m-Governance: Next Frontier in Governance from Indian Context

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Abstract: The paper defines m-government, its relation with e-governance and the major motivations involved in the deployment of m-governance. Importance of m-government in developing country having large section of young population is studies along with the potential, uses and limitations of m-government. The paper then presents the major technical and non-technical barriers involved in the implementation of m-governance. The technological alternatives at channel, back-end systems and devices are also elaborated. The paper presents a generic management framework which can serve as a guide for the government agencies, in managing the adoption of wireless and mobile technologies, for the effective implementation of m-government. To tap the vast unrealized potential in India of m-governance paper draws a 7-point call for action plan.

Keywords: ICT; e-Governance; m-Governance; management framework; delivery models

1 INTRODUCTION

M-Governance is an extension of e-governance using the current mobile-enabled development or leveraging the mobile revolution to enable development impact. It provides the conventional and electronic government services available via mobile technologies using devices such as mobile phones, laptop computers, personal digital assistants (PDAs) and other wireless internet infrastructure. These mobile enabled services bypass the need for traditional physical networks for communications and collaboration. M-Governance can be thought as a sub-domain of e-governance. e-Governance is the use of information and communication technologies (ICTs) to enhance the activities and operation of public sector organizations. m-Governance has the potential to help make public information and governance services available "anytime, anywhere" to citizens and officials. Mobile services are very popular, cheaper and have wide accessibility in most of the rural areas in India and/or Asian countries. m-Governance is particularly needed for the developing countries across the world, as internet access rates are low but mobile phone usage is vet high and growing rapidly in both urban and rural areas.

In this paper we have tried to explore the potential benefits, the opportunities and the threats for deployment of m-governance. The transition from conventional and electronic, government systems and procedures to m-governance requires through analysis these potential benefits and threats. We have tried to explore the motivational involved in implementation of m-governance. The m-governance framework involving the inputs, processing, output and possible outcomes, along with their sub components are also discussed. m-Governance initiatives in India and further call for action is also elaborated briefly.

1.1 The Relationship between e-Governance and m-Governance

e-Governance is the efficient use of Information and Communication Technology (ICT) at all levels of government set up in facilitating the delivery of public services to common man and also to the corporate world. m-Governance is defined as the use of all kinds of wireless and mobile technologies, application and devices for improving services delivery to the parties involved in e-Governance including citizens, businesses and all government functions [1]. It certainly is not a replacement for e-Governance.

It can be established that m-governance is an integral part and a complimentary sub-set of e-governance [2]. Most of the researchers consider that e-governance is a foundation for m-governance [3,4]. The main difference between the two terms is mainly in terms of the mode of proving access. In e-governance, access to the service is provided through the conventionally established wired network using web based portals. Whereas, m-governance uses applications, that exploits mobility of the citizens, businesses and other operations of the government.

For densely populated country like India, m-Governance can serve as an substitute to e-Governance because a large set of population certainly have mobile phones, but do not have personal computers and internet connectivity. Hence, the alternative of m-Governance can be used to make public information and government services available, anytime and anywhere in a personalized and localized manner, to the citizens and officials. It has now being appreciated by government that mobile handset is not only a device destined only for communication but also a powerful medium for empowering the citizens and a powerful enabler of good governance [5]. M-Government is emerging as the next big wave for information and communication technology (ICT) use in the public sector.

1.2 Motivational factors for m-Governance Implementation
To understand the motivational factor, it is necessary to first understand the evolution of m-governance. The evolution of m-governance is shown in Fig 1. The main factors responsible for the emergence of m-Governance are:
- wider acceptance and penetration of mobile devices
- ease and flexibility offered to the citizens;
- easier interoperability;
- the fact it can bring government closer to citizens,
- the fact that m-government services are cheaper than computer-based services.

Motivational factors are:
- Improved service access – wireless mobile devices provides the citizen with an alternative/additional channel across vast geographical remote areas, with more convenience and flexibility of use, to access the public services.
- 24/7 service availability– many m-governance services can be computerized to provide 24/7 availability, e.g. general information retrieval or certain transaction processing [7].
- Faster service response – as most of the government services can be computerized, citizens and users can gain access without waiting time, making the transaction much faster than the conventional approaches (telephonic, fax or in-person visits).
- Enhanced service quality and efficiency – automation of government function can lead to improving the service quality and services/products can be delivered efficiently.
- Service scalability– m-governance services can be offered at a much lower cost than the conventional services delivery (e.g. reduction in printing cost significant for highly populated country like India.
- Enhanced participation by stakeholder – m-Governance can lead to higher awareness and higher involvement of citizens and businesses in government functionaries.

Item	c-Governance	e-Governance	m-Governance
Principle	Bureaucratic Process (phone, fax)	Process reengineering using IT (PC, Internet)	Seamless integration and linkage wireless devices
Service time	8 hours a day, 5 days a week	24 hours a day, 7 days a week	24 hours a day, 365 days non-stop
Service space	In-person visit, fax, phone	Customer's home and office using the Internet	Customer's location and physical place
Service form	Several visits to offices	Multi-clicks to web portal	One time access to needed service

Fig. 1 Overview of conventional, electronic and mobile governance concept [6]

- Integration, communication and interaction– m-governance allow better integration of government departments. Mobile communication channel can be used to interact with specific groups of people who may not be reachable through conventional communication channels.
- Reduced expenses (fixed and operational) – m-governance reduces operating and maintenance cost, enable cost effective information storage and presentation.

2 DELIVERY MODELS FOR M-GOVERNANCE

In general, there are four main delivery models for m-governance:

1. government-to-citizens (G2C)
2. government-to-government (G2G)
3. government-to-business (G2B)
4. government-to-employees (G2E)

m-governance will cater Government-to-Citizens (G2C) services to a larger extent. However, G2G, G2B and G2E m-government services can also covered.

2.1 M-Governance G2C services fall into four categories [8]

1) Informational and educational services (push services): This involves distributing information to citizens (e.g. related to services, schedules, education, emergencies, regulations and other flat content). The government service is mainly executed by pushing information through SMS.

2) Interactive services: Through interactive services, stakeholders can engage in a dialogue with governments and send inquiries, problems, comments, or service requests to specific agencies. Citizens also can access forms, applications, and databases.

3) Transactional services: Two-way interactions between stakeholders and government are done. At this stage, citizens can complete their transactions with government electronically and at their convenience. This includes self-service options for paying taxes, making payments, lodging tax returns, applying for services and grants, as well as other similar G2C interactions, allowing the citizen to access these services 24/7.

4) Governance and citizen engagement: Citizens engagement through SMS in governance is done at this stage.
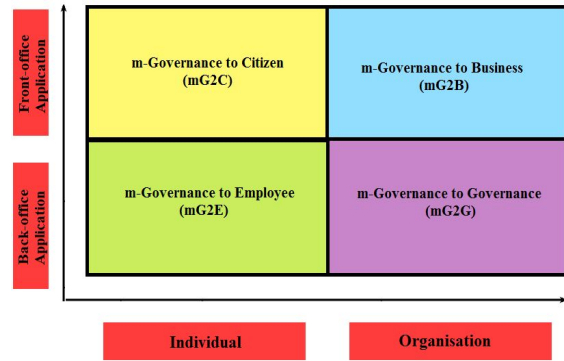

Fig. 2 Primary delivery models of m-government [6]

3 BARRIERS FOR ADOPTION AND DIFFUSION OF M-GOVERNANCE

3.1 Technical Barrier:

To fully realize m-government's service, measures have to be implemented at three levels [9]:

- within and across levels of government with respect to sharing of information;
- within levels of government with respect to service delivery and user registration;
- across levels of government with respect to overall information architectures.

3.2 Non Technical Barrier

Non Technical barrier can further be classified as Governance barriers, Organizational Barrier and Social barriers [10].

1) Governance and policy barriers:
- Accountability
- Transparency
- Openness
- Accessibility
- Participation

2) Organizational and institutional barriers:
- Lack of leadership
- Economic and financial barriers
- Legal Issues
- Vision Issues

3) Social barriers:
- Awareness
- Pricing
- Privacy
- Security
- Trust

4 TECHNOLOGICAL ALTER-NATIVES FOR M-GOVERNANCE

Wide range of technological alternatives at network level, channel level, back end systems and devices, are possible for m-governance deployment. Appropriate identification and deployment for a particular service, geographical area and class of citizen is of crucial significance.

Table 2: E Strengths and weaknesses for various mobile channels [13]

CHANNEL	STRENGTHS	WEAKNESSES
Voice XML	• Portable voice-activated services • Voice- and phone-enabled Internet access • Fast time-to-market • Open standard • Supports natural language • Less expensive than traditional IVR • Ease of integration	• Limited capability and development tools • Web browsing must be specific • Inability to pause, resume, forward and rewind
SMS	• Simple, easy and convenient • Cost effective • Private communications • Fast communications	• Some security vulnerabilities • Fake SMS (spoofing)
USSD	• Simple and logical • Real-time, fast and responsive • Inexpensive • Harmonious with other technologies • Interactive navigation • Can be used for payments, mass usage	• Session-based timeouts • Codes more difficult to remember than Common Short Codes
WAP	• Minimal risk and investment • Independence from carriers • Based on Internet standards • Easier to maintain and iterate user interface/design • Streamlined reporting • Good for pushing content • One version across platforms, except iPhone	• Small size of mobile screen • Not as popular as SMS or USSD • WML scripts not embedded in WML pages • Cannot update for offline consumption • Must leave WAP site for video or audio • Slow to update • Not great for user-generated content
MMS	• Direct and personal • Messages can be stored and forwarded • WAP push potential • Segmentation • Interactivity through multi-media • Easy bulk messaging	• Not compatible with basic phones • More expensive than SMS • Content adaptation limited by screen size and resolution variations • Read and response rates lower than SMS
Data Applications	• Self-contained experience • Graphics and user-generated content • Automatic updates and read content offline • Leverages device-native capabilities (camera,	• Fragmentation, need to build for multiple platforms, with time and costs • Managing multiple releases • Client side changes

4.1 Channels

VoiceXML uses dedicated voice browser, which allow people to access the Web using speech synthesis, pre-recorded audio, and speech recognition and can be supplemented by keypads and small displays [11].

SMS– Have inherent advantage of being simple to use. SMS are very popular, especially in younger po population.SMS can be effectively deployed for citizen notifications, news, weather updates , emergency alerts, healthcare and business support services.

USSD– Unstructured Supplementary Service Data (USSD) messages are produced GSM device and are transferred directly over network signaling channels. USSD messages are generally simple, and capacity using 3G and 4G technologies.

logical, inexpensive and accessible. These messages have a great potential for mobile banking, accessing news services, submission services, feedback, voting, and directories [12].

WAP– Wireless Application Protocol is an open and global specification for wireless communication. Using WAP users with wireless devices can easily access information and services provided by government.

MMS– Multimedia Messaging Service is very similar to SMS, but has additional functionality for rich text, video and audio.

Data applications and mobile web– Data services engaged in data transfer using wireless devices have enhanced in terms of its power, speed

4.2 Back-end systems

Implementing m-governance within the existing conventional government system requires the extension of the existing application to mobile and wireless devices. The extension needs to be done in [12]:

- the enterprise application (CRM, ERP, supply chain management (SCM), work management (WMS) and Business Intelligence (BI));
- the mobile middleware with focus on data security and synchronization, device management, etc
- the mobile client application (software running on the device), with emphasis on data availability, communication with middleware, local resource utilization, and local data storage.

4.3 Other Technical Issues

Ubiquitous: m-Governance systems ensure that websites (and website content) are accessible from all possible devices, and to all users.

Security and identity management: this included mobile device security, encryption and authentication, secure coding processes for mobile applications, and ongoing risk assessment, security and threat monitoring.

Integration with existing system: m-governance system should aim at complementing and enhancing the prevailing governance system. Integration with the existing e-governance or c-governance is the key to effective deployment of m-governance.

Interoperability [14]: m-Governance should be designed for interoperability so that they can exchange information and to use the information that has been exchanged. The software and hardware should be able to share data and should have the capacity to use the data as relevant information.

Accessibility: m-governance systems should be equally accessible to all section of the society, especially persons with disabilities and senior citizens.

5   M-GOVERNANCE   MANAGEMENT FRAMEWORK

The m-governance management framework shown in Fig. 3, first presented by Tarek Kiki [15], helpin analyzing m-governance services, with a recursive relationship between inputs and outcomes.

Input- Implementation of m-governance will provide government with new set of challenges, but will also provide opportunities. Both represent a pressure once a government decides to adopt m-governance. The broad classification of challenges is political, organizational and administrative. The framework must be applied on each category estimate the impact and response and forecast the outcome. The government must analyze the pressure in terms of its challenges and opportunities and then consider it as an input.

Processing- As per Anthony [16] any organization has three levels: strategic, managerial and operational levels. The strategic or top-management level finalizes the main objectives for the organization. The management level has the function of acquiring and arranging the resources for executing the laid down objectives, preparing the task plan for the operational level. The operational level does the actual execution of the tasks laid down. Each of these levels can be further divided into four functions: Planning, Organizing, Leading and controlling. Including these three levels with four functions at each level in the m-governance framework will enable government to process the impact.

Output-Processing of the impact can result in some sought of change and/or innovation. Change will be alteration to the existing process, task etc. whereas, innovation can be considered a special type of change that introduces something new or original in the entire framework.

Outcomes-Outcome can take any or both of two forms: benefits and/or risks, each should be well planned and calculated before taking any step for the implementation wireless and mobile technologies. The response may lead to some benefits, which will be the targeted goals. These goals should be defined in advance for each type of the input and should be considered as 'drivers' for m-Government. Along side of the benefits will be the risks. Elimination/mitigation of risk should the targets and re-planning of the entire framework should be done.
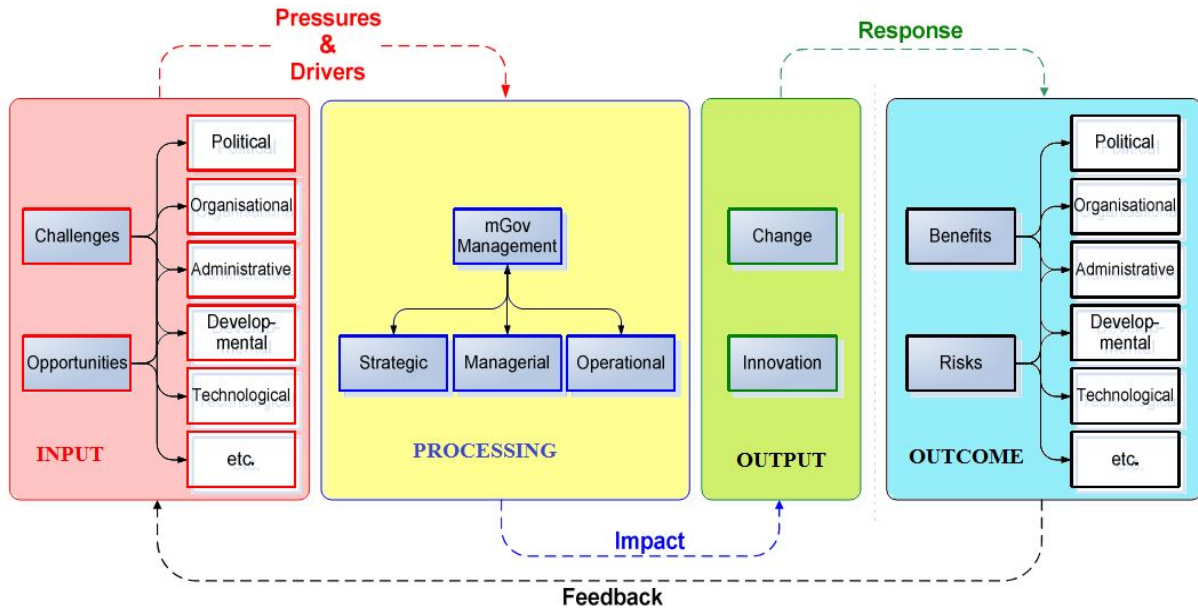
Fig 3. m-Governance management framework[15]

6 M-GOVERNANCE IN INDIAN CONTEXT

From the Indian context it has long being noted that the vast potential of m-government continues to be untapped. For realizing the potentials offered by m-Governance, systematic planning is required at government level. To promote m-governance as an integral part of e-governance major changes in national policy are needed.

6.1 m-Governance Initiatives in India

1) *Kerala State IT Mission (KSITM):*Kerala is moving ahead with its m-governance initiatives with the Kerala State IT Mission taking advantage of the high percentage of teledensity. Services such as complaint registration, entrance exam results, file tracking and health services have led to the state become a role model in this space. The latest m-service allows people to check their voter ID details and polling station by sending an SMS. The 'M-Governance in Kerala' project covers more than 60 government departments to utilise mobile technology to improve public service delivery, strengthen programme efficiency, and have better transparency and accountability. In the 2010-11 Local body elections held in Gujarat, the Gujarat state election commission used the ambitious online voting system.

2) *Mobile Banking in India:*Almost all public and private sector banks in India

are now providing and promoting m-banking services. Many banking services such as balance enquiry, fund transfer, third party bill payment, cheque book ordering, stop payment instructions, ECS, etc are already made available on mobile. The use of these services by general class of citizen need to be promoted and faith in these services need to established.

3) *Other governance systems on mobile:* Many other services such as weather Information and alerts, Agriculture related information from kisan call centers, state some examples of common citizen services using mobile devices are Indian Meteorological Dept's Weather Information, Kisan Call Centre's Agriculture related queries solution, Class X and XII State board/ CBSE's Exam result, etc.

6.2 Call for Action in India

The following suggestions have been made to reap the benefits of m-governance:

1) *Make m-governance integral part of e-governance:* Making m-governance an integral part of e-governance will help in realizing the full potentials of e-governance. All government website and functionaries should be made mobile complaint, and promotion of the same needs to be done on a larger scale. m-Governance should also be made an integral part of e-Business.

2) *Make m-governance as a mission-mode project in National e-Governance Plan [17]:* The National e-Governance Plan (NeGP) was launched in order realize the potential of e-governance. m-Governance should be made an integral part of the e-business plan for e-governance at the district level and innovations in the application of m-governance are needed.

3) *Include m-government in India's flagship programs:* Include m-governance in major flagship programs [17] such Rajiv Gandhi Bharat Nirman Seva Kendras (Rs 28,000 crore), Mahatma Gandhi National Rural Employment Guarantee Programme (MGNREGP) (Rs Rs 39,100 crore), National Rural Livelihood Mission (NRLM) (Rs 10,000 crore), and Sarva Siksha Abhiyan (SSA) (Rs 71,100 crore). This will help in expanding the reach of all these flagship program to vast majority of the population.

4) *Implement m-governance effectively at all district level disaster management cells:* Due its wide popularity and ease of accesses mobile devices can be effectively used to alert citizen in case of natural or other forms of disaster. Landline phone network may get disrupted very easily in case of any natural disaster, whereas mobile network are generally less fragile to such breakdown.

5) *Use m-governance for increasing awareness of major government schemes and other initiatives:* m-governance can be effective in creating awareness of government scheme so that citizen can be benefited and scheme can be implement effectively. Other general short message such as payment notices of taxes, saving of resources such as water and electricity, reduction of pollution can also be sent.

6) *Promotion of m-banking and other financial products*

7) *Use m-Governance in legal framework:* M-governance can also have a significant impact by enabling law enforcement organizations to access relevant information from any location. This information is critical to the successful investigation, identification, tracking, and prosecuting of cases.

7 CONCLUSION

In this paper we have argued that, given the fundamental differences between conventional e-Governance and m-Governance, it is necessary to thoroughly look inside and analyze the benefits and challenges posted by the use new wireless technology in governance. In dept analysis of the key technological requirements along with its intelligent deployment taking into consideration the entire lot local factor must be done. In developing countries like India having large penetration of mobile devices, proper deployment of m-governance can lead to effective governance. In the management framework for m-Governance, application of input to the governance system will assist in predicting benefits and estimating risks, which could result in some form of change and/or innovation. The recursive relationship between the outcome and inputs presented in the framework empowers the government to revise and modify the initial set goals. Efforts in the direction of implementing m-governance so far in India have been minimum. Due to lack of proper vision about m-governance the vast potential of m-governance continues to be untapped. To tap the vast unrealized potential in India of m-governance paper draws a 7-point call for action plan.

Acknowledgment

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