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CLOUD COMPUTING & ELECTRONIC GOVERNANCE: FUTURE PROSPECTS, OPPORTUNITIES & CHALLENGES IN INDIA

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ABSTRACT

The e-governance is about the new way in which public sector organizations might have to transform themselves, because of the positive impact of information communication technology on government functioning and deliverance, whereas platform independent, location independent and technology independent cloud computing has opened new frontiers of modern information communication technology, which is robust and agile. It is evaluated that the new information technology mandates will create change within government organizations, agencies and departments increasingly and thereof develop newer platform for transactions with the citizen. The precursory measures being developed are mainly about how government will deliver services to the citizen, not how to bring the citizen into the democratic or decision-making process. The present research focuses on evaluating electronic governance as new aspect of governance and strengthening of platform by using cloud computing.

Keywords: Electronic Government, Cloud Computing, Service Infrastructure, Service Delivery, Interactive Platforms and Development

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1. AN INTRODUCTION TO E- GOVERNANCE & CLOUD COMPUTING

E-governance, meaning 'electronic governance' is using information and communication technologies (ICTs) at various levels of the government and the public sector and beyond, for the purpose of enhancing governance *(Bedi, Singh and Srivastava, 2001; Holmes, 2001; Okot-Uma, 2000).* According to *Keohane and Nye (2000),* "Governance implies the processes and institutions, both formal and informal, that guide and restrain the collective activities of a group. Government is the subset that acts with authority and creates formal obligations. Governance need not necessarily be conducted exclusively by governments. Private firms, associations of firms, nongovernmental organizations (NGOs), and associations of NGOs all engage in it, often in association with governmental bodies, to create governance; sometimes without governmental authority." Clearly, this definition suggests that e-governance need not be limited to the public sector. It implies managing and administering policies and procedures in the private sector as well. The nations across the world are changing and trying to be more responsive and cohesive in delivering services to their citizens, business

enterprises and stakeholder, *Charag and Mufeed (2013).* The electronic government (e-government) has been adopted globally by both developed and developing countries. Whereas many studies revealed that the e-government not only improves the efficiency of public administration but also the practice of good governance, such as increasing transparency, deducing administrative corruption, improving service delivery, improving civil service performance, citizens empowerment and improving government finance *(Almunawar, Low, Habibur-Rahman, Mohidin; Bhatnagar, 2012)*. The Citizens in countries with advance e-government systems such as South Korea, Australia and Singapore (the top three countries in UN e-government ranking 2014) enjoy many benefits as many government services can be accessed through the Web or through their smart phones interactive interfaces, therefore bridging the gap between government and stakeholders. Whereas Cloud computing is a revolutionary concept for many businesses, governments and citizens. According to Gather, by 2012, 20% of businesses will adopt cloud services and own no IT assets. Cloud computing have various definitions which some have been brought here. One of the reasons why cloud computing has multiple definitions is that cloud computing does not refer to a specific technology but rather to a concept comprising a set of combined technologies.

Electronic Government is a generic term for web-based services from agencies of local, state and federal governments. In e-government, the government uses information technology and particularly the Internet to support government operations, engage citizens, and provide government services. The interaction may be in the form of obtaining information, filings, or making payments and a host of other activities via the World Wide Web *(Sharma & Gupta, 2003, Sharma, 2004, Sharma 2006).* While definitions of e-government by various sources may vary widely, there is a common theme. E-government involves using information technology, and especially the Internet, to improve the delivery of government services to citizens, businesses, and other government agencies. E-government enables citizens to interact and receive services from the federal, state or local governments twenty four hours a day, seven days a week. E-government is in the early stages of development. Most governments have already taken or are taking initiatives offering government services online. However, for the true potential of e-government to be realized, government needs to restructure and transform its long entrenched business processes.

According to *Gartner*, e-government involves the use of ICTs to support government operations and provide government services *(Fraga, 2002).* However, e-government goes even further and aims to fundamentally transform the production processes in which public services are generated and delivered, thereby transforming the entire range of relationships of public bodies with citizens, businesses and other governments *(Leitner, 2003).* In the last few years, there has been much talk of mobile government or m-government. M-government refers to the use of wireless technologies like cellular/mobile phones, laptops and PDAs (Personal Digital Assistants) for offering and delivering government services. According to *World Bank* "E- Government refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions." Whereas as according to *United Nations* e-government is defined as utilizing the Internet and the world-wide-web for delivering government information and services to citizens. The *IEEE Computer Society* defined Cloud computing as: "A paradigm in which information is constantly stored in servers on the Internet and cached temporarily on clients that include desktops, entertainment centers, computers, notebooks, handhelds, etc." . It is the delivery of computing as a service rather than a product, where by shared resources, software and information are produced to computers and other devices as a metered over a network.

The Global Business Dialogue on Electronic Commerce refers Electronic government (hereafter e-Government) refers to a situation in which administrative, legislative and judicial agencies (including both central and local governments) digitize their internal and external operations and utilize networked systems efficiently to realize better quality in the provision of public services." *The Gartner Group's* suggests the continuous optimization of service delivery, constituency participation, and governance by transforming internal and external relationships through technology, the Internet and new media." The definition of the Working Group on E-government in the Developing World suggests e-government is the use of information and communication technologies (ICTs) to promote more efficient and effective government, facilitate more accessible government services, allow greater public access to information, and make government more accountable to citizens. E-government might involve delivering services via the Internet, telephone, community centers (self-service or facilitated by others), wireless devices or other communications systems.". According to *The UNESCO* e-governance is the public sector's use of information and communication technologies with the aim of improving

information and service delivery, encouraging citizen participation in the decision-making process and making government more accountable, transparent and effective. E-governance involves new styles of leadership, new ways of debating and deciding policy and investment, new ways of accessing education, new ways of listening to citizens and new ways of organizing and delivering information and services. The electronic governance is playing a vital role in delivering services to the stakeholders and brings in more efficiency and accountability within the system of delivering information and quick services to citizens, business enterprises and institutions, *Charag and Mufeed (2013).* E-governance is generally considered as a wider concept than e-government, since it can bring about a change in the way citizens relate to governments and to each other. E-governance can bring forth new concepts of citizenship, both in terms of citizen needs and responsibilities. Its objective is to engage, enable and empower the citizen." Many scientists of the National Institute of Standards and Technology (NIST) that work on cloud computing in America defined it as follows: "Cloud computing is a model for enabling convenient to access to networks and applications quickly, common set of configurable computing resources (e.g., networks, servers, storage and applications) that can work with little or interfere with the service provider to provide or be released immediately."

e - Governance is in essence, the application of Information and Communications Technology to government functioning in order to create 'Simple, Moral, Accountable, Responsive and Transparent' (SMART) governance. The revolution in Information and Communications Technology (ICT) has brought a whole new agenda for governance into the realm of possibility. E-Governance comprises decisional processes and the use of ICT for wider participation of citizens in public affairs. Citizens are participants in e-Governance and the whole system of governance depends on the final outcome of the interactions between the citizen and e- based Government interfaces. As the e-government system needs proper information and communication technology (ICT) infrastructure, and normally the government has to own, manage and maintain the system and infrastructure. This can be very costly. In addition, investment in system and infrastructure needs to be wisely decided. However, this is not an easy task as the conventional ICT infrastructure is rigid. If the system is too large, it will be under use, wasting resources. However, if the system is too small, scaling up is not straightforward. Recently, a new computing model; cloud computing, has been widely adopted, including in public administration. It has tremendous growth as it can be used by any sector without many hurdles. According to Gartner, the utilization of cloud computing will reach $250 billion by 2017. Utilization of cloud computing for e-government is growing in many countries around the world and governments have started to capitalize on the cloud. For example, in 2014 the US government was expected to spend $1.7 billion on private clouds, which will increase to $7.7 billion in 2017 (International Data Corporation). The modern electronic governance system uses the cloud infrastructure which is independent of location and platform and provides services with zero downtime. The governments all over the world are in continuous quest of developing newer ways to deliver public services more efficiently and effectively, *Charag and Mufeed (2013).*

The Cloud computing has a very different model of working from compared to conventional. In a conventional computing system, most computing resources for an organization belong to and normally reside in the organization premises and the organization incurs all cost of owning such resources, which may include investment, operation and maintenance costs. In contrast, the organisation is not required to own most of the computing resources in a cloud computing system as these resources belong to a cloud provider. The organization only utilizes the computing resources offered by the provider, which is accessible through the Internet. As the resources are paid using a pay-per-use method, the organization does not have to bear the burden of all the costs mentioned previously.

One of the main benefits of cloud computing for government discussed in the literature is cost saving for running an e-government because computing resources are outsourced to cloud providers. As a result, governmental budget on ICT expenditure can be reduced *(Wyld, 2009).* Furthermore, expenses on ICT resources can be easily calculated. This is because pay-per-use method is used to charge the utilization of resources. The government can also save money on the cost of maintenance of resources since this is shifted to the cloud provider. Another major benefit is a simpler, more flexible system and quicker scaling ability as compared to conventional computing system. The management of computing resources in the cloud is very straightforward as the resources are outsourced to a cloud provider. In addition, the resource is ready to be used anytime and the needed capacity can be fulfilled upon request. Also, maintenance of computing resource is the job of the cloud provider and maintenance are normally done without service interruptions as the provider can shift its computing resources easily. The simplicity of cloud computing can make government focus more on its core business, serving the citizens *(Kelton Research)*. Next, expanding or shrinking ICT resources used in running a cloud-based e-government or public administration system can be done easily and quickly as the government need only to contact the cloud provider to do it. In addition, expansion of resources is much cheaper than the conventional computing system because no additional investment cost is needed. Support for government agility is another benefit of cloud computing utilization in government. Unlike the conventional computing system, computing

resources can be gathered in minutes and portable applications (services) can be developed quickly, and can be accessed anytime and anywhere using various devices. Information and Communication Technology (ICT) together with internet is making it possible to share vast amount of knowledge and information and is driving all round socio-economic changes and growth, *Charag and Mufeed (2013).*

The next benefit worth mentioning is reliability and availability. E-government services are generally accessible through the Internet regardless time and place. To ensure reliability and availability, the conventional computing system use redundant data centres. However, this is costly. A cloud computing service provider will definitely ensure high reliability and availability of its services as this is the source of its credibility. In addition disaster recovery, recovery of data loss during a disaster such as flood and fire, can easily be supported as cloud computing is supported by myriads of servers co-located in different locations. ICT keeps changing and new technology quickly replaced the obsolete one. Therefore, update to a newer technology is necessary in order to avoid poor performance in services. However, migrating to a new system with the latest technology or system upgrade is certainly not simple. Frequently, migration requires a shutdown, followed by a testing of the new system, which may create interruption of services. In cloud computing, migration to new technology is seamless and the interruption of services not necessary *(Hashemi, Monfaredi, and Masdari, 2013).* Cloud computing service providers normally keep their system up to date and the system update will have no effect on services. Cloud-based e-government systems will enjoy a seamless migration to new technology without extra cost.

Although many benefits are found in utilizing cloud computing in public administration or in e-government system, there are still many issues and challenges that need to be addressed. The first and obvious issue is the government losing control of data. This can be a big issue as trust can be the main key for adoption of cloud computing by public organizations. Since data are stored in the cloud, can the government trust cloud providers to protect data on the same level as if the of protection if the data is stored locally? Trust cannot be established easily, especially if there is no third party that can guarantee the security and privacy of data or information stored in the cloud. One possible solution to this problem is to establish an assurance by an independent party through certification or accreditation (such as ISO 27001 or SAS 70).

The second issue, which is highly associated with the first one, is security and privacy. This issue is also applied to the conventional computing system; however, since government and its data are separated and the data are accessed through an open network such as the Internet, the issue highly affects the confidence in using cloud computing *(Armbrust et al. and Zhu, 2011).* Security problems may happen in servers within the cloud, the client machines, and the network. *Subashini and Kavitha* classify security issues on cloud computing into four categories: security related to a third party resource, application security, data transmission security, and data storage security. There are additional issues on security. Cloud computing security issues are discussed by *Subashini and Kavitha*, *2009.* Another potential issue is performance, especially for data intensive computation as client machines are geographically distanced, which could be a thousand miles away from the cloud. Also Internet speed will definitely affect the performance. The possibility of data transfer bottlenecks as the intensity of data processing and transfer as well as the number of users accessing the data increase may complicate the performance and costs as data transfer consumes communication bandwidth *(Armbrust et al., and Kim et al.)* Assuming that the provider can scale-up its infrastructure, the customer only incurs the additional cost for the scale-up. However, if the provider is not in a position to fulfill the demand as the scale-up may be beyond expectation, things become complicated.

2. CREATING POSSIBILITIES BY ELECTRONIC GOVERNANCE & CLOUD COMPUTING

Governments now realize that e-Governance is more than just floating government web sites on the Internet. The definition for the purposes of this paper is to characterize e- Governance as a process to make simpler and improve democratic government and business aspects of governance through an application of electronic means in the interaction between citizens and government and businesses and government and also in internal government operations *(Backus, 2001).* E-Governance represents a significant opportunity to move forward with qualitative, cost effective government services and a better relationship between citizens and government *(Fang, 2002).*

The potential benefits of using ICT in government include, but go beyond, efficiency and effectiveness. By making available interactive access to and use of information by people who use government services e-Governance initiatives hope to empower citizens *(Gage, 2002)* and improve relationships between governments and citizens by helping build new spaces for citizens to participate in their overall development *(Gasco, 2003).* Online systems have not only helped achieve efficiency gains by cutting overall time to process applications but also made transactions more traceable, transparent and easier to access *(Bhatnagar, 2003).* However, if e-Governance initiatives are to curb corruption then the

design of such systems needs an appropriate conceptual framework and needs to be understood by policy makers and public managers *(Cisar, 2003; Mahmood, 2004; Tangkitvanich, 2003*). Within the principal-agent framework there are three dimensions of institutional structure as the most critical in bearing on opportunities for corruption: (1) the monopoly power of officials; (2) degree of discretion that officials are permitted to exercise; and (3) degree to which there are systems of accountability and transparency in an institution *(Klitgaard, 1988, 1995; Rose-Ackerman, 1978, 1994).* E-Governance, reformers aspire to reinforce the connection between public officials and communities thereby leading to a stronger, more accountable and inclusive democracy. The success of e-Governance requires fundamental changes in how government works and how people view the provisions through which government is helping them. Governments need to undertake e-Governance initiatives actively, strategically and resourcefully *(Moon 2002).* The e – Governance perform following transformations in the system of governance and information sharing:

INTERNAL - This refers to the use of ICT to improve the efficiency and effectiveness of internal functions and processes of government by interrelating different departments and agencies. Thus, information can flow much faster and more easily among different governmental departments, reducing processing time, paperwork bottlenecks, and eliminating long, bureaucratic and inefficient approval procedures. Internetworking among different governmental departments improves internal efficiency by enabling time reductions for using, storing and collecting data, reduction of labor costs and information handling costs, as well as the speed and accuracy of task processing.

EXTERNAL - ICT opens up new possibilities for governments to be more transparent to citizens and businesses, giving access to a greater range of information collected and generated by government. ICT creates also opportunities for partnership and collaboration among different governmental institutions *(Allen et al., 2001)*. Electronic government blurs the lines not only within government agencies, but also between government and those that touch it *(Tapscott, 1996).*

RELATIONAL - ICT adoption may enable fundamental changes in the relationships between the citizens and the state, and between nation states, with implications for the democratic process and structures of government. Vertical and horizontal integration of services can be realized, enabling the integration of information and services from various government agencies to help citizens and other stakeholders get seamless services. *Fountain (2001)* uses the concept of the "virtual state" that is a governmental entity organized with "virtual agencies, cross agencies, public- private networks whose structures and capacity depend on the Internet and web".

The combination of electronic governance with cloud computing system has created new options of delivering services to end users in a cost effective manner and with robust system of deliverance. The cloud computing addresses an old problem built into traditional data centers: Their silo-like architectures, where too often applications, data, and storage devices can't interact. This has produced "you-can't-get-there from- here" IT environments burdened by wasted resources and complex management hassles that often lead to risky administrative lapses. According to a Cisco forecast, data center complexity will increase fivefold between 2010 and 2015. The result: IT infrastructures that is too unwieldy, too expensive, and too slow at a time when agility and responsiveness are essential for success. The electronic governance is playing a vital role in delivering services to the stakeholders and bringing in more efficiency and accountability within the system of delivering information and quick services to citizen, business enterprises and institutions, *Charag and Mufeed (2013).*

3. ROLE OF ICT AND CLOUD COMPUTING IN DELIVERING PROMISES OF GOOD GOVERNANCE:

The emergence of Information and Communications Technology (ICT) has provided means for faster and better communication, efficient storage, retrieval and processing of data and exchange and utilization of information to its users, be they individuals, groups, businesses, organizations or governments. What had begun as a faster, more accurate and simpler means of word-processing quickly lent itself to being used as a tool for processing and tabulating data as an aid in decision making. With growing computerization and increasing internet connectivity, this process has presently reached a stage where more and more users are motivated to modifying their ways of doing things in order to leverage the advantages provided by ICT *(NeGP)*. In other words, this has led to 'business process re-engineering'. So far as governments are concerned, the coming together of computerization and internet connectivity/web-enablement in association with process re-engineering, promises faster and better processing of information leading to speedier and qualitatively better decision making, greater reach and accountability, better utilization of resources and overall good governance. In the case of citizens, it holds the promise of enhanced access to information and government agencies, efficient service delivery and transparency in dealings and interactions with government. With the increasing awareness

among citizens about their rights and the resultant increase in expectations from the government to perform and deliver, the whole paradigm of governance has changed. Government, today, is expected to be transparent in its dealings, accountable for its activities and faster in its responses. This has made the use of ICT imperative in any agenda drawn towards achieving good governance. It has also led to the realization that such technologies could be used to achieve a wide range of objectives and lead to faster and more equitable development with a wider reach. In its Fourth Report entitled 'Ethics in Governance', the Commission had clearly stated that the tools of modern technology such as Information and Communications Technology (ICT) should be used to transform the relationship of the government with its constituents, citizens and businesses, and also between its own agencies. e-Governance is the logical next step in the use of ICT in systems of governance in order to ensure wider participation and deeper involvement of citizens, institutions, civil society groups and the private sector in the decision making process of governance.

There are five broad categories of goals commonly pursued for e-government. E-Government is a means to accomplish these broader social goals, goals that move beyond mere efficiency of government processes to that of overall reform and development.

a. **CREATING A BETTER BUSINESS ENVIRONMENT**. Technology is a proven catalyst in increasing productivity and economic growth, especially in rural and underserved communities. The use of ICT in government and the establishment of an e-government infrastructure help create a business-friendly environment by streamlining the interaction and improving the interface between government and business, especially SMEs. By cutting out redundancies in procedures and emphasizing immediate and efficient delivery of services, e-government creates the conditions that attract investors/ investment. This goal is highly dependent on the country, its industry strengths and its global competitive advantage. Once identified, these should be incorporated in the country's e-government strategy, with agencies, the bureaucracy and public services aligned towards promoting these sectors. E-procurement, for example, can open new markets to local businesses by opening up the government procurement process, making it more competitive and fair.

b. **CUSTOMERS ONLINE, NOT IN LINE.** This refers to the effective delivery of public goods and services to citizens accompanied by quick response government with minimal direct intervention by a public official.

c. **STRENGTHENING GOOD GOVERNANCE AND BROADENING PUBLIC PARTICIPATION**. Promoting transparency and accountability in government through the proliferation of ICT in management and operations also opens opportunities for citizens to be more actively involved in the policy- and decision-making processes of government. As a major tool in building a tradition of transparency and good governance, e-government can advance the fight against corruption. However, e-government by itself will not put an end to corruption. It must be accompanied by other mechanisms to be fully effective. At the same time, e-government facilitates the swift delivery of complete information. The broad dissemination of information helps empower citizens and facilitate informed decision-making. The transparency of information will not only further democracy but also instill a sense of accountability among government leaders and compel effective governance.

d. **IMPROVING THE PRODUCTIVITY AND EFFICIENCY OF GOVERNMENT AGENCIES.** Reengineering processes and procedures to cut red tape, facilitate delivery of services, increase productivity of the bureaucracy, and increase savings are benefits inherent in e-government. More specifically, e-government can help:
   - Increase government staff productivity, reduce overhead from fewer offices and less paper management, improve capacity for planning management by government (using better tools and improving access to critical information, for example, in city planning through the use of a GIS), and increase revenue as businesses and citizens actually apply for more licenses, due to the fact that the process is much easier and less corrupt.
   - Induce cost savings in the medium to the long term. In the short term, however, staffing and costs tend to increase as government must offer multiple delivery platforms (both the traditional and e-government) during the initial transition.
   - Streamline the operations of government. Most government processes have evolved over many years, and usually involve many steps, tasks, and activities. Streamlining government processes through ICT eliminates redundant procedures and helps to reduce red tape.

e. **IMPROVING THE QUALITY OF LIFE FOR DISADVANTAGED COMMUNITIES.** ICT makes it possible for government to reach marginalized groups/communities and improve their quality of life. This means empowering them through their participation in the political process, as well as delivering much-needed public goods and services. Ultimately, the goal of e-government is to enhance the interaction between three main actors in

society—government, citizens and business—in order to stimulate political, social and economic progress in the country.

In the end, e-Governance is about reform in governance, facilitated by the creative use of Information and Communications Technology. The electronic governance has evolved into a better functioning e-Government where each service is delivered through an information super highway. The e-Governance has stringent role in the development of cross platform mode of interaction and transaction of information, *Charag and Mufeed (2013).* It is expected that this would lead to:

1. **BETTER ACCESS TO INFORMATION AND QUALITY SERVICES FOR CITIZENS:** ICT would make available timely and reliable information on various aspects of governance. In the initial phase, information would be made available with respect to simple aspects of governance such as forms, laws, rules, procedures etc later extending to detailed information including reports (including performance reports), public database, decision making processes etc. As regards services, there would be an immediate impact in terms of savings in time, effort and money, resulting from online and one-point accessibility of public services backed up by automation of back end processes. The ultimate objective of e-Governance is to reach out to citizens by adopting a life-cycle approach i.e. providing public services to citizens which would be required right from birth to death. As with the advent of new technologies and systems becoming more flexible and dynamic in working and processing of information, *Charag and Mufeed (2013).*
2. **SIMPLICITY, EFFICIENCY AND ACCOUNTABILITY IN THE GOVERNMENT:** Application of ICT to governance combined with detailed business process reengineering would lead to simplification of complicated processes, weeding out of redundant processes, simplification in structures and changes in statutes and regulations. The end result would be simplification of the functioning of government, enhanced decision making abilities and increased efficiency across government – all contributing to an overall environment of a more accountable government machinery. This, in turn, would result in enhanced productivity and efficiency in all sectors.
3. **EXPANDED REACH OF GOVERNANCE**: Rapid growth of communications technology and its adoption in governance would help in bringing government machinery to the doorsteps of the citizens. Expansion of telephone network, rapid strides in mobile telephony, spread of internet and strengthening of other communications infrastructure would facilitate delivery of a large number of services provided by the government. This enhancement of the reach of government – both spatial and demographic – would also enable better participation of citizens in the process of governance.

4. CHALLENGES TO E – GOVERNANCE & CLOUD COMPUTING

Like any government infrastructure project, e- governance can be done in phases and the costs of implementation will depend on current infrastructure availability, supplier and user capabilities, and mode of service delivery (whether through the internet or through telephone hotlines and one-stop shops). The electronic governance is one of the most important platforms, where interaction and action takes place in the modern times of today, *Charag and Mufeed (2013)*.The more complicated and sophisticated the kind of services the government wants to offer, the more expensive it is. Governments should focus on small, self-financing or outsourced projects. Because e-government projects must be financially sustainable, there must be a revenue/ cost-reduction model in place from the beginning. Smaller projects with a clear revenue-generation strategy and minimal initial investment are the most likely to be sustainable over the long term. For instance, Web sites are one of the easiest and cheapest ways to achieve high impact e-government with a minimum of investment. e-Government projects are, more often than not, long-term endeavors, requiring large capital infusion in software, hardware, infrastructure and training. A viable financing plan should not only pay for the immediate needs to jumpstart e-government; it must also consider its long-term financing options for the sustainability of the project. The gap between citizens and government is bridged by the creation of electronic interface, which has the ability to provide information at a required time and in a required manner, *Charag and Mufeed (2013).*There are various business models for funding e-government projects, and the private sector plays a critical role in these. Under partnership arrangements, the private sector builds, finances and operates public infrastructure such as roads and airports, recovering costs through user charges. Various financing schemes exist—from soft and development assistance loans from donor/multilateral aid agencies to partnerships and outsourcing deals with private third party vendors under special financing schemes (e.g., the Build-Operate-Transfer or BOT scheme) that can minimize the initial cost to government. Under BOT, the private sector designs, finances, builds, and operates the facility over the life of the contract.

At the end of this period, ownership reverts to the government. A variation of this is the Build-Transfer-Operate (BTO) model, under which title transfers to the government when construction is completed. Finally, with Build-Own-Operate (BOO) arrangements, the private sector retains permanent ownership and operates the facility on contract. Government can encourage private sector investment by complementing and supporting private sector efforts rather than duplicating them. The key to e-government is to improve citizen access to service delivery, not further expand the role of government. Government should not attempt to create products and services where public-private partnerships or private service providers can adequately provide these products and services more efficiently and effectively. In Indian case the governments both –the Union and the States must make earnest efforts to complete the daunting, but formidable task of quicker and effective e - government programs by:

- serious efforts would be required to mobilize resources for this arduous job. One way to deal with the situation could be that governments enter into arrangements for leasing of computers. This would reduce initial heavy capital investments;
- establishing complete connectivity between various ministries and departments so that transfer of files and papers could be done through internet thereby choosing efficacious speed as an alternative to manual labour. To make this really effective, there is a need to make databases of various departments compatible with one another. Thus, interoperability of e-governance projects is of vital importance if the citizens are to feel the benefit of IT in day to day life;
- supplying information to the public in a language that they understand and are comfortable with, and generally, it is the local language. As, technology is available by which transliteration from English into other languages can be made. Therefore, the problem is manageable provided there is enough motivation to do this onerous task; and
- changing the mindset of the government employees who are used to working only in the manual mode. This is a big task and needs patience and careful planning.

The electronic governance in itself faces many challenges and therefore hinders implementation and deriving benefits from the purposeful ICT based system. Similarly the cloud computing challenges have always been there. Companies are increasingly aware of the business value that cloud computing brings and are taking steps towards transition to the cloud. A smooth transition entails a thorough understanding of the benefits as well as challenges involved. Like any new technology, the adoption of cloud computing is not free from issues. Some of the most important challenges according to *Jack Rosenblum, 2012* are as follows:

1. **SECURITY AND PRIVACY**
   The main challenge to cloud computing is how it addresses the security and privacy concerns of businesses thinking of adopting it. The fact that the valuable enterprise data will reside outside the corporate firewall raises serious concerns. Hacking and various attacks to cloud infrastructure would affect multiple clients even if only one site is attacked. These risks can be mitigated by using security applications, encrypted file systems, data loss software, and buying security hardware to track unusual behavior across servers.
2. **COST**
   It is difficult to assess the costs involved due to the on-demand nature of the services. Budgeting and assessment of the cost will be very difficult unless the provider has some good and comparable benchmarks to offer. The service-level agreements (SLAs) of the provider are not adequate to guarantee the availability and scalability. Businesses will be reluctant to switch to cloud without a strong service quality guarantee.
3. **INTEROPERABILITY AND PORTABILITY**
   Businesses should have the leverage of migrating in and out of the cloud and switching providers whenever they want, and there should be no lock-in period. Cloud computing services should have the capability to integrate smoothly with the on-premise IT.
4. **RELIABILITY AND AVAILABILITY**
   Cloud providers still lack round-the-clock service; this results in frequent outages. It is important to monitor the service being provided using internal or third-party tools. It is vital to have plans to supervise usage, SLAs, performance, robustness, and business dependency of these services.
5. **PERFORMANCE AND BANDWIDTH COST**
   Businesses can save money on hardware but they have to spend more for the bandwidth. This can be a low cost for smaller applications but can be significantly high for the data-intensive applications. Delivering intensive and

complex data over the network requires sufficient bandwidth. Because of this, many businesses are waiting for a reduced cost before switching to the cloud.

6. All these challenges should not be considered as road blocks in the pursuit of cloud computing. It is rather important to give serious consideration to these issues and the possible ways out before adopting the technology

5. CONCLUSION

The developments in the institutions of governance has determined the apparatus of governance and created a reasonable difference between administration and governance. The newer aspects like governance for sustainable development as a functioning standard has taken greater relevance. The failing aspect of efforts and the inability of nations to sustain growth in most parts of the world, and thereof has limited achievements of economic progress, poverty reduction and social progress, which have primarily highlighted the importance of governance for sustainable development, *Charag and Mufeed (2016).* The electronic governance has evolved over time from basic automation of processes to full-fledged system of delivering wider services, information and throughputs to citizen class, businesses organizations and government institutions. The application of information technology tools in public sector is envisioned to facilitate social development and economic growth. The areas of electronic governance has been classified into three main categories i.e. e-government as internet service delivery, e-government as the use of ICT within the government, e-government as the capacity to transform public administration by mean of information and communication technology. Interest in e-Governance is growing with the increasing use of information communication technology (ICT) by governments to improve quality of governance and service delivery mechanism, *Charag and Mufeed (2013).* However, e-government has been explained from two prominent perspectives i.e. interaction and evolution. The interaction part is managed by technology based interfaces whereas evolution part is related to cloud computing which is newer aspect of providing integrated service deliverance across diverse geographical locations. The research on cloud computing and its integration in developing common and versatile platform requires more focus and thereby giving priority to security and cost.

CONFLICT OF INTERESTS

None.

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