

ICT and E-Governance: A Complete Overview

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Abstract - *The emerging technologies have changed the face of Indian government as e-governance .The efforts of the National Informatics Center (NIC) to connect the entire district headquarters during the eighties was a watershed. From the early nineties, e - governance has seen the use of IT for wider sectoral applications with policy emphasis on reaching out to rural areas and taking in greater inputs from NGOs and private sector as well.*

While the emphasis was initially on automation and computerization, later on efforts began to be made into connectivity, networking, setting up systems for processing information and delivering services. At a micro level, this ranged from IT automation in individual departments, electronic file handling, and access to entitlements, public grievance systems, service delivery for high volume routine transactions such as payment of bills, tax dues to meeting poverty alleviation goals through the promotion of entrepreneurial models and provision of market information.

Keeping in mind the various positive impacts of e - governance; in May 2006, the Government of India approved the National e - Governance Plan (NeGP) with the vision: "Make all Government services accessible to the common man in his locality, throughout common service delivery outlets and ensure efficiency, transparency & reliability of such services at affordable costs to realize the basic needs of the common man". As government is trying its level best to make various government services easily approachable to common man, ICT is proving its worth in making this dream a reality. Integration of NeGP and new emerging technologies like cloud computing, Data and web mining, Artificial Intelligence will help in connecting the nation at all levels. In this paper we will be discussing e-governance policies, its impact and a new conceptual framework along with its future scope. In nut shell we are emphasizing the impact of newer coming technologies on present e-governance infrastructure.

Key Words: NeGP, NIC, Cloud Computing, Data and web mining, Artificial Intelligence.

INTRODUCTION OF E-GOVERNANCE:

Electronic Governance is the application of Information Technology to process of Government functioning to bring about new SMART governance.

- Simple

- Moral
- Accountable
- Responsive
- Transparent

Electronic governance also involves transformation from being a passive information and service provider to active citizen involvement. However evolution of E-governance is a highly complex process requiring provision of hardware, networking, and software and re-engineering of the procedures for examination of cases and decision making. The main objective of achieving Electronic Governance goes far beyond more than computerization or automation of office operations. It means a fundamentally change as to how the Government operates and this implies a new set of responsibilities for the executive, legislature and the citizen.

Earlier, due to limitation of resources step by step computerization has been started that will be beneficial to cover various areas of Government operations. In order to have an impact of use of IT in Government for citizen service, those services which have a direct interface with the public like post offices, banks has been taken up for computerization on a priority basis.

Over the past 6 years the scope of e-Governance has grown substantially in India. India's expertise in e-governance initiatives has demonstrated significant success in improving accessibility, cutting down cost, reducing corruption, extending help & increased access to unserved groups. The government is completely focused towards accelerating this progress by coming up with new projects regularly. Therefore it is a very important area for the government today & that is the reason we are seeking huge investments in this sector. After initially investing ₹ 10,000 cores the government early this year announced that it will invest another ₹ 20,000 cores in next few years. In addition the Government of India has also signed a loan agreement of ₹ 150 million for the e-delivery of public service development policy loan under the National e-governance plan (NeGP). The various e-governance initiatives in India have changed the way we interact with government. There are so many areas where we have made progress- on line land record details, income tax certificate, interactive classrooms-passport, on line income tax return etc. Booking movie or rail tickets online has made life easier. Rail tickets are the need of all the segments of people whereas filing income tax online might not be. In the coming years such more services should come up coupled with better capacity building & awareness programs for rural people.

With the wide spread uses of IT, computers, smart phones, tablets, faster & widespread internet connectivity & other components of ICT in India over the last couple of decades the need for e-governance has finally got the due importance it always deserved.

PRESENT INFRASTRUCTURE:

For the past few years, a great deal of focus has shifted to this concept of e-governance which has varying meaning and significance, as already stated. E-Governance relies heavily on the effective use of Internet and other emerging technologies to receive and deliver information and services easily, quickly, efficiently and inexpensively. E-Governance helps simplify processes and makes access to government information easier. The other anticipated benefits of e-governance include efficiency in services, improvement in services delivery, standardization of services, better accessibility of services, and more transparency and accountability. It is convenient and cost-effective for the Government also in terms of data storage and access to the stored data. The government benefits from reduced duplication of work. In addition, the processes of data collection, analysis and audit are simplified, and become less tedious. Another cherished goal of e-governance is greater citizen participation in the governance of the country. In the context of the statement, a government may theoretically move more towards a true democracy with the proper application of e-governance. With increasing concern about the environment, e-governance has an important benefit. Online government services would lessen the need for hard copy forms and thus produce significant savings in paper, contributing to a greener planet! E-governance holds advantages for the business community too, playing the role of a catalyst and a channel for e-business, a fact evidenced by developments in the US and Singapore. But perhaps the single largest benefit of e-governance is its potential to give birth to an entire web-based economy.

It is still early days for most NeGP projects. Very few projects have reached their post implementation phase and we are yet to see the challenges of steady state operations for large programs in government. The next wave will be to get the internal functions of each department automated, which will be feed into the various delivery channels (e-portals).

Initiatives like e-officered-district are going to be key in the next several years, not only in improving the internal efficiencies of the departments but also in being able to provide timely, transparent services to citizens.

Feedback from citizens is also very essential. The authorities should have clear targets, what is that they want to achieve? Is it just computerization of some departments or they actually want to deliver some application based service too. Last-mile connectivity, disconnect between employer and employee & non awareness among citizens all these are major setbacks & need to be tackled.

Articulating in the form of the report on second administrative reforms commission titled "Promoting e-governance –The smart way forward" which is defined as "simple, moral, accountable, responsive and transparent government. The report defined the need for governance to bring government closer to citizens (G2C) and business (G2B) while promoting inter-government agency cooperation in a friendly, convenient & inexpensive fashion. Challenges such as lack of IT literacy (Digital Divide), awareness regarding benefit of e-governance, underutilization of existing ICT infrastructure, attitude of Government departments towards e-governance application & resistance to re-engineering of departmental process is the need of time. IT is slowly becoming a strategic mechanism for more substantial transformation of Government across the country. Some of the sectors presenting huge opportunities i.e. power, education, healthcare & agriculture. And as we move forward 'innovation' & 'inclusion' will be the key for any e governance project to be successful & impactful.

Technologies like 'Cloud Computing', 'Data mining', and 'Artificial Intelligence' etc. will go a long way to provide a shared and secured infrastructure for consolidation of data, service & applications.

IMPACT ON INDIAN SOCIETY

E -Governance is slowly becoming a buzzword in the corridors of power. What actually then is e -governance? Simply stated, the use of Information and Communication Technology in governance may be termed as E -Governance. It has radically defined the way a government provides service to citizens, businesses and other arms of the government using the following delivery models:

- Government -to -Citizen (G2C)
- Government -to -Business (G2B)
- Government -to -Government (G2G)
- Government -to -Employees (G2E)

The term E -Governance has different connotations:

- E -Administration— The use of ICT to modernize the state; the creation of data repositories for MIS, computerization of records.
- E -Services— The emphasis here is to bring the state closer to the citizens. Examples include provision of online services. E -administration and e -services together constitute what is generally termed e -government.
- E -Governance—The use of IT to improve the ability of government to address the needs of society. It includes the publishing of policy and programmed related information to transact with citizens. It extends beyond provision of on -line services and covers the use of IT for strategic planning and reaching development goals of the government.
- E -Democracy—The use of IT to facilitate the ability of all sections of society to participate in the governance of the state. The remit is much broader here with a stated emphasis on transparency, accountability and participation. Examples could include online disclosure policies, online grievance redress forums and e -referendums.

How is e -governance important in the context of India? The answer may be found in the following lines quoted from Dr. APJ Abdul Kalam, the former President of India, "Delivery of services to citizens is considered a primary function of the government. In a democratic nation of over one billion people like India, e -Governance should enable seamless access to information and seamless flow of information across the state and central government in the federal set up. No country has so far implemented an e -Governance system for one billion people. It is a big challenge for us". India has since the last decade made rapid strides in the area of Information and Communication Technology (ICT). The Government of India too has over the years acknowledged the pivotal role that ICT has played in bringing government services to the doorstep of

the people. It is apparent that the last decade has seen e-governance drop roots in India. ICT has enabled the delivery of government services as it caters to a large base of people across different segments and geographical locations. The effective use of ICT services in government administration has greatly enhanced existing efficiencies, drive down communication costs, and increase transparency in the functioning of various departments. It has also given citizens easy access to tangible benefits, be it through simple applications such as online form filling, bill sourcing and payments, or complex applications like distance education and telemedicine.

India in last few years has seen a rapid expansion of IT and telecom at domestic as well as global level, which has resulted in a huge demand for e-services. With the increasing penetration of computers in urban areas, adoption of e-service is huge. Looking at the growth of the mobile telephony in the country it is apparent that technology is not a barrier even in rural areas if it is simple to use and has value.

As far as public services are concerned, in the last five years, the core ICT infrastructure in the form of State Wide Area Networks (SWAN), State Data Centers (SDC) and front ends in form of Common Services Centers (CSC) are largely in place. Implementation of Mission Mode Projects (MMP) has ensured availability of considerable services electronically. And now with the focus on e-District project, the high volume services at district and sub-district level will be delivered electronically. There is huge demand of efficient, reliable and transparent public services and the experience of e-District services in pilot districts of Kerala, UP, Assam and other states shows that the Indian citizens is ready for these services. In Kerala, in just 180 days there have been nine lakh transactions on the e-Nagrik through CSCs.

In order to penetrate e-Services vertically and horizontally Union Ministry of Communication and Information Technology has proposed the draft of the Electronic Service Delivery (ESD) bill, 2011. Once enacted the bill will make it mandatory for every government organization to deliver public services only in electronic mode. Presently, according to the Information Technology Act 2000, delivery of e-services is left to the discretion of individual departments and citizens do not have the right to demand these services. However the ESD Bill 2011 will supersede

other related legislation and with this bill, citizens shall have the right to e-services. Once the new legislation is passed all government departments will have to issue a framework within six months on the services to be digitized and the formats to be adopted along with a cutoff date for completing the exercise.

Ministry of Communication & Information Technology (MCIT) has invited various stakeholders like state governments, citizens and various departments and released next draft of the bill. The draft bill was put in the public domain for consultations and it is expected that the same will be finalized within this year.

EMERGING TECHNOLOGIES IN IT AND E-GOVERNANCE: THE NEED

- How to better understand our citizen's needs
- How to gain more operational effectiveness
- How to provide better, faster access to critical data about service status while increasing the value of information for those who make decisions on different levels of the government
- Develop project implementation plans on state and national level
- Propose extensive and effective databases for the e-Society
- Provide extensive data for support of e-Government
- Create effective data and system architectures for more goal oriented solutions to transitional problems

Going by the e-Governance definition, with the use of emerging technologies, policy makers can get key conclusions from large amount of data that can be a critical component of any e-Governance initiative.

NEW DIMENSIONS IN FORM OF FRAMEWORK

For many years, people working to enhance information & telecommunication infrastructure and applications have referred to rural communities as being at the "last mile of connectivity." But they are still on "first mile of connectivity."

For a rural person, getting connected is a means for sharing the wide range of options available to urbanites, a means for accessing the services (health, education, information, etc.) that enable urban people to improve their lives.

We proposed that the frame work should consist of four components. Each of components must have a specific job. The different components of the framework are shown in Fig 1.



Figure.1 (Proposed Components of Framework)

Where

- U.I is User Interface.
- A.C is Authentication Check.
- W.S.M is Computational Web Service Mapping.
- J.S is Job Scheduler.

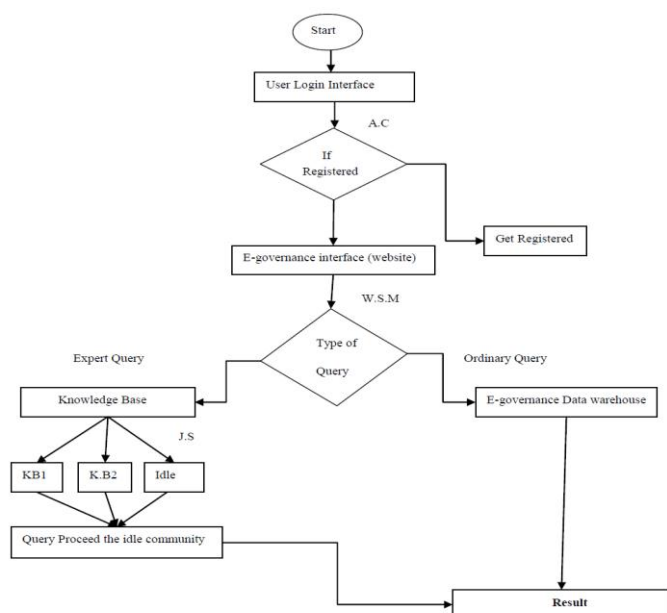
Whenever user request for a e-Governance web service to Framework, the system first checks the authenticity of the user after interfacing with Authentic Server then Framework refers “e-Governance Web Service Mapping” and maps to e-Governance web service existing at different locations and fetches the required e-Governance web service from it and submits it to “Job scheduler” of Framework which schedules the jobs to the Grid of volunteer commodity hardware. The idea behind user-friendly computing is to allow ordinary users on the internet to get maximum benefit from internet. The users don’t have to go here and there to collect information from government bodies. Users just have to login into the e-governance website and get whatever information they requirement-Governance web service assists users in making cost effective and correct use of information. It includes assistance in information retrieving, query processing, registration, training, upgrading information etc. Scheduler of Framework sends the jobs to idle volunteer commodity hardware, the sending jobs are loaded to these idle volunteer commodity hardware and when jobs get computed successfully they are pulled back by Framework and are sent to the required thin clients,

mobile etc. The load balancing of the idle volunteer commodity hardware is being done by the J.S of Framework. With the help of cloud computing, software applications can be accessed from a network using thin clients/mobiles. Thus cloud computing can help to make computing ubiquitous and bring it within the reach of the masses, especially the poor. In this paper, we propose a specific frame work of e-Governance based on clod computing and data mining, at which software layer is at the top, which is being accessed by thin clients or by commodity hardware (PCs, Clusters, Supercomputers, and Mainframes etc.).The Commodity hardware again is of two types:

- a) Active Commodity hardware: It needs e-Governance web services.
- b) Idle Commodity Hardware: The idle Commodity hardware is used as volunteer computing commodity hardware. It is used for processing the web services and the processed web services are supplied to thin clients, active commodity hardware etc.

Thus, Framework is connected with thin clients and commodity hardware. At a time all commodity hardware cannot be busy, some may be idle and we have to use them in optimized order in order to enhance the cost/benefit analysis of cloud computing. By providing a simple interface to the user, Framework makes it possible to achieve super computing power as easily as one can get electric power through a wall socket. Again we intend to introduce an intelligent layer, with the help of which Framework would behave as an expert system on a specific domain. Here Framework would help e-Governance to address all types of users along with the flavor of expert system. Thus our cloud based expert e-Governance system would act as a human expert within one particular field of knowledge. The proposed expert e-Governance system embodies knowledge about one specific problem domain and possesses the ability to apply this knowledge to solve problems from that problem domain. We know that human experts are very scarce, their services are expensive, and they are usually very much in demand, very busy as well as mortal in nature. Above all it is difficult to get experts on several domains at a time. But our proposed framework would have clusters of experts on several domains and would be accessible as

and when required. In proposed framework where user requests for a service, then Framework first checks the nature of the service, if it is merely a request for getting a specific e-Governance web service then it would be provided by Framework, by the help of data mining from the e-governance data warehouse. But if it is a request for an expert advice then Framework would use the inference engine. For launching the inference engine, it would select volunteer nodes. The inference engine would refer the active commodity hardware for knowledge base. It would exploit knowledge base and would find the expert advice for the user and would pass that to Framework and from it to end users. Thus hardware commodity would be knowledgebase as well as the hub of different e-Governance web services. Inference engine would exist in W.S.M component of Framework, which would either find required e-Governance web service, located at different locations of commodity Hardware or would launch inference engine to different idle Hardware commodity (Volunteer nodes) with the help of J.S component of Framework. Thus Framework would play a major role to give a new look of intelligent e-Governance web service, K.B1, K.B 2 etc. are knowledge base. The working process of the whole system is shown in the algorithm mentioned in figure below:



BARRIERS & BENEFITS

It has been seen that most often e -government initiatives suffer delays and encounter failures as

the implementation agencies lack guidance in the areas of planning and implementation of

E-governance projects. Here an analysis has been made on various limitation factors of implementing e-governance projects:-

Table 1: Analyses of E-Government Limitation Concept

Dimension	Examples
Operational Cost	<p>Cultural issues Resistance to change by high-level management Time consuming for reengineering business process in public organizations</p> <p>Operational cost Main supply come from central government Shortage of financial recourses in public sector organizations High cost of IT professionals and consultancies IT cost is high in developing countries</p> <p>Cost of installation, operation and maintenance of e-government systems</p> <p>Cost of training and system development</p>
IT infrastructure	<p>Shortage of reliable networks and communication Inadequate network capacity or bandwidth Lack resources standards and common architecture policies and definitions Existing systems are incompatible and complex Existing internal systems have restrictions regarding their integrating capabilities Lack of integration across government systems Integration technologies of heterogeneous databases are confusing Lack of knowledge regarding e-government interoperability High complexity in understanding the processes and systems in order to redesign and integrate them Lack of enterprise architecture Availability and</p>

	compatibility of software, systems and applications
Organizational	Lack of coordination and cooperation between departments Lack of effective leadership support and commitment amongst senior public officials Unclear vision and management strategy Complex of business processes Politics and political impact
Operational Cost	Main supply come from central government Shortage of financial recourses in public sector organizations High cost of IT professionals and consultancies IT cost is high in developing countries Cost of installation, operation and maintenance of e-government systems Cost of training and system development.
Organizational	Lack of coordination and cooperation between departments Lack of effective leadership support and commitment amongst senior public official's Unclear vision and management strategy Complex of business processes Politics and political impact

Consequently for developing countries, e-government's first stage was the Computerization of internal operations and services. Thus, for many government departments, "e-governance" was a significant, expensive, infrastructural change, as they had to plan switching from totally paper-based systems and services to totally computer- and internet-based systems and services. But e-governance is not a shortcut to economic development, budget savings or clean, efficient government. Instead, e-governance is an evolutionary process and often a struggle that presents costs and risks, both financial and political. The investment in e -governance tends to produce below par results in the absence of standards also. It is therefore critical to have suitable policies, guidelines and specifications well laid out to overcome the problems associated with planning and implementation of e -governance projects.

In spite of some reservations and potential negative implications of implementing and designing

e -governance, including disintermediation of the government and its citizens, impacts on economic, social, and political factors, vulnerability to cyber attacks, and disturbances to the status quo in these areas, e -governance can radically change the face of governance, especially in a big country like India and provide its citizens, an interface to get better and more efficient Government services.

CONCLUSION

Egovernance is a citizen centric approach to provide a transparent, simple, faster and accountable interface to all .It is an IT based solution of multiple administrative and public sector tasks and services. However Government is spending a huge amount on it, multiple plans at National and state level have already emerged, but still there is a lot to be done. IT experts and computer scientists are doing there level best to provide a better infrastructure to all e governance projects but it is not as easy to implement this all. All the frameworks suggested by various experts can only work when there will be a feeling acceptability and readiness in the mind set of all its users, either they are the government employees or the citizens for whom it is actually built. Awareness and knowledge of ICT applications is the another face of the coin.

Talking about infrastructure of Egovernance projects various new techniques like cloud computing, data mining and AI can be used to make it better. Data and resource sharing, faster information access and office automation by "cloud computing" is a favorable approach in these days, but it is expensive too. Building cost effective and user friendly software is the need of the time.

Finally I wish to say that it is a good beginning regarding Indian Scenario and as it is well said "well begin is half done", we will definitely achieve the aim of a reliable, cost effective ,user friendly and citizen centric e-government for the people of India.

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