Open Access
Full Length Article

ORIGINAL ARTICLE

The Progress of E-Government across the Globe: The Role of Technology as a Pushing Factor

Yassir Mahmood[1], Faisal Rizwan[2], Sultan-ullah[3]

[1]Ph.D Scholar (Technology Management), Faculty of Management Sciences, International Islamic University Islamabad
[2]Assistant Professor, Faculty of Management Sciences, International Islamic University Islamabad
[3]Assistant Professor, Department of Information Technology, University of Haripur

ABSTRACT

E-Government (E-Govt) presents a tremendous impetus to progress forward by delivering the government's services in an effective and convenient manner. However, the development of E-Govt is not without challenges. This slow progress is highly influenced by the existence of technological and non-technological issues. This study considers the technological sophistication as an important pushing factor for the advancement of E-Govt development in a country and studied their relationship over the period of 7 years (2010-2016). Countries' E-Govt data was obtained from the United Nation's E-Govt annual surveys while data for technological sophistication was obtained from Global Information Technology Reports published by World Economic Forum. Using panel data of 7 years, the analysis was performed for 148 countries by applying Random Effect Model. Findings suggest that Technological Sophistication acted as a major constituent for E-Govt development. Additionally, in general countries positions have improved regarding E-Govt during the selected time period.

Keywords: E-Govt, Information and Communication Technologies, Technological Sophistication, Country, United Nations

Author`s Contribution
[1]Manuscirpt writing, Data analysis, Data collection, interpretation
[2,3]Conception, synthesis, Interpretation, and discussion

Address of Correspondence
Yassir Mahmood
Email: yasir.mahmood@iiu.edu.pk

Article info.
Received: December 11, 2017
Accepted: June 19, 2018
Published: June 30, 2018

Cite this article: *Mahmood Y, Rizwan F, Ullah S. The Progress of E-Government Across the Globe: The Role of Technology as a Pushing Factor. J. Inf. commun. technol. robot. appl.2018; 9(1):89-97.*

Funding Source: *Nil*
Conflict of Interest: *Nil*

INTRODUCTION

Rapid technological advancements, especially in Information and Communication Technologies (ICTs), have produced vital impacts on the Governments (Govts), businesses and individual's lifestyles. ICTs are not only improving the business processes but also help Govt in providing effective services to citizens. By utilizing ICTs, Govts across the globe are delivering public services to their citizens in an efficient and effective manner. Such use of ICTs to provide Governmental information and public services have been referred to as E-Government (E-Govt) in the research literature. In its simplest form, in E-Govt the Government's agencies (whether local, state or federal) use web-based technologies particularly the internet to support Govt operations (Palvia & Sharma, 2007). Additionally, it is the provision of different online services through governmental websites.

E-Govt presents a tremendous impetus to progress forward by delivering the government's services in an effective and convenient manner (Bhatnagar, 2009). It helps Govts in achieving greater efficiency by eliminating bottlenecks and red tapes in the service delivery process (Mutula, 2008). Unlike the traditional approach, an individual can avail any government service 24/7 without interruption. The 24/7 implies that a citizen can transact with Govt 24 hours a day 7 days a week from any location. On the contrary, the traditional Motor and Brick approach by Govt involves manual filing, wastage of papers and other resources and above all accessing, storing and managing of such data is too difficult (Mutula, 2008). E-Govt controls corruption which leads to improving the transparency and accountability (Ojha et al., 2011; Bertot et al., 2010; Meijer, 2007).

However, the development of E-Govt is not without challenges. For successful implementation and delivery of e-services, it requires more planned and coordinated efforts of the governments. Governments around the world have made massive financial and political and technological commitments to establish E-Govt (Accenture, 2004; Ifinedo, 2012), nevertheless, only a few nations have developed it to the optimum level while many are still in the early stages of E-Govt. This slow progress is highly influenced by the existence of technological and non-technological issues. Based on this, much research has explored the factors that increase the chances of E-Govt success (Tan et al., 2010; Das et al., 2011; Krishnan & Teo, 2011b). A meta-analysis conducted by Rana et al., (2012) highlighted the most frequently used different demographic (age, educational level, gender), behavioral (trust, attitude, satisfaction, behavioral intention, perceived behavioral control, self-efficacy) and organizational (social influence, perceived benefits, leadership triad, etc.) factors, which influence E-Govt adoption, diffusion and usage. According to Rana et al., (2012), most of the E-Govt research focused behavioral aspects of employees and citizens. They also argued that much of the prior research has considered independent and dependent constructs at the individual level, only a few of them were in the context of the organization. In a similar vein, the literature review undertaken by (Nkohkwo & Islam, 2013) highlighted a number of challenges (like Infrastructural, political, human, financial, organizational and socio-economic) that come underway during the development of E-Govt system. This study based on the directions of meta-analyses and the limitations of E-Govt literature considered the technological sophistication as an important pushing factor for the advancement of E-Govt development in a country. That is Technological sophistication provide an appropriate platform which acts a key element through which E-Govt system can be designed and implemented. This missing link in the extant literature acted the prime motivation to conduct this research. Focusing this gap the questions which this research posed are:

RQ1: *Has a country position changed with respect to E-Govt Developments from the year 2010 to 2016?*

RQ2: *What role technological sophistication plays in promoting E-Govt Developments in a country?*

The flow of this research is as follow: the next section includes a brief literature review, the research design is given followed by results and discussion part, while in last section limitations of research are incorporated.

LITERATURE REVIEW

In earlier literature, E-Govt has been defined as"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" (World Bank 2015). The concept of E-Govt is new and is still without any universally agreed definition (Al-Sebie & Irani, 2005). Various research scholars and international agencies have defined and explained the concept of E-Govt differently (Fang 2002; UNDESA 2014). Some defined it as the accessibility of Government to deliver efficient services. A few defined it as a goal in itself (Yildz, 2007), others view it as a tool for reforms and Government process re-engineering. While the definitions may vary widely, nevertheless, among all definitions some

common notions exist like: using sophisticated technologies especially ITs and the Internet, delivering effective and efficient services, access to information, improving democracy, accountability and transparency, citizen's participation and better governance (Oyomono, 2004).

Technology by any mean act as the lifeblood for the development of E-Govt. For the purpose of this research technology characteristics mean the ICTs utilized in government agencies at the country-level. In this way, the progress of E-Govt is too hard without the technological platform provided by ICTs (UNDESA, 2016). To this point, we assert that technological sophistication in any country plays a vital role in E-Govt diffusion.

- **Technological Sophistication and E-Government**

Weil & Rosen (1995) stated: "Technological Sophistication (TS) is assessed by the function of the availability and utilization of technology" (p. 4). For example, people face a hazardous situation or feel discomfort in countries where technology receives scant attention due to being unfamiliar to masses on a large scale. On the other hand, elsewhere in the world, technology is widely embraced by the people due to the wide variety of technologies available in the common market. With the advanced level of technologies especially ICTs, people tend to transfer their matters to an online system for quick and accurate dealing. This technological advancement also enabled Govts to take the right steps to move their transactions to the internet to obtain a wide range of publicity besides gaining a firm fast hold in the comity of nations. In the course of time, it is believed that this change in the composition of interactions would justify further development in E-Govt (Singh, 2007).

Technological development and its availability is the lifeblood to ensure the speedy growth of the E-Govt and the extent of Internet usage to sustain an unshakable existence in all odds. The more we harness our living standards, working out the use of internet and a free approach to using the web, the more our masses would gain a dominant position resulting in an improved government-citizen relationship (Tolbert et al., 2008). Similarly, the greater the TS, the greater the penetration of E-Govt is expected. In other words, the quality of the infrastructure also constrains the nature of the applications that can be deployed for E-Govt. For example, the bandwidth available to household Internet users limits the use of rich media (sound and video clips) on E-Govt Web sites. Like-way, the more effective and vibrant is the TS, the more cohesive and healthy would be the cause of E-Govt. And E-Govt is expected to show greater penetration only when supported by the vociferous application of technology in vogue. For instance, a weaker bandwidth may disallow citizens to use rich media (sound and video clips) on E-Govt portals.

According to the well-known neoclassical and new growth theories that elucidated technological progress and creativity is called second to none in any way (Lucas, 1988; Romer, 1990). In other words, nothing would be remarkable with annals of human life without "Renaissance" that happened to appear through technology in the world today (Lucas, 1988). Extending this argument in the context of E-Govt, it is thereafter rightly argued that TS can contribute a great deal of strength to E-Govt system as E-Govt development entirely depends upon how to utilize the technology infrastructure to deliver the public services online (Siau & Long, 2009). So also Srivastava & Teo (2010) emphasized that a Govt and its agencies can do their duties well pertaining to routine activities of citizens and businesses when ICTs are widely available. Warkentin et al., (2002) quoted that E-Govt is characterized by the comprehensive use of the latest technologies such as ICTs which accelerate E-Govt development. Grant & Chau (2005) accentuated that E-Govt like e-business would be impossible without a sound technological platform. And to highlight E-Govt more, Moon et al., (2005) contended that the more technologically advanced (i.e. a higher level of TS) a country is, the more likely would be the country to gain a solid ground to boost up its E-Govt projects and agenda. Hence it is predicted that:

H_1: Technological Sophistication is positively associated with E-Govt development in a country.

RESEARCH METHODOLOGY

This study considered the quantitative research method because it suited to answer the posed research questions and testing hypothesis based on positivist research philosophy. As positivism is the form of research that assumes reality is objectively given and is described

by measurable properties which are independent of the researcher. Also, it includes formulating the hypothesis that portrays the subject matter in relation to independent and dependent variables and the relationships between them.

As country formed the unit of analysis in this research, so we required data from a large number of countries aggregated at the national level. Collecting large-scale primary data for this research such as (opinion and expert surveys, questionnaire, and interview) from several countries is constrained by resources and time. Hence, data were obtained from reputable international organizations. Some meta-analyses (Dwivedi et al., 2011; Avison et al., 2008) recognized secondary data analysis as one of the important research methods. Data Collected by international agencies are more comprehensive and likely to be more reliable than self-reported data collected by individual governments (Nyirenda & Cropf, 2010; Ngafeeson & Mehri, 2013). International organizations have offices in most of the countries and can collect data with relative ease. Further, these global reports are updated regularly (usually annually), creating valuable historical data sets. Following the above-discussed suggestions, this research utilized two major data sources World Economic Forum (WEF) and the United Nations (UN). These secondary data sources have been used in past studies by many researchers (Kottemann, 2009; Larosiliere& Carter 2013; Krishnan & Teo 2012).

The nature of the data used in this study offered two important advantages - replicability and generalizability which are greatly endorsed by Das et al., (2011). Replicability was established by the use of publicly and widely used data in E-Govt research (Krishnan & Teo, 2012). Generalizability was assured by including the maximum number of countries across the globe (Kiecolt &Nathan, 1985).

The study's analyses were based on data collected over time, i.e. a 7-year data period (2010-2016). Thus, this research used a panel data to capture the developments of E-Govt over time. The advantage in panel data is that greater variations with respect to changes in variables are captured; a single year study (cross-sectional analysis) may not reflect such changes.

The United Nations Department of Economic and Social Affairs (UNDESA) conduct E-Govt surveys in order to measure countries achievements regarding important E-Govt areas like online services. The online presence of a country is measured using the Online Services Index (OSI). The UN E-Govt dataset contains quantitative measures rather than perceptual measures. These are counts of features and services as provided through the government websites. Data for 193 countries are available for E-Govt development. So far the UNDESA survey provides a comprehensive and complete assessment of E-Govt development across the globe (Krishnan & Teo, 2012). It covers almost all of the UN member states for online presence (Ojo et al., 2007; Singh et al., 2007).

The measure for Technological Sophistication required the creation of a new index and is composed of one component: "Latest Technology Availability". This index reflects the broad mix of technologies available within a country to enhance its productivity, with specific emphasis on its capacity to fully leverage ICTs (World Economic Forum 2016). The data ("In your country, to what extent are the latest technologies available? 1 = not available at all; 7 = widely available") was taken from the Global Information Technology Reports published by World Economic Forum.

In addition to the theoretically driven independent variable, Gross Domestic Product (GDP) per capita has also been added to the research model as a control variable. The most common measure for economic prosperity is GDP per capita. For any country, GDP is considered to influence macro-socioeconomic phenomena like technology development. It is then important to assert that countries which have ample financial resources may develop higher levels of E-Govt systems. Earlier literature has also identified that lack of such resources mitigates the progress of E-Govt (Kottemann, 2009; Das et al., 2011). In order to control for the possible effects of financial resources GDP per capita is used as a control variable in the model of current research. As across the countries GDP per capita is not normally distributed so it transformed by taking the natural log of it. Multiple data analyses techniques were used to address the research questions and testing hypothesis. In data analyses: descriptive statistics, scatterplot and regression analyses were undertaken.

DATA ANALYSIS AND RESULTS

The data sources for countries were from two distinct databases i.e., UN and WEF. The number of countries varies across each database. The UN enlisted 193 countries for the OSI while WEF recorded the TS for almost 148 countries. The UN list has a higher number of countries. In order to extract a common country list, this research benchmarked UN country's list and matched it with WEF's list. In doing so a list of 148 common countries was formed. Apart from checking E-Govt status across the globe and descriptive statistics the same 148 common countries list was used for final data analyses (see annex A).

Descriptive statistics of different variables were carried out for the selected time period i.e., 2010 to 2016. The details are drawn in Table 1 which demonstrates that over the selected time period the mean value of E-Govt improved from 0.28 to 0.46 while the mean value slightly dropped from 5.03 to 4.77 in case of TS. This depicts that across the whole globe E-Govt has improved while TS has further worsened. During the selected period E-Govt percentage change is high (mean value 1.48) but percentage change in TS is low (mean value -0.048). Samples analyses given interesting results. In the case of E-Govt, a consistent sample of 190 countries' (out of 193) data was available from the year 2010 to 2016. On the other hand during the selected time period, out of 148 countries, the sample for TS varied from 141 (the year 2012) to 135 (the year 2010 and 2016).

Table 1: Descriptive Statistics

Variable	N	Mean	St.Dev	Min	Max
TS in 2010	135	5.03	0.88	3.34	6.84
TS in 2012	141	4.98	0.89	3.2	6.7
TS in 2014	140	4.83	0.92	2.7	6.6
TS in 2016	135	4.77	0.94	2.7	6.6
% Change in TS	125	-0.05	0.07	-0.28	0.14
E-Govt 2010	190	0.28	0.21	0.00	1.00
E-Govt 2012	190	0.43	0.23	0.00	1.00
E-Govt 2014	190	0.39	0.26	0.00	1.00
E-Govt 2016	190	0.46	0.27	0.00	1.00
% Change E-Govt	190	1.40	3.16	-0.63	35.23

To identify whether a country's position regarding E-Govt has changed from 2010 to 2016 a scatterplot was designed. Further, a 45º line is added to the scatterplot which acted as a dividing line between the countries that improved in the area of E-Govt and those that failed to show any progress in the selected time period. Figure 1 depicts that the Central African Republic, Eritrea, and Djibouti are few of those countries that have the lowest E-Govt scores for the year 2010 and shown no progress till the year 2016. Lesotho, Congo Chad, and Cameroon are among those nations that have good scores in the year 2010 but their E-Govt progress declined in the year 2016. The scatterplot further shows that the USA and South Korea have top positions as these countries have the highest scores in E-Govt areas. Interestingly both countries lie beneath 45º line which states that although both countries are market leaders regarding E-Govt functions over the period from 2010 to 2016 their scores dropped slightly. On the other hand UK, Australia and Singapore are such countries who lie way above the 45º line showing recent significant improvements in their E-Govt scores. In the general majority of the countries are above the 45º line which proves that worldwide, countries have improved in the fields of E-Govt. This answered the first research question that we have posted earlier that "Has a country position changed with respect to E-Govt Developments from the year 2010 to 2016?". The conclusive evidence from the scatterplot depicted that large-scale countries have improved in the areas of E-Govt during the time period of 2010 to 2016.

Before testing the hypothesis it was important to conduct some diagnostic test upon the data. In order to check heteroskedasticity across the data, this study carried out Breusch-Pagan / Cook-Weisberg test. The test result depicted that the p-value of chi2 is less than 0.05 (i.e. Prob > chi2 = 0.0108) so the problem of heteroskedasticity exists. In order to control this problem, this study used robust standard errors (see table3) in OLS regression.

Since among researchers there is no common regression model for analyses of technological effects on E-Govt as a substantial theoretical framework is sparse in earlier literature. Although the Random effects model (REM) has been frequently applied for the analyses of panel data. The other option available for such analyses

is the Fixed Effects Model (FEM). The research at hand avoided the FE techniques as the sample (number of countries) is large, in this case, too many dummies of countries may be created. Adding to this note, Judge et al.,(1985) accentuated that REM is best suited than FEM in cases where the sample (n) is large and the number of years (t) is small, assuming other assumptions of RE hold. The suggested arguments by researchers (Judge et al.,1985; Elbahnasawy, 2014) encouraged us to apply REM to check the effects of technological sophistication on E-Govt. Further, to decide about the appropriate model between REM or FEM the current research applied Hausman test. The test assumes that FE should be used if the p-value is significant (p<0.05) and if not REM should be applied. The test when applied (see table 2) yielded insignificant p-value (0.28) so REM is used in current research (table3). Therefore, the following RE model is estimated:

E-Govt i, t = β0+ TSi, t + LnGDPi, t + year effect + ϵ i, t

TS stands for Technological Sophistication, LnGDP stands for Natural Log of Gross Domestic Product

Table 2 Hausman Test

Variable	Coefficients		Difference (b - B)	S.E
	Fixed (b)	Random (B)		
Tech	0.03	0.07	-0.04	0.015
LnGDP	0.02	0.08	-0.05	0.04
chi2(5) 6.29 Prob> chi20.28				

Table 3 has the results of both OLS regression and RE model. Model 1 in table 3 represents the OLS results. While model 2 in table 3drawn the RE estimates. The REM results show that TS has significant positive effects on E-Govt (β= 0.07, p= 0.000). GDP per capita has also significant positive effects on E-Govt. The explanatory power of model 2 is good (i.e., R2 0.63). Furthermore, model 2 overall fitness is also good (Prob > chi2 0.000). The year effect is controlled in both models. As TS has significant positive effects on E-Govt, on the basis of these results we have to accept our hypothesis that "Technological Sophistication is positively associated with E-Govt development in a country".

Table 3: Regression Analyses

Model-1					**Model-2**			
OLS					**RE**			
Variable	**B**	**Rob SE**	**T**	***p* value**	**B**	**SE**	**z**	***p* value**
TS	.09	.01	7.52	0.000	.07	.01	4.93	0.000
LnGDP	.08	.01	11.15	0.000	.08	.01	8.12	0.000
R20.64 F(5, 541) 235.25 Prob > F 0.0000					R20.63 Wald chi2(5) 695.99 Prob > chi20.0000			
Total panel observations 547 Year effects yes					Total panel observations 547 Year effects yes			
Dependent Variable E-Govt, TS stands for Technological Sophistication, LnGDP stands for a log of Gross Domestic Product Year effect is controlled in both models								

CONCLUSTION

As this was postulated in the start of the study that E-Govt rendered better solutions in providing governmental services to citizens and businesses of a certain nation. It is thus not surprising that various international agencies and developed nations have encouraged the implementation of E-Govt systems to accelerate the societal developments. In this regard, the current research stressed that the availability of technologies in a country may gear up the E-Govt initiatives. This research empirically investigated the impact of Technological Sophistication on E-Govt. Both the theoretical underpinning and statistical analysis suggested that the technology acted as the major constituent needed for the E-Govt developments. Further

as far progress in the E-Govt scores are concerned, on general countries worldwide have enormously improved their positions regarding E-Govt services.

Recommendations:

Several recommendations can be made from the outcomes of this study. The policymakers of countries when establishing E-Govt system should focus on the availability of the latest technologies. As in the absence of such, any country may not achieve the optimum level of E-Govt system.

Limitations and Future Research Directions

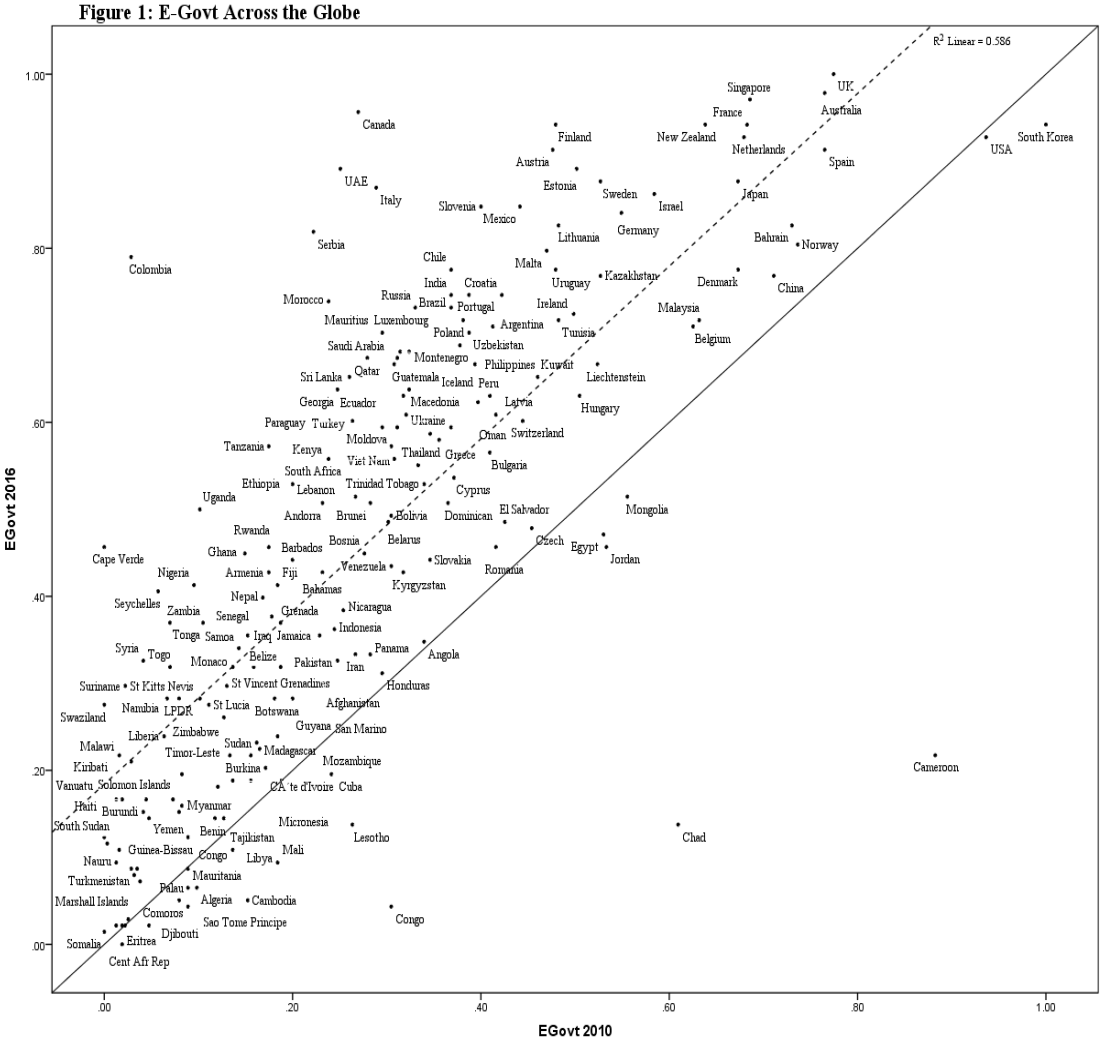
Like any research, this research has also some limitations. This study used a unique measure for the Technological Sophistication, any future research may further use this variable with the same measure to validate the current study findings. Further, only one variable is studied as the dependent variable in this study, future research can identify other areas of Govts that can take benefit from the availability of sophisticated technologies.

REFERENCES

1. Accenture. (2004). E-Government Leadership: High Performance, Maximum Value. Retrieved December 13th, 2016, from http://www.accenture.com
2. Al-Sebie, M.,& Irani, Z. (2005). Technical and organizational challenges facing transactional e-government systems: An empirical study", International Journal of Electronic Government, 2(3), 247-276.
3. Avison, D., Dwivedi, Y. K., Fitzgerald, G.,& Powell, P. (2008). The beginnings of a new era: Time to reflect on 17 years of the ISJ. Information Systems Journal,18(1), 5–21.
4. Bhatnagar, S. (2009). Unlocking E-Government Potential Concepts, Cases and Practical Insights. New Delhi, India: Sage Publications.
5. Bertot, J. C., Jaeger, P. T.,& Grimes, J. M. (2010).Using ICTs to create a culture of transparency: E-Government and social media as openness and anti-corruption tools for societies. Government Information Quarterly, 27, 264-271.
6. Das, A., Singh, H.,& Joseph, D. (2011). A Longitudinal Study of E-Government Maturity. PACIS 2011 Proceedings. Paper 52.
7. Dwivedi, Y. K., Venkitachalam, K., Sharif, A. M., Al-Karaghouli, W.,& Weerakkody, V. (2011). Research Trends in Knowledge Management: Analyzing the Past and Predicting the Future. Information Systems Management, 28(1), 43-56.
8. Elbahnasawy, N. G. 2014. E-Government, Internet Adoption, and Corruption: An Empirical Investigation. World Development, 57, 114-126.
9. Fang, Z. (2002). E-Government in the digital era: concept, practice, and development. International Journal of the Computer, the Internet and Management, 10 (2), 1-22.
10. Grant, G.,& Chau, D. (2005).Developing a generic framework for E-Government. Journal of Global Information Management, 13 (1), 1-30.
11. Ifinedo, P. (2012). Drivers of e-government Maturity in two developing regions: focus on Latin America and sub-Saharan Africa. Journal of Information Systems and Technology Management, 9 (1), 05-22.
12. Judge, G. G., Hill, R. C., Griffiths, W. E., Lutkepohl, H., & Lee, T. C. (1985). Introduction to the theory and practice of econometrics (2nd ed.). New York: John Wiley & Sons.
13. Kiecolt, K. J.,& Nathan, L. E. (1985).Secondary analysis of survey data. Beverly Hills, CA: Sage Publication.
14. Kottemann, J. E. (2009).The effects of technological, institutional and fiscal readiness on the extent of nations' e-government.Electronic Government, An International Journal, 6 (3), 327-341.
15. Krishnan, S.,& Teo, T. (2011b).E-Government, E-Business, and National Environmental Performance. PACIS 2011 Proceedings, Paper 100.
16. Krishnan, S.,& Teo, T. S. H. (2012).Moderating Effects of Governance on Information Infrastructure and E-Government Development. Journal of the American Society for Information Science and Technology, 63 (10), 1929-1946.
17. Larosiliere, G.,& Carter, L. (2013). An Empirical Study and the Determinants Of E-Government Maturity: A Fit-Viability Perspective. ECIS 2013 Proceedings.Paper 248, Utrecht, Netherlands.Utrecht University.
18. Lucas, R. E. (1988). On the mechanics of economic development. Journal of Monetary Economics, 22 (1), 3-42.
19. Meijer, A. (2007). Digitization and Political Accountability in the USA and the Netherlands: Convergence or Reproduction of Differences? The Electronic Journal of e-Government,5 (2), 213 - 224,
20. Moon, M. J., Welch, E. W.,& Wong, W. (2005). What Drives Global E-Governance? An Exploratory Study at a Macro level. In Proceedings of the 38th Hawaii International Conference on System Sciences.Big Island, USA.
21. Mutula, M. S. (2008). Comparison of sub-Saharan Africa's e-government status with developed and transitional nations.Information Management & Computer Security, 16 (3), 235-250.
22. Ngafeeson, M. N.,& Mehri, M. I. (2013). E-Government Diffusion: Evidence from the Last Decade. International Journal of Electronic Government Research, 9 (2), 1-18.
23. Nkohkwo, Q. N., and Islam, M. S. (2013). Challenges to the Successful Implementation of e-Government Initiatives in Sub-Saharan Africa: A Literature Review" Electronic Journal of e-Government,11 (2), 253-253),
24. Nyirenda, J. C.,& Cropf, R. A. (2010). The Prospects for E-Government and E-Governance in Sub-saharan Africa: A Case Study of Zambia. International Journal of Electronic Government Research, 6 (1), 23-45.
25. Ojha, A., Sahu, G. P. &Gupta, M. P. (2011). Citizens' adoption of pay-to-use E-Government services: An empirical study. International Journal of Electronic Government Research, 7 (2), 15-35.
26. Ojo, A., Janowski, T.,& Estevez, E. (2007). Determining progress towards e-Government – What are the core indicators? Report No. 360, United Nations University, International Institute of Software Technology, Macao.
27. Oyomno, G. (2004). Towards a framework for assessing the maturity of government capabilities for e-government. The Southern African Journal of Information and Communication, 4, 77.
28. Palvia, S.C.,& Sharma, S.K. (2007). E-government and e-governance: definitions/domain framework and status around the

world. Paper presented at International Conference on E-Governance, Hyderabad, December 28-30. 1-15.
29. Rana, N P., Williams, M. D., & Dwivedi, Y. K., (2012). E-Government Adoption Research: A Meta-Analysis Of Findings. ECIS 2012 Proceedings.
30. Romer, P. M. (1990).Endogenous technological change. Journal of Political Economy, 98 (5), 71-102.
31. Siau, K.,& Long, Y. (2009).Factors impacting E-Government development. Journal of Computer Information Systems, 50 (1), 98-107.
32. Singh, H., Das, A.,& Joseph, D. (2007). Country-Level Determinants of E-Government Maturity, Communications of the Association for Information Systems, 40, 632-648.
33. Srivastava, S. C.,& Teo, T. S. H. (2010).E-Government, e-business, and national economic performance. Communications of the Association for Information Systems, 26 (1), 267-286.
34. Tan, C. W., Benbasat, I., &Cenfetelli, R. (2010). Understanding the Antecedents and Consequences of E-Government Service Quality: Transactional Frequency as a Moderator of Citizens' Quality Perceptions. ECIS 2010 Proceedings, Paper 115.
35. Tolbert, C. J., Mossberger, K.,& McNeal, R. (2008).Institutions, Policy Innovation, and E-Government in the American States. Public Administration Review, 68 (3), 549-563.
36. United Nations Department of Economic and Social Affairs (2014). E-Government for the Future We Want. New York, Printed at the United Nations.
37. United Nations Department of Economic and Social Affairs (2016).E-Government in Support of Sustainable Development. New York, Printed at the United Nations.
38. Warkentin, M., Gefen, D., Pavlou, P.A.,& Rose, G. M. (2002).Encouraging citizen adoption of e-government by building trust. Electronic Markets, 12 (3), 157-162.
39. Weil, M. M.,& Rosen, L. D. (1995). The Psychological Impact of Technology from a Global Perspective: A Study of Technological Sophistication and Technophobia inUniversity Students From Twenty-Three Countries. Computers in Human Behavior, 11 (1), 95-133.
40. World Bank. (2015). Asia: Urban Transport and ICT CapacityBuilding. Washington, DC: World Bank.
41. World Economic Forum. (2016). Global Information Technology Report 2016: Innovating in the Digital Economy. Geneva: World Economic Forum.
42. Yildiz, M. (2007).E-government research: reviewing the literature, limitations, and ways forward.Government Information Quarterly, 24 (3), 646-665.

Figure 1: E-Govt Across the Globe



Appendix A

Albania	Colombia	Iran	Montenegro	Slovenia
Algeria	Costa Rica	Ireland	Morocco	South Africa
Angola	Croatia	Israel	Mozambique	South Korea
Argentina	Cyprus	Italy	Myanmar	Spain
Armenia	Czech	Jamaica	Namibia	Sri Lanka
Australia	Dem Rep Congo	Japan	Nepal	Suriname
Austria	Denmark	Jordan	Netherlands	Swaziland
Azerbaijan	Dominican Rep	Kazakhstan	New Zealand	Sweden
Bahrain	Ecuador	Kenya	Nicaragua	Switzerland
Bangladesh	Egypt	Kuwait	Nigeria	Syria
Barbados	El Salvador	Kyrgyzstan	Norway	Tajikistan
Belgium	Estonia	Latvia	Oman	Tanzania
Benin	Ethiopia	Lebanon	Pakistan	Thailand
Bhutan	Finland	Lesotho	Panama	Timor-Leste
Bolivia	France	Liberia	Paraguay	Trinidad-Tobago
Bosnia Herzegovina	Gabon	Libya	Peru	Tunisia
Botswana	Gambia	Lithuania	Philippines	Turkey
Brazil	Georgia	LPDR	Poland	UAE
Brunei Darussalam	Germany	Luxembourg	Portugal	Uganda
Bulgaria	Ghana	Macedonia	Qatar	UK
Burkina Faso	Greece	Madagascar	Romania	Ukraine
Burundi	Guatemala	Malawi	Russia	Uruguay
CÃ´te d'Ivoire	Guinea	Malaysia	Rwanda	USA
Cambodia	Guyana	Mali	Saudi Arabia	Venezuela
Cameroon	Haiti	Malta	Senegal	Viet Nam
Canada	Honduras	Mauritania	Serbia	Yemen
Cape Verde	Hungary	Mauritius	Seychelles	Zambia
Chad	Iceland	Mexico	Sierra Leone	Zimbabwe
Chile	India	Moldova	Singapore	
China	Indonesia	Mongolia	Slovakia	