E-Governance Status in India

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Abstract— E-governance refers to the delivery of government information and services via the Information and communications technology (ICT) to citizens or businesses or governmental agencies. The purpose of this paper is to present the status of e-Governance in India. The paper discusses the initiatives taken by Government of India to computerize Government to Citizen (G2C), Governance to Business (G2B) and Government to Government (G2G) services. The important G2C services like National Rural Employment Guarantee Scheme (NREGS) and Dial.Gov; G2B services like Ministry of Corporate Affairs and e-Biz and G2G services like SmartGov of Andhra Pradesh and e-Office are presented in detail. Tools and Technologies are adopted for providing e-Governance services are explained. The issues in digital governance like Cyber Crime and lack of Citizen Unique Identity are also mentioned. Government projects in pipeline and future projects are also included. It is concluded that e-Governance in India enables people to have efficient, effective, transparent and accountable services.

Keywords— Intelligent Search Engine, E-office, E-services, NEGP, E-governance

I. INTRODUCTION

Information Communications and Technology (ICT) refers all the hardware and software that people use to send and receive information. The Government of India is the governing authority of the union of 29 states and 7 union territories. Many functions of the government are involved in delivery of information and services to its citizens. Governance processes are about creation of files, noting in the file, decision at various levels, finally delivering decisions as letters and notifications. Tracking movement of files and monitoring of development programs are hence it leads to various issues in manual process such as huge resource utilizations, long time and corruption etc. An automation of these files can accomplish a very important role both in improving the efficiency of decision making as well as in building transparency in government services [17]. E-Governance means the use of internet by the government to provide its services at the door step of customers, business and other stakeholders. E-Governance applications have been helped government to reach the unreached population in the country such as Telemedicine, Utility Services application etc. In 1975, the Government of India had started using computers in the government services and computerized decision support system in the departments to facilitate planning. National Informatics Centre (NIC) was established in 1976 and through its ICT Network National Informatics Centre Network (NICNET) has linked all the departments of the state governments, central government and around 625 district administrations of India. Andhra Pradesh was the first state in the country to take up E-government in a systematic manner. The major projects that have laid the foundation of E-government in Andhra Pradesh are: APSWAN, CARD, APDMS and FAST. Computer aided Administration of Registration Department (CARD) is an e-government project for computerization of the land registration system.

In E-Governance, government makes the best possible use of technology to communicate and provide information in terms of national websites such as 'India.gov.in', 'MyGov.gov.in' and 'Dial.gov' etc. These websites provide information about the department concerned its aims, citizen charters, organizational details and online grievance facilities available. These days electricity, water, phone and all kinds of bills can be paid over the internet. These e-services lead to speed of public services, reduce duplication and increase citizen participation in the government. Information technology is converting physical files to digital files and implementing electronic office solution. The key benefits of digital office created searchable documents, easily manageable documents, security and access rights to documents etc. In India, there are multiple challenges to e-Governance projects due to insufficient infrastructure, Cyber security, poverty, multilingual, lack of awareness, less literacy rate and other technology related issues [10].

A major e-Governance initiative on national scale National e-Governance Plan (NeGP) is the lead nodal agency for implementing e-governance in India [15]. The main objective of NeGP is to transform government citizen services from their present manual delivery to digital delivery. The NeGP comprises 27 Mission Mode Projects (MMPs) incorporating 9 central MMPs, 11 State MMPs and 7 integrated MMPs for multiple backend Ministries and Departments. The NEGP includes projects like Income Tax, Pensions, Customs and Excise, MCA 21, Passports, e-Office at the central level and e-District etc.

II.   REVIEW OF LITERATURE

The literature is reviewed under e-Governance services, infrastructure, technologies, current running projects and future coming projects. In [1], the authors focus on strategies for citizen centered e-Governance services such as user centered Comprehensive Plan, Conduct User Information Needs Assessments and Engage Users. In [3], the authors suggest some development approaches like as reusability, middleware technology standards and Service-Oriented Architecture (SOA) for reusing the component in e-Governance. In [4], the authors present a service oriented design approach for building e-Governance services such as service composition, service environment and service collaboration. In [6], the author analyses the NeGP projects such as Central Mission Mode Projects (MMPs), State MMPs and Integrated MMPs. In [10], the authors discuss the need of information security for safer, secure and smooth functioning of e-governance services. In paper [5], the authors proposed Government-to-Consumer-to-Government service for Nigeria government such as online integrated census information system. For this three tier structure design including Presentation tier, Application tier and Database tier is suggested. My Eclipse is used for design front end and Microsoft SQL Server 2005 is used for relational database management system. In [12], the authors described the three phases (information, interaction and transformation) for government circulating of information and services between citizens, business and other departments. E-voting systems for elimination of direct physical involvement and provide virtual participation of voter is presented in [14]. For voting process five interfaces are design user interface, verification, monitoring, auditing and system configuration. In [21], the survey was done on e-Government development status around the world. The authors described the comparative status of countries on e-Governance readiness based on some key parameters including web presence measures, telecommunication infrastructure measures, E-Participation and human capital measures.

III.   E-GOVERNMENT SERVICES IN INDIA

Service is the process of serving or a system providing a public need. Indian government provides a set of online services to its identified customer base. There are a number of categorizations for interaction within e-Government: Government-to-Citizen (G2C), Government-to-Government (G2G) and Government-to-Business (G2B). G2C implies that citizens are allowed to retrieve government information and perform government transactions online. G2G supports online communication between government agencies. G2B allows businesses to retrieve government information and complete transactions with government agencies online.

A.   *Government to Citizen (G2C) Initiatives:*

This is the communication process of individual citizens with the government. G2C are those activities in which the government delivers online access to information and services to citizens. A great number of initiatives have been taken in this category by the Governments. Some of these G2C applications are Right to information (RTI), e-District, e-Payment and Dial.Gov etc. Government should develop more websites for all sectors to involve the public to make the successful e-Governance [15].

Dial.Gov: Dial.gov is dedicated and intelligent search engine for the masses. It has separate gateways for individuals, students, business, women, children's, farmers and youth. The portal (www.dial.gov.in) helps with welfare schemes which aim to bridge the existing gap between the benefit services information and the beneficiary through an Intelligent Search Engine. The information about benefits is available to the citizen through different channels like Dial.Gov web portal, an interactive voice response service and call Centre helpdesk. This Portal after receiving inputs regarding scholarship, pension, youth, women, old, sports and farmer come up with three types of schemes such as central, state and international. It is developed and implemented by National Informatics Center (NIC). The Search procedure finds welfare scheme information related to the keyword enter into the Search textbox. The Interactive Voice Response facility (IVRS) is an alternate delivery platform, where the caller interacts with the system and the system gives out the desired information. The IVRS has the capability of understanding English and Hindi both languages. In cases where the call cannot be completed with IVRS then call automatically gets connected to the Call Centre [17].

B.   *Government-to-Business (G2B) Initiatives*

This is the interaction between government and the commercial business sector to get the businesses information and services online [15]. The Government of India launch the website 'www.makeinindia.com' where the Make in India program includes major new initiatives designed to facilitate investment and build best-in-class manufacturing infrastructure. Most common example of G2B is Ministry of Corporate Affairs Department discussed in detail.

Ministry of Corporate Affairs (MCA 21): The Ministry of Corporate Affairs has implemented the MCA 21 Mission Mode Project under the National e-Governance Plan (NeGP) in September 2006. It is an innovative program being the first mission mode project being undertaken in the country. The Project offers online accessibility of all Corporate Affairs services including filing of documents, registration of companies and public access to corporate information through a website (http://www.mca.gov.in). The project aims at providing easy and secure online access to all services and information provided by the Union Ministry of Corporate Affairs to corporates and other stakeholders. Currently 93%

of the filings are made directly at the online portal. The goals of this project were formulated keeping in mind different stakeholders such as Business, Public, Professionals, Financial Institutions and Employees. There are many services offered under this initiative such as enables electronic filing of documents, Registration and incorporation of new companies, Registration, modification and verification of charges, issue of certified copies and redresses of investor grievances and applications for various statutory services offered by the ministry etc.

C. Government to Government (G2G) Initiatives

This is the non-commercial interaction and transactions between Government organizations. G2G initiatives help in making the inside government procedures more efficient. The example of G2G services such as Crime and Criminal Tracking Network & Systems (CCTNS), e-Office, e-Procurement and e-Courts etc. [15].

E-Office: E-office is focused on facilitate office procedures in order to use less paper. Currently various departments of Government of India are changing from manual file management system to digital office. The Revenue Administration at Sindhudurg is an example of paperless office that enables fast, transparent and environment friendly working. The e-Office modules developed by the National Informatics Centre (NIC), New Delhi are used for this purpose. It is helping the Government departments go paperless or become offices with less paper. E-Office is aimed at improving internal efficiencies in an organization through electronic administration. It has integration of various modules such as E-File, Knowledge Management Systems (KMS), Collaboration and Messaging Service (CAMS), E-Leave and E-Tour [17]. E-File is programmed workflow based system that replaces the existing manual management of files with a more efficient electronic system. KMS enables users to create and manage electronic documents that can be viewed, searched and shared. CAMS provide various applications such as Task Monitoring System, e-Talk, e-Appointments, Document Sharing, Notifications via. Email, SMS, e-Alerts and online Bulletin Services. E-Leave is a system that automates the leave application and approval process. E-Tour is a module that facilitates the well-organized management of employee tour programs.

IV.   TECHNOLOGIES USED IN E-GOVERNANCE

Technology defines the infrastructure required for implementing e-Governance services. ICT infrastructure includes hardware, software and communication protocols. National e-governance Plan (NeGP) is a government agency for implementing e-governance in India. NeGP goal is to make most public services available online ensuring that all citizens have access easily. The government has set up three common ICT infrastructures for effective deliveries of public services are State Wide Area Networks (SWANs),

State Data Centre (SDC) and Common Service Centres (CSC) [15]. SWANs are based on multi-tiers of Network connectivity model, which comprise of State Head Quarter, District Head Quarters and Tehsil Head Quarters etc. SWANs which are used for backbone network for data, voice and video throughout a state/UT. State Data Centre has been providing various functionalities such as secure data storage, online delivery of services, Disaster Recovery, Citizen Information/Services Portal, Service Integration, and State Intranet Portal. The Common Services Centres (CSCs) are proposed to be the delivery points for Government, Private and Social Sector services to rural citizens of India. The various G2C Services has been providing at Common Services Centres such as Agricultural services, Land Records, Issuance of Birth and Death Certificates, Bill payments –water, electricity, telecom, Property Tax and Grievances Services etc. Some tools are used for providing e-Governance services are described below.

A.   Optical Character Recognition (OCR)

OCR is the recognition of printed or written text character by a computer. This involves photo scanning of the text character-by-character, analysis of the scanned-in image and then translation of the character image into character codes, such as ASCII, commonly used in data processing. OCR is being used by libraries to digitize and preserve their holdings. OCR is also used to process checks and credit card slips. OCR contributes toward paperless governance by reducing number of unnecessary copies when reading or detection can be done by device at a lightning speed.

B.   Magnetic Ink Character Recognition (MICR)

MICR device which is commonly used in banking environment where customer's identification and bank information are preprinted with iron oxide based ink. This device detect the ink will translate to the readable form. An MICR reader translates these characters into digital form for the computer.

C.   Video Conference

Videoconferencing technology conducts a conference between two or more participants at different sites by using computer networks to transmit audio and video data. For example a point-to-point video conferencing system works much like a video telephone. NIC is providing Video Conferencing services in government organizations [19]. Video Conferencing facilities are being upgraded with state of art technology in all locations by providing High Definition Video Conferencing systems. Videoconferencing services are being used for monitoring of various Government Projects, Schemes, Public Grievances, Monitoring of Law and Order, Hearings of RTI cases, Distance Education, Tele-Medicine, monitoring of Election processes, Launching of new schemes and so on.

D. *Personal Digital Assistant (PDA)*

Personal digital assistant is a term for any small mobile hand held device that provides computing and information storage and retrieval capabilities, keeping schedule calendars and address book information handy. Some PDAs offer a variation of the Microsoft Windows operating system called Windows CE.

E. *Cloud Services*

Cloud computing is an emerging area for organizations that offer on-demand based computing resources. It can be provided three types of services are Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service s(IaaS). The e-Office cloud model allows easy creation of an e-Office setup for organizations. For example an organization needs to create an e-Office the required modules to set up e-Office can be acquired from the cloud [17]. Currently government is setting up of National and State levels cloud computing platforms. These are provided facility of AppStore e-RAAS (Reusable, Application, Availability and Store).

F. *Biometric Technologies*

Biometrics is the science and technology of measuring biological data. Biometric Technologies refers to a device that obtains biometric information immediately typically in a digital format ready for comparison to a database [20]. Some of the more uses of these biometric methods for identification or verification include Fingerprint recognition, Hand geometry, Retina scanning, Facial recognition, Signature dynamics, Keystroke dynamics and Voice recognition. Other technologies that are emerging or that are being studied include facial thermography, DNA, hand grip, fingernail, ear shape and brain wave pattern and foot print recognition.

V. ISSUES IN E-GOVERNANCE

Cyber Crime and poor infrastructure are major issues of e-Governance in India. It carriages a major challenge in obtaining the full benefits of services provision under e-Governance. The various barriers can be identifying as follows:

Privacy: The privacy of the citizen necessities to be confirmed while using the online services. Whenever a citizen gets into any transaction with a Government agency, it can expose out lot of information, which can be misused by the hacker. Thus, the citizen should be ensured that the information flow would pass through reliable channels and seamless network. The identity of citizens requesting services needs to be verified before they access the services [10].

Infrastructure: The infrastructure issues which are important like rural telecommunications network, power problems in various states and ways of communications affect the speed which delays the implementation. Unless these areas are improved an effective e-Governance programme cannot be implemented [8].

Cybercrime is used to undermine the effectiveness of a nation government. Governmental systems have been targeted for disturbance due to a variety of reasons, which includes the desire of hackers to demonstrate their skills against some of the most tightly guarded computer systems. As per the information by Indian Computer Response Team (CERT-In) a total number of 308,371 and 78 government websites were hacked during the years 2011,2012 and 2013 respectively [18].

Lack of integrated services: Most of the e-governance services which are offered by the government are not integrated. Lack of interaction between different departments of government may be its major cause. There is a need to integrate the initiatives existing in the various departments of the government [7].

Different Languages: India is a country where people belonging to different states speak different languages. The diversity of people in speaking different of languages is a challenge for implementing e-Governance projects. Through lot of efforts are put by center and state governments on multilingual system such as Bharat Operating System Solutions (BOSS) is present in almost all the Indian Languages. Still it becomes a challenge for the government to write e-Governance applications which are to be implemented for the whole nation in more than one language [8].

VI. E-GOVERNANCE TECHNOLOGIES IN PIPELINE AND FUTURE PROJECTS

India government has implemented various successful e-Government projects. It promotes emerging areas of technology to encourage developments of future e-Governance projects. Some of the current technologies in pipeline [9] such as Ubiquitous computing, Free and Open Source Software, High Performance Computing and Big Data Analytics. The above mentioned technologies are used in future projects started by the government such as Wireless Pollution Monitoring and Evaluation system, Wireless Sensor Network for Real-Time Landslide Monitoring and so on.

A. *Ubiquitous Computing*

Ubiquitous computing touches on an extensive range of research areas including mobile computing, location computing, context-aware computing, distributed computing and sensor networks. The goal of Department of Electronics and Information Technology (DEITY) researchers are working in ubiquitous computing is to create intelligent products that connect to the Internet and the data they generate is easily available [9]. C-DAC (Hyderabad, Chennai and Bangalore) is the main implementing agency for Ubiquitous computing along with academic institutions such as IIM Kolkata and Amrita University.

B.   Free and Open Source Software (FOSS)

Open source software is software whose source code is available for modification or enhancement by anyone. It is freely licensed to use, change and share by any person. The National Resource Centre for Free & Open Source Software (NRCFOSS) has been establishing to provide design, development and support services to the FOSS community in the country. The major initiative in the area of Free & Open Source Software is Bharat Operating System Solutions (BOSS) [9]. It is Linux based localized Operating System distribution that supports 18 Indian languages. BOSS has been certified by Linux Foundation and is useful in e-Governance projects. Punjab State Government has deployed BOSS in many schools under Sarva Shiksha Abhiyan programme. Indian Navy has adopted BOSS for their office applications. BOSS has also deployed in Chattisgarh, Kerala, Tamil Nadu, Tripura, Puducherry, Andaman & Nicobar Islands and Haryana for e-governance applications.

VII.   CONCLUSIONS

This paper reviews the e-Governance services, infrastructure and technologies on the implementation of electronic governance in India. E-services provides better delivery of government services to citizens, less corruption, increased transparency, greater convenience, citizen empowerment through access to information, decrease in time and effort, revenue growth and cost reductions [7]. We have seen a lot of improvements in new technologies, but cybercrime overcome the benefit of digital governance.

VIII.   SUGGESTED PROJECTS FOR E-GOVERNANCE

Indian government currently running various successful services such as online railway ticket reservation, online bill payments etc. Mostly Current systems are informatics and single side interaction based but now need of interactive government services.   Interactive Service system in many ways opens up possibilities for direct participation of individuals in the governance processes. It creates an interactive Government-to-Consumer-to-Government (G2C2G) Channel in various functions Such as e-census, e-ballots, and e-health records management etc. An online census is the web based application which allows respondents to perform the census and manage census data easily and securely by using Internet. An internet voting allows the voter it give vote online without going to any physical polling station. Creation of Nationwide Networks for Education, Health, Police, Posts and Tourism will be the need of the hour. These networks will be the key to nation development.

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