Determinants of e-Government Readiness: A Literature Review

Nametsegang Boemo-Mokhawa, Dundar F. Kocaoglu
Dept. of Engineering and Technology Management, Portland State University, Portland, OR - USA

***Abstract*--In all countries, some services are being provided and delivered through the use of information and communication technologies (ICT). Over the past decade, the use of electronic services (e-services) has proved to be efficient and effective in the private sectors providing much needed financial viability and business growth. Governments around the world have since joined the bandwagon, and empirical research provides evidence that countries that have mature electronic government (e-government) systems enjoy improved efficiency and effectiveness in the public service provision and delivery. There are many measurement instruments that measure a country's readiness for use of ICT or e-government, and these measurements are commonly used for comparative purposes at regional, international and global levels. The instruments measure the capacity of a country to use ICT in the provision and delivery of services. This paper reviews these instruments and explores literature on existing methodologies on determining a country's readiness to adopt and use information and communication technologies in public services. The objective of these reviews is to identify critical determinants of a country's electronic readiness (e-readiness).**

I. INTRODUCTION

Governments use e-government as a vehicle to drive national digital economy, which promises better human and sustainable development, and building of more democratic societies [1,2,3,4,5]. To have a flourishing digital economy, a country has to have an economic and institutional environment that provides incentives for the effective use of existing and new knowledge and flourishing of entrepreneurship; an educated and skilled population that can create, share, and use knowledge; and national information and communication technologies (ICT) that can facilitate the effective communication, dissemination, and processing of information [1,2,3,4,5]. Digital economy reflects an environment where businesses and citizens acquire, create, disseminate, and use knowledge more effectively for greater economic and social development [2,4]. Therefore, businesses and citizens can achieve that when information is readily available and accessible, however, they also need to have the skills to distill the knowledge and transform it into values. Different countries have varying capacities to achieve these transformations. As countries continue to invest more, with different priorities and depth, in digital economy and against a backdrop of varying capabilities, there is apparent need to periodically evaluate their respective readiness to absorb the new knowledge that emanates from such processes and transform it into socio-economic benefits [1]. Such evaluation calls for better understanding of determinants that make countries to be better prepared for effective use of e-government, to be e-ready.

Since the turn of this century, governments world-wide have been investing in ways that would reduce cost, improve efficiency and effectiveness, and improve their relationships with their stakeholders (employees, citizens and businesses) through digitization and re-engineering of their work processes and service deliveries. Governments continue to invest in ICT in order to improve their relationships with national stakeholders by enhancing their readiness to digital economy. These national stakeholders use knowledge more effectively for greater economic and social development [1]. Generally the use of ICT to enhance government's processes and service delivery is called electronic government, or simply e-government. There are many variants of e-government definitions depending on contexts such as a specific emphasis on one stakeholder relationship than on others but generally the core definition is as given by World Economic Forum [1].

> *"E-government is the use of information and communication technologies (ICT) in enhancing public service in order to improve government relationships with its employees, citizens, businesses or its internal structures to ensure efficiency and effectiveness within government or with other governments. These relationships are generally referred to as Government-to-Employees (G2E), Government-to-Citizens (G2C), Government to Businesses (G2B), and Government to Government (G2G)."*

UNDESA gives fundamentally the same definition, but provides a better elaboration on critical national areas that usually resonates with political development agenda for a country [6]:

> *"ICT-enabled public service delivery is defined as electronic government (e-government). E-government promises to deliver, amongst others, public services that create citizen and business satisfaction and confidence; improve transparency, accountability, democracy and reduced levels of corruption; achieve economic and social outcome such as in health, education, industry development, welfare, agriculture, etc. The use of ICT and its application by the government for the provision of information and public services to the people. The aim of e-government therefore is to provide efficient government management of information to the citizen; better service delivery to citizens; and empowerment of the people through access to information and participation in public policy decision-making."*

II. LITERATURE REVIEW

According to the 2013 Global Information Technology Report [1], companies that use ICT to optimize their production function and liberalize resources toward other productive investments normally experience efficiency gains. ICT are increasingly recognized as a platform for increased economic growth and new sources of high-value-added jobs [1,]. Such benefits did not escape national, state, and local governments. According to United Nation's 2012 e-Government Readiness Index, the top ten countries are South Korea, Netherlands, United Kingdom, Denmark, United States, France, Sweden, Norway, Finland and Singapore [7]. National use of ICT has proven to be an excellent vehicle of commerce in countries with high Gross Domestic Product (GDP) per capita. Empirical studies show that GDP per capita correlates highly with use of e-government [8]. That is, rich countries tend to be technology savvy and show high intensity of ICT usage [9,10].

Numerous studies have been presented in the literature on the connections between ICTs and social and economic development. Heeks, in one of his iGovernment Working Paper Series cautions that while e-Government can contribute positively to development the majority of development-specific e-government projects fail either totally or partially citing the problem of mismatch between project development and on-the-ground reality (known as 'design-reality gaps') [11]. According to Heeks, the analysis of e-government projects indicates that seven dimensions, summarized by the ITPOSMO acronym, are necessary and sufficient to provide an understanding of the design-reality gaps: Information; Technology; Processes; Objectives and values; Staffing and skills; Management systems and structures; and Other resources such as time and money. The larger this design-reality gap, the greater the risk of e-government failure, therefore the gap must be reduced to increase the probability of project's success. Almarabeh and AbuAli assert that in spite of apparent e-government projects' failures noted globally there is still hope to reverse the trend if better knowledge is gained about the causes and appropriate steps taken to find remedial solutions, both correctively and proactively [12]. E-Government handbooks for developing provide potential challenges and remedies to e-government implementations such as insufficiencies in Infrastructure development; Law and public policy; e-Literacy; Privacy; Security; Transparency; Interoperability; Records management; Education and marketing and issues of digital Divide.

Effective use of e-government, presents a promise to state organizations in improving efficiencies and effectiveness in the public sector, business communities and the citizens in general. Achieving these goals could go a long way in improving the national economic and social development [1,7,8,9,10].

A. Determinants for e-Government Readiness

Several studies including the United Nations Surveys (2003, 2004, 2005, 2008, 2010 and 2012); International Telecommunication Union E-Government Development Index (EGDI); and the Economist Intelligence-Digital Economy have explored the determinants for e-government readiness. These studies use models to evaluate and benchmark countries' capacity to use information and communication technologies in pursuit of the promises that ICT have come to represent the factors that determine successful development of e-government as are summarized below [7,13,14,15,16,17,18,19,20].

1) United Nations Surveys and E-Government Development Index (EGDI)

The main driver of the United Nation's e-Government Development Index is the basic requirement for human and social development. That is, the United Nation believes that effective use e-government is a vehicle for human and social development. The E-government Development Index, therefore, measures the capacity and willingness of the public sector to deploy ICT for improving knowledge and information in the service of the citizen [7,13,14,15,16,17,18]. A country's capacity entails the financial, infrastructural, human capital, regulatory, administrative and stable governance of a country. The willingness, is represents the political commitment of a country's leadership to democratically serve its citizens.

The survey reflects a level of development of a country in terms of its readiness to adopt and adapt to information and communication technologies given its technological infrastructure and the extent of its human capital. The EGDI emphasizes the value of inclusiveness, and urges for widespread adoption by citizens to assure achievement of desired benefits.

This framework, notwithstanding other government relationships with national stakeholders such businesses and employees, the EGDI is conceptualized within the context of government serving its citizens, and therefore assumes the aim of e-government as providing efficient government management of information; better service delivery; and empowerment of the citizens through access to information and participation in public policy decision-making. In a broad sense, the EGDI takes citizens to include the general public and individual businesses, and it assumes participatory democracy and citizen empowerment as democratic rights.

EGDI is a composite index comprising the Web measure Index, the Telecommunication Infrastructure Index and the Human Capital index.

a) Web Measure Index

- Each year the Survey captures the year-on-year changes in the E-Government Development of countries as evidenced by their website assessments.
- The Survey assesses the same number of functionally same/similar sites in each country to ensure consistency

- Survey adheres to the same set of core features and services assessed in the past. This allows for consistency in benchmarking and measurement of states' e-government progress over time
- EGDI does not attempt to assess the services qualitatively. In this endeavor it is different from many other surveys, which combine access to, and delivery of, services/products and quality in one indicator.
- The purely quantitative nature of the web measure assessment assures minimizing of the bias inherent in combining qualitative assessments with quantitative measures.
- The EGDI and the web measure index are broad relative indices, they are indicative of the diffusion of e-government in the countries.

The online presence is assumed to evolve from Stage I to Stage IV as follows:

- Emerging presence - Stage I: e-government presents information which is limited and basic. The e-government online presence comprises a web page and/or an official website; links to ministries/departments of education, health, social welfare, labor and finance may/may not exist.
- Enhanced presence - Stage II: the online services of the government enter the interactive mode with services to enhance convenience of the consumer such as downloadable forms for tax payment application for license renewal
- Transactional presence - Stage III: allows two-way interactions between the citizen and his/her government. It includes options for paying taxes; applying for ID cards, birth certificates/passports, license renewals and other similar C2G interactions by allowing him/her to submit these online 24/7.
- Networked presence - Stage IV: represents the most sophisticated level in the online e-government initiatives. It can be characterized by an integration of Government-to-Government (G2G), Government-to-Citizen (G2C) and Citizen-to-Government (C2G), and reverse interactions. The government encourages participatory deliberative decision making and is willing and able to involve the society in a two-way open dialogue

b) Telecommunication Infrastructure Index

The telecommunication infrastructure index is a composite weighted average index of six primary indices based on basic infrastructural indicators, which define a country's ICT infrastructure capacity and uses the following indicators:

- PC's/1000 persons
- Internet users/1000 persons
- Telephone Lines/1000 persons
- Online population
- Mobile phones/1000 persons
- TV's/1000 persons.

Data for used to construct the infrastructure index of the EGDI was taken primarily from the UN International Telecommunication Union (ITU) and the UN Statistics Division, supplemented by the World Bank.

c) Human Capital Index

With a higher level of education and skill citizens are likely to have greater access to ICTs and likely to embrace modern ICT quickly and more efficiently. In turn, a citizen skilled in the use of emerging technologies is more likely to adapt it toward greater gains of economic and social productivity. A key benefit of ICT is its ability to diffuse learning, information and knowledge more speedily, more widely and more deeply than ever before.

The data for the human capital index relies on the United Nation Development Program's Education Index which is a composite of the following indicators:

- Adult literacy rate (two third weight)
- Combined primary, secondary and tertiary gross enrolment ratio (one third weight).

TABLE 1: E-GOVERNMENT DEVELOPMENT INDEX-BASED INDICATORS

United E-Government Development Index (EGDI)		
Web Measure sub-index	Infrastructure sub-index	Human Capital sub-index
Emerging presence	PC's/1000 persons	Adult literacy
Enhanced presence	Internet users/1000 persons	
Transactional presence	Telephone Lines/1000 persons	Combined primary, sec and tertiary Education
Networked presence	Online population	
	Mobile phones/1000 persons	
	TV's/1000 persons	

2) International Telecommunication Union (ITU): Measuring the Information Society 2013.

This 2013 report identifies key ICT developments and tracks the cost and affordability of ICT services. Its core feature is the ICT Development Index (IDI), which ranks countries' performance with regard to ICT infrastructure and uptake [19]. The report aims to provide an objective international performance evaluation based on quantitative indicators and benchmarks.

The main objectives of the IDI are to measure

- the level and evolution over time of ICT developments in countries and relative to other countries;
- progress in ICT development in both developed and developing countries: the index should be global and reflect changes taking place in countries at different levels of ICT development
- the digital divide, that is, differences between countries with different levels of ICT development
- The development potential of ICTs or the extent to which countries can make use of ICTs to enhance growth and development, based on available capabilities and skills.

The ITU recognizes that ICTs can be a development enabler, if applied and used appropriately, and it is critical to countries that are moving toward information or knowledge societies. Development of ICT is, therefore, central to the IDI's conceptual framework. The ICT development process, and a country's transformation to becoming an information society, can be depicted using the three-stage model that comprises the following:

- Stage 1: ICT readiness - reflecting the level of networked infrastructure and access to ICTs
- Stage 2: ICT intensity - reflecting the level of use of ICTs in the society
- Stage 3: ICT impact - reflecting the result/outcome of efficient and effective ICT use.

The IDI aims to capture the evolution of the information society as it goes through its different stages of development. The IDI has three sub-indices (Access Sub-Index; Use Sub-Index; and Skills Sub-Index) and each sub-index has several indicators.

a) Access Sub-Index

Access Sub-Index captures ICT readiness, and includes five infrastructure and access indicators (Weight 40% and the weights for the indicators are equal)

- Fixed-telephone subscriptions
- Mobile-cellular telephone subscriptions
- International internet bandwidth (b/s) per internet user
- Percentage of households with computers
- Percentage of households with internet access

b) Use Sub-Index

The Use Sub-Index captures ICT intensity, and includes three ICT intensity and usage indicators (Weight 40% and the weights for the indicators are equal)

- individuals using the Internet
- fixed (wired)-broadband subscriptions
- wireless-broadband subscriptions

c) Skills Sub-Index

The Skills Sub-Index captures ICT capability or skills as indispensable input indicators. In the absence of data on ICT skills, it includes three proxy indicators and is therefore given less weight in the computation of the IDI compared with the other two sub-indices (Weight 20% and the weights for the three indicators are equal)

- adult literacy
- gross secondary enrolment
- gross tertiary enrolment

The choice of indicators included in the sub-indices reflects the corresponding stage of transformation to the information society. Therefore, the indicators in each sub-index may change over time to reflect technological developments related to ICTs, and as more and better data become available. For example, what was considered basic infrastructure in the past – such as fixed-telephone lines – is fast becoming less relevant in the light of increasing fixed-mobile substitution. Similarly, broadband is currently considered an advanced technology, characterizing intense Internet use, and is therefore included in stage 2 (as an indicator in the use sub-index). However, in the future it may come to be seen as essential and be moved to stage 1 (as an indicator in the access sub-index), while another; new technology may appear in Stage 2.

3) Economist's Digital Economy Ranking 2013

Digital Economy Ranking is the current e-government evaluation index, since 2010, for The Economist, which previously used the index called "e-readiness rankings". The move is meant to reflect the increasing influence of ICT in economic and social progress [20].

TABLE 2: ITU – MEASURING THE INFORMATION SOCIETY

International Telecommunication Union – Measuring the information Society		
Access sub-Index	Use Sub-index	Skills Sub-index
Fixed-telephone subscriptions	Individuals using the Internet	Adult literacy
Mobile-cellular telephone subscription	Fixed (wired)-broadband subscriptions	Gross secondary enrolment
International internet bandwidth (b/s) per internet user	Wireless-broadband subscriptions	Gross tertiary enrolment
Percentage of households with computers		
Percentage of households with internet access		

There are six categories which are weighted into the total index as follows:
- Connectivity and technology infrastructure (20%)
- Business environment (15%)
- Social and cultural environment (15%)
- Legal environment (10%)
- Government policy and vision (15%)
- Consumer and business adoption (25%)

Each category or criterion is measured by a number of indicators or dimensions. For instance, the category "Connectivity and technology infrastructure" is structured by the following sub-criteria: Broadband penetration, broadband quality, broadband affordability, mobile-phone penetration, mobile quality, internet user penetration, international internet bandwidth, and internet security.

The digital economy rankings assess the quality of a country's ICT infrastructure and the ability of its consumers, businesses and governments to use ICT to their benefit. When a country uses ICT to conduct more of its activities, the economy can become more transparent and efficient. The ranking allows governments to gauge the success of their technology initiatives against those of other countries. It also provides companies that wish to invest or trade internationally with an overview of the world's most promising business locations from an ICT perspective.

Over 100 separate criteria, both qualitative and quantitative, are evaluated for each country by the Economist Intelligence Unit's team of analysts. These criteria are scored on their relative presence in a country's economic, political or social landscape. The categories, and the individual criteria within them, are weighted according to the evaluators' assumptions of their relative importance in fostering a country's information economy.

The index covers 70 countries and is updated every 2 years. The economist's evaluation, although being well supported and covering e-Government multi-dimensionally uses some sub-indices that are difficult to evaluate due to the large number of potentially relevant factors that affect them. These indices, that is, e-Government strategy, level of censorship, ease of registering new business, and effectiveness of traditional legal framework, are implicitly assessed within the survey and their scores are not provided. It is also not clear how the criteria and categories' weights were derived.

The digital economy rankings model consists of over 100 separate quantitative and qualitative criteria. Major data sources include the Economist Intelligence Unit, Pyramid Research, the World Bank, the United Nations and the World Intellectual Property Organization, among others.

The six categories and individual criteria, and their weights in the model, are described below.

a) Connectivity and Technology Infrastructure

Weight in overall score: 20%

- Connectivity measures the extent to which individuals and businesses can access the Internet and mobile networks, and do so affordably with an assurance of quality, reliability and security.
- Penetration of each market's mobile-phone subscriptions, overall Internet users and broadband Internet accounts are ranked as a percentage of the total population.
- The affordability of the lowest-priced broadband subscription, measured as a percentage of an average household's median income, is used as the overall measure of digital service affordability.
- Broadband quality is measured as the extent to which fiber-optic access figures in a country's total broadband connections.
- Likewise, mobile quality is based on the extent of 3G and 4G mobile subscriptions as a share of total mobile subscriptions.
- The penetration of secure Internet servers in the population is used as a reference indicator of the extent to which reliable digital transactions can be made in each market.
- International Internet bandwidth is an indicator of the ability of a country's networks to carry the burgeoning volume of data traffic originating from within and outside of its borders.

Category criteria and weights: Broadband penetration (15%); broadband quality (10%); broadband affordability (10%); mobile-phone penetration (15%); mobile quality (10%); Internet user penetration (15%); international Internet bandwidth (10%); Internet security (15%).

b) Business environment

Weight in overall score: 15%

In evaluating the general business climate, the Economist Intelligence Unit screens many sub-indicators to provide a comprehensive and forward view of each country's attractiveness as a trading economy and as a destination for business investment from 2009 to 2013. The criteria cover such factors as the strength of the economy, political stability, taxation, competition policy, the labor market, and openness to trade and investment.

Category criteria and weights: Overall political environment; macroeconomic environment; market opportunities; policy towards private enterprise; foreign investment policy; foreign trade and exchange regimes; tax regime; financing; the labor market. (All nine criteria are weighted equally.)

c) Social and cultural environment

Weight in overall score: 15%

Category description: Education is a precondition to being able to utilize Internet services, but this category also considers a population's web-literacy (experience using the Internet and receptivity to it), and the technical skills of the workforce. These technical skills are evaluated by both

evidence of the familiarity of a country's population with information technology (IT) applications and the extent to which its schools and governments provide the education infrastructure to engender them. Also included is an assessment of entrepreneurship, evaluates how well the society fosters creative business activity that can lead to the creation of intellectual property, new products and industries.

Category criteria and weights: Educational level (measured by school life expectancy, gross enrolment in education and enrolment in tertiary education); Internet literacy; degree of entrepreneurship; technical skills of workforce; degree of innovation (measured by the generation of patents and trademarks, as well as R&D spending). (All five criteria are weighted equally.)

d) Legal environment

Weight in overall score: 10%

Category description: E-business development depends on both a country's overall legal framework and specific laws governing Internet use. This category reflects those legal frameworks that have a direct impact on the use of digital technology to inform, communicate and transact business. Governments need to be forward-thinking in their creation of legal frameworks to cater to Internet commerce. These include legislative approaches to such issues as cybercrime, data privacy and spam, but just as importantly countries need to create a legal atmosphere that works to minimize abuses and non-competitive behavior, including provisions covering consumer protection and legal jurisdiction.

E-ready countries are those that have little culture of bureaucracy to interfere with the registration of a new business or restrict access to information. The commitment of the country to implementing digital identity cards is also considered as a means of determining how a country's population can access digital commerce and digital government services.

Category criteria and weights: Effectiveness of traditional legal framework (30%); laws covering the Internet (25%); level of censorship (10%); ease of registering a new business (25%); electronic ID (10%)

e) Government policy and vision

Weight in overall score: 15%

E-ready governments supply their stakeholders, citizens and organizations, with a clear roadmap for the adoption of technology, and they lead by example in their use of technology to create efficiencies. The Economist Intelligence Unit assesses the activities of governments in this area, and their ability to lead their countries towards a digital future. Are governments employing technology to operate and provide public services with less resource investment? Are they spending on ICT to stimulate similar spending in the greater economy? Are "savings" translated into service gains for citizens? Can more people interact with, and receive information from, the government regardless of their own access to technology? This category also analyses, in each country, the availability of digital channels to individuals and businesses for accessing public services, and to citizens for obtaining government information about civic issues and engaging in consultation with government officials on matters involving the political process.

Category criteria and weights: Government spend on ICT as a proportion of GDP (5%); digital development strategy (25%); e-government strategy (20%); online procurement (5%); availability of online public services for citizens (15%) and businesses (15%); e-participation (15%, based on the UN e-participation index).

TABLE 3: ECONOMIST INTELLIGENCE – DIGITAL ECONOMY

Connectivity and Technology infrastructure	Business Environment	Social and Cultural Environment	Legal Environment	Gov. Policy And Vision	Consumer and Business Adoption
Broadband penetration (15%);	Overall political environment	Educational level (gross enrolment in secondary and tertiary)	Effectiveness of traditional legal framework (30%)	Government spend on ICT as a proportion of GDP (5%)	Consumer spending on ICT per head (15%)
Broadband quality (10%);	macroeconomic environment	Internet literacy	Laws covering the Internet (25%)	Digital development strategy (25%)	Level of e-business development (10%)
Broadband affordability (10%)	market opportunities	degree of entrepreneurship	Level of censorship (10%)	E-government strategy (20%)	use of Internet by consumers (25%, range and intensity of purchasing activity);
Mobile-phone penetration (15%);	policy towards private enterprise	technical skills of workforce	Ease of registering a new business (25%)	Online procurement (5%)	use of online public services by citizens (25
Mobile quality (10%);	foreign investment policy	Degree of innovation (number of patents; trademarks; R&D spending).	Electronic ID (10%)	Availability of online public services for citizens (15%)	Businesses (25%)
Internet user penetration (15%);	foreign trade and exchange regimes			Availability of online businesses (15%);	
International Internet bandwidth (10%);	Tax regime; equally			Availability of e-participation (15%, UN e-participation index).	
Internet security (15%).	financing				
	The labor market.				

f) Consumer and business adoption

Weight in overall score: 25%

If connectivity, societal adoption, and legal and policy environments are necessary enabling platforms for a digital economy, then the actual utilization of digital channels by people and companies is a measure of successful implementation. The Economist Intelligence Unit looks at the amount that businesses and consumers spend on accessing ICT services, the extent and range of Internet features used by individuals, their online purchasing activity, and the extent to which individuals and businesses use the online public services that have been made available.

Category criteria and weights: Consumer spending on ICT per head (15%); level of e-business development (10%); use of Internet by consumers (25%, assessing both the range of Internet features used by individuals and their online purchasing activity); use of online public services by citizens (25%) and businesses (25%).

III. CONCLUSION

This study has explored literature from various reports such as United Nations Surveys (2003, 2004, 2005, 2008, 2010, 2012 and the E-Government Development Index (EGDI)); the International Telecommunication Union (ITU)'s Measuring the Information Society; and the Economist's Digital Economy. These reports, and others not mentioned here, together make the body of knowledge on e-government. E-government as a phenomenon is still at infancy and the knowledge about it will continue to grow. Countries continue to invest in e-government development initiatives. These investments outflows are neither steady nor consistent across countries. As countries plan future investments, it is critical to reflect on present and past investments and use strategies to achieve national objectives. Global competition and need for international collaboration require a country to evaluate its position in the digital economy in order to anticipate opportunities and improve social and economic environment. E-readiness evaluation is therefore critical to assure successful development. Factors that influence e-government development are many and varied but apart from EGDI having an indicator that shows a proportion of population owning a TV set and the subjective judgments used in the Web Measure the final list summary table would look like Table 3 above for a summary checklist of critical determinants considered pertinent for successful e-government development.

The Economist Intelligence - Digital Economy has a more comprehensive coverage than United Nations Surveys and E-Government Development Index (EGDI) and International Telecommunication Union (ITU) - Measuring the Information Society 2013. The former also covers moderating national environment necessary to aid successful development, and in many ways provides a richer list of determinants than others. However, it should be noted that the economist still uses ITU core indicators and in many instances uses indicators from the United Nations agencies.

REFERENCES

[1] World Economic Forum (2013). The Global Information Technology Report 2013: Growth and Jobs in a Hyper-connected World. Accessed on March 24, 2014 @ http://www3.weforum.org/docs/WEF_GITR_Report_2013.pdf.

[2] United Nations (2006). Compendium of Innovative E-Government Practice. ST/ESA/PAD/SER.E/96, Volume II

[3] United Nations (2007). Compendium of ICT Applications on Electronic Government: Mobile Applications. ST/ESA/PAD/SER.E/113, Volume 1.

[4] United Nations (2009). Compendium of Innovative E-Government Practice. ST/ESA/PAD/SER.E/114, Volume III.

[5] United Nations (2010). Volume 2: Mobile Applications on Human Security and Business development. ST/ESA/PAD/SER.E/132, Volume 2.

[6] United Nations (2005). Global E-government Readiness Report 2005. From E-government to E-inclusion. UNPAN/2005/14. Department of Economic and Social Affairs. Division for Public Administration and Development Management (UNDESA). Accessed February 24, 2014 @ http://unpan1.un.org/intradoc/groups/public/documents/un/unpan021888.pdf.

[7] United Nations (2012). E-government Survey 2012. E-Government for the People. Opened January 15, 2014 @ http://www.unpan.org/egovkb/global_reports/08report.htm.

[8] Fernández-i-Marín, Xavier (2011) "The Impact of e-Government Promotion in Europe: Internet Dependence and Critical Mass," Policy & Internet: Vol. 3: Iss. 4, Article 2. Opened on February 2014 @ http://xavier-fim.net/doc/xfim-impact_egovernment_promotion_europe_internet_dependence_critical_mass-policy_internet-2011.pdf.

[9] OECD (2009), "General government expenditure", in Government at a Glance 2009, OECD Publishing. http://dx.doi.org/10.1787/9789264061651-8-en.

[10] United Nations (2005). Education, Scientific and Cultural Organization -UNESCO Report 2005. Towards Knowledge Societies: Knowledge versus Information societies: UNESCO report takes stock of the difference. Accesses on May 1, 2014 @ http://portal.unesco.org/ci/en/ev.php-URL_ID=20493&URL_DO=DO_TOPIC&URL_SECTION=201.html.

[11] Heeks (2003). Most e-Government-for-Development Projects Fail: How can risks be Reduced? Institute for development Policy and management. Opened 04/21/2014 @ http://www3.weforum.org/docs/WEF_GITR_Report_2013.pdf

[12] Almarabeh, T. and AbuAli, A. (2010). A General Framework for E-Government: Definition, Maturity Challenges, Opportunities, and Success. European Journal of Scientific Research. ISSN 1450-216X Vol.39 No.1 (2010), pp.29-42.

[13] United Nations E-government Survey 2010. Opened January 15, 2014 @ http://www.unpan.org/egovkb/global_reports/08report.htm.

[14] United Nations E-Government Survey 2008. From E-Government to Connected governance. Opened January 15, 2014 @ http://www.unpan.org/egovkb/global_reports/08report.htm.

[15] United Nations Global E-government Readiness Report 2005. From E-Governance to e-inclusion. Opened January 15, 2014 @ http://www.unpan.org/egovkb/global_reports/08report.htm.

[16] United Nations Global E-government Readiness Report 2004. Towards Access for Opportunity. Opened January 15, 2014 @ http://www.unpan.org/egovkb/global_reports/08report.htm.

[17] United Nations (2010). E-government Survey 2010. Opened January 15, 2014 @ http://www.unpan.org/egovkb/global_reports/08report.htm.

[18] United Nations (2010). E-government Statistical Annex. Opened February 10, 2014 @ http://unpan1.un.org/intradoc/groups/public/documents/un-dpadm/unpan038858.pdf.

[19] International Telecommunication Union (2014). ITU World telecommunication/ICT Indicator Database: Opened on April 24th, 2014 @ http://www.itu.int/en/ITU-D/Statistics/Documents/publications/mis2013/MIS2013_without_Annex_4.pdf.

[20] Economist (2010). Digital Economy Ranking. The Economist. Opened on 04/24/2014 @ http://www.economistinsights.com/technology-innovation/analysis/e-government-europe-middle-east-and-africa.