012, 260 farmers and 49 students from Manipur have registered.
- Newly recruited 50 subject matter specialist (SMS) and block technology manager (BTM) under Agricultural Technology Management Agency(ATMA) are trained with the help of IASF.
- More than 500 farmers coming to Plant Health Clinic, Directorate of Agriculture, Imphal are also getting the benefits of IASF .
- More than 50 BSc/BSc(Agriculture) students who come to Plant Health Clinic, Directorate of Agriculture, Imphal get the benefits of this project.

IASF will cover four more states (Sikkim, Meghalaya, Mizoram, Tripura) and will be localised into four more major local languages (Khasi, Mizo, Bengali and Nepali) by the end of May 2013.

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency Improvements

- IASF service is available 24×7 through the internet and mobile SMS. Experts' advices about farmers' farming problem are available indirectly through the Internet or mobile SMS. If the IASF system was not available, they need to visit Plant Health Clinic, Department of Agriculture, Imphal or the respective district headquarters which will be costly and time consuming. Farmers can now also visit one of the nearest eight IASF access points. Under the Department of Agriculture, Government of Manipur, 7 NGOs located at six different district of Manipur are supporting the system to provide the Manipuri farmers with better reach.
- Experts can advise farmers from anywhere using the internet or mobile SMS. Registered experts are informed via mobile SMS and e-mail when the IASF automatically answers any new queries from farmers. They can also modify these answers using the IASF portal or mobile SMS if they feel any modification is required. Therefore, the answer/advice given to farmers for their query is validated and verified by authorised agricultural experts.
- IASF provides more efficient solutions to farmers' queries by sharing knowledge among experts.

Innovative Ideas Implemented

Resolve Repeated Works on Farmers' Repeated Queries

The department found that 70% of the queries asked by farmers are repeated (India Development Gateway) and 70–80% of the advices are duplicate (e-sagu). Many systems require experts to give solutions for such repeated queries. IASF is a self-learning system that acquires new problems and corresponding solutions. Depending on the parameter values of every new query and their proximity to existing answered queries, solutions are automatically provided without the actual presence of the expert. Therefore, sustainability and maintenance issues can also be minimised.

Availability of Experts

IASF service is available 24×7 through internet and mobile SMS. Therefore, farmers can get an immediate solution to their farming problem by sending their query through mobile SMS or IASF portal. Farmers can also visit one of the nearest eight IASF access points and get help from the NGOs who are running these IASF access points.

NGOs and KVKs

Some active NGOs of Manipur are trained in the IASF system; they are providing IASF service to the farmers directly..

Knowledge Sharing

IASF is a portal to share knowledge/experience among agricultural experts, research scholars, students and farmers across different regions by using a discussion forum module or by suggesting other expert's advice to farmers' query.

SMS Alerts by the Agriculture Department, Government of Manipur

They can broadcast alerts, useful information to farmers' mobile devices via SMS.

Level of Integration

- It is planned to integrate IASF with state portals.
- The project is appreciated and adapted by 5 NE states namely Manipur, Meghalaya, Mizoram, Sikkim, and Tripura. At present, IASF is deployed only in Manipur state in English and Manipuri. IASF will cover 4 more states (Sikkim, Meghalaya, Mizoram, Tripura) by the end of May 2013. IASF will be localised into Khasi, Mizo, Bengali and Nepali languages. It will cover more crops as per the requirement given by each mentioned state.
- Mobile SMS is already integrated into IASF for most functionalities supported by IASF. By May 2013, IVR (interactive voice response) services will also be available to farmers.

ENABLER INDICATORS**1. Process Reengineering****ICT and Non-ICT Front-end Changes**

Farmers usually visit Plant Health Clinic, Department of Agriculture, Imphal or the respective district headquarters to get advice from experts for their farming problems. This process is costly and time consuming. IASF service is now available 24×7 through internet and mobile SMS. Farmers can also visit one of the nearest eight IASF access points or the seven NGOs trained in IASF.

ICT and Non-ICT Back-end Changes

Experts can advise farmers from anywhere using the internet or mobile SMS. The Department of Agriculture, Government of Manipur can send alerts and useful information to registered users (farmers, students, experts, etc.) via mobile SMS and e-mail.

2. Capacity Building

Leadership Support

Agricultural experts from the Department of Agriculture, Central Agriculture University (CAU), Krishi Vigyan Kendra (KVK) and progressive farmers will be provided training after their respective state comes under board. At present, IASF is deployed in Manipur only. Subject matter specialists (SMS) and block technology managers (BTM) under the Agricultural Technology Management Agency(ATMA) are trained and more than 40 experts from Manipur are already trained. So far, more than 10 agricultural related NGOs and about 200 progressive farmers are also trained using IASF on their request in the hill Districts of Manipur. More than 500 farmers and 50 BSc/BSc (Agriculture) students coming to Plant Health Clinic, Directorate of Agriculture, Imphal are also trained.

Four more states will join the IASF board and training will be provided to their respective experts, NGOs, KVKs and progressive farmers by May 2013.

Change Management Strategy

IASF is under the change management strategy defined by QMS (quality management system) of C-DAC (Centre for Development of Advanced Computing) Mumbai based on SVN (subversion) repository.

Capacity Building Plan

At present, eight IASF access points are already set up in Manipur. More IASF access points will be set up in other states also. Four more states will join the IASF board and training will be provided to their respective experts, NGOs, KVKs and progressive farmers by May 2013.

Project Management

- The Department of Agriculture, Government of Manipur has formed an expert committee under the State Department of Agriculture to monitor IASF regularly and to update it in future if required.
- One data analyst cum data entry operator is temporarily working with the IASF to support agricultural experts.

Financial Model

The project is under the sponsorship of the Department of Electronics and Information Technology (DeitY), Government of India, under the national vision for development of the NE region for a period of three years (June 2012 to May 2013).

Efforts at Sustainability

The agriculture department of respective states is taking a major role in implementing this project in their respective state. Each state has formed an expert committee under the State Department of Agriculture to monitor IASF regularly and to update it in the future if required. Manipur state data centre will take responsibility for maintenance with support from the respective state agricultural departments. Technology B

ICT Solution Adopted

The present productivity of rice in the Northeast region is very low while the soil and climatic condition is quite favourable for rice production. If proper technology is adopted, the yield level can be increased significantly. Hence, there is a need to work on a system that is based on a pull model rather than a push model, which would provide information as and when required.

Rule-based reasoning (RBR) and Case-based reasoning (CBR) are two techniques used world wide to address the problems of farmers where decision making is very complex. Activities explored includes selection of land; selection of crop; crop rotation; irrigation scheduling; weed and pest control; prognosis, diagnosis and treatment of disease; marketing of crops; etc. These two techniques have been applied to many varieties of crops resulting in decreasing production cost and increasing yields.

CBR systems provide an adequate framework to cope with *continuous domains*, where a great amount of new valuable experiences are generated in a non-stop way. These systems become *more competent* in their evolution over time by learning new relevant experiences. CBR can be synergistically combined with RBR—it is found that the hybrid approach works better than just applying either of the two techniques in isolation.

IASF is an advisory system obtained by integrating CBR and RBR. It is used for answering queries related to farming activities carried out in the Northeast region of India.

Security and Confidentiality Standards

IASF is a user base defined framework for which security and confidential standards are applied based on the registered user type. Registration is free and only registered users can directly access the portal. Passwords of experts are encrypted.

Disaster Recovery and Service Continuity

At present, IASF is hosted at C-DAC Mumbai and maintained and supported by ITSS (Information Technology Systems and Supports) team

of C-DAC Mumbai. Once project is over, IASF will be tested by STQC (Standardisation Testing and Quality Certification) and will be deployed at the state data centre, Government of Manipur. The Manipur state data centre will take responsibility for maintenance with support from respective state agricultural departments.

The department has service-based SLA which includes availability of IASF server and IASF services 99% of time. 1000 users per day should be able to use IASF without any problem.

VALUE INDICATORS

1. Digital Inclusion

At present, IASF is deployed only for Manipur state in English and Manipuri. The system will cover four more states (Sikkim, Meghalaya, Mizoram, Tripura) by the end of May 2013. IASF will also be localised into Khasi, Mizo, Bengali and Nepali languages. IASF is an advisory system which can be extended easily for other crops in any other state of India.

- NGOs and officers working in different regions with different demographic and cultural differences will be trained to support farmers at villages directly with help of IASF.
- IVR system in Manipuri, Khasi, Mizo, Bengali and Nepali languages will be available at the end of the project.
- IASF SMS service will be available in local languages (Manipuri, Khasi, Mizo, Bengali and Nepali).

2. Green e-Governance

Since the IASF service is available through internet and mobile SMS, it will reduce the use of papers by experts and farmers.

Dr Zia Saquib, Executive Director, Centre for Development of Advanced Computing, Mumbai, e-mail: saquib@cdac.in

Ranjan Yengkhom, Senior Technical Officer, Centre for Development of Advanced Computing, Mumbai, e-mail: ranjan@cdac.in

Rice Knowledge Management Portal, Government of India

B C Viraktamath and Shaik N Meera

PROJECT OVERVIEW

In India, rice is the major cereal crop grown in about 44.6 million hectares. India represents the diversity under which rice is grown across the globe. No other crop is as versatile as rice. Rice crop is interwoven in the cultural, social and economic life of millions of Indians—it holds the key for food and nutritional security of the country. Given the burgeoning task of further enhancing the production and productivity of rice, the existing information sharing mechanisms appear to be insufficient. It is being increasingly felt that ICTs can be a major vehicle for all-round socio-economic development. Given the task of reaching so many state department officials, NGOs, scientists working in rice regions of the country, it is not possible to cater to the needs of all the stake holders with the given resources. One of the viable options was developing and maintaining a knowledge management portal on rice that can be expected to help millions of rice workers located in various parts of the country to be effective and efficient in collecting, organising, summarising, analysing and synthesising the rice knowledge; and thus can be expected to help in better decision making.

In this changing scenario, the Indian Council of Agricultural Research (ICAR) wishes to promote the use of Information and Communication Technologies (ICTs) in agriculture by developing national level knowledge management portals. As a first step towards achieving this objective, an exclusive portal on rice viz., Rice Knowledge Management Portal (RKMP with www.rkmp.co.in as the website) was developed by ICAR under the National Agricultural Innovation Project (NAIP).

To provide the most comprehensive agricultural knowledge directly from the scientific community, the Rice Knowledge Management Portal was developed through a series of consultations involving the consortium partners and other ICT4D experts. In a short span of 24 months, the portal was built with high quality content developed by eight consortium partners, 20 AICRIP (All India Coordinated Rice Improvement Project) centres and thousands of other stakeholders.

RKMP now serves as an information highway for sharing rice knowledge across the country. It has several global firsts in terms of comprehensiveness and utility. Built on web 2.0 standards, this portal caters to location specific

information needs of many stake holders in local languages. With about 20 platforms, more than 10,000 pages of content, 3000 minutes of audio, 50 video clips, this is the first comprehensive agricultural portal of the country.

In the *research domain*, various services are provided such as the AICRIP Intranet, archives of 27000 datasets, bio-informatics suite, India Rice Research Repository (i3R) etc. It operates two e-learning platforms providing learning opportunities to scientists and extension workers at their time and space. The *extension and farmers domain* provide production know how, package of practices, FAQs etc., in English and local languages, and the completely *image driven diagnostic tool* helps extension professionals and farmers to diagnose field problems based on the stage of the crop cultivation. The largest rice database of location specific content, RKMP also helps farmers to know about the soil health and fertilizer recommendation system through the online *fertimeter* application. The exclusive and exhaustive information on weeds aims to help make wise decisions in weed management. If farmers have more queries, the portal provides answers through its online/SMS based question answer platform 'Expert Answers on Rice' managed by 152 rice experts. The platform uses the three-tier structure namely web based question and answer forum, SMS based alerts and web based questions answered through SMS

As Indian agriculture is highly dependent on the vagaries of weather, the portal provides short-term weather forecasts to render timely information to farmers and extension agents for real time decision making. The day-to-day mandi price of rice prevailing in various national markets are channelled into this portal for better decisions which could lead to better remuneration for the rice farmers. Farmer are provided with assistance in spotting the nearest research station, extension office, KVK (Krishi Vigyan Kendra), dealer to get first-hand information. Information on various government schemes at both the national and state level will bring government activities to the reach of farmers in remote lands. A gallery of 52 video clips, 4000 minutes of audio clips and the details of various frontline demonstrations are sure to benefit rice farmers in need of reliable and convincing information. The portal aims at kindling innovativeness in farmers through its well-documented database of various rice innovations. At the same time, it has put enormous efforts in preserving indigenous rice knowledge for future generations. The all-rice portal serves as an information highway for the rice sector to share general rice knowledge along with specific content for 15 states in English, Hindi, Telugu, Tamil, Kannada and Marathi. RKMP hopes to serve a wide range of stake holders like farmers, extension professionals, researchers, traders, NGOs, policy makers, etc., and help in better planning, realising higher productivity and production of rice through improved knowledge and skill.

To enhance the export opportunities for rice from India, a *Trade Information System* delivers trade information of different markets all over the world, and exports and imports information of rice.

Policy makers can directly access area, production, productivity trends of the last four decades for all districts.

The portal developed through the latest ICT tools envisions supporting mobile telephony and will also help agricultural departments' ongoing activities in reaching out to farmers through extension advisory services, in the most effective way. The portal was launched in the presence of the Hon'ble Prime Minister of India during the 83rd ICAR Foundation Day on July 16, 2011. With it, a better flow of rice knowledge and information is contributing to the overall rice development in the country.

RESULT INDICATORS

1. Key Performance

ICT Based Services

A cafeteria of data, information and knowledge is shared through RKMP. Unlike other ICT4D initiatives, this is the first time that a public sector research and development organisation is providing credible information to farmers and other stake holders of rice. Data, information and knowledge is delivered through this portal without compromising on the quality and credibility of the content. A striking feature of the portal is its provision of context-specific information catering to the information needs of different stake holders.

For delivering information, different domains are available.

Research Domain

The following content is available in this domain.

- Data repository
- AICRIP Intranet
- Status of rice production state wise
- RiceVocs (2500 rice related vocabulary)
- Bio-informatics tool
- Research themes
- Research fora (community of practices)
- Directory of Rice Researchers
- India Rice Research Repository (i3R)
- Tools and techniques
- History of rice breeding
- Rice research in India

Extension Domain

The following content and services are available in this domain.

- Production know how of rice (2500 heads)
- Package of practices (state specific)
- Expert Answers on Rice (EAR)
- Government schemes
- Extension methods
- Diagnostic tools
- FAQs
- Frontline demonstrations
- Production concerns of the month
- Farmers Innovation
- Fertimeter
- Spot nearest research/extension Office/dealer
- Recap sheets
- Audio and video gallery
- Weed management
- Weed information system (Wisy)
- Indigenous Technical Knowledge (ITK)

Farmers Domain

The following content and services are available in this domain in the local language:

- Production know how
- Package of practices
- Expert Answers on Rice (EAR)
- Government schemes
- Farmers innovation
- Audio gallery
- Video gallery
- Digital photo library
- Weed management

Service Domain

The following content and services are available in this domain.

- Trade information system (trade know how)
- *Mandi* (market) prices
- Spot nearest research/extension office/dealer
- Weather information

General Domain

The following content and services are available in this domain.

- History and evolution of rice
- Rice in Indian culture
- Rice facts
- Rice in human nutrition
- Rice endproducts

- News and events
- Virtual rice resources
- Rikipedia
- Virtual tour

Rice Stats

The Rice Almanac is generated in this domain and updated periodically.

E-learning

Two learning platforms are available to farmers, scientists and extension workers.

- LearnRice - Moodle
- LearnRice

Users Feedback: RKMP has redefined the way organisations access rice related information in the country. There has been a felt need for a single gateway of knowledge using differential platforms. It is expected that these platforms will have a high degree of consumer acceptance. Many officials and delegates from ICAR and other organisations have appreciated RKMP in various contexts regarding its several global firsts in terms of comprehensiveness and utility (Box 1).

Even the Director General, International Rice Research Institute (IRRI) visited RKMP at DRR (Directorate of Rice Research) and appreciated the efforts.

As a registered user, one can upload content into RKMP, irrespective of his/ her institutional affiliation. RKMP nodal officers (AICRIP Centre scientists from State Agricultural University) will validate and approve the content before it is displayed online. At RKMP, the source of each content is acknowledged. It is suggested that before uploading material, it is better to go through the RKMP Content Upload Policy available online.

Services that were Introduced

All the above services are introduced this year (2011–12). Following are some of the impact indicators and deliverables the project aimed to offer and have successfully hosted through RKMP:

- Six information systems of RKMP in place with 24×7 online availability
- A single gateway for information sharing and content aggregation facility for rice workers
- A web based knowledge management system and MIS for AICRIP
- Digitised datasets of AICRIP, POS and FLDs (three sets of archive digital resources)
- Nation level approach papers in eight disciplines of rice research
- FAQs on rice production technology (in English, Hindi and local languages) digitised for 15 states

User's feedback

"RKMP is one model we wish to promote across agriculture and allied sectors at country level. We are happy to have funded this innovative project"
— Dr. Bengali Babu, National Director, NAIP

"When the Principal Investigator has this kind of clarity, the projects ought to be successful. Congratulations" — Professor S L Mehta, Chairman, RPC, NAIP

- "Amazing work" — Martin Parr, KM Programme Manager, CABI, UK
- "RKMP— that it is the only portal with full and complete information on rice" — Ms. Shilpa Deshpande, Symbiometrics Innovations Private Limited, Ahmedabad
- "RKMP will eventually be admired as an outstanding mobilization of ICT and agri sciences. I can tell a good tech innovation when I see one—believe me. RKMP is for me not only a product, but a model, a framework too. You can discontinue developing the product but you can continue to refine the framework— that is how your leadership will come to be recognized"— Dr. Venkataraman Balaji, Director, Technology and Knowledge Management, Commonwealth of Learning, Vancouver, BC, Canada
- "AICRIP information is very useful to compare the performance of different technologies over years across different ecologies. Status of rice production in each state, research papers, community of practices and bioinformatic tools under the research domain helps in extensive rice research in India"— Dr M P Rajanna, Sr. Breeder (Rice) ZARS Mandya, Karnataka

"Rice Knowledge Management Portal (RKMP) is very useful to progressive farmers like me. Earlier I used to go to many research stations for updating my knowledge. I attended first content development workshop at ZARS, Mandya way back in 2010. The Portal gives lot of information on rice package of practices, production technologies, etc. in Kannada language, I am using Online Fertilizer recommendation system and online diagnostic tool for diagnosing the problems of pests and diseases. I am taking the print out and distributing the important information as flyers to my fellow farmers. I think all the stake holders should make use of this good facility." — Sri K. Suresh, progressive farmer, Nelludi Kottala, Taluka, Bellary, Karnataka

- 30 audio-video clips on selected rice production technologies and methods
- 24×7 online web based question-answer platform for the rice sector
- Online availability of extension methods, tools, check lists and pro formae
- Outline directory of seed and input agencies in place (skeleton)
- Framework for "Find you nearest extension worker/expert/dealer" in place
- Rice wiki in place

- E-learning platform with 15 courses in place (in English) and 5 courses in Hindi and local languages
- A digital photo library on rice in place
- All the government schemes aimed at rice development available in interactive mode
- 45 AICRIP scientists to get hands-on experience on RKMP
- 60 extension personnel to get hands-on experience on RKMP
- Complete digitised content for EIS and FIS for the country
- Topic map of rice with user friendly interfaces
- Linkages and indexing services
- A complete report of the knowledge flow mechanisms in the rice sector due to RKMP
- RKMP data centre ready to serve the knowledge management portals of other crops

Implementation Coverage

- The portal is being implemented in the entire country with partners representing each region in the country i.e. North, South, East, West and Northeast regions with eight consortia partners and 20 AICRIP centres.
- The total number of pages in the Rice Knowledge Management Portal are 10594 (excluding 20 platforms) with 117725 page loads and 10707 unique visitors till date. This is the fastest growing single crop portal in the world.
- Many platforms are being accessed by different stake holders to make use of knowledge. For example, about 700 scientists are making use of the data repository—this is seen as a viable model for developing agricultural portals at the nation level.

2. Efficiency and Improvement Initiatives

Time and Cost Efficiency Improvements

Before the implementation of RKMP, knowledge sharing in the rice sector was a difficult process.

Problems with Regard to Knowledge Sharing in the Rice Sector

- Potential users (farmers, scientists, extension officials, private sector and other key players) within and outside the country were not familiar with many of the rice technologies, datasets, usable form of rice information. There was an inbuilt inability to cross-search rice information available in India in an isolated manner, at once. There was no single gateway through which a user could search all the information resources available on rice.
- Even the rice workers themselves did not have a single window for identifying commonalities between their work and that of their colleagues

in other rice research stations. There was a lack of data refinement, standardisation within and between stake holder communities working towards rice development.

- There was increased risk of duplication of efforts while collecting, analysing and processing scientific rice research information, technologies, technological and information needs of farmers, socio-economic and institutional information of different rice regions of the country. Such duplications lead to excessive wastage of time and other monitory resources on the exchequer.
- At organisational levels, there was no real time knowledge and technology exchange among rice based institutes, state departments of agriculture, other stake holders and farmers. The virtual triangle of access, quality and costs of knowledge interventions were high.

All these factors had made it a costly and difficult endeavour to access validated information on rice. RKMP is reaching its stake holders in various forms. Some of the ways interactivity is promoted are given below.

- i. *IP based customisation* helps individuals to browse through location specific content.
- ii. *Video and audio galleries* will help provide 'do how' skills and knowledge on rice production technology.
- iii. *Expert Answers on Rice* is a platform in which interactivity is involved between the user and the expert.
- iv. RKMP provides content/information in local languages like Hindi, Telugu, Kannada, Tamil, and Marathi along with English for the ease of the farming community.
- v. Offline CDs and non-digital delivery mechanisms help users without connectivity as well.

Users/stake holders get information on rice with one click through RKMP. They can upload their information, easily find out *mandi* prices, nearest extension officers etc. Farmers can easily understand fertilizer doses by entering minimum information about their fields. They can easily diagnose pest and disease problems in rice crop using the completely image driven pest and disease diagnostic tool. Training and information support has been given by e-learning platforms with two dimensions—one is for online training support and the other for asynchronous knowledge support.

Innovative Ideas Implemented

Harnessing the existing AICRIP setup through knowledge management tools is one of the finest innovations of this project with in-built sustainability. At present, the system receives seed dispatch, crop condition (sowing, transplanting, flowering etc.) details through AICRIP MIS platform under RKMP. Within one year, twenty per cent of the 47th AICRIP workshop data has been submitted online through this site. This data is very useful for

planning monitoring tours to different AICRIP coordinating centres under DRR and suggesting recommendations for different problems faced during different stages of rice cultivation.

Knowledge management (KM) in agriculture is relatively a new concept. The mammoth task of driving the knowledge sharing process in agriculture requires lot of efforts at various hierarchical levels among agricultural organisations. In India, there is an urgent and strong need to adapt KM strategies in agriculture as applied in the project. The tagging processes adapted in RKMP which makes the user's browsing experience effortless is well appreciated.

Level of Integration

RKMP can be accessed through any of the search engines (it supports Google Chrome, Mozilla Firefox, I.net explorer etc.,). All stake holders who have connectivity can access huge amount of information. In agricultural organisations, connectivity has to be strengthened for effective use of this portal. Mobile interfaces will help reach out to farmers as well. It is planned to make the portal mobile to reach out to at least 1.8 million rice farmers directly.

Synergising Krsihi Vigyan Kendras (KVK) System and RKMP

This portal is an example of harnessing the enormous potential of ICT and KM strategies to manage the voluminous knowledge in the existing All India Coordinated Rice Improvement Project (AICRIP) setup. If this knowledge is delivered through state departments of agriculture and KVK networks involving other stake holders, visible impacts can be realised at the farm level. A model is developed for synergising the AICRIP and KVK systems that could help upscale it for other crops/ sub-sectors.

Synergising NFSM and RKMP

To implement the resolution of the National Development Council (NDC) envisaging increase in the production of rice, wheat and pulses to the tune of 10 million tonnes, 8 million tonnes and 2 million tonnes respectively, the 'National Food Security Mission' (NFSM) has been launched in 2007-08 in 311 districts of 17 states. NFSM-Rice comprising a cafeteria of technological interventions was planned and implemented (for example, demonstrations, distribution of seed mini kits etc). If RKMP knowledge is delivered through the state departments of agriculture under NFSM, visible impacts can be realised at the farm level.

Mobile Application

The onset of web and mobile revolutions in India will allow partners to empower citizens by embodying knowledge with time critical services. This would contribute to enhanced productivity and hence income levels of poor farmers. There are plans to analyse the structural and functional aspects of mobiles in the rice sector and analyse the potential to fine tune the extension system using mobile applications.

Institutionalising RKMP with AICRIP

Institutionalising of RKMP activities will serve two important purposes— (i) Knowledge from the AICRIP system will directly flow into the extension system which will help usher in knowledge intensive rice production across the country. As many KM theories suggest, a system in place will enable enhanced efficiency in transfer of technology; (ii) it will showcase the visible impacts of the AICRIP system by creating and sharing research products through this platform. This will enhance the visibility of the online ICAR system.

ENABLER INDICATORS

1. Process Reengineering

ICT and Non-ICT Front-end Changes

Built on Drupal (open source) with effective tagging of 1000 content heads, this is the most comprehensively defined agricultural semantic portal of the country. Plug-ins and add-on platforms (such as .Net and java based) gives additional strength to the portal. With RKMP, a lot of problems could be addressed within a short span of one year. Before the launch of RKMP, the Indian rice sector was facing acute information shortage. Some of the problems faced by various stake holders are now addressed by RKMP in the most effective way.

ICT and Non-ICT Back-end Changes

The project is implemented in a consortium mode. Each consortium partner has specific roles to play based on their core competency. DRR

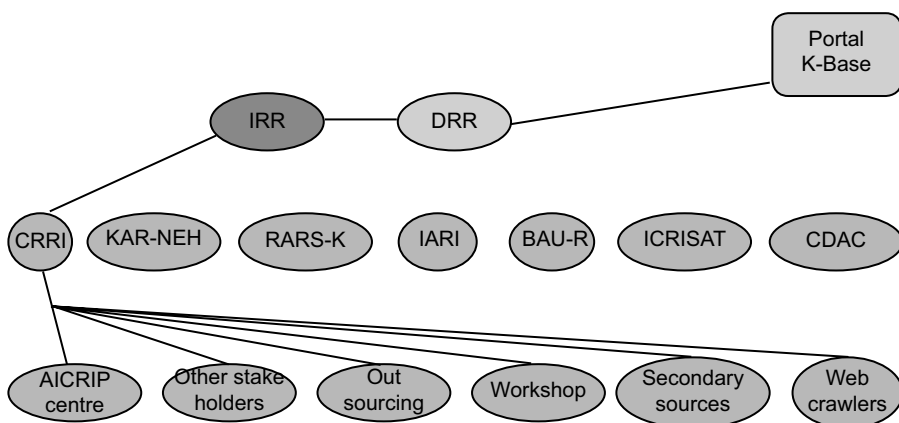


Figure 1 Conceptual model for content development in RKMP

leads the consortium. ICRISAT and C-DAC are technical partners focusing KM models and front technologies respectively. Other partners are called ‘content collaborators/ partners’, whose primary responsibility is to develop local content in collaboration with the AICRIP centres, SAUs and other stake holders from the states within their jurisdiction. A conceptual model for content development for one state is given in Figure 1.

The design, planning, coordination, execution, technical expertise, and hosting and maintenance of the Rice Knowledge Management Portal were taken up by the Directorate of Rice Research, Hyderabad in association with its collaborating institutes. Information support is provided by selected stake holders in the rice sector of the country.

2. Capacity Building

As part of the capacity building plan, various workshops (Table 1) were planned and conducted.

Table 1 *Workshops planned and conducted*

Sl. No.	Type of workshop (Figures in parenthesis indicates the total number of workshops)
1.	Launch workshops of the project (16)
2.	Workshop for finalising the design features and functional requirement of the portal
3.	Content development strategies workshop for content collaborators and their team members
4.	Review workshop
5.	Content development phase I Content development for the first batch states Content development workshops (6)
6.	Capacity building workshop for rice researchers (3)
7.	Capacity building workshop for NGOs, KVKs and state department (extension) officials (3)
8.	Capacity building and upscaling workshop for private sector Upscaling opportunities for the RKMP (1)
9.	Content development phase II Content development for second batch states Content development workshops (9)
10.	IRRI's orientation workshop
11.	Content translation and capacity building workshop
12.	Review workshop
13.	Expert Answers on Rice workshop (1)
14.	Rice Topic Map and Agopedia workshop (1)



RKMP-IRRI
Workshop on Knowledge Management Collaboration
16-19 February 2011
University of Agricultural Sciences, Bangalore
Organized by IAS-B, DRR (ICAR) and IRRI



Workshop on Knowledge Management Tools
(Jointly organized by KRISAT and DRR)
14-15 December 2010
KRISAT, Patancheru, Andhra Pradesh
Logos for ICRIAT, ICRISAT, and DRR are displayed below the text.

Workshops held for capacity building



Hands-on experience to stake holders at DRR, Hyderabad

15. Capacity building workshop in rice regions
(if sponsored by common service centres (CSC), ICT4D projects, NGOs, state governments etc.,
(at least 3 anticipated – not committed)
– not be reflected in the NAIP sub-project budget
16. Capacity building and upscaling workshop for private sector
Upscaling opportunities for the RKMP sponsored by the private sector
(anticipated number 3 – not committed)
17. Sustainability planning workshop

Other than these, to provide the effective hands on experiences to the stakeholders various capacity building workshops have been organised across the country by various partners.

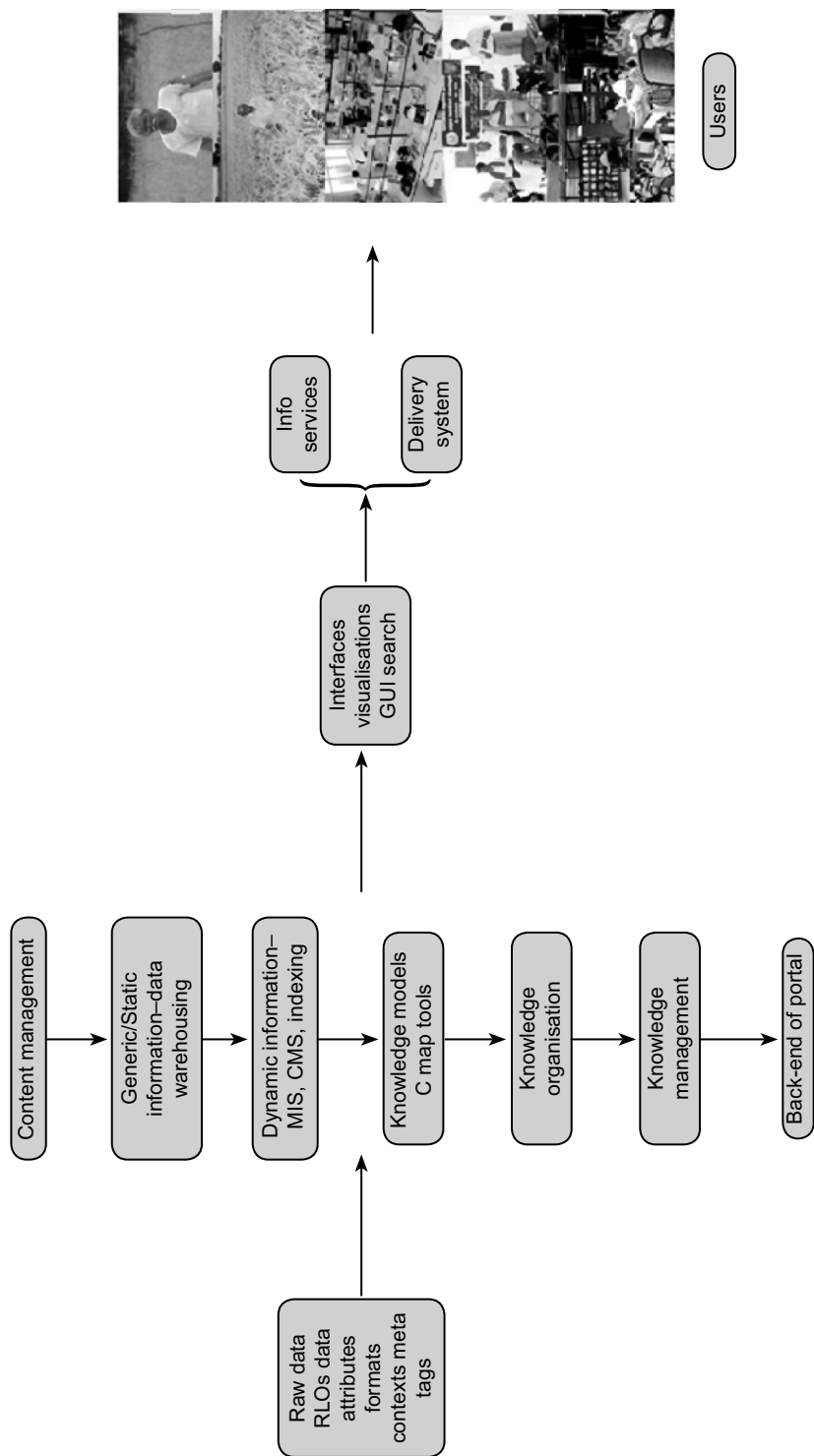


Figure 2 Conceptual model of portal back-end development and user interfaces

3. Technology

ICT Solution Adopted

As mentioned before, this portal is built on Drupal (open source) with effective tagging of 1000 content heads. It is hosted on www.rkmp.co.in and connected to 100 mbps line of national knowledge network. Portal back-end development comprised of development of information architecture, defining the platforms in terms of content management systems, database types, web servers, script, handlers, concept maps and user interfaces etc (Figure 2). The main portal is built on an open source content management system with lot of plug-ins to support the content flow customisation. The basic information unit for the portal is an RLO (reusable learning object). In the information architecture defined for the portal, there are about 4500 content heads with data attributes (both in terms of technical format and agriculture domain expertise).

Building the first semantic portal in agriculture was another challenge. Such a portal should enable multi-dimensional search by means of rich domain ontology. For that, different types of information were categorised into semi-structured and extensible sub-heads allowing for bottom-up evolution and decentralised updates. Effective tagging of these terms, hierarchically made users add new classification and organisational schemas and extend the information structure. With concept maps at application layers, the portal content is stored and managed in a decentralised way with effective manual tagging and auto-tagging processes.

Security and Confidentiality Standards

Four levels of users are created such as super administrator, administrator, moderator, users and guests. User privileges are designed depending on the role of access to the data to specific platforms.

Disaster Recovery and Service Continuity

Continuous backup and vulnerability checks are being done.

VALUE INDICATORS

1. Digital Inclusion

RKMP is the first step, in terms of application of ICTs and KM strategies, in agriculture to build a portal with enormous content. The portal serves as an information highway in the rice sector for farmers, researchers, extension professionals, policy makers, home makers, students etc. The vision is to realise higher productivity and production of rice through improved

knowledge and skill sets. It is hoped that the efforts will pave the way to reduce the gaps of the growing Digital Divide, specifically in the important cereal crop of the country namely, rice. The total number of pages in the Rice Knowledge Management Portal are 10594 (excluding 20 platforms) with 117725 page loads and 10707 unique visitors till date. This is the fastest growing single crop portal in the world. The success of this can be emulated in other important crops.

Dr B C Viraktamath, Director, Department of Agricultural Research and Education (DARE), DIAR, Andhra Pradesh, e-mail: pdrice@dricar.org

Dr Shaik N Meera, Senior Scientist, Directorate of Rice Research, Andhra Pradesh, e-mail: naiprkmp@gmail.com

Section VII

About CSI-SIGeGov

A Note on CSI Special Interest Group on e-Governance (CSI-SIGeGov)

K S Vijaya Sekhar and R K Bagga

BACKGROUND

Computer Society of India (CSI) has implemented the concept of “Special Interest Groups” to promote activities and research in major focused areas. The Special Interest Group on e-Governance (SIGeGov) was formed in Hyderabad during 2006–2007 with Dr Ashok Agarwal (Adjunct Professor, BITS Pilani and Chairman, EWB India and Past Chairman, CSI-SIGeGov) as Chairperson, with support from CSI HQ and CSI Hyderabad Chapter.

CSI is the only professional society covering individual users and citizens as its members and is most appropriately suited to focus on and add significant value to the successful implementation of the e-governance initiatives in India. Because e-governance has the potential to take our country to the next level of progress, as a developed nation, the mission of CSI-SIGeGov assumes great importance in this endeavour.

OBJECTIVES

CSI-SIGeGov’s objectives include knowledge sharing with all stake holders through conferences, knowledge sharing summits and e-governance awards. CSI has instituted the Nihilent e-Governance Awards, entrusting SIGeGov with the role of organising these awards and implementing the award judging process.

The objectives of SIGeGov include

- Acting as the secretariat for the e-governance awards and maintaining updated databases of all relevant stakeholders in this area
- Support of research in selected areas like assessment framework and implementation strategy for e-governance projects

- Publication of all nominations received during CSI-Nihilent e-Governance Awards in the form a book for wider circulation and knowledge sharing
- Participation in the processes for evolving standards in technology, processes and databases
- Conduct of national and international conferences in e-governance individually or by joining hands with other reputed institutions
- Interaction with international bodies like IFIP and SEARCC to benefit India by sharing India's experiences with other nations

ACTIVITIES OF CSI-SIGeGov

I. CSI-Nihilent e-Governance Awards (www.csinihilent-egovernanceawards.org)

CSI-SIGeGov has instituted a series of awards for recognising the contributions made in the field of e-governance in the country. These awards have been sponsored by Nihilent Technologies Ltd. The awards are given for recognising the efforts made in e-governance area, specifically at the State, Department, District and Project levels. There is active participation in these awards from the State and Central Government establishments, Departments, District authorities and undertakings and research establishments. Participation by many of these central and state level organisations have made these awards a much awaited event, every year since 2002. The concept of field visits and analytical hierarchy process (AHP) was implemented to make the awards process transparent and acceptable to Government officials.

II. Knowledge Sharing Summit (www.csi-sigegov.org)

The national level e-governance Knowledge Sharing Summit (KSS) is an annual event organised by CSI-SIGeGov. The summit aims to provide a forum for policy makers, practitioners, industry leaders and academicians to deliberate, interact and develop an actionable strategy for transparent and good governance.

There is an inherent need to explore and share success stories, best practices and achievements from across the country for better implementation of e-governance initiatives. The KSS intends to provide the forum for discussion on the e-governance initiatives of the Government of India, implementation strategies and challenges and to share the learning from national best case studies in the area of e-governance.

SIGeGov launched a website to act as knowledge portal for all e-governance initiatives in India. In 2009, the first KSS was held at Hyderabad

with support from the Government of Andhra Pradesh. In 2010, the second summit was held in Bhopal with support from the Government of Madhya Pradesh. In 2011, the third summit was held in Gujarat with support from the Government of Gujarat. During KSS-2011, CSI conferred on Mr Narendra Modi, Hon'ble Chief Minister of Gujarat, its first e-Ratna awards for providing unique leadership in using ICT in the state of Gujarat and for providing better citizen service over the years.

For the year 2012, the Knowledge Sharing Summit (KSS-2012) was held at Raipur, Chhattisgarh, and the e-Ratna award was conferred on Hon'ble Chief Minister of Chhattisgarh, Dr Raman Singh.

III. International Conference on e-Governance (www.iceg.net)

International Conference on e-Governance (ICEG) was founded at IIT Delhi in 2003 to address the growing need for furthering knowledge in e-governance. It is organised under the umbrella of International Congress of e-Government (ICEG), which is a forum for the advancement of knowledge in the discipline of e-governance and promotion of the same at various levels of governments across the world.

ICEG serves as a premier global organisation where various stake holders (academics, government officers, industry, professionals, NGO, citizens, government and international agencies) participate and share ideas and resources for knowledge creation, skill development, networking and spread of e-government at various levels. It became a beacon for e-government policy makers with its very first conference in 2003, when the then Hon'ble President, Dr APJ Abdul Kalam, guided the conference as the Chief Guest.

SIGeGov jointly organised ICEG series with the University of Hyderabad in 2008, with IIT, Delhi in 2009, with IIM, Bangalore in 2010; and with NIRMA University, Gujarat, in 2011.

IV. CSI-SIGeGov Publications

The following six books covering research and case studies on governance, were released by SIGeGov during the Annual Conventions of CSI; these are available free for download.

1. *Widening e-Governance Canvas: Selected e-Governance Initiatives in India*, (eds) Surendra Kapoor, Prabhu Gollamudi and Nityesh Bhat, published by ICFAI University Press (2011).
2. *Enablers of Change: Selected e-Governance Initiatives in India*, (eds) Piyush Gupta, R K Bagga and Ayaluri Sridevi, published by ICFAI University Press (2010).
3. *Fostering e-Governance: Compendium of Selected Indian Initiatives*, (eds) Piyush Gupta, R K Bagga and Ayaluri Sridevi, published by ICFAI University Press (2009).

4. *Transforming Government: e-Governance Initiatives in India*, (eds) by Dr R K Bagga and Piyush Gupta, published by ICAI University Press (2008).
5. *Compendium of e-Governance Initiatives in India*, (eds) Dr R K Bagga and Piyush Gupta, published by Universities Press (2007).
6. *e-Governance Case Studies*, (eds) Dr Ashok Agarwal, published by Universities Press (2006).

V. CSI Hyderabad Chapter (www.csihyderabad.org)

CSI-SIGeGov has an office located in CSI Hyderabad chapter premises and has been interacting on a regular basis in assisting the chapter office and affiliated Student Branches, enhancing quality of their activities. CSI Hyderabad has tied-up with corporate organisations to provide in-depth training and live projects for students in their final year of engineering as a part of their curriculum. The program starts off with an intensive training program that is customised based on the live project, covering Programming Language, Platform, Database Management, Software Development Life Cycle, Project Management, Documentation, Team Work, Communication, etc. Hyderabad is looking forward to hosting the Golden Jubilee Convention (CSI2014).

VI. CSI Students Branch (CSISB) at IIIT Hyderabad (csi.iiit.ac.in)

CSI has large number of student branches and it will soon be touching one lakh members including India's most famous IT industry leaders, brilliant scientists and dedicated academicians. The mission of the CSI Student Branch at IIIT Hyderabad 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. Based on the recommendations of SIGeGov, a syllabus on e-governance has been suggested for universities/engineering colleges. As a pilot study, three Courses on e-governance have been completed successfully at IIIT Hyderabad.

Contact: KS Vijaya Sekhar, CSI-SIGeGov Secretariat, International Institute of Information Technology, Gachibowli, Hyderabad 500 032, Andhra Pradesh, India. Tel: +91 40 6653 1119. Fax: +91 40 2300 0044.

KS Vijaya Sekhar, CSI-SIGeGov Secretariat, International Institute of Information Technology, Gachibowli, Hyderabad. e-mail: vijay@iiit.ac.in

R K Bagga, Advisor, Outreach Division, IIIT-Hyderabad, email: rbagga@iiit.ac.in

List of Acronyms and Abbreviations

AA	: Authorised Agents
ACR	: Annual Confidential Reports
AG	: Accountant-General
AHP	: Analytical Hierarchy Process
AICRIP	: All India Coordinated Rice Improvement Project
AMC	: Annual Maintenance Contract
APL	: Above Poverty Line
ARO	: Assistant Returning Officers
ASD	: Absentee, Shifted and Duplicate Voters
ASP	: Application Service Provider
ASP	: Authorised Service Providers
ATMA	: Agricultural Technology Management Agency
ATR	: Action Taken Report
BC	: Business Correspondent
BCP	: Business Continuity Plan
BDO	: Block Development Officers
BEC	: Boundary, Entity, Controller
BOOT	: Build–Own–Operate–Transfer
BPL	: Below Poverty Line
BTM	: Block Technology Manager
CAU	: Central Agriculture University
CBR	: Case-Based Reasoning
CCE	: Continuous and Comprehensive Evaluation
CCT	: Commissioner Commercial Tax
C-DAC	: Centre for Development of Advanced Computing
CGSCSC	: Chhattisgarh State Civil Supplies Corporation
CHFMIS	: Chhattisgarh Forest Management Information System
CCP	: City of Panaji
CMSA	: Community Managed Sustainable Agriculture
COCO	: Connect Online, Connect Offline
COREPDS	: Centralised Online Real time Electronic PDS
COTS	: Commercial Off-The-Shelf
CPPF	: Central Passport Print Facility
CR	: Change Request
CSAT	: Citizen Satisfaction
CSC	: Common Services Centre
CSIDC	: Chhattisgarh State Industrial Development Corporation
CSP	: Customer Service Point
CSP	: Communication Service Provider
CSP	: Computer Service Providers
CTD	: Commercial Tax Department
CUG	: Closed User Group
DDO	: Drawing and Disbursing Officers

DDP	: Data Distribution Plan server
DeGC	: District e-Governance Committee
DeGS	: District e-Governance Society
DeitY	: Department of Electronics and Information Technology
DGLL	: Directorate General of Light ships and Light houses
DGPS	: Differential Global Positioning System
DAC	: Discretionary Access Control
DIT	: Department of Information Technology
DNCO	: Directorate of Net Centric Operations
DoIT	: Department of Information Technology
DoIT and C	: Department of Information Technology and Communication
DPC	: District Passport Cells
DPM	: District Project Managers
DPR	: Detailed Project Report
DR	: Disaster Recovery
DSC	: Digitally Signed Certificates
DSWO	: District Social Welfare Officer
DTA	: Directorate of Treasuries and Accounts
EAR	: Expert Answers on Rice
EBT	: Electronic Benefit Transfer
ECI	: Election Commission of India
ECS	: Electronic Clearings Service
EDS	: Electronic Delivery of Services
EFT	: Electronic Funds Transfer
eGLC	: e-Governance Project Lifecycle
e-Gras	: Government Receipt Accounting System
e-MaRCMA	: Marriage Registration and Court Marriage Application
EQMS	: Electronic Queue Management System
FAMS	: Fire Alert Management System
FAST	: Fully Automated Services of the Transport department
FC	: Financial Commissioner
FCR	: Financial Commissioner Revenue
FCS	: Food, Civil Supplies, department of
FD	: Finance Department
FFS	: Farmers Field School
FOMS	: Forest Offence Management System
FPS	: Fair Price Shop
FTP	: Functional test plan
G2C	: Government-to-Citizen
G2E	: Government-to-Employee
G2G	: Government-to-Government
GAD	: Gap Analysis Document
GDP	: Gross Domestic Product
GEL	: Goa Electronics Limited
GHG	: Green House Gases

GIS	: Geographical Information System
GMDSS	: Global Maritime Distress and Safety System
GoAP	: Government of Andhra Pradesh
GoI	: Government of India
GPR	: Government Process Reengineering
GPRS	: General Packet Radio Service
GRT	: Gross Register Tonnage
GUI	: Graphical User Interface
HALRIS	: Haryana Land Records Information System
HARIS	: Haryana Registration Information System
HRSI	: High Resolution Satellite Imagery
HSDC	: Haryana State Data Centre
i3R	: India Rice Research Repository
IaaS	: Infrastructure as a Service
IASF	: Intelligent Advisory System for Farmers
ICAR	: Indian Council of Agricultural Research
ICDS	: Integrated Child Development Services
ICM	: Institute of Cooperative Management
ICT	: Information and Communication Technology
ICT4D	: Information and Communication Technologies for Development
IDI	: International Data Exchange
IFMS	: Integrated Financial Management System
IKM	: Information Kerala Mission
IPR	: Intellectual Property Rights
ISP	: India Security Press
ITK	: Indigenous Technical Knowledge
ITSS	: Information Technology Systems and Supports
IVRS	: Interactive Voice Recognition Service
KM	: Knowledge Management
KSITM	: Kerala State IT Mission
KSS	: Knowledge Sharing Summit
KVK	: Krishi Vigyan Kendra
KYC	: Know Your Customer
LAN	: Local Area Network
LIS	: Land Information Search
LMK	: Lok Mitra Kendra
LRIT	: Long Range Identification and Tracking
LSGI	: Land Surveying and Geo-Informatics
MAC	: Mandatory Access Control
MC	: Municipal Committee
MDA	: Maritime Domain Awareness
MDM	: Mid-Day Meal Scheme
MEA	: Ministry of External Affairs
MFD	: Maharashtra Forest Department

MGNREGS	: Mahatma Gandhi National Rural Employment Guarantee Scheme
MMP	: Mission Mode Project
MPCTD	: Madhya Pradesh Commercial Tax Department
MPSEDC	: Madhya Pradesh State Electronics Development Corporation
MPSEGC	: Madhya Pradesh State Employment Guarantee Council
MSA	: Master Service Agreement
MSC	: Maritime Safety Committee
MSP	: Minimum Support Price
NAIP	: National Agricultural Innovation Project
NAIS	: National Automatic Identification System
NDC	: National Data Centre
NDC	: National Development Council
NeGP	: National e-Governance Plan
NFSM	: National Food Security Mission
NIC	: National Informatics Centre
NII	: National Information Infrastructure
NISG	: National Institute of Smart Government
NLRMP	: National Land Record Modernisation Programme
NM	: Nautical Miles
NMMP	: National Mission Mode Project
NOC	: Network Operations Centre
NPM	: Non-Pesticidal Management
NPMU	: National Programme Management Unit
NREGA	: National Rural Employment Guarantee Act
NRHM	: National Rural Health Mission
NRIS	: Natural Resource Information System
NSDG	: National e-Governance Services Delivery Gateway
NTRO	: National Technical Research Organisation
OEM	: Original Equipment Manufacturer
OIC	: Offer In Compromise
OTP	: One Time Pin
PaaS	: Platform as a Service
PAC	: Pre Approval Category
PCRA	: Petroleum Conservation and Research Association
PDA	: Personal Digital Assistants
PDS	: Public Distribution System
PG	: Public Grievance
PHED	: Public Health and Engineering Department
PIO	: Public Information Officer
PMC	: Project Management Consultant
PMS	: Poll Monitoring System
PMU	: Programme Management Unit
PO III	: Polling Officers III
PoC	: Proof of Concepts

PoP	: Point of Presence
POS	: Point of Sale
POT	: Point of Transaction
PP	: Personal Particulars
PPP	: Public-Private partnership
PRIDE	: Passport Related Information Data Exchange Online
PS	: Principal Secretary
PSK	: Passport Seva Kendra
PSP	: Passport Seva Project
PURA	: Providing Urban Amenities in Rural Areas
PVR	: Police Verification Report
QMS	: Quality Management System
RBR	: Rule-Based Reasoning
RCMS	: Revenue Court Cases Monitoring System
RDC	: Regional Data Centre
RFP	: Request For Proposal
RKMP	: Rice Knowledge Management Portal
RLO	: Reusable Learning Object
RMC	: Rajkot Municipal Corporation
RO	: Revenue Officers
RBAC	: Role-Based Access Control
ROR	: Record Of Right
ROs	: Returning Officers
RPO	: Regional Passport Offices
RRSSC	: Regional Remote Sensing Service Centre
RSBY	: Rashtriya Swasthya Beema Yojana
RTI	: Right To Information
RTO	: Regional Transport Offices
SAARAC	: South Asian Association for Regional Cooperation
SaaS	: Software as a Service
SAC	: Space Applications Centre
SAR	: Search And Rescue
SCADA	: Supervisory Control And Data Acquisition
SDA	: State Designated Agency
SDC	: State Data Centre
SDI	: Spatial Data Infrastructure
SDO	: Sub-Divisional Officers
SECR	: State Electronic Certificate Repository
SERP	: Society For Elimination of Rural Poverty
SHG	: Self-Help Group
SIPF	: State Insurance and Provident Fund
SIRD	: State Institute for Rural Development
SJED	: Social Justice and Empowerment Department
SLA	: Service Level Agreement
SLPS	: Service Level Performance Standards
SMS	: Subject Matter Specialist

SNRMS	: State Natural Resources Management System
SOC	: Security Operations Centre
SOI	: Survey Of India
SOLAS	: Safety Of Life At Sea
SPC	: Speed Post Centres
SPMU	: State Programme Management Unit
SPV	: Special Purpose Vehicle
SRC	: Smart Ration Card
SRC	: Static Radar Chain
SRO	: Sub-Registrar's Offices
SRS	: Software Requirement Specifications
SSDG	: State Services Delivery Gateway
SSL	: Secured Socket Layer
STQC	: Standardisation Testing and Quality Certification
SURPIC	: Surface Picture
SVN	: Subversion
SWAN	: State Wide Area Network
TINXSYS	: Tax Information Exchange System
ToT	: Training of Trainers
TP	: Tax Practitioner
TPDS	: Targeted Public Distribution System
UAT	: User Acceptance Tests
ULBs	: Urban Local Bodies
URN	: Unique Relationship Number
USCG	: United States Coast Guard
UTM	: Unified Threat Management
VLE	: Village Level Entrepreneur
VPN	: Virtual Private Network
WAN	: Wide Area Network
WEEE	: Waste Electric and Electronic Equipment
Wisy	: Weed Information System
WMS	: Wildlife Management System
WRD	: Water Resource Department

Author Index

Agarwal, Badal, 137

Bagga, R K, xxi, 39, 445

Bamra, Gulshan, 127

Bansal, Ghan Shyam, 346, 359

Bhadoo, Ajay, 315

Bhat, Nityesh, xxv

Budhiraj, Renu, 3

De Sa, Anthony, 149

Gohel, Mahesh, 315

Gollamudi, Prabhu, xxv

Gupta, J P, 59

Gupta, Rohit, 137

Gupta, Saurabh, 212

Harish Kumar, K, 186

Harish, Mithila, 26

Himmelreich, Jörg, 10

Iyer, Harish P, xxv, 26, 53

Jaju, Sanjay, 281

Jayasankar Prasad, C, 387

Joshi, Veerbala, 105, 255

Kapoor, Surendra, xiii, xxv

Kaushik, Virender, 3

Kendurkar, Subash, 149

Khemka, Ashok, 346

Malhotra, Sanjay, 242

Mandloi, Neeraj, 237

Mathur, S D, 137

Meera, Shaik N, 427

Mehta, K H, 265

Mihir Vardhan, R, 196, 203

Mishra, Madhu, 127

Naik, Saneet, 196

Noufal, K P, 387

Oza, Kiran, 335

Panda, Subhasish, 371

Pardeshi, Muktesh Kumar, 395

Parial, A M, 186

Purohit, Rahul, 3

Raidu, D V, 159

Raj Kumar, 335

Rathore, Amit, 93

Sahay, R R, 84

Saini, Gurpreet Singh, 346

Samsuddin, M, 69

Santosh Kumar, 168

Saquib, Zia, 417

Satish Babu, xv

Semwal, Anil, 371

Shah, D H, 59

Sharma, Dharmpal, 93

Sharma, R K, 242

Sheel, Vikas, 304

Shukla, S K, 265

Simli, Golok Kumar, 395

Singh, Arun Kumar, 168

Singh, L C, xvii

Somasekhar, A K, 304

Tiwari, Preeti, 237

Trinath, Venkat, 159

Variyani, I D, 105, 255

Venkatesan, Sreenath P, 18

Vijaya Sekhar, K S, 39, 445

Viraktamath, B C, 427

Vithal, D V R, 39

Yadav, A K, 359

Yende, Anant, 203

Yengkhom, Ranjan, 417