

SECTION I

Widening e-Governance Canvas
Invited Papers

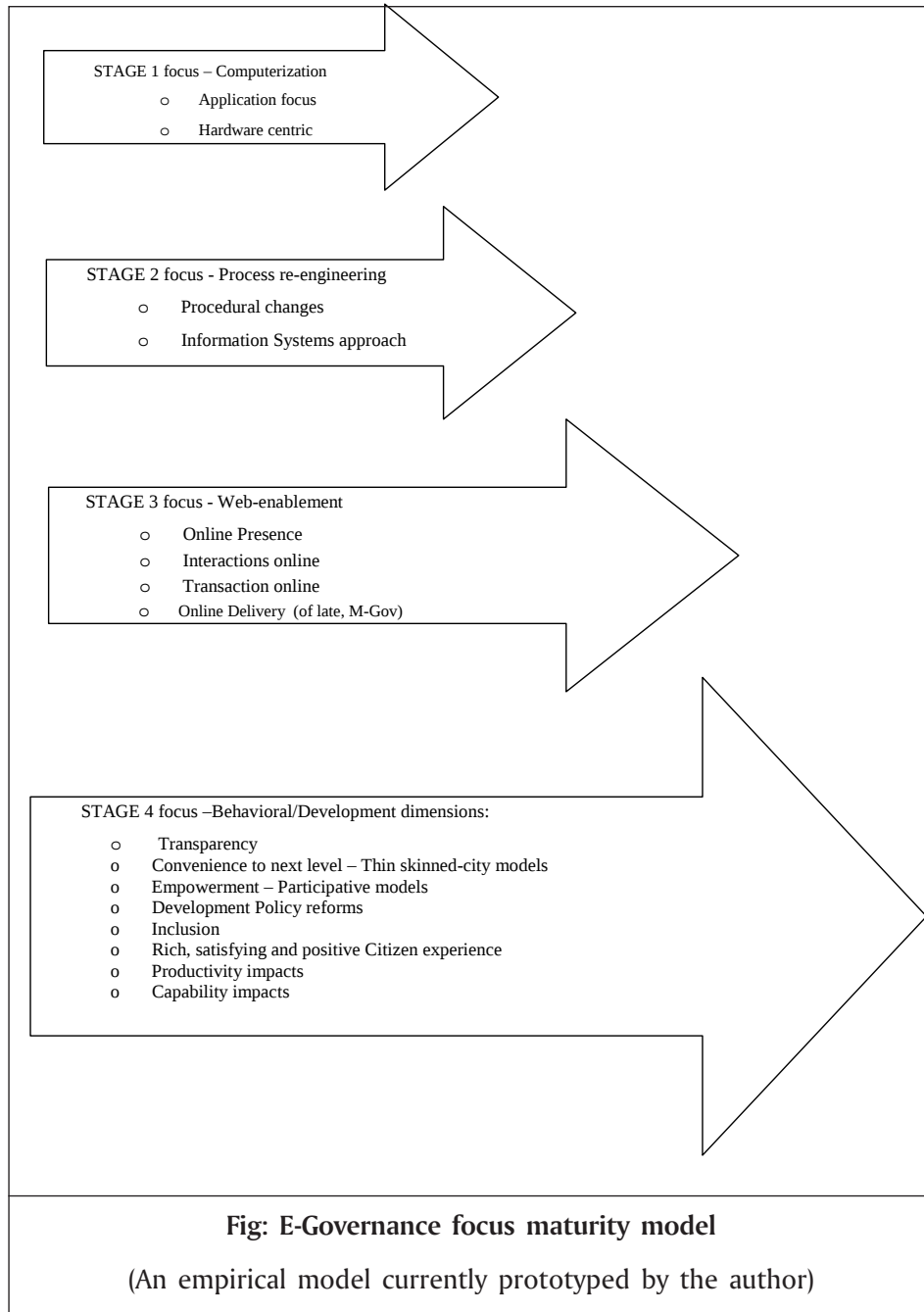
CHAPTER 1

New Frontiers of Service Delivery: e-Gov. Focus Maturity Model

Dr. Dhrupad Mathur

During the last decade there has been an enormous emphasis on the delivery of public services with transparency and convenience. One aspect which is frequently overlooked amid the jungle of technology issue is the citizen-experience, the outcome of service delivery. This has become very important today, especially for a nation that carried the legacy of the colonial rule for long, where the concept of service delivery was historically non-existent and any step towards citizen service was seen as a benefit from the government, but things have changed since last few decades. There is enough commitment from the political leadership now to show visible results towards better citizen services. This can be seen in the form of various large scale development programs and associated projects. However, when it comes to achieving the best frontiers of service delivery, there is still a room for improvement.

While the focus of initial years of ICT and e-Gov initiatives was more towards computerization, subsequently process engineering and web-enablement got the centre stage. With more and more developmental commitments, the thinking is now gravitating towards various implicit and sustained dimensions of the service delivery ecosystem. The following empirical model has thus been proposed. It is a construct, to be seen over the backdrop of various practical e-Gov cases. It is titled as **e-Gov focus maturity model**.



As per the United Nations E-Government Survey 2010, considering various parameters of Online service index, India ranks 55th. If we take a look on various components of this index India scores: 45 for emerging information services, 41 for enhanced information services, 22 transaction services and 8 connected approach. On the other hand there are countries such as US, Canada etc that score very high on each of these indices. A close study of the indices and other rankings in the e-Gov survey will further substantiate the evolution of the e-Gov initiatives as per the model above and the emerging focus brought up at every stage of evolution.

Though there is apparently a natural sequence in the focus-maturity as per the stage of e-Gov evolution but the cognizance of these focus areas is not necessarily sequential and there is a certain extent of overlap across stage. In fact, the nations that started scaling up the ladder of e-Gov & ICTD programs a little late always had the opportunity to be exposed to almost all the newer focus areas. Of course it requires suitable capacity and willingness within the agencies, government departments to contemplate on various stages of maturity as listed in the e-Gov focus maturity model.

Most important citizen-centric dimensions as we see it in the above model emerge during stage-4, which has an emphasis on the behavioral aspects. These aspects many times are amorphous and are also difficult to imagine and imbibe during the earlier stages of e-Gov development where there is pressure to show visible results through deployments, application development, hardware installations or related infrastructure setup. Thus, across all developing nations, we may see several e-Gov applications working perfectly well on a service counter which has not got even basic amenities in place since the focus was entirely on technology and not the citizen-experience.

We realize that merely stage 1, 2 & 3 level maturities will not help. Thus it's important to enhance the related experience and other dependencies as per stage-4 above. Let's further take an illustration: Recently while entering in India through one of the international airports, one of my friend saw that an immigration official was misbehaving with many travellers, was impolite and the episode soon turned out to be a squabble at the airport and guards had to intervene. The scenario is not very different from what many people would have experienced in their quest to get services from government agencies. Let's understand that the last node is very important. Well, we do have an e-Gov application at the node there but the poor citizen gets an

unpleasant experience, a rotten taste of dealing with the e-Gov frontend. Look at what happened to others in the same immigration queue – all got fearful, families with children were scared and were just thinking of getting out soonest. What did the immigration officials probably derived? A taste of the legacy-Raj? In spite of several thousand crores of rupees spent on ICT enabled transformation & e-Gov projects, the citizens remain under-privileged or under-served. It's like preparing a very tasty meal for someone with all good intentions and instead of serving it suitably, smashing into the face. So the focus should not only on *preparing* but also *serving* it suitably. Yes, we do have citizen-charters in place; there are feedback mechanisms but it important to activate the system to achieve the end results. E-gov projects are inaugurated with all fanfare, yes, it's a reason to celebrate as an achievement of our republic but equally important is to reach out to the people who carry the onus of touching lives of the common man.

Referring to the above maturity-model again, a higher degree of sensitization towards stage-4 maturity can only be achieved through sustained, committed and collective efforts. This can not be achieved only by technology and policies but by deep-seeded change management interventions. Hence we see that there is a certain emphasis on 'change management' across ICT & e-Gov projects but the unresolved question is that do we understand it well? How will the entire strategy of dealing with human subjects be aligned towards larger developmental goals?

ICTD & E-Gov leaders have to often struggle with the trade-off between doing things **right** and doing things **fast**; and one fully understands there is no easy way out of this. On one hand it's important to have a clear implementation strategy and result-focus but the on the other hand one has to keep an eye on the long term development and vitality as per the ecosystem in which these projects operate; keeping the beneficiary in mind.

* Views expressed in the article are personal.

(Dr Dhrupad Mathur, Director (Industry Interface), SPJCM, Dubai.
email:dhrupadm@gmail.com)

CHAPTER 2

Meeting the Demand of e-Governance Professionals from the Higher Education System

Prof. Rafiq Dossani

India, over the past decade, has become a test bed for innovations in information and communication technologies (ICT) serving underprivileged users such as rural users and low-income urban users. Various reasons explain this emergence. The most obvious is the search for a solution to what has long been an intractable problem: that rural India has remained poor while the rest of the country has moved ahead. The hope that ICT can surmount at least some of India's social, political and administrative challenges and create a viable technology for the provision of health, education, and other social services is thus ICT's strongest calling card. An additional expectation is that ICT can be used innovatively to improve access to the large, underserved market that rural India's 700 million people represent, especially considering that India has the resources to build an ICT infrastructure, i.e., its large, skilled, cost-efficient IT workforce.

ICT can, therefore, be used for the delivery of the following services:

Informational services disseminate generic (non-customized) information, such as weather forecasts, crop practices, and contact information.

Transactional services involve an exchange of specific (or customized) informational services or funds between two or more parties using the ICT infrastructure. Examples include e-commerce and email.

E-Governance services refer to transactional services that involve local, state, or national government. Providing land records, submitting user complaints to local officials and confirming a user's presence on electoral rolls are examples.

In this paper, we focus on one service, e-Governance, and inquire as to the capacity of the higher education service to provide the skills needed to supply the service.

The following table lists the needed capacities, and priorities that may be offered through e-Governance. The primary reason for the difference between the priorities of rural and urban areas is the availability of some of the services in the list below in more adequate supply in urban areas, with the result that providing e-governance services in such cases will not be highly valued. Typical examples of services that are in relatively adequate supply in urban areas are health and education services, whereas these are relatively inadequate in rural areas. Even employment services are provided to a larger extent by the private sector in urban areas, thus reducing the need for an e-governance intervention, whereas rural area employment is in short supply, with the gap being filled by government employment programs.

EGovernance Service	Priority - Rural	Priority - Urban
Public-sector/govt. Employment Information & Fulfillment	High	Medium
Transactions (eg., tax payments)	High	High
Grievance Management	Medium	High
Citizen's Data Services (eg., land records, company registration)	Medium	Medium
Health Services	Medium	Low
Education Services	Medium	Low
Census & Voter Services	Low	Low
Personal Information Services (eg., email)	Low	Low

Note: The rural priorities are based on a survey conducted in 2005 under the auspices of the National Informatics Centre and undertaken by Dossani, et. al. (2005). The list of urban priorities is based on the author's compilation from interviews.

The country's higher education service needs to be of adequate quality to fulfill the needs for e-governance. Apart from domain and technical skills, such as accounting, healthcare and other skills that derive from the above table, additional requirements include project management, training and cloud computing skills.

For example, let us consider the case of providing healthcare services via e-governance to rural users. Even if we assume that the state will be able to obtain the services of healthcare professionals, several additional tasks remain. The first are project management skills. For instance, how will these services be delivered - the mix of onsite and offsite/online services for diagnosis, delivery and evaluation; and record-keeping. The second task is training of rural residents to provide support services, such as primary healthcare, in the absence of trained doctors. The third is to use cloud computing to provide applications for diagnosis, data management, etc.

Clearly, these are tasks of immense magnitude and complexity. So, the question raised is: does the higher education system cater to these requirements?

In sheer numbers, the answer might seem to be positive. If one considers the growth of professional graduates, numbers from the All India Council for Technical Education (which excludes healthcare graduates) are encouraging, as may be seen from the tables below.

Growth of AICTE approved Technical Institutions in last five years

Year	Engineering	Mgmt	MCA	Phar	Arch	HMCT	Total	Added in Year
2006-07	1511	1132	1003	665	116	64	4491	171
2007-08	1668	1149	1017	854	116	81	4885	394
2008-09	2388	1523	1095	1021	116	87	6230	1345
2009-10	2972	1940	1169	1081	106	93	7361	1131
2010-11	3222	2262	1198	1114	108	100	8004	643
2011-12	3393	2385	1228	1137	116	102	8361	357

Growth of intake in AICTE approved Institutions in last five years

Year	Engineering	Mgmt	MCA	Pharm	Arch	HMCT	Total	Added in year
2006-07	550986	94704	56805	39517	4543	4242	750797	73566
2007-08	653290	121867	70513	52334	4543	5275	907822	157025
2008-09	841018	149555	73995	64211	4543	5794	1139116	231294
2009-10	1071896	179561	78293	68537	4133	6387	1408807	269691
2010-11	1314594	277811	87216	98746	4991	7393	1790751	381944
2011-12	1485894	352571	92216	102746	5491	7693	2046611	255860

To get a sense of perspective, consider how many engineers will graduate over the next few years. As the table above shows, by 2016, India will graduate about 1.5 million engineers a year (equal to the intake in 2011-2012). By then, China will be graduating about 1 million engineers and the United States 100,000.

Thus, in terms of the quantity, one can see that there are unlikely to be shortfalls. By most indications, the professional graduates from Indian colleges (not just engineers, but architects, healthcare professionals, etc.) possess a level of technical skills that are adequate. Hence, if there is a shortfall, it will be in terms of the ancillary capacities listed earlier, i.e., project management, training and managing on the cloud.

Unfortunately, the first two are skills in very short supply in the country. This is because the higher education system at broader level is yet to be fully developed in true sense. Let us look at each in turn. First, consider project management skills. The reason why Indian colleges do not produce students skilled in project management is that students are required to specialise in a technical subject from the start of their college degree. Hence, they do not take courses or undertake practical work of the type that will give them project management skills. Second, on developing training skills, this is a fairly specialized activity that is best acquired through short professional courses after one's formal education is over. However, the pressures of employment for income that are present in most Indian families is high. The result is that few students will take such classes since it means sacrificing income from regular employment without the prospect of adequate reward.

Finally, on developing applications for the cloud that are specific to e-governance, the problem is not that the skill sets are lacking. Instead, the problem is that the government does not welcome small, creative startups as partners for providing cloud applications. Instead, it relies either on internal suppliers, such as the National Informatics Centre, or on large or small private IT vendors. However, majority of players are learning competencies for cloud environment and neither of these types of providers possess enough knowhow and skills that is needed for designing ways to use the cloud. Instead, their strength is to look at best practices worldwide and Indianise them. It is desirable that they need to come up with practical solutions to fulfill the unique requirements of India.

The solution to this problem is easier than the more difficult problems presented by the shortage of project management and training skills. It is for the government, perhaps beginning with state governments, to open the door by funding small firms for generating e-governance applications.

In summary, this paper prioritizes e-governance services and lists some of the skills that are needed to provide these services. It argues that the technical skills and quantity of workforce is adequate. The shortfalls are in project management, training and creative applications on the cloud. The first two are long-term challenges that will need reform of the education system and better incentives. The last skill is not being developed in India because of numerous reasons related to public and private sector. Much of this can be remedied by a change in policy.

Reference:

Dossani, R., R. Jhaveri and D.C. Misra. 2005. Enabling ICT for Rural India. Project report prepared jointly by Stanford University's Asia-Pacific Research Center and the National Informatics Center. Available at: http://aparc.stanford.edu/publications/enabling_ict_for_rural_india_2005

Prof. Rafiq Dossani, Stanford University, Contact: dossani@stanford.edu

CHAPTER 3

A Values based Approach to e-Government

Prof. Harish P Iyer

Introduction

The concept of “e-Government” is by no means new. It might be argued that it has attained a fair amount of critical mass over a period of the past decade or so. From issue of birth and death certificates to making railway reservations, the exposure – direct or indirect - to e-Government has touched many a common man, and the idea of e-Government has permeated many a stratum of the Indian society – cutting across multiple demographic boundaries.

This paper presents two ideas. The first is an exhortation that due to the overpowering abilities of technology, eGovernment is very much about ‘e’ and that it is time that phrases such as *e-Government is less about ‘e’ and more about ‘government*, the *e in eGovernment is in small caps while G is in capital* etc were not repeated as mechanically as is encountered in every discussion on the subject. The second is that if eGovernment practitioners do need catchy phrases to guide them, it is perhaps time to replace ‘e’ with a different alphabet.

Given that the track record of a number of e-Government projects in the country is not very flattering, one wonders whether such catchy phrases are of any help. The Hindu, in an October 2011 editorial, notes that “under the National e-Governance Plan Income Tax, passport, visa, land records, property registration, pensions, road transport, police, municipalities, panchayats, and employment exchanges are all priority services, but these are not ready for electronic service provision even after years”¹.

Notwithstanding the mixed results, the Government spending on eGovernment initiatives continues to grow. There currently are a host of eGovernment projects under various stages of conceptualisation, and implementation. There are a number of eGovernment projects which are being redone from scratch – for reasons ranging from failure of earlier ones to a move towards [or away from] certain types of technology. Adding to this logjam is the contribution of a few eGovernment practitioners who are not averse to reinventing eGovernment applications even if very similar systems are under live usage elsewhere in the Country. For some reason, ‘replication’ seems not to find favour in some Government circles.

The Political import of visibility

It is not uncommon when dealing with ICT pertaining to eGovernment to segregate tasks into those that are ‘visible’ [software interfaces, PCs, handhelds, eService Centers...], and those that are hidden or ‘invisible’ [changes in Government processes, for instance]. Even if no reliable data exists on the level of activities of the back office/invisible type, we will posit that, from Government’s point of view, significantly increasing the level of activities belonging to the visible end of the spectrum is desirable. We can identify the following reasons in support of our presumption.

1. As stated in the draft IT policy 2011, the desire of the Indian Government is to render ICT ubiquitous. Achieving ubiquity mandates significant level of investments in ‘visibles’ - hardware and software –through which connectivity will be achieved.
2. Though it is common knowledge among eGovernment practitioners that true success in eGovernment projects is obtained only if back office process changes [the invisible] accompany citizen facing eGovernment initiatives, the practitioners tend to focus on citizen facing, *visible* efforts – such as establishment of CSCs, laying of wide area networks etc. Citizen facing activities are relatively easy, there is much political mileage to be obtained from being *seen* to promote such affirmative action.
3. As part of the draft National Policy on Information Technology 2011, the Government intends to provide “ubiquitous, affordable, access to information and public services for enhancing efficiency, transparency, accountability and reliability”. By placing visible aspects of technology [ubiquity, accessibility]

and *value propositions* [accountability, transparency etc are value propositions] on the same platform, Governments tends to affirm the “rationalising effect of *science* on State intervention”² Yaron Ezrahi calls this ‘visual attestive culture’³

From virtuous to vicious - a mob of four

To hold the view that ‘e’ is subservient to ‘G’ in eGovernance is to subscribe to an instrumentalist view of technology – where technology is viewed as a set of instruments that act as tools for better governance. This view is perhaps dated. What is perhaps less anachronistic is to admit that technologies have begun to dictate what good governance should be.

Speed, portability etc are one dimension of transference that has taken place from the domain of technology to the domain of governance. To quote Sundar Sarukkai “*element of speed now becomes an important element of good governance – not necessarily because that is the way we conceive good governance but because that is what these technologies are best suited to do*”⁴. Speedy Governance is certainly a desirable one. Just as individual behaviour bears little relationship to mob behaviour under certain circumstances, so also speed, *virtuous when single*, becomes *vicious* in the company of following three other forces.

1. The undemocratic [and speedy] nature of evolution of technology where everybody – the citizens, the industry, and the Government is free to participate and yet nobody controls either the direction or the content of development.
2. As already stated elsewhere in this paper, the compulsion for Government and bureaucrats to be seen to act [speedily] giving them no slack to ‘sit back’ and reflect.
3. The uncertainty over the tenure of bureaucrats and eGovernment practitioners during which eGovernment practitioners must dream-up and deliver eGovernment solutions.

The demographic, cultural, and economic characteristics of receivers of eGovernment services are far from standard. The effect of the forces such as those suggested above however is such that many characteristics of uniqueness among the population of beneficiaries are sculpted away and a *standardised personality* of the

intended receivers of eGovernment services is all that is retained. Once such *virtual standardised personality* is given life to, all that remains is to create *standardised packaging of information and services*. This seems to present the eGovernment practitioners with an efficient manner in which to conduct eGovernment operations.

Woe to those who, by design or accident, retain their non-standard self. The results of a 2008 study⁵ conducted on selected Government sites to assess how well they supported all citizens – including those differently able – is shown below. As shown under the column 4, even minimum level of support was not available in India.

Country	UN Treaty	Internal Law	Min level	A error	A warn	AA error	AA warn	AAA error	AAA warn
China	Yes	Weak	0	332	1156	2273	1198	388	664
India	Yes	Weak	0	145	442	825	606	112	182
Cambodia	Yes	Weak	1	67	663	517	631	87	222
Philippines	Yes	Strong	4	8	426	862	719	123	277
Total				552	2687	4477	3954	710	1345

The essence of technology

It is important for eGovernment practitioners to understand and place ‘e’ of the eGovernment in perspective before they begin to make plans around it. In keeping with the spirit of this paper, we will not be satisfied with any banal definition of ‘e’. Perhaps it may be relevant to recall the words of German Philosopher Martin Heidegger. “*Technology is not equivalent to the essence of technology. When we are seeking the essence of “tree,” we have to become aware that That which pervades every tree, as tree, is not itself a tree that can be encountered among all the other trees. Likewise, the essence of technology is by no means anything technological*”⁶. Heidegger offers no definitive answers to the question to how one must view technology. Perhaps there is no definitive answer. There is however considerable merit in his words “Everywhere we remain unfree and chained to technology, whether we passionately affirm or deny it. *But we are delivered over to it in the worst possible way when we regard it as something neutral*”⁷.

Other than to suggest that cultural neutrality cannot be a part of the essence of technology – ICT in particular - this paper will refrain from getting into further debate.

e-Exclusion – a by-product of Standardisation

In 2011, the author was introduced to a wonderful web based eGovernment ICT solution intended for use in the Education sector. The system was of G2C nature. Implementation of the system had resulted in elimination of middlemen and creation of very lean and transparent processes. For all the excellent features the system carried, it had its user interface only in English. On enquiry as to why such a system did not carry vernacular choices too – since the system was aimed at those unlikely to have sound knowledge of English – it was suggested to the author that the system had induced the students and their parents to become familiar with English – a familiarity, the project managers submitted, that was to be desired. Desired by whom?

In the above example, we see the emergence of one type of a standardised personality – a beneficiary who is able to read and understand English. Definition of a standardised personality is an exercise involving comparisons and is an act laden with cultural implications. As the example cited above confirms, not only was it *not* the charter of this eGovernment project to help spread knowledge of English, it also betrayed the belief of the project owners of the superiority of English education over the vernacular. We take issue with this only because it carries with it the potential to exclude a number of citizens from enjoying what is due to them.

Without getting too statistical, we can attempt to figure out the negative effect that follows from a subscription to “packaging services in English for delivery to beneficiaries proficient in English” narrative. The following table extracted from DISE database shows the break up of primary and upper primary students enrolled under different language medium schools in the State of Andhra Pradesh.

Enrolment by medium of instructions*			
School category	Telugu	English	Urdu
Primary only	3610708	1302132	181607
Primary with Upper Primary	1458752	691401	60574
Primary with UP. Pri. and Sec/HS	118136	309541	4766
Upper Primary only	0	0	0
Upper Primary with Sec/HS	1787553	736596	54478
Total / All Sch.	6975149	3039670	301425

Source: District Information System for Education – www.dise.in – Figures for Andhra Pradesh – 2009-10

As the data shows, students enrolled in *English* medium schools during the year 2009-10 were only a *third* of the total primary and upper primary student population. If an eGovernment system was implemented targeting such students and even if a small percentage of the intended beneficiaries failed to participate in the program due to English language barrier, that would have worked out to exclusion of several Lakh students – from one State alone.

Enrolment by medium of instructions*			
School category	Telugu	English	Urdu
Primary only	3610708	1302132	181607
Primary with Upper Primary	1458752	691401	60574
Primary with UP. Pri. and Sec/HS	118136	309541	4766
Upper Primary only	0	0	0
Upper Primary with Sec/HS	1787553	736596	54478
Total / All Sch.	6975149	3039670	301425

Stakeholder participation – the solution to double deviance

Rajiv belongs to an Indian metro. He started picking rags at a very young age after he dropped out of school. The meager income of his parents, who are also rag dealers, forced him to leave school and earn to add to the family income. At 14, he was already pulling a rickshaw and supporting his family economically⁸.

Rajiv's poverty and dropping out from school for economic reasons is not the creation of technology. However, if eGovernment initiatives existed [and they do in India] for provision of school fees and maintenance scholarship and yet the likes of Rajiv continued to remain school dropouts, eGovernment services should shoulder a portion of the blame.

Narrowly conceptualised and delivered eGovernment systems should be deemed to be *doubly at fault*- firstly for excluding the likes of Rajiv due to reasons of their migrant / homeless status, and other handicaps [related to Language, age, infirmities etc], and secondly, for their pre-occupation with promoting [educationally, economically and through other means] beneficiaries with 'standardised personalities', thus worsening the socio-economic divide.

If cases such as Rajiv's are to be prevented, eGovernment practitioners should practice thinking in terms of ontological measurements. Such measurements – not different from what is referred to as normative standards in philosophical terms – first require determining “what could be”. What is the ‘could be’ with respect to Rajiv? More importantly, who should decide what the ‘could be’ for Rajiv should be? Just as we refrained from defining the essence of technology and armed ourselves with questions through which to ponder, so must we acknowledge that experts from within or outside of the domain of eGovernment can at best only *partially decide* what “could be” for others. To complete the ‘could be’, Rajiv too should be consulted. This calls not merely for citizen participation but enablement of *e-participation*. In today's age of multimedia and mobile phones based ICT, little skills are mandated for engaging in two-way interaction with *any* strata of society.



Street Children interacting with Computer through 'Hole-in-the-wall'

Rajiv is not an imaginary person. We learn that Rajiv was introduced to computers through hole-in-the-wall project. By giving him access to *non-standardised* service and, equally importantly, by facilitating *his own* participation in developing content of interest to him, the initiative helped him rejoin the school going stream and regain his childhood.

Conclusion

As a small step towards promoting Values based eGovernment, CSI-Nihilent, in its 2011 assessment framework, introduced evaluation components which required nominees to self-assess their performance with respect to *e-inclusion*, *e-participation* and *e-wastage*.

It is suggested in this paper that such must be the approach of eGovernment practitioners in India – that they must understand that the ‘e’ is in fact more powerful than is acknowledged and that it permeates and colors the culture in which it finds itself in silent ways. It is further suggested in this paper that having made this acknowledgement, the practitioners should replace the ‘e’ with perhaps ‘V’ for Values [or ‘C’ for culture, if they wish]. It is hoped that this will help remind them that it is incumbent on governments to acknowledge – if Government were not to contribute to deepening of information chasm – that there are no standardised personalities to whom standardised eServices can be offered.

References:

1. The Hindu, October 12, 2011, Editorial titled “IT Policy and Credibility gap”
2. Yaron Ezrahi, *The descent of Icarus: Science and the transformation of contemporary democracy*, Harvard University Press, 1990
3. *ibid*
4. Sundar Sarukkai, “Culture of Technology and ICTs”, *ICTs and Indian Social Change*, Sage Publications 2008
5. Joanne Kuzma, Yen Dorothy and Klaus Oestreicher, “Global e-government Web Accessibility: An Empirical Examination of EU, Asian and African Sites”
6. Martin Heidegger. *The Question Concerning Technology and other essays*. Translated by William Lovitt. Harper & Row, New York, [1977]
7. *ibid*
8. www.hole-in-the-wall.com

Prof. Harish P Iyer is a Fellow member of the Institute of Chartered Accountants of India. He has served as Consultant Professor at T.A.Pai Management Institute (TAPMI), Manipal. He was the co-ordinator of the first, full time executive program on e-governance (eGPX) jointly offered by DIT, NISG, and TAPMI.

CHAPTER 4

CSI Nihilent e-Governance Awards Nominations Assessment 2010-11: Process Overview

Shri Surendra Kapoor, Shri Prabhu Gollamudi and K S Vijaya Sekhar

CSI SIG e-Governance group has been successfully conducting Nihilent e-Governance Awards over the years. Any assessment of nominations requires to have a good and well tested process. And any process cannot sustain over such a long time unless processes are reviewed and improvements put in place. Improvements would depend on inputs from users, in this case nominee organization and practicing professionals. Every year the organizing team receives nominations- which present an attempt to use ICT for applications that were not earlier on the horizon. We also have some repeat cases showcasing enhanced functionality there by making the job of assessors tougher to cull out the best of the initiatives. The objective of this paper is to present an overview of the process, improvements in the templates and present the steps in evaluation. The paper sets out with background of the awards and various award categories. It then presents enhanced evaluation framework which consists of Result Indicators & Enabler Indicators and their attributes. Finally, it elaborates the Analytical Hierarchical Process (AHP) which is revised and followed for evaluation and assessment process followed for the received nominations in various categories. It concludes by presenting the strengths of the process and areas of improvement.

1. Introduction

The Computer Society of India was formed in 1965 and since its inception CSI has been instrumental in guiding the Indian IT industry down the right path since its formative years. Today, the CSI has many chapters all over India, student branches, and more than 70,000 members. India's elite of IT industry, brilliant scientists and dedicated academicians (<http://www.csi-india.org>) continue to patronage the CSI activities. Special Interest group on e-Governance is part of CSI and with continued support from Nihilent Technologies has instituted awards for recognizing the contributions made in the field of e-Governance in the country, particularly by Government Organizations/Institutions/Agencies both at Central level and State level.

This is the ninth year since these awards in e-Governance were initiated. The basic objective of these awards has been to recognize and appreciate the successful efforts by the States, Government Departments, Project initiatives and Districts in achieving good governance using ICT. The endeavor has been to bring as many projects to the fore front for the benefit of all. As part of these awards, another major value addition being made has been towards knowledge sharing by documenting and bringing out a publication, for the benefit of all at large. The publication presents the major successful e-Gov initiatives selected from the nominations received and Award Winners are felicitated during the CSI Annual Convention each year.

The CSI SIG team has put in significant efforts in revamping the Awards web site both from content perspective and ease of use.

2. Award Categories

Nominations for the year 2010-11 Awards were invited for the following categories:

- (a) **Award of Excellence – State Category.** States are judged based on their overall performance in e-Governance initiatives during the year 2010-11, especially with respect to policies, infrastructure, capacity building, projects, etc.

- (b) **Award of Excellence – Department Category.** Central and State Government Departments who have demonstrated excellence in the area of e-Governance during the year 2010-11.
- (c) **Awards of Excellence – District Category.** Outstanding efforts demonstrating excellence in e-Governance during the year 2010-11 at the District level.
- (d) **Award of Excellence – Project Category.** Projects that have been implemented or enhanced during the year 2010-11 and delivered benefits to its stakeholders. The projects will be judged in three sub-categories, namely G2C, G2B, and G2G/G2E.

For indicative purposes the schedule that the team followed for the process is presented below:

On-line Nomination submission	1st May – 31 st Aug
Short listing for 'Field Visits'	1 st – 15th Sep
Field level assessment and 'Finalists' identification	12 th Sep - 20th Oct
Presentations by 'Finalists' & Winners identification	First week of November
Awards Ceremony	Part of CSI Annual Convention (Normally during December)

This year CSI-SIG eGov has instituted a new award called 'Award of Sustenance' to recognize earlier winners efforts to sustain the early initiatives and for making systems stand the test of time and continued to serve with enhanced capabilities. For this award five years old project award winners are considered and evaluated using a framework developed to test the sustainability of the projects.

SIGeGov and CSI Nihilent e Gov Awards web sites are used to announce the Awards and seek nominations from Government Departements. In addition to above , brochure announcing the Awards are sent to all to senior officials of State and Central Governments and Districts

3. Conditions for Entry

- Entry for sending nominations is open to all Government agencies in India (both Centre and State/UT Governments, District level).
- All the Government Organizations & Semi-Government Corporations, District Collectorate, Municipal Corporations, Autonomous bodies including Public Sector Undertakings are welcome to apply.
- Entries should fall in one of the specified Award categories.
- Entries under Project category are only for those projects which have been implemented in India
- In case of project category, they should have at least 75% of the services being delivered should be Government services.
- Awards for year under consideration will consider the initiatives implemented during previous year and the current year. These can be either implemented during the current year in question or Special incremental efforts or enhancements to the earlier initiatives.
- To encourage fresh e-Governance efforts, the Initiatives that have been recognized and awarded by CSI in the last 2 years will not be usually not considered by the Selection Committee for recognition.

4. Judging Process

- Nomination to each category will be judged by the Awards selection committee, consisting of members from Government, Industry and Academia.
- The judging process shall be based on:
 - On-line nomination submission
 - Field visits to short listed entries by Selection Committee/nominated members for on site assessment and identification of 'Finalists'
 - Presentations by 'Finalists' to the Selection committee
 - Final Award list is generated based on the combined evaluation at different stages as above.

- The selection committee reserves the right to seek additional information from the nominated entries during the evaluation process.
- The final recommendation of awards will be made by the selection committee on the basis of the information available to them in the nomination form, on-site visits and presentations by the applicants.

5. Evaluation Criteria for the Awards

- The evaluation criterion is based on two indicators i.e. Results and Enablers. The attributes considered for Result indicator are mainly in terms of outcomes and the attributes for Enabler indicator are in terms of the processes in place so as to achieve the desired results. Keeping into consideration the constraints on time and resource, for the purpose of these Awards, only the key attributes are being considered for these awards.
- For the Awards of 2010-11 a new section called 'Value Indicators' has been added to the templates. The Selection Committee will use this 'Value Indicators' information for overall assessment at each stage of short listing and appropriate weightage applied depending on category of nomination.

The Value Indicators are high level goals and objectives which can be used as guiding philosophies for defining visionary scenarios within which to place e-Governance projects. Guidelines for providing details and to respond to 'Value Indicators' section have been presented on the Awards web site for the convenience of nominees. The background for introducing the three value indicators is explained below:

Digital Inclusion

It is often stated that "e-Governance" is more about "Governance" and less about 'e'. While this might well be true, e-Governance is, from one perspective, all about delivery of Government services through the medium of portals and pages on public and /or private networks, which are accessed through the time tested PCs, Laptops, mobile devices etc. These delivery channels and touch points, collectively referred to as Information and Communication Technology [ICT], form the backbone of e-Governance. The digital ecosystem within which e-Governance finds itself is however not without its contradictions and challenges. A significant number of beneficiaries of e-Governance services do not speak English rendering non-Vernacular web pages inaccessible to them.

A significant number of intended beneficiaries for e-Government services are senior citizens and women. In India, many from among these classes of Citizens have special mobility related challenges. If no special consideration is given to such disabilities, and delivery of Government services is designed in a generic manner which require such beneficiaries to travel to the service centers instead of the Services “travelling” to their doorsteps – say through mobile phone based services – then these beneficiaries become digitally excluded or disenfranchised.

A significant number of stakeholders cannot read or write, let alone have any proficiency in the use of Computers. On top of their core illiteracy, digital illiteracy is also a burden thrust upon them. Even if the Government designs its pages in the Vernacular, will not such a marginalized class of beneficiaries benefit from e-Government services if they are explained, made accessible, and delivered through Voice interaction mode?

Unless conscious effort is made to during the design stage itself, e-Governance projects have the unintended consequence of contributing significantly to digital divide. The above are some examples of how, in designing e-Governance services, unless very intensive care is taken, some classes of citizens/beneficiaries come to become excluded.

e-Participation

e-Participation is about connecting beneficiaries of eGovernance initiatives with the policy-making group and involves identifying ways of giving the beneficiaries greater stake in the policy-shaping process. ICTs provide a variety of tools which can give beneficiaries easier access to information about what decisions are being taken which affect their lives – BEFORE the decisions are taken.

What services of the Government to bring under the charter of e-Governance, what features to incorporate as part of Computerization, what standards to establish under Citizen Charter, how the issue of Digital divide [specific to the e-Governance initiative under consideration] should be tackled and many other related issues can all be opened up for e-Participation from the intended beneficiaries.

Ranging from [quantitative] reduced coordination costs to [qualitative] increased and improved feelings of satisfaction and involvement, the benefits of eParticipation from stakeholders in the design and implementation of e-Governance initiatives cannot be overemphasized.

e-Waste

e-Waste [electronic waste] consists of everything from redundant cell phones and computers, to out-of-date televisions and printers.

eWaste is produced in vast quantities by every ICT project – e-Governance ones included. And with the price of commodities soaring, the profit from the extracting the copper, gold, silver and palladium, locked up in electronic devices, can be considerable. But to maximize profit, a significant per cent of the e-waste is segregated, dismantled and recycled in the unorganized sector based in urban slum in metro cities.

National and State Level policies and regulations relating to eWaste disposal certainly help but unless every e-Governance project consciously and formally takes steps to ensure that eWastes produced by it are properly channeled for recycling or destruction with minimal impact on the environment, the long term social costs of e-Governance projects may well come to out weigh their short term benefits.

- The quality of content submitted by the applicants for the nominations will be of most important part of the evaluation process. The information needs to be as per formats/ templates defined on the awards web site.
- The key indicators and attributes being used for evaluation under each award category is presented in the following section.

4. Evaluation criteria for the awards

The evaluation criterion is based on two indicators i.e. Results and Enablers. The attributes considered for Result indicator are mainly in terms of outcomes and the attributes for Enabler indicator are in terms of the processes in place so as to achieve the desired results. Keeping into consideration the constraints on time and resource, for the purpose of these Awards, only the key attributes are being

considered for these awards. The key indicators and attributes being used for evaluation under each award category are given in subsequent paragraphs with brief explanation of each of the attributes.

Award of Excellence - State Category Evaluation Criteria	
Result Indicators & Attributes	Enabler Indicators & Attributes
1. Key Performance - List of State Mission Mode Projects as per the NeGP and their status in terms of pilots and roll-out - State portal implementation with single window G2C/ G2B information and transaction services. Provide information on number of portals functioning in the state departments and strategy of integration and consistency. 2. Government efficiency improvement initiatives(Till date in Brief and elaborate during the year for each of the following) - Initiatives implemented under G2C, and their impact (time/cost) - Initiatives implemented under G2B, and their impact (time/cost) - Initiatives implemented under G2G and G2E, and their impact (time/cost) 3. Innovation and Best Practices - Specific innovative ideas implemented in eGov area and their impact - To what extent transparency has been achieved and how	1. State Policy & Strategy - eGov/ICT vision road map and its implementation status - Sharing of common infrastructure status with details - Policies related to open standards, technology architectures, website standards, security standards and their current status - Planned budget during the year for e-Governance and the actual expenditure incurred for the same 2. Support Infrastructure - Plan for SWAN and current achievements - State Data Center, and its utilization by various department applications - CSC – Rural and Urban, established and planned during the year and their actual utilization data services wise 3. Capacity Building - Leadership support & visibility. Provide details - Training plan and its implementation effectiveness - Institutional structure for training planned and implanted

Award of Excellence – Department Category Evaluation Criteria	
Result Indicators & Attributes	Enabler Indicators & Attributes
1. Key Performance - What services (G2C, G2B, G2G andG2E) are delivered using ICT ; provide impact in terms of time and cost of delivery of services - Implementation coverage till date andduring the year (geographical areas covered under pilot, roll-out, future plans) 2. Government Efficiency improvement initiatives - Time and cost efficiency improvements in the working & delivery of servicesb. Specific innovative ideas implemented in eGov area; and their impact on services - To what extent the services are integrated with other offices / departments.	1. Department Policy & Strategy - eGov/ICT vision road map for department and its current status - To what extent the common infrastructure(national, state, other department; delivery channels) is being shared - Technology standardization policy and its implementation 2. Process Re-engineering & Reforms - Major non-ICT front end process changes planned for Department level eGovernance efforts and their current status - Major non-ICT back end process changes planned for department level eGovernance efforts and their current status 3. Capacity Building - Leadership support & visibility and current status - Change management strategy defined and status thereof - Capacity building plan and its implementation status - Are the Program Management Teams are there full time (department officials/ consultants)

Award of Excellence – District Category Evaluation Criteria	
Result Indicators & Attributes	Enabler Indicators & Attributes
1. Key Performance - What services (G2C, G2B, G2G andG2E) are delivered using ICT ; provide impact in terms of time and cost of delivery of services - Implementation coverage till date andduring the year (geographical areas	1. District Policy & Strategy - eGov/ICT vision road map for department and its current status - To what extent the common infrastructure(national, state, departmental; delivery channels) is being shared

covered under pilot, roll-out, future plans) c. Future plan with regard to geographical coverage as well as scope of services 2. Government Efficiency improvement initiatives a. Time and cost efficiency improvements in the working & delivery of services b. Specific innovative ideas implemented in eGov area; and their impact on services c. To what extent the services are integrated with other systems within and outside the district	c. Technology standardization policy and its implementation 2. Process Re-engineering & Reforms a. Major non-ICT front end process changes planned for district level eGovernance efforts and their current status b. Major non-ICT back end process changes planned for district level eGovernance efforts and their current status 3. Capacity Building a. Leadership support & visibility and current status b. Change management strategy defined and status thereof c. Training of internal & external members on the use of the ICT systems – planned vs implemented; d. Does the full time Program Management Teams (District officials/ consultants) exist? e. Efforts to ensure sustainability of various eGov efforts, in addition to the few mentioned above. 4. Technology a. Technological solution adopted [including cost of ownership, maintenance model]; b. Security and confidentiality standards defined and implemented c. Competence of people in technology (hardware, software, security etc)
---	--

Award of Excellence - Project Category Evaluation Criteria	
Result Indicators & Attributes	Enabler Indicators & Attributes
1. Key Performance a. Describe the services (G2C, G2B, G2G and G2E) that are currently being delivered using ICT; Describe the benefits obtained from these services by each category of stakeholders; b. Present those services that are enhanced/ introduced/functionally extended during the year. What services are planned to be delivered through ICT in subsequent stages/ phases; c. Implementation coverage till date and during the year (geographical areas / category of stakeholders covered under pilot, roll-out, future plans) 2. Efficiency improvement a. Time and cost efficiency improvements in delivering and availing of ICT enabled services; b. Specific innovative ideas implemented in eGov area; and their impact on services; c. The extent to which this eGovernance initiative is integrated with other internal and/or external ICT systems	1. Processes a. Major ICT and Non-ICT front end process changes that were planned and the extent to which the plans have been implemented; b. Major ICT and Non-ICT back end process changes that were planned and the extent to which the plans have been implemented 2. People and Resources a. Project management & Monitoring adopted; b. Training of internal & external members on the use of the system – planned vs implemented; c. Change management strategy defined and implemented; d. Leadership support (Political, Bureaucratic) and its visibility; e. Financial Model (Funding pattern , Business model PPP etc) defined and implemented 3. Technology a. State strategy adopted for Disaster Recovery & service continuity and it's compliance; b. Give a detailed description of the Technological solution adopted [including cost of ownership, maintenance model] and it's compliance to NeGP standards; c. State the Security and confidentiality standards adopted and the level of compliance.

5. Methodology followed for evaluation

As contained in the paper of Prof. G P Sahu et.al which was published in the previous year's book, the evaluation of nominated e-government projects falls into the purview of what is called **Multi-criteria decision analysis (MCDA)** or **multi-criteria decision making (MCDM)**. Unlike methods that assume the availability of measurements, measurements in MCDA are derived or interpreted subjectively as indicators of the strength of various preferences. Preferences differ from decision maker to decision maker, so the outcome depends on who is making the decision and what their goals and preferences are. There are many MCDA / MCDM methods in use and for the CSI-Nihilent e-government awards, the AHP has been preferred over other MCDA methods, because of its ease of use. Analytic Hierarchy Process (AHP) has been preferred over other MCDA methods, because it allows the relative importance of various parameters to be defined based on inputs from various experts and arriving at appropriate weightages for various parameters. AHP is a structured technique for dealing with [HYPERLINK "http://en.wikipedia.org/wiki/MCDA"](http://en.wikipedia.org/wiki/MCDA) complex decisions and well matches with the needs of the e-Governance area.

6. Evaluation Process

Nomination to each category was judged by the Awards selection committee, consisting of members from Government, Industry and Academia. The selection committee usually seeks additional information from the nominated entries during the evaluation process. The final recommendation of awards will be made by the selection committee on the basis of the information available to them in the nomination form, on-site visits and presentations made by the applicants. A simple five step process was followed while assessing the projects nominated for CSI-Nihilent e-Governance awards.

- (a) **Step 1: Online Nominations.** Going with the objective of fostering e-process utilization, the proposals/nominations were invited through the portal <http://csinihilent-egovernanceawards.org>. The due dates for various stages and instructions for filling up of online nomination form with necessary documentary attachments was made available on the website.
- (b) **Step 2: Short Listing Based on Nominations.** After the due date of the

submission was over, the received nominations were evaluated by two experts on parameters mentioned in the nomination submission template. Each expert awarded score for each attribute for every project in the supplied AHP excel worksheet. These marks were multiplied by the corresponding weightage of each attribute. The marks assigned by experts were averaged for each project. A minimum cut-off score was decided by the core selection group for qualifying into the next step of assessment i.e. field visits. The marks scored in this stage, has 35% weightage in overall score of a project.

- (c) **Step 3: Field Visits.** Based on the rankings of each project short listed in Step 2 above, top 33% (approximate) nominations were selected for field visits. The field visits were undertaken by two experts for each shortlisted nomination. The main objective of field visits is to validate the correctness of the information submitted in nomination entry. Second objective is to have a first hand exposure on the benefits of the initiatives for its stakeholders. The Project Owners were informed well in advance on the visits to make all necessary arrangements for meeting and visits to project sites. Most of the visits were for one day duration wherein project was studied in detail with a view to ascertain correctness of information submitted in nomination entries. Field visit are an integral component of the overall assessment process for getting first hand exposure to the project and its accruable benefits. Each team member assessed and assign scores for various attributes on the AHP excel worksheet. The AHP score of each project was arrived at after multiplying with weightage of each attribute and averaging the scores awarded by members. The marks scored in this stage, has 65% weightage in overall score of a project.
- (d) **Step 4: Identification of Finalists** Based on the aggregate score of each nomination, combining Step 2 and Step 3 scores 'Finalists' are identified for Department, District and Project category of Awards except State category. For State category normally SIG is identifying 'Presenters' based on nomination strength rather than any field visits. Once the Finalists are identified, 50% of their aggregate score are carried over to the Presentation stage.
- (e) **Step 5: Presentations** Final Step in the evaluation process is presentations

of all the short listed nominations by the project teams to a committee of experts. Presentations are made to the selection committee, and individual scores are given by each member. The AHP work sheet was used by the committee members to award scores for each attribute. The marks scored in this stage, has 50% weightage in overall score of a project.

7. AHP Model

The actual stages that were followed for evaluation of e-government projects and identifying the best e-government project are presented below. These steps apply equally to other categories of awards, though the sub-attribute and sub-sub attributes may vary in each case.

The AHP hierarchy prepared during 2009-10 continues to be the basis for attributes grouping.

An excel worksheet based model was prepared to obtain weightages for various attributes from experts. This year a new assessment item called 'Value Indicators; got added and accordingly experts views were taken for determining weightage for each attribute.

Weightages assigned by each expert was fed into the model', which calculated averages for each attribute

Initial screening of nominations was done and those selected were assigned scores for each attribute by the core selection group and inputted into the evaluation model as described before. 'Result of Step 2 above'

Once the field visits are completed and experts provided their scores these scores were again populated into evaluation model. The worksheet indicating calculation of scores of projects as an outcome of Step 3 above.

Based on scores obtained during Step 2 and 3 above weighted aggregates were calculated and 'Finalists identified based on 35:65% assignments of scores between the first two assessment stages

These scores then are carried to the 'Finalists' presentation stage. Once the presentation scores are received and after applying AHP weightages, 50:50 % is

used between aggregate score of earlier stages and the Presentation stage score. Based on final scores the award Winners get identified under each category. The Selection committee(Jury) usually recognizes some of the very special cases of 'Finalists' by way of Jury/Special Recognition Awards.

8. Conclusion

The evaluation framework used consistently over the last few years to assess State, Departments, districts, and projects, based on Result, Enabler and Value indicators has matured and worked satisfactorily by providing a transparent process for evaluation to achieve a fair assessment. As done last year, nominations from various stakeholders for the awards were captured online by means of a nomination template. Through out the evaluation process (initial screening based on submitted documentation, field visits, and presentations by stakeholders) AHP model was used for determining weightages for various parameters

The few aspects to be considered for future improvements include: judging one off cases along with high usage and most relevant citizen service systems; improving nominee adherence to response for all the attributes;strengthening Value indicators section for seeking more detailed information and introducing normalization process to remove the variance in the grading given by different selection committee members.. CSI-SIG eGov plans to focus on 'Sustenance' of initiatives by various e-Governance projects based on the Award winners five years back.

Shri Surendra Kapoor, Convenor, CSI-Nihilent e-Governance Awards 2010-11 email: kapoorsurendra@yahoo.com, Shri Prabhu Gollamudi, IT consultant, email: gsnprabhu@yahoo.com and K S Vijaya Sekhar, Member SIG Team, email: sigegov@gmail.com

Mobile Office System Adoption in Seoul Metropolitan Railway Transit (SMRT) of Korea

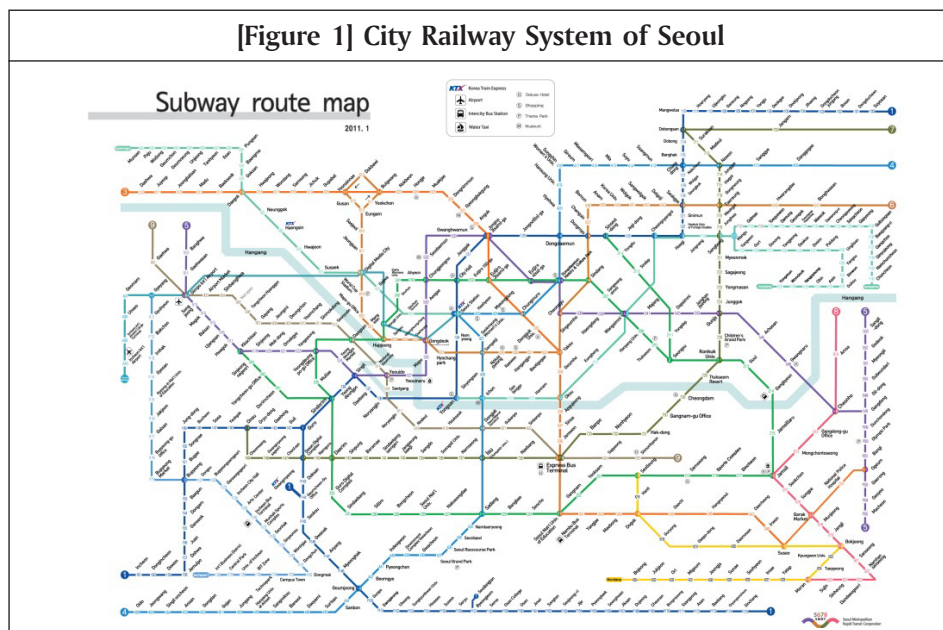
Prof. Namjae Cho and Jungin Choi

1. Background: City Railway Services in Seoul

Seoul, the capital city of South Korea, is a modernized large-scale metropolitan city with the population of 11 million residences. Seoul has been the capital of Korea for the last 600 years. For this reason Seoul has full of historic monuments and palaces. The city of Seoul has been known as one of the fastest growing capital. Recently the city received keen attention as it is chosen as one of the best city Asian people want to visit and as it is awarded the best e-government service provider to its citizen. The number of inbound visitors from abroad is also increasing rapidly.

Seoul has 8 completed lines of city railway, of which most of the line sections are subway lines moving under the ground. Two additional lines are under construction and 2 more lines are included in the master plan, making total 12 metropolitan railway lines by the end of the completion of the master plan. By now, 8 lines and part of line 9 and two city extension of Korea national railway make a complex and convenient coverage of the city of Seoul via fast railway network. As each train take passengers to almost every corner of the city and the train interval is maintained around 5 minutes, the city transportation in Seoul has become world-famous infrastructure. The metro system in Seoul is also known for its convenience, cleanliness, and modern technology. The complex web of subway lines is depicted in [Figure. 1].

The first subway line (line number 1) in Seoul was built in 1974. Since then four lines were completed by 1985 based on the first stage city railway plan. The first four lines are managed by Seoul Subway Company (renamed as Seoul Metro afterward). When the second stage city railway plan is completed, the city decided to establish a second company to manage the next 4 lines. There was an important reason for establishing a separate company instead of incorporating new lines into existing Seoul Metro. By making two separate companies and evaluating their quality of services periodically, the city could introduce the competing mind into public services. The two companies, through competition, are expected to compete to gain high reputation in their service provision and to maintain organizational tension toward innovation and improvement.



2. Seoul Metropolitan Transit Railway (SMRT)

2.1 Company Overview

Seoul Metropolitan Railway Transit (SMRT) Company is a government-owned public company owned 100% by the City of Seoul. SMRT was established in 1994 in order to manage city railway services.

SMRT manages 148 stations and 6 large-scale maintenance centers. The company operates 1,560 coach compartments and 152 kilo meters of railway lines in Seoul carry 3,390,000 passengers per day.

Line 5 operates 608 compartments (8×76 coaches) carrying 1,160,000 passengers per day, line 6 operates 328 compartments (8×41 coaches) carrying 650,000 passengers per day, line 7 operates 504 compartments (8×63 coaches) carrying 1,270,000 passengers per day, and line 8 operates 120 compartments (6×20 coaches) carrying 310,000 passengers per day. Daily revenue from fare collection is about 1.3 Billion KRW.

SMRT ranked as number 1 in the management evaluation among all public service companies belong to the Ministry of Government Administration and Home Affairs for 4 consecutive years from 2005 to 2008. SMRT also ranked top in 2008 in Integrated Railway Safety Review performed by the Ministry of Land, Transport and Maritime Affairs among all railway operators in Korea.

2.2 Development of Mobile Office Environment at SMRT

1) Business Practice of SMRT during 1994~2009

SMRT has about 30,000 Major facilities. List of the whole facility include over one million items scattered all around the city. For this reason employees of SMRT keep move around the city to locate and manage the facilities of responsibility.

Since the birth of SMRT in 1994 the task scheduling, assignment, orders, and reporting was processed manually up until 2004. Every morning each employee should go to the company headquarter, confirm the task order of the day, and receive work order sheet. They carry the work-order to the location of the facility, process the task assigned, and complete the work-order sheet manually. After returning back to the office, they again should fill-up the completion report about the task they performed.

Such manual work process produced enormous amount of paper documents and the company should devote massive amount of time and effort to manage, transport, and store the documents. Employees had to spend 20% of their time on the street to move back and forth from office and facility in addition to commuting. In addition 30% of employee time devoted to create and manage administrative documents and

to participate in meetings. For this reason only 50% of their time was used to take care of the actual tasks of facility check-ups, maintenance, adjustments, and operations.

After computerized reporting system was adopted in 2006, employees could be freed from the manual creation of work-completion report at the end of the day. The keyed in the report contents about the work they completed in each day. The accuracy and usability of data has increased. However, the time spend on the street was same as before as the other processes including picking up the paper-based work-order sheet were remained unchanged. Still 20% of employee time was used for moving back and forth and 25% of the time was used for administrative chore. In addition, people waited on a line to enter the report as the peak load is concentrated toward the end of the day.

2) Mobile Office System Development Project at SMRT

Mobile Office System is considered to have the potential to innovate business practices as the infrastructure, application, and terminal equipment becomes reliable and smart. Korea is well known in the quality of telecommunication infrastructure. Since 1995, the Korean government drove the establishment and adoption of broadband backbone through Giga-Internet project, high-speed network project as well as the adoption of 'Wibro' mobile infrastructure and smart applications. The introduction of smart phone such as iPhone opened up the potential to optimize the use of such telecommunication infrastructure. Smart phones provide improved flexibility and applicability compared to existing mobile support environment such as PDAs and laptops.

The top management initiated the radical changes in business process to reduce non-task waste of employee time using advances in technological environment. He decided the development of mobile office system which can economize on the use of smart phones. Initial skepticism on the social effect, technical functionality, speed, fear for being connected and monitored were expressed the voice of labor union. Close communication about the potential problems and solutions with the employees was helpful in pursuing the project in a cooperative atmosphere.

The CIO of SMRT decided to develop the application systems in-house as he did not want to be overly dependent on external services in future changes and

developments of the system. Fast experience of hiring several external developers in the development of separate information systems might affect this decision. With the help of KT(Korea Telecom), the MOS infrastructure service provider, they started the development of internal service network, inter-connection with existing legacy information, and the development of mobile applications.

In this vein, they re-organized IT Division by combining existing three separate departments: IT planning, system development, and technology analysis. They strengthened technical capability by recruiting more engineers, emphasizing updated technical training for existing IT members, and facilitating the sharing of development results, experiences, knowledge, and skill. They focused on the development of mobile office system applications, technology, and services best fit to the situation of the company and user groups.

3. Characteristics of the Mobile Office System of SMRT

By combining existing IS applications (such as engineering systems, electronic engineering and product design management system, and facility management system) and wireless personal media, SMRT could successfully develop a mobile task-supporting environment, first of its kind in the world as they mentioned, that help the management of subway lines real-time without the restriction of time and space. They named the system as ST&F (SMRT Talk & Flash).

Thanks to the adoption of ST&F, employees now do not have to commute to the company headquarter office in the morning. Employees receive work-order via their individual smart phones before they leave home. They commute directly to the location assigned for planned and regular check-ups or to the location of facility with problem report. After completing the task the employees report the completion of the task real-time using the applications in their smart phones.

Home page screen of ST&F system looks like [Figure 2]. The top menu includes Problem Reporting, Company Announcements, Approval of Railway Tasks, Operation Procedure Guide, and Barcode Inquiry.

1) ST&F Problem Reporting System

[Figure 2]



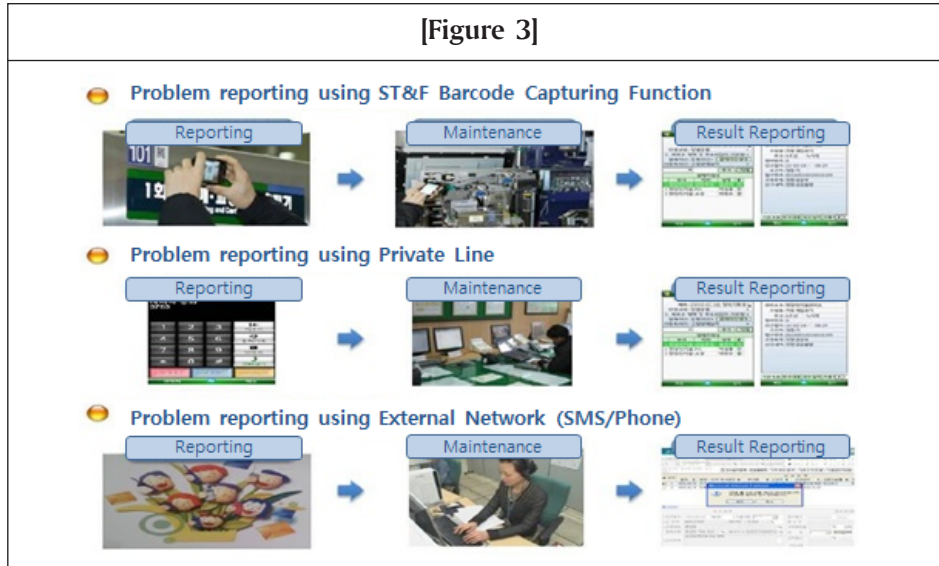
Previously, problem reporting was a task assigned only to technicians in charge of facility check-up. After the mobile office system put in place, any member of SMRT can file the problem report wherever and whenever they find a problem in equipments and facilities while commuting or while working around. Immediately after the problem report is forwarded, a responsible and qualified technician closest to the spot while moving around is assigned the repairing and maintenance job. The problem is fixed real-time and the result of resolution is reported.

There are three different methods of problem reporting: the use of ST&F barcode picture capturing, the use of company private phone line, and the use of SMS or public phone by citizen. When the ST&F is used, one use smart phone to take the picture of QR code attached in each facility or equipment. Then the facility or equipment information is retrieved and a menu to report a problem pops up so that the reporting can be completed on the spot (refer to [Figure 3]).

2) ST&F Barcode Processing System

ST&F Barcode Processing System is linked to the corporate facility management system so that problem reporting, part history-management, and problem resolution result reporting can be completed through one integrated interface. Although the reporter does not have sufficient knowledge on the facility of concern, the system help the user find key information so that any authorized employee can report a problem or the result of task completion (refer to [Figure 4]).

[Figure 3]

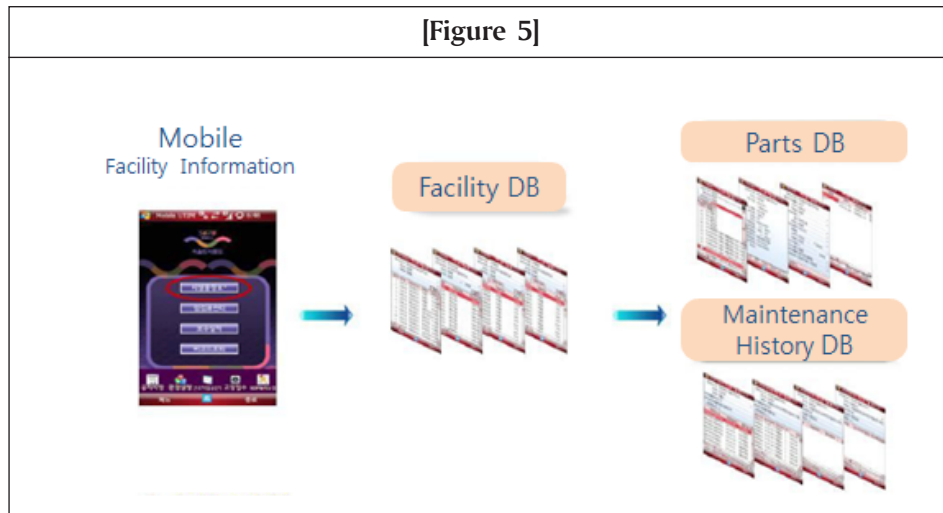


[Figure 4]



3) ST&F Part History Manager

ST&F Part History Management system helps employees to search and review the current status as well as the detailed history of the maintenance of all equipment, facilities, and parts as a group or by individual items with just one simple touch of a button of their smart phones (refer to [Figure 5]).



4) ST&F Operating Procedure Guide System

ST&F Operating Procedure Guide System provide SOP (Standard Operating Procedures) and response methods to the occurrence of such emergency situation as fire, railway delay, explosion or earthquake. SOP and response method include step-by-step response procedures to crises for all types of tasks such as integrated controlling, customer services, driving, coach handling, and engineering. It includes action guidelines at the spot, facilities and equipment handling guidelines, corporate rules by roles, as well as the methods for CPR (Cardiopulmonary Resuscitation).

5) Effect of the Adoption of ST&F at SMRT

After the adoption of ST&F system, the employees do not have to commute to the headquarter office in the morning. All the employees received the daily task assignment via their smart phones. They can directly go to the location appropriate to the completion of the mission such as periodic check-ups and problem handling. After the completion of the mission, they report the results immediately and directly to the central office.

The new practice reduced the time for moving back and forth to 10% of their working time from previous 20% (a 100% improvement). The time used for paper works and administration chore also reduced to 10% of their working time

from previous 30% (a 200% improvement) on the average. The employees could use 80% of their time to concentrate on the completion of assigned task. The effect of this improvement resulted in the heightened efficiency of the use of human resources and the heightened level of railway safety.

The response time between problem reporting and the completion of problem fixing has also reduced dramatically to 20 minutes from 2 hours in previous practice. The ST&F Barcode Recognition helped every employee to report a problem they found and simple fix result without detailed technical knowledge, virtually every employee of SMRT turned into facility managers. The effect turned out as the increase of preventive maintenance and the reduction of defect-occurrence rate by 40% compared to pre-adoption period.

In addition, the use of ST&F Part History Manager and Operating Procedure Guide systems helped standardize the performance reducing the discrepancy in the quality of task results between novices and skilled experts. This improvement increased the overall level of confidence of employees in performing their tasks.

The company reports that the total monetary benefit from the ST&F system is expected to be 220 billion KRW (about 200 million USD), which include the annual reduction of operating costs (28.4 billion KRW) and revenues from new business services. Since the total investment into ST&F was 10.2 billion KRW, the benefit is way far surpassing the investment.

The system also facilitated the enhancement of the reputation of the company. As the success of ST&F system of SMRT drew attention among industry professionals, experts from Canada, Singapore, and China visited SMRT for a benchmarking. Based on the confidence in their technological achievement, SMRT is pursuing the commercialization of the system to make it a new business to create extra revenue from the provision of software and consulting services to domestic as well international railway operators.

Smartness and mobility has become the strategic necessity of today's corporate world. Mobile office system successfully incorporates both of these two attributes. However, consideration of the specifics and contingencies of organizational and task needs should be made for desired results. The case of SMRT shows how business

needs and task characteristics fit to the use of technology. They could successfully innovate the speed and quality of public services by way of using advances in high-speed mobile infrastructure, applications, and equipments. Internal members of the company actively pursued the design and development of new systems rather than simply hiring and relying on external technology vendors.

One learning from the case is that the members of a user company, who understand the nature of the corporate task better than any other should take initiative in developing noble technology. In a related vein, human relationship within the company can be carefully taken care of using the participative development approach. In addition, the case of SMRT shows that the mobile office system can be applied and extended to various business areas such as facility management and maintenance beyond such typical uses as sales and marketing support.

Prof. Namjae Cho (Hanyang University, Korea) Assisted by Jungin Choi (MS student, School of Tech. and Innovation Management), email: namjcho@yahoo.co.kr

CHAPTER 6

m-Governance future in Indian Context

*K S Vijaya Sekhar, R K Bagga and Khairiyyah Binti Mohd Noor**

Introduction

A century ago, companies stopped generating their own power with steam engines and dynamos and plugged into newly built electric grid. The cheap and affordable power did not just change how businesses operated, it set of a chain reaction of economics and social transformation, which brought the modern World; the global village. Today a similar revolution is under way, when internet's global computing grid is pumping massive data, information and software code into our home, offices and businesses. Internet technology is the key to 21st Century growth and progress and is used to refer to the collection of tools and techniques to improve productivity both in public and private sectors. In this context, it is the current state of humanity's knowledge which combines resources to solve problems, fulfill needs of citizens, or satisfies their wants. That is exactly the charter of all Governments all over the World. The use of technology by the man began with the conversion of natural resources into simple tools to build automatic machines that are able to help human beings in cooking, washing, entertainment and travelling. The discovery of the wheel helped man in travel and other technologies development during previous centuries helped man to do work in much easier ways. The development of information technology has impacted the press, the media, the communication using internet, which has reduced the physical barriers and allowed human beings to network on a global scale with the click of a button. e-Governance is expected to become a common mode of meeting people's needs

* Article appeared in the CSI Communications October 2011 Issue

which is in infancy particularly in developing country like India. Can India, with abundant of computer literate professionals take a quantum jump by using the explosive growth of mobile device and meet the need of masses particularly in rural area by directly focusing on m-Governance?

Governance to e-Governance

Governance is the act of governing by the governments or any other organizations or agencies which can be defined as “The manner in which power is exercised in management of a Country’s economic and social resources for Development”. Hence, Governance can be simply put as the process of decision-making and the process by which decisions are implemented (or not implemented). Since governance is the process of decision-making and the process by which decisions are implemented, an analysis of governance focuses on the formal and informal agencies involved in decision-making. e-Governance is the efficient use of Information and Communication Technology (ICT) at all levels of government set up in delivering citizen services to common man and also to the corporate world.

m-Governance

m-Governance is a sub-domain of e-Governance and it is not a replacement of e-Governance, through which the governments delivers their services to the citizens using mobile devices. m-Governance is as an alternative to e-Governance especially for the country like India, that has very large population of citizens where accessing or having the personal computers and internet usage is comparatively low as compared to mobile phones. Hence, the alternative of m-Governance or mobile Governance can help make public information and government services available anytime and anywhere by bringing personalized, localized and context aware services close to citizens and officials. Most of the government realized a long time back that mobile is no longer a tool meant only for communication but it’s a medium for empowering the citizens and a powerful enabler of good governance. m-Governance can be defined as a strategy and its implementation involving the utilization of all kinds of wireless and mobile technologies, services, applications and devices. It improves upon the benefits for those involved in e-Governance, including citizens, businesses, and all government units. m-Governance offers a great potential for enhancing the provision of basic public services, especially to

the poor and marginalized populations. Furthermore, it also enhances the participation of non-State agencies in critical democratic governance issues, such as transparency, electoral processes, oversight of governments and public policy making. While many m-governance efforts are essentially focused in the provision of private services, United Nations Development Programme (UNDP) interest lies in the improvement in terms of both quality and quantity of public services for those who have little to no access to them.

Need for mGovernance in India

To know the relevance of mobile devices in developing countries such as India, we must know the benefit of these devices. The growth of mobile technology is increasing rapidly day by day and every month, a new mobile device might come out in the market. This grows with the demand and the use of mobile devices by the users is increasing now a days. The high demand of mobile devices from the users especially in developing countries such as India which has high population is because of the benefits and advantages that they can get from these devices. Some of the advantages/benefits of the mobile devices are: Ready Availability, Low Cost, Easy Learning Curve and Location Based Services.

One of the India's Government aims is to connect all the States, villages and even every home in India through wireless broadband; so that, information can flow from any part of India to the home of any citizen anywhere in India even in a rural areas. Instead of the need of citizens to go to government agencies to get the services, now those services come to the citizens through all the e-Governance projects and plans. But, because of the high population in India and as well because of the slow pace at which the internet is spreading across the country, there will be a problem to reach e-Governance to all the citizens especially in rural areas. Hence, mobile devices technology has come out to improve the government services delivery to the citizens with mobile technology. The hand held mobile device set can make in roads into even the remotest area and can help make public information and government services available at anytime, anywhere to citizens and officials.

In rural India, being able to store a number in contacts and then call that contact is a primary mechanism for overcoming traditional infrastructure

challenges, like learning the prices of goods at market. However, currently, most mobile phones available to people in rural areas of India, have a text driven interface, making it near impossible for illiterate users to obtain and store contacts. Information in rural India isn't centralized through census information, medical and health records, or a regional phone book. Therefore, the contact lists on mobile phones become an extremely valuable mechanism for creating adhoc networks that enable information sharing. For example, several research participants recorded the blood type of the contacts stored in their phone's address book. These users were able to act on this information when medical emergencies occurred in their village. They could quickly identify possible donors for blood transfusions and alert their network of the need. All these actions can be done through a simple piece of information stored in a mobile device. To show how data could be made tangible, and how illiterate users could easily share contact information, Adaptive Path, a product experience and strategy design company created a concept called *MobilGlyph*. Solving the "save a contact" problem for illiterate users became one of the focuses for their project.

m-Governance allow for the use of mobile wireless communication technology within the government administration and tool for delivery of information and services to citizens and business. The use of mobile technology in government sector not only provides an alternative channel of communication and public service delivery, but more importantly, it can address the mobility of government itself where m-Government can help make public information and government services available anytime and anywhere by aware services close to citizens and officials. Therefore, these can help in reaching rural citizen to access government services. Transition from e-Government to m-Government requires researching the integration process between the two. m-Governance is an add on to e-Government involving the utilization of all kinds of wireless and mobile technology, services, applications and devices for improving benefits to all parties involved in e-government including citizens, businesses and all government agencies. m-Governance can be powerful component of the e-Government in facilitating the delivery of more and better services to citizens. With the developments in mobile and wireless technologies, some applications and services of e- Government are being provided through mobile devices, and yet these technologies are also opening ways to some unique and new applications and services. In terms of technology involved, currently many mobile

government applications make use of SMS (short messaging service). Other technology includes Wireless Application Protocol (WAP), MMS and mobile internet. It is expected that mobile internet will play a more significant role in near future due to the development of 3G technologies and the capabilities to process more information faster.

Mobile Devices in India

Though mobile phones have been available for over two decades, their exponential spread in India during 2010-2011 is due to low cost and affordability, through large number of players in 2G arena. Not only their penetration has exceeded landline, it is bound to displace the existing inefficient BSNL set up. Steve Jobs of Apple must get the credit for his launch of iPhone and iPad, smart devices meeting the diverse need of new generation.

Status of m-Governance in India

Today, India is moving towards m-Governance after major involvement in e-Governance. It's a well known that Information and Communication Technology (ICT) is very essential for processing, storing, organizing, and presenting data and information. The reasons for the keen interest in governing through mobile are not tough to guess. As the Indian telecom subscriber base reached the extraordinary figure of 700mn, mobile phones have become the most accessible tool of communication available to such a large population. Thus, making the best way for delivery of information at citizen's site is a personalized way. Within two decades of mobile launch in India, mobile phone has reached at remote rural hamlet despite the much known hurdles like lack of connectivity and power and low level of literacy. In the other side, it has created lakhs of direct and indirect job opportunities for youth.

In the second phase of the development, it has emerged as a delivery channel for different kind of services and now anyone can transfer amount from one bank account to another using their mobile phone. Government and private agencies have also started using "Mobile Phone" to deliver citizen and business services to common man. Recently, Reserve Bank of India has allowed commercial banks to provide banking services on mobile phone, whereas Government of India has approved the "Framework for delivering financial services through mobile phone" developed by

Inter-ministerial group. After the launch of 3G technologies in India, users will be able to access health, educational, agricultural, infotainment services on their mobile phone. Around 54 Gram Panchayats in five remote blocks of West Bengal State will soon have SMS alerts on disasters, funds inflow and outflow, information about health camps and pulse polio campaigns will be sent to and from between the State departments, district offices and Gram Panchayats, block development offices. In India, m-Governance is still at a nascent or new stage. While many innovative applications are underway in both private sector as well as government domains, it may be a little premature to celebrate its success. However, embracing the possibilities and opportunities that this technology provides will only lead to an effective and cost-efficient way of exploiting the same.

Current m-Governance project and services in India

The project and services that currently provided by Government of India through m-Governance are:

i) The latest M-service added is The electoral Details on Mobile

Kerala State IT Mission (KSITM) has added a new m-service by which citizens can check their Voter ID details by sending an SMS. The voters just need to send the message **ELE** to the Kerala m-Governance short code **537252** and the sender will get the details regarding his/her voter details Roll No, and polling station. Another example is that Gujarat State Election Commission has developed a project called 'Online Voting System' for its Local Body Elections in October 2010 and in April 2011.

ii) Mobile Banking in India

In India, Banking sector has become more customers friendly to provide banking services through mobile phone. It has given an opportunity to customers to update themselves about Account balance, transactions and do the transfer of amount from one Account to another. All the public and private sector banks in India have started providing their different services through mobile phone. Currently they are offering banking services through mobile free of cost (except some bank) but customers have to bear the cost of mobile service providers.

List of the banks offering banking services on mobile handset (Source: <http://www.indg.in/e-governance/mobilegovernance/mobile-banking>):

iii) Common Citizen Services in India using Mobile devices

Some examples of common citizen services using mobile devices are Indian Meteorological Dept's Weather Information, Kisan Call Centre's Agriculture related queries solution, CBSE's Exam result of class 10 and 12 and so on. DataQuest (May 2011) may be referred for detailed list.

Suggested Proposal for moving from e-Governance to m-Governance in India

Within two years from now which has a time frame till Oct 2013, it is suggested that policy makers of India should implement m-Governance using below six phases to get better m-Governance services in order to give complements to e-Governance:

Phase 1: Making all government websites mobile compliant/mobile site access should be promoted. All government agencies should use mobile optimized content as a primary method for device support.

Phase 2: Plan strategies to popularize the use of mobile devices technology in rural areas by giving subsidies, training and guidelines.

Currently, m-Governance status in India still at the starting level and in fact still new to the citizens especially for the Indian citizens in rural areas whereas the urban citizens are most aware of the mobile technologies that are growing increasingly nowadays. While most of the Indian rural areas are not aware and interested about the mobile technologies that are growing increasingly nowadays, and in fact some of them never use and own at least a mobile phone. If this condition still happens, the services that are provided by the government through the mobile devices might not reach the citizen. The government should plan a strategy how to popularize the use of mobile devices among the Indian rural citizens. Most of the Indian rural citizens have lack of knowledge about these technologies, because they are born and live in poor condition which might prevent them to own and use such technologies. To overcome this problem, the government should provide and give subsidy to own a mobile phone and they should be given a training how to use that

mobile device. They also should be given knowledge what are the benefits they can get from the mobile technologies and why these technologies are becoming famous for other areas and countries. The Government of India should come out with the plans and strategies to formulate guidelines about the use of mobile devices and enable government departments to provide services from mobile phones like paying utility bills etc. It also should aims to formulate standards for applications for easy interoperability of services across multiple service providers and multiple Government departments and other agencies.

Phase 3: Implement m-Governance by developing mobile applications in local languages and more mobile utilization applications.

Phase 4: Plan strategies to popularize the use of mobile devices technology among all citizens by education.

To popularize the mobile technologies among all the citizens, they should be introduced to such technologies since their early childhood. Currently in India, most of urban kids are already exposed with those technologies but the problem is for the kids in rural areas. To overcome this problem, the government should provide more learning by using the mobile technologies in the education space in India. This learning method is called as m-learning. Whereas m-learning apps already exist in the education in India but this learning method might still not in use in rural areas. Meanwhile, the government should expand m-learning method to all the school areas in India even in rural areas, so that, all the citizens might be exposed with those technologies. This strategy will change the mindset of rural citizens about the mobile technologies.

Phase 5: Develop mechanisms and platforms for the good design and delivery of mobile Governance.

To improve the m-Governance in India, it is proposed that development of suitable mechanisms to enable users to pay for public services through mobile phones, and develop and deploy innovative public private partnership. Multi stakeholder partnership models for the design and delivery of mobile governance services should come out. It will also encourage the development of cloud-based implementation models. Besides that, a platform should be proposed for the way

the mobile services deliver to the citizens which will be fully integrated with existing infrastructure created under the National e-Governance Plan (NeGP). All ministries and departments will be able to start offering their services on this platform.

Phase 6: Implement laws for mobile Governance for better m-Governance services.

As we know, m-Governance is the complements of e-Governance so that m-Governance should provide services in a better way rather than e-Governance services. To achieve this vision, Government of India should come out with some laws to get the better services from m-Governance to overcome the problem that are still faced by e-Governance such as corruption. The laws that should be enacted by the government are such as Privacy Law, Data Protection Law and Legal Enablement for better m-Governance.

Challenges for m-Governance in India

To facilitate the deployment of m-Governance services reach to the citizens, it is essential to critically examine the challenges that have traditionally being the 'entry barriers'. Here, we can define those challenges into technical challenges and management challenges. The main challenges of m-Governance are typically the same as those of e-Governance, such as low levels of computerization of government operations at the back-end, lack of digitized data or content and change management. As mentioned above, that the challenges for m-Governance in India have traditionally been the 'entry barriers'. Some of these 'entry barriers' which we can put it as management and technical challenges in m-Governance includes:

- i) Cost:* m-Governance tends to be yet one further channel for e-governance, in which case it will create additional costs. This will continue until m-Governance can truly substitute for other delivery channels. Such substitution will be viable for applications within government.
- ii) Low levels of literacy*

The low levels of literacy in India mostly happening in the rural areas. Currently, most mobile phones available have a text driven interface, making it near impossible for illiterate users to obtain, read and get any information provided by the government.

iii) Lack of knowledge of English language

80% of Indian citizens speak and understand only the local languages while only 5% of them have knowledge and understand English language. But, most of mobile devices applications are developed using English language. So, this factor will give challenge to the m-Governance services to reach their services to the citizens especially in rural areas through mobile devices.

iv) Computer illiteracy

The computer illiteracy problem in India will also pose challenge to m-Governance application reaching the citizens. This is because some mobile devices are using technology in m-Governance which is related to computer based devices such as tablet PC, iPad, iPhone etc. Therefore, the computer illiterate users might face problems and difficulties to access government services which are offered through such mobile devices.

v) Not enough facilities in mobile devices for m-Governance

Though, in India the costs of mobile devices and calls are perhaps the lowest in the world, in order to effectively deliver government services on mobile devices, we need very simple text messaging solutions. For example, if a person has to put details in a form etc, he/she cannot do so if such facilities are not available in the current devices. Therefore, the immediate option is to look at mobile devices that combine computing with mobility and are affordable.

vi) To develop application in each of local languages

Another challenge is to develop applications that can be offered in each of local languages. Because India is facing a lack of knowledge of English language challenge, the applications that can be offered in local languages should be developed. But, it still has another challenge where currently, India has 22 different national languages which will give major challenges for developers.

vii) Trust/security

If m-Governance is to encompass m-payment systems or other transactional

public services, then it must have good security and must be trusted. As yet, there is still a credibility gap to be crossed for many mobile device users.

The mobile nature of information poses a significant challenge at the government level. Data no longer simply resides within the network. It exists on mobile devices and data that is on a network can be accessed from virtually anywhere. In addition, compromising a mobile device itself can place the government at risk. The present cloud computing being offered will further aggravate the security environment.

viii) Data overload

Mobile devices increase the pressures of a world in which users are permanently connected. These connections increase the number of messages circulating and can cause a blizzard of communications by spam, junk and unwanted messages. Govt of India has just restricted the number of SMS per day to 100 to control such eventuality.

Conclusion

The research study done at IIIT, Hyderabad on the m-Governance in India is to give a better view of the government services through mobile devices technology. The discussion on this application has brought many issues, challenges and ideas involving m-Governance applications in India. In India, m-Governance is still at new stage and still need for more improvement to get a better m-Governance. While many innovative applications are underway in both private sector as well as government domains, it may be a little premature to celebrate its success and still need for the improvement. The proposed suggested plan for the m-Governance in India is to give better e-Governance environment in each phase. The proposal covers the strategy that could be accepted by Government of India in order to make m-Governance success and get acceptance by all citizens. Currently, m-Governance in India is still facing challenges in both management and technology. Hence, to improve the m-Governance in India, some suggestions have been recommended which are to overcome those challenges in order to implement m-Governance and make it successful in next few years.

References

- A Lesson in Computer Literacy from India's Poorest Kids. Available at: <http://www.businessweek.com/bwdaily/dnflash/mar2000/nf00302b.htm>. Accessed June 9, 2011.
- DATAQUEST site, E-GOVERNANCE: 20 Hot eGov Projects in India available at: http://dqindia.ciol.com/content/top_stories/103101501.asp. Accessed May 19, 2011.
- Designing Mobile Technology for Emerging Markets "Rural India" available at: <http://blog.i2fly.com/?p=978>. Accessed May 20, 2011.
- e-Gov (Magazine), May 2011, Vol. 07, Issue 05.
- eGovernment Mobile Applications available at: <http://www.egov.com/Solutions/Innovative/Pages/MobileGov.aspx>. Accessed May 18, 2011.
- Governance Now (Magazine), April 1-15, 2011, Vol. 02, Issue 05.
- India Development Gateway official site available at: <http://www.indg.in/india>. Accessed May 18, 2011.
- www.itmission.kerala.gov.in accessed 10 Jun 2011.
- M-Governance: Service On-the-go available at: <http://voicendata.ciol.com/content/NetworkingPlus/210010501.asp>. Accessed Jun 1, 2011.
- mGovernment Benefits and Challenges. Available at: <http://202.138.100.134/node/10603>. Accessed May 18, 2011.
- Mobile future for e-government. Available at: http://www.ericsson.com/solutions/news/2007/q1/20070326_egovernment.shtml. Accessed May 19, 2011.
- Mobile technology. Available at: <http://www.businesslink.gov.uk/bdotg/action/detail?itemId=1074298219&type=RESOURCES>. Accessed May 18, 2011.
- Nicholas Carr: The Big Switch; Rewiring the World from Edison to Google published by WW Norton & Company New York 2008
- Rachel Hinman, MobilGlyph: Making Data Tangible. Available at: <http://adaptivepath.com/ideas/mobilglyph-making-data-tangible>. Accessed May 19, 2011.
- Romit Pandey and KS Vijaya Sekhar: From e-Governance to m-Governance: The way forward paper submitted to ICEG-2011.
- Saaransh – A compendium of Mission Mode Projects under NeGP, January 2011.

The Future of M-governance in India in the Draft Stage. Available at: <http://202.138.100.134/node/10603>. Accessed June 8, 2011.

The iPad 2 – Price, Features, Availability – Everything You Need to Know! Available at: <http://www.redmondpie.com/ipad-2-price-specs-features-availability-everything-you-need-to-know/>. Accessed June 18, 2011.

The Times of India Newspaper, Hyderabad, Monday, May 30, 2011.

K S Vijaya Sekhar, Pursuing his PhD in Dr BR Ambedkar Open University, Hyderabad. email: vijay@iiit.ac.in, R K Bagga, Advisor – IIIT-H, email: rbagga@iiit.ac.in and Khairiyyah Binti Mohd Noor, M.Tech, IIIT-H, email: khairiyyah.noor@gmail.com

