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**e-GOVERNANCE IN HIGHER EDUCATION SPECIAL REFERENCE TO
ROLE OF MOBILE GOVERNANCE (m-GOVERNANCE)**

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CONTENT

Sl. No.	TITLE OF THE ARTICLE	Page No.
1	CULTIVATION OF MOBILE GOVERNANCE IN HIGHER EDUCATION DIVISION — <i>Gudhe Koteswar Rao</i>	1-3
2	THE ROLE OF MOBILE TECHNOLOGIES IN THE TEACHING AND LEARNING — <i>Dr. Chandrapal Punia</i>	4-9
3	E-GOVERNANCE IN EDUCATION — <i>Dr. Rakesh Kumar</i>	10-14
4	UTILITY OF E-GOVERNANCE & M-GOVERNANCE IN HIGHER EDUCATION: AN ANALYSIS --- <i>Megha Kumari</i>	15-18
5	FROM E-GOVERNANCE TOWARDS M-GOVERNANCE: INTERMEDIATE EDUCATION (TS) --- <i>Dr. A. Blujender Reddy</i>	19-23
6	M-GOVERNANCE IN HIGHER EDUCATION INSTITUTIONS A CASE STUDY ON ST. FRANCIS COLLEGE FOR WOMEN, BEGUMPET-HYDERABAD -- <i>D. Rupali & K. Ravi Kumar</i>	24-29
7	E-GOVERNANCE STATUS IN DEVELOPING COUNTRIES --- <i>Dr. Kasala Nageswar Rao</i>	30-36
8	MOBILE LEARNING: SMART EDUCATION SYSTEM IN INDIA --- <i>Dr. M. Kavitha</i>	37-43
9	M-GOVERNANCE IN HIGHER EDUCATION INSTITUTIONS --- <i>Dr. M. Sadanandam</i>	44-48
10	TEACHING ENGLISH LANGUAGE @ MOBILE <i>Dr. Palakurthy Dinakar</i>	49-52
11	TRANSFORMING FROM E-GOVERNANCE TO M-GOVERNANCE --- <i>Dr. S. Chandra Shekar</i>	53-55
12	E-GOVERNANCE IN TELANGANA: PRESENT PROBLEMS AND POSSIBLE SUGGESTIONS FOR FUTURE DEVELOPMENT --- <i>Dr. S. Venkatesh</i>	56-58
13	SMART AND ELECTRONIC GOVERNANCE IN INDIA --- <i>Capt. M. Pandarnath,</i>	59-963
14	ADMINISTRATIVE EFFICIENCY AND E - GOVERNANCE - A CASE STUDY OF TELANGANA -- <i>Dr. Gade Pami & Kalakotla Suman</i>	64-70
15	THE IMPACT OF e-HRM ON e-EDUCATIONAL SERVICES --- <i>Dr. G. Rathnakar & Dr. A. Raghuvender</i>	71-82
16	IMPACT OF MOBILE PHONE IN DISTANCE EDUCATION --- <i>Dr. Gopu Sudhakar</i>	83-86
17	MOBILE LEARNING FROM RESEARCH TO PRACTICE TO IMPACT EDUCATION: LEARNING AND TEACHING IN HIGHER EDUCATION --- <i>Dr. P. Srinivasa Rao & T. Srikanth Reddy</i>	87-93
18	ELECTRONIC SERVICES IN HIGHER EDUCATION SECTOR --- <i>Dr. Y. Venkateshwarlu</i>	94-101
19	ISSUES & CHALLENGES: E-GOVERNANCE IN HIGHER EDUCATION -- <i>D. Rajkumar</i>	102-105
20	IMPACT OF E-GOVERNANCE AND ICT IN HIGHER EDUCATION SECTOR IN INDIA: ISSUES AND CHALLENGES --- <i>Dr. Manda Purnachandar</i>	106-111
21	NEED OF E-GOVERNANCE AND M-GOVERNANCE IN HIGHER EDUCATION- A BIRD'S VIEW — <i>Dr. P. Malathilatha</i>	112-115

E-GOVERNANCE STATUS IN DEVELOPING COUNTRIES

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Abstract: E-governance is Electronic Governance refers to the delivery of government data 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), Government 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 G2G services like Smart Government 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. Electric government (e-government) projects in developing countries are facing many challenges to deliver sustainable e-government services. From the existing literature we found that most of the studies considered lack of technology, and limitations in budgets and human resources as the main hurdles in effective implementation of e-government services. Along with these limitations, we found that the e-government maturity models adopted by developing countries are failing to provide an appropriate strategic plan to deploy sustainable e-government services. While assessing the existing e-government maturity model, we made several observations on the lack of detail, the technology-centric nature, the emphasis on implementation, and the lack of an adoption strategy. This work contributes toward the proposition of a new e-government maturity model that would address the limitations of existing e-government maturity models, and would support governments in developing countries to achieve sustainable e-government services. To achieve this goal, we considered five determinants – a detailed process, streamlined services, agile accessibility, use of state-of-the-art technology, and trust and awareness. The proposed model was validated by employing an empirical investigation through case study and survey methods. We found that both the implementers (government) and adopters (users) of the e-government services benefited from the proposed model, resulting in an increased sustainability of e-government services.

Introduction

Electric government (e-government) projects in developing countries are facing many challenges to deliver sustainable e-government services. From the existing literature, we found that most of the studies considered lack of technology, and limitations in budgets and human resources as the main hurdles in effective implementation of e-government services. Along with these limitations, we found that the e-government maturity models adopted by developing countries are failing to provide an appropriate strategic plan to deploy sustainable e-government services. While assessing the existing e-government maturity model, we made several observations on the lack of detail, the technology-centric nature, the emphasis on implementation, and the lack of an adoption strategy. This work contributes toward the proposition of a new e-government maturity model that would address the limitations of existing e-government maturity models, and would support governments in developing

countries to achieve sustainable e-government services. To achieve this goal, we considered five determinants—a detailed process, streamlined services, agile accessibility, use of state-of-the-art technology, and trust and awareness. We found that both the implementers (government) and adopters (users) of the e-government services benefited from the proposed model, resulting in an increased sustainability of e-government services maturity models, resulting in poor sustainability of these e-government services. The word sustainability has been loosely used to define the efficiency that a government could achieve in terms of cost, time, and effort to implement e-government services, while being able to accommodate the interests of various stakeholders (i.e., the government and citizens). Further assessment of e-government maturity models has brought forward several limitations to our knowledge, namely a lack of adoption (emphasis on technology), a linear pattern of stages, a lack of detailed processes, and a lack of state-of-the-art technology. Such limitations obstruct the design of sustainable e-government services, making it imperative to design alternative maturity models. We considered two research questions for the purpose of this study.

Research Methodology

The exploratory research method has been followed for the study. The research has followed Secondary sources which include different books, journals, newsletters and annual reports of different organizations. Internet facilities are also availed for collecting secondary data.

Review of Literature

The literature is reviewed under e-Governance services, infrastructure, technologies, and current running projects and future coming projects. Bertot, Jaeger and McClure (2008), focused on strategies for citizen centered e-Governance services such as user centered Comprehensive Plan, Conduct User Information Needs Assessments and Engage Users. Sharaban Kumar and Jayarao (2013) suggested some development approaches like as reusability, middleware technology standards and Service-Oriented Architecture (SOA) for reusing the component in e-Governance. Das and Patra (2013) presented a service-oriented design approach for building e-Governance services such as service composition, service environment and service collaboration. Geetika and Neeraj, analyzed the NeGP projects such as Central Mission Mode Projects (MMPs), State MMPs and Integrated MMPs. Shailendra Singh and Singh Karaulia (2011), discussed the need of information security for safer, secure and smooth functioning of e-governance services. Waziri et.al. (2014), 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. Palavia and Sharma (2007) 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 (Anane et.al 2007). For voting process five interfaces are design user interface, verification, monitoring, auditing and system configuration. In 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.

E-Government Services

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 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

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. Dial.Gov: Dial.gov is dedicated and intelligent search engine for the masses. It has separate gate ways 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.

Government-to-Business (G2B) Initiatives:

This is the interaction between government and the commercial business sector to get the businesses information and services online. 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 corporate 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 enable 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.

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. 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 department's 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. E-File is programmed work flow-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.

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). 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 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 detects the ink will translate to the readable form. A MICR reader translates these characters into digital form for the computer.
- C. **Video Conferencing:** Video conferencing 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. Video Conferencing facilities are being upgraded with state of art technology in all locations by using 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 (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 currently government is setting up of National and State levels cloud computing platforms. These are provided facility of App Store 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. 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 thermograph, DNA, hand grip, fingernail, ear shape and brain wave pattern and foot print recognition.

E-Governance Technologies in 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 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. 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

Conclusions

This paper reviews the e-Governance services, infrastructure and technologies on the implementation of electronic governance in developing countries. 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. We have seen a lot of improvements in new technologies, but cyber crime overcome the benefit of digital governance.

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