

E-Government Readiness: from the Design Table to the Grass Roots

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ABSTRACT

e-Government generally refers to the government's use of information technologies (such as LANs, WANs, the Internet, Intranet, and mobile computing) to exchange information and services with citizens, businesses, general public and other arms of government. e-Readiness refers to a country's ability to take advantage of the Internet as an engine of economic growth and human development. In this aspect, several benchmarking indices are available at the macro (also called global) level by the UNPAN, World Bank, EU and others, and e-Readiness indices at the macro level are constructed primarily for ranking countries.

These are concerned with the global digital divide, i.e., the gap between countries that have access to ICT and those that do not, mainly because of differences in income, education, culture, etc. are being taken into consideration. However, it has been realized that a micro-level measurable criteria needs to be developed, though they already exists in discrete format, which have been developed by institutions and academics. At micro level, performance measuring tools needs to be developed to dictate appropriate design, planning, implementation, and monitoring criteria so that relevant programmes could really become essential component of society development, and at the same time contribute to human development.

It is increasingly clear that for a country to put ICT for effective use, it must be "e-ready" in terms of infrastructure, the accessibility of ICT to the population at large, and the effect of the legal and regulatory framework on ICT use. A key indicator of e-readiness is infrastructure and in developing countries this is often a key challenge to the advancement of society. There are many elements to e-readiness such infrastructure, telecommunications, Internet connectivity and skills set as obtained from various sources. At the same time, infrastructure also refers to utilities such as roads, electricity, water and sanitation and these are all relevant components for any ICT4D-social enterprise setting up operations in developing counties. If the digital divide is going to be narrowed, all of these issues must be addressed in a coherent and achievable strategy so that they can be tailored to meet the

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local needs of particular countries.

A good fact is that developing country leaders can use e-readiness assessment to help them measure and plan for ICT integration. It can help them focus their efforts from within, and identify areas where external support or aid is required. But an assessment alone is insufficient, and decision-makers face four key challenges in making effective use of this tool. First, they need to understand how ICT can help their countries achieve economic and social benefits, and set achievable goals accordingly. Second, they must take concrete steps toward effective and sustainable ICT uses that will help their countries realize their objectives. Third, there must be measurable criteria to be developed, so that their implementations can be ranked, and finally, an appropriate data mining solution needs to be established for taking necessary steps in reconciliation, management and future expansion. This paper would like to synthesize various measurable criteria and performance measuring tools in terms of e-Government readiness and at the same time would be performing a few analytical assessments and try to put forward recommendations on successful implementation of e-Government, especially focusing developing countries.

Categories and Subject Descriptors

J.1 [Administrative Data Processing]: *Business, Education, Financial, Government, Law, Manufacturing, Marketing, Military*

General Terms

Management, Measurement, Performance, Reliability, Human Factors, Standardization

Keywords

e-Government, e-Governance, e-Government Readiness, Digital Divide, ICT, e-Readiness

1. INTRODUCTION

Information and communications technologies (ICTs) are playing an increasingly essential role in the daily lives of community by revolutionizing employment, industry and leisure, and at the same time transforming the rules of doing entrepreneurship. In the domain of government, ICT applications are assisting to extend the delivery of public goods and services to citizens not only by improving the process and management of government, but also by redefining the traditional concepts of citizenship and democracy. A prospective sign is that, leaders from several countries are committed to introduce e-government and are demonstrating that by combining technology with new ways of operating, government can be made much more effective, efficient, transparent and responsive [16][1][26][17].

Moreover, ICTs offer unprecedented opportunities for governing underprivileged to overcome the crisis of representative democracy, and the Internet empowers civil society to play its role more effectively to facilitate the performance of governments' main function; serving the people who elect them. In this way, a society is being formed, or in the way of formation in many countries. It is information society, or a society driven by information. The information society is about a society based on the effective use of information and knowledge. In this context, ICT for Development (or ICTD) i.e., utilization of ICT for overall society development another term has emerged, which is not about technology but about development in its manifold and diverse manifestations and the people who use (or do not use) it to improve their livelihood. In essence, ICTD has deep roots in governance, is part of governance and has effects on governance patterns and practices at both national and local levels [9], [29].

Subsequently, in public administrative processes, ontology based organizational archival systems are especially important. These archives are already existing in various forms and norms – as sources of knowledge, laws, comments on laws, specific regulations, old similar cases, available case specific documents and information which are prevalent in different places and in different forms and representations, at several degrees of formality, and are related through many links. The deciding factor is that, in order to make informed, transparent and accountable decisions consistent with the past that are compliant with the law and consistent with similar decisions in other places, all of this knowledge should be placed within an accessible framework [3][17][18].

These could only be achieved through uniform and homogeneous implementation of basic information infrastructure across all levels of management hierarchy (government and private); population should be taken under a common platform of information availability; useful information should be easily accessible at affordable cost maintaining quality, speed and relevance; and local scenario should be transformed into global texture to meet not only local demand but also global demand. In fact, these are the common ingredients for establishing electronic government system in a country. Thus, establishment of a successful e-Government system in a country deserves to be readily available, easily accessible, and compatible to local demand.

However, it is evident that the short term effects of ICTs on societies are both far-reaching and uneven. On the one hand, ICT is instigating the transition from industrial based economies to knowledge based societies. On the other hand, ICT still has little or no impact around the world today that underscores the uneven progress of economic development. It aggravates further in many countries through the critical role of government to extend their services by using information technology. Mismanaged projects in the name of e-development, improper monitoring and implementation plan, unbalanced funding and allocation, lack of skilled personnel to run e-Government related projects, and foremost lack of vision at the central level (both government agencies and development partners) are a few reasons for failure of e-Governance projects in many countries [6][7][8][29][13].

This paper will try to clarify the major issues surrounding performance measurement of e-Government, as well as provide readers with best practices in e-governance in the contemporary world, especially focusing the indicators for performance

measurement. Furthermore, this paper will try to synthesize various indices of e-Government readiness and derive general recommendations on successful implementation of e-Government systems across the world. Finally, this paper will be focusing on a few mathematical models in establishing a measuring criterion for measurement of e-Government (rather, e-Government readiness) initiatives.

2. BACKGROUND

Generally, e-Government applies concepts of electronic commerce (e.g., information and marketing through Web sites, selling to customers on-line) to government operations. In this context, e-Government refers to government's use of information technologies (such as Wide Area Networks, the Internet, and mobile computing) to exchange information and services with citizens, entrepreneurs, and other arms of government. In other word, e-Government comprises of government activities that takes place by digital processes over a computer network, usually the Internet, among the government and members of the public and other entities in the private sector. These activities generally involve the electronic exchange of information (e.g., government forms, driving licenses, etc.) to acquire or provide products or services, to place or receive orders, to provide or obtain information, or to complete financial transactions [definition search at Google and Wikipedia].

On the other hand, e-Governance is more than just a government website on the Internet. The strategic objective of e-Governance is to support and simplify governance for all parties; government, citizens and businesses. The use of ICTs can connect all three parties and support processes and activities. In other words, e-Governance is the electronic means to support and stimulate good governance. Therefore, the objectives of e-governance are similar to the objectives of good governance. Good governance can be seen as an exercise of economic, political, and administrative authority to better manage affairs of a country at all levels .It is not difficult for people in developed countries to imagine a situation in which all interaction with government can be done through one counter 24 hours a day, 7 days a week, without waiting in a long queue. However, to achieve this same level of efficiency and flexibility for developing countries is going to be difficult. The experience in developed countries shows that this is possible if governments are willing to decentralize responsibilities and processes, and if they start to use electronic means [30][10][12][32].

Measuring government systems' efficiency and performance parameters is important in this context. Many countries are introducing e-Government initiatives with high aspirations and enthusiasm just by looking into others, but not with depth in the pre-requisites and concurrent management issues. Furthermore, measurement criteria vary from country to country, depending on many parameters that are visible or sometimes remain invisible. They dictate implementation and management processes, if not design processes from the very kick-start of the programme. e-Government system, as it seems lucrative, is not that easy to implement across the countries. This brings out the question, whether the system has been designed properly based on the ground reality; whether the nation is capable of running or adapting e-Government; or whether the country is competent enough to carry out e-Government promotion; or whether the people are able enough to adjust into the transformed environment.

Subsequently, many similar consequences, parameters and terms arise, among which is one important term that measures the capability of a government or an enterprise in adopting e-Governance initiatives - e-Readiness. To comply with e-Governance, one must first be e-Ready. Thus, e-Readiness is the ability to use Information and Communication Technologies (ICT) to develop one's economy and to foster one's welfare. A key indicator of e-readiness is infrastructure and in developing countries this is often a key challenge to the advancement of society. There are many elements to e-readiness, as such infrastructure, telecommunications, Internet connectivity and skills set as outlined in the contemporary resources. Infrastructure also refers to utilities such as roads, electricity, water and sanitation and these are all relevant needs for any ICT4D-social enterprise setting up operations in developing countries [13], [39].

E-Readiness indices at the macro are constructed primarily for ranking countries, and thus are concerned with the global digital divide, i.e. the gap between countries that have access to ICT and those that do not, mainly because of differences in income, education, etc. Because what appears on the macro level can hide wide heterogeneity among organizations (educational institutions, government departments, etc.), local areas (cities, towns, etc.), and individuals (female, individuals with disabilities, etc.). However, in terms of digital access, and at micro level a more detailed benchmarking is suggested to compute sub-measures for networking, applications, web-accessibility and readiness (NAWAR).

NAWAR is constructed primarily to measure how ICT is actually put to work for development. For example, NAWAR is concerned with the gap between humans with respect to natural / assistive access to ICT in e-business environments, i.e. whether organizations have assistive systems (e.g. Braille keyboards and printers, one-handed keyboards, annotated web sites for screen reading software, etc.) and whether organizational cultures adopt green computing. More importantly, because NAWAR is concerned with how ICT is actually put to work for development, attention is given to change in the level of activity, i.e. the move from e-readiness to impact in e-business environments.

Apart from NAWAR, there are other e-Indices that are being followed by international agencies. They are, network(ed) readiness index (NRI), e-readiness index, e-participation index, digital access index (DAI), etc¹. The next section will put forward discussions on a few of these indices, analyze them in terms of e-Government readiness (EGR) assessment, formulate a mathematical model to measure EGR, and try to put forward a few recommendations for successful implementation of e-Government system both at national and local levels.

3. METHODOLOGY

Ideally the Internet and other ICT tools offer an unprecedented opportunity for people to access information by overcoming geographical barriers and borders. However, with the tremendous opportunities for networking (virtual networking), transparency remains to be fit into the limitation of national policies, irrespective of whether this is perceived as good or bad in the public view. Furthermore, from theoretical view point, ICT's position in governance systems and practices is to become widely participatory and all inclusive. At the same time, economic opportunities availed by using ICT seem to be endless. But where are the societies situated, globally, regionally, and nationally;

along this optimistic road to democracy and prosperity? Will it be a hasty journey with confined gains or a long winding road lined with overlooked opportunities? Regrettably, the answer might be: it depends on where and for whom [23], [24], thereby making the potential implications of ICTs within barrier and captivity.

Despite the facts that e-Government system has been a paradigm shift in transforming the traditional governance system, many countries are yet to find appropriate benefit out of the system. During the last decade of information revolution, many countries across the world have initiated activities related to decrease the digital-divide and increase the e-Government phenomena in their countries. Though, there are many success stories, but many countries, especially Sub-Saharan African and South Asian countries are yet to reap the actual benefit. If the trend of top ten ranked countries is being observed during 2003-2005 (Table-1), it can be observed that only South Korea and Singapore are the two countries that are competing in terms of e-Government Readiness Index. Similarly, Table-2 shows the ranking of top 10 countries in terms of E-participation during 2003 – 2005 and it has been observed that the picture is very similar, except Mexico and Netherlands show tremendous improvement in terms of e-participation.

Table 1. e-Government Readiness Index of top 10 countries during 2003-2005

Rank	2003		2004		2005	
	Country	Index value	Country	Index value	Country	Index value
1	USA	0.927	USA	0.9132	USA	0.9062
2	Sweden	0.840	Denmark	0.9047	Denmark	0.9058
3	Australia	0.831	United Kingdom	0.8852	Sweden	0.8983
4	Denmark	0.820	Sweden	0.8741	United Kingdom	0.8777
5	United Kingdom	0.814	Rep. of Korea	0.8575	Rep. of Korea	0.8727
6	Canada	0.806	Australia	0.8377	Australia	0.8679
7	Norway	0.778	Canada	0.8369	Singapore	0.8503
8	Switzerland	0.764	Singapore	0.8340	Canada	0.8425
9	Germany	0.762	Finland	0.8239	Finland	0.8231
10	Finland	0.761	Norway	0.8178	Norway	0.8228

Table 2. e-participation Index of top 10 countries during 2003-2005

Rank	2003		2004		2005	
	Country	Index value	Country	Index value	Country	Index value
1	United Kingdom	1.000	United Kingdom	1.0000	United Kingdom	1.0000
2	USA	0.966	USA	0.9344	Singapore	0.9841
3	Canada	0.828	Canada	0.9016	USA	0.9048
4	Chile	0.828	Singapore	0.8361	Canada	0.8730
5	Estonia	0.759	Netherlands	0.8033	Rep. of Korea	0.8730

6	New Zealand	0.690	Mexico	0.7705	New Zealand	0.7937
7	Philippines	0.672	New Zealand	0.7705	Denmark	0.7619
8	France	0.638	Rep. of Korea	0.7705	Mexico	0.7619
9	Netherlands	0.638	Denmark	0.7377	Australia	0.7143
10	Australia	0.621	Australia	0.6721	Netherlands	0.6984

Just to follow through, from Table 1 and Table 2 one can recognize the competition among the top ranked countries. Though the output has been carried out to four decimal digits, several countries have attained the same ranking. This reveals the fierce competition and at the same time necessitates more accurate formula and tools to calculate the ranking. It is expected that during 2007, the researchers will have to look for more accurate calculating tools and discrete indicators to calculate the ranking. However, the next sub-section will focus on analytic observations on EGR indices.

3.1 E-government Readiness Indices

E-government is the use of ICT to enable more efficient, cost-effective, and participatory government, which facilitates more convenient government services, allows greater public access to information, and makes government more accountable to citizens. These practices reinforce other reforms that are helping countries to compete in the regional and global economy by strengthening local markets and upgrading individual choice that in turn promote economic growth and poverty reduction [38].

In these contexts, e-Government readiness deals with elements within the government (deliverers), people and enterprises (receivers), and other stakeholders (mediators). Therefore, to perform the above mentioned elements in a homogenous and efficient pattern, there must be a sequence of operational commands and performance chains at each tier of the entire operation. Furthermore, these sequences are broadly divided into two forms of actions; back end operations and front end interactivity. Figure-1 illustrates a form of e-Government system in terms of these parameters, as observed by the author.

Before going to analytical discussion, some important parameters of good governance practices are being illustrated below (with names of some success cases around the world) that also provide a few indicators of e-Government system:

- Managerialism, accountability, transparency and freedom of information, rule of law, combating corruption;
- Citizen participation: (Philippines- Bureau of Internal Revenue, Office of the Ombudsman; Hong Kong- Independent Commission against Corruption);
- Efficiency gains in government, individuals, businesses: (India, Gujarat- 1998-99 road monitoring investment of Rs 630 million earned Rs 169 million per year after three years);
- Effectiveness (faster and more accurate response): (e-Government initiatives in Europe by the European Commission)
- Service Integration (web-portal, smart card)- (Birth registration in Rajshahi City Corporation, Bangladesh; Bhoomi project of Karnataka, India providing support in land administration; [Met@LoGo](#), Meta e-Local governance portal

for the benefit of local SMEs in Latin America; eSeva of Andhra Pradesh, India supporting payment of utility bills)

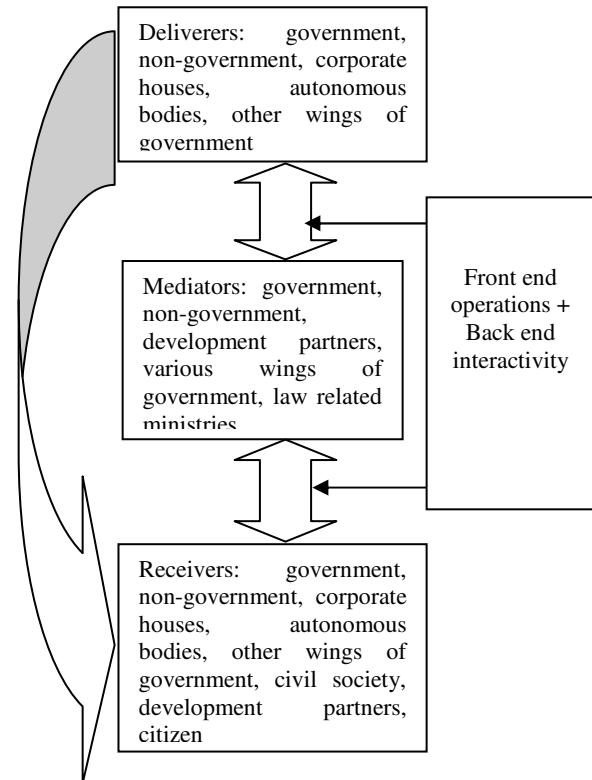


Figure 1. e-Government system parameters (the list is not exhaustive)

- Policy, Legislation and Regulation (appropriate level of regulation to ensure affordable ICT access and attractive environment for private investment)- (Corporate Affairs Commission of Nigeria; Building e-Government and developing IT software and services in Ha Noi, Vietnam; Chinese e-Government initiatives)
- Human Resources, organizational Development and Political Acceptability: (e-Government Executive Education Program of Dubai School of Government)
- Decentralization of governance systems
- Adopt greater integration at the local level (local government initiatives): (e-Trikala Digital City project of Greece; e-SriLanka project in Sri Lanka)
- Learn from success stories (failure too): (The UK Local E-Democracy National Project)
- Stimulation of local ICT industries (SME expansion): (Singapore's e-Government initiatives)
- ICT at the doorsteps of the masses (telecenter movement): (South Korean IT Village projects; Gyandoot of Madhya Pradesh, India; SARI project of Tamilnadu, India) [22][27][32][31][28][34][35][14][15][5].

Looking over all those indicators and initiatives, if one would like to measure the e-Government readiness in terms of its impact in the society and the government, two things will have to be taken account. One is the direct link or the direct beneficiary aspect of e-Government, which is e-Economy, and the other one is the indirect or secondary beneficiary (ultimate), which is e-Society.

E-economy (more emphasis on basic infrastructure [-> more or less deals with the] nation's readiness for business or economic growth); and

E-society (ability of the overall society to benefit from ICT [-> more or less deals with the] nation's readiness for the societal development)

Researches have been carried out by the Asia-Pacific Economic Cooperation (APEC) (APEC's Electronic Commerce Assessment), United Nations Online Network in Public Administration and Finance (UNPAN), World Information Technology and Services Alliance (WITSA) (e-Biz Readiness ranking), The Economist's Economist Intelligence Unit (EIU), Waseda University's 2007 World E-Government ranking, infoDev and others. There are about 25-30 indicators evolved from those researches [2][33][38].

Organizations mentioned above, including World Economic Forum (WEF) have conducted various studies and researches to measure impact of E-society and E-Governance. They have developed several e-readiness assessment guides, conducted readiness assessments, and established a new indicator, namely network readiness index (NRI). NRI has been developed to measure the degree of preparation of a nation or community to participate in and benefit from ICT developments [2][33][38].

The NRI is composed of three component indexes, which assess:

- *environment for ICT offered by a country or community*
- *readiness of the community's key stakeholders (individuals, business and governments)*
- *usage of ICT among these stakeholders.*

Table 3 shows various parameters of NRI in terms of its relationships and dealing with e-Government readiness components. Another index was introduced by ITU in 2003, namely, the Digital Access Index (DAI), which they claim is the World's first global ICT ranking in education and affordability, and an important measuring criteria in boosting new technology adoption. DAI distinguishes itself from other indices by including a number of new variables, such as education and affordability. In 2003, it also covered a total of 178 economies, which made it an wider and inclusive global ICT ranking tool.

Table 3. Parameters of NRI and its relationships with stakeholders

Network Readiness Index (NRI)	
Environment	
Relates to	Deals with
degree of conduciveness	<i>Market</i> - presence of appropriate HR and ancillary business to support E-readiness, which in term encourage venture capital availability, quality of scientific research institute, availability of scientists and professionals (technologists), improvement of ICT import/export
	<i>Regulatory/Political</i> - national priorities should be reflected in policies/laws), which lead to reduction in overall administrative weight, quality of legal system, ICT laws,

	efficiency of tax systems, information right, vibrant media
	<i>Infrastructure</i> - availability of quality access through improved infrastructure quality, reduced waiting time for fix phones, robust information backbone, more public pay phones, Internet servers
Readiness	
Relates to	Deals with
capacity of stakeholders to leverage the potential of ICT	<i>Government</i> - readiness within the government to employ/upgrade ICT centered professionals and reflection in their activities with proper applications leading to policy making processes, internal processes, online presence
	<i>Business</i> - readiness of entrepreneurs to participate in and obtain benefit from ICT leading to easy of obtaining telephones, reduced cost of business phone subscription, improved human resources trainings, quality business schools, quality scientists and professionals, extensive R&D
	<i>Individual</i> - readiness of common citizens to utilize ICT that would lead to greater allocation of national budget on education, adult literacy, tertiary enrolment, radio-television, household online, quality of mathematics and science education, cheaper fixed phone call rate, accessibility of Internet through fixed phones, reduced ISP fees
Usage	
Relates to	Deals with
proper utilization of available facilities	<i>Government</i> - promotion of success cases, provision of providing all government services online
	<i>Business</i> - deployed by entrepreneurs such as computers installed at business houses and proper utilization, technology absorption at firm level, outsourcing
	Business houses may incorporate these issues; connectivity/infrastructure, business environment, consumer adoption, legal and policy environment, social and cultural environment, support other e-services
	<i>Individual</i> - adoption/usage by common citizens that would lead to cheaper PCs, improved PSTN (ISDN), increased cable TV subscribers (along with Internet), increased Internet users

Similarly, Table 4 shows e-readiness parameters developed by EIU and their corresponding weight factors to measure the e-readiness ranking. Table 5 shows e-Government readiness parameters, as developed by the infoDev, World Bank.

Table-4. EIU e-readiness parameters

e-readiness parameters	% of weight
connectivity and technology infrastructure	25%
business environment	20%
consumer and business adoption	20%
legal and policy environment	15%
social and cultural environment	15%
supporting e-services	5%

Source: The Economist Intelligence Unit at www.eiu.com

Table-5. infoDev e-government readiness measurement parameters

EGR measurement parameters	Relationships
physical access to ICT	Infrastructure
appropriateness of ICT	Local demand
affordability of ICT in the local context	Low cost
ICT capacity and training	Skill development
availability of locally relevant content and services	Easy access
integration of ICT into peoples' lives	Versatility
socio-cultural factors that affect ICT use	Pragmatic
legal and regulatory environment for ICT use	Enabled regulation
security and peoples' trust in ICT	Good governance
use of ICT in business	E-commerce
macroeconomic environment affecting ICT use	Enabled policy
government's role in driving e-readiness	Better governance
people's role in accommodating themselves in e-readiness*	Grass roots governance

(*- author would like to add this parameter)

Source: infoDev at www.infodev.org

3.2 Mathematical Modeling

One existing research formulates e-readiness as shown in Formula-1, which is dependent on the number of indicators:

Formula: 1 **e-Readiness_i** =

$$\sum_{j=1,n} Kij Eij / \eta, \text{ where}$$

E-readiness = the overall e-readiness score;

i- country;

j- each of the indicators;

Kij- relative weights assigned each indicator;

Eij- individual score for each indicator on a scale of 1 to 5; and

η- total number of indicators.

(Altogether 52 indicators were considered taken from the WB, ITU, Heritage Foundation, and Transparency International) [19], [20], [21].

Formula: 2 **e-Readiness** = (eDF + eSF + eSI)/3, where

eDF is eDemandForce and it is equal to (1 + 2)/2;

eSF is eSupplyForce and it is equal to (3 + 4 + 5)/3; and

eSI is eSocietalInfrastructure and it is equal to (6+7+8)/3; where

1 = Culture, understanding, effectiveness,

2 = Knowledgeable citizens,

3 = Industry competitiveness,

- 4 = Access to skilled workforce,
- 5 = Willingness & ability to invest,
- 6 = Cost of living & pricing,
- 7 = Advanced infrastructure, and
- 8 = Macro economic environment [10][19][20][21]

Formula: 3 **e-Government Readiness** ∝

$f(\Phi_1, \text{ government ; } \Phi_2, \text{ entrepreneurs ; } \Phi_3, \text{ development partners ; } \Phi_4, \text{ civil society; } \Phi_5, \text{ citizens })$, and, therefore,

e-Government Readiness =

$$\sum_{i=1,n} \Phi_1 + \Phi_2 + \Phi_3 + \Phi_4 + \Phi_5 + \dots + \Phi_n, \text{ where}$$

Φ₁ relates to government's readiness (policies, acts, regulations, laws, HRD),

Φ₂ relates to business sector's readiness (electronic signature, electronic transactions, e-commerce, SME development),

Φ₃ relates to development partners' readiness (fruitful partnerships with all stakeholders, appropriate funding, longer term vision),

Φ₄ relates to civil society's readiness (effective participation, grass roots empowerment, HRD),

Φ₅ relates to citizen's readiness (socio-economy, culture, attitude, civic knowledge, HRD), and

Φ_n relates to other visible and non-visible parameters.

Note: Formula 1 deals with very technical issues that many developing countries are lagging behind and remain at the bottom in the ranking, while Formula 2 deals with a far more wider and inclusive scope in terms of readiness of other parameters that are directly and indirectly related to a nation's e-readiness. Author has proposed Formula 3, accommodating other parameters related to a country's e-Government readiness, though could not be formulated numerically. This one needs further research, experimentation and quantification.

4. RECOMMENDATIONS AND FUTURE DIRECTIONS

A detailed analysis of e-Government readiness, especially in the realm of national readiness deserves extensive research, framework development, data integration, impact study for a longer period, accumulation of parameters related to socio, economic, cultural and political aspects, and foremost, continued study. This research has been initiated to continue benchmarking all these parameters and adopt a thorough analysis through appropriate statistical methods.

Leading countries have already restructured their public sector, process and technology infrastructure to ensure the successful realization of e-Government. Experienced countries with regards to introducing e-Government at early stages are, USA, Singapore, Canada, Australia, New Zealand, and others. They have shown that the root of problems to be resolved in introducing e-services is not technological, rather organizational and hidden in the process domains. Grass roots implementation of e-Government deepens further into the society and socio-economic processes.

The essence of e-government is to radically transform the ways and mechanisms of operating the administration and, as a result, the basic principles on which these mechanisms have been developing in past decades or even centuries should also transform. In the longer run, business renovation or business process renovation methods should be accommodated within the framework of e-services [19][20][21].

However, in quantifying the development aspects of EGR from the designing stage to the implementation stages at the grass roots remains a difficult challenge to the researchers and academics and at the same time to the implementing agencies. It throws challenges to establish a monitoring and evaluation tool, which can be applied for the tremendously complicated issue, like socio-economic development by enabling ICT based methods. The situation aggravates further, while it is being applied to the grass roots environment in developing and transitional economies. All these need extensive monitoring of design tools, implementation methods, and operational modalities through inclusive research and studies.

5. CONCLUSIONS

A number of e-readiness assessment tools, methods, guidelines and results have been found during this research. Bridges dot org finds that at least 84 countries have been assessed using at least one of the instruments, sixteen countries have been assessed by five different organizations, but many countries have not had any e-readiness assessments till date. Though the assessment indicators vary, most of them just tend to measure ICT connectivity, ICT use and integration, training, human capacity, government policies and regulations, infrastructure, security and economy. To measure their effectiveness, one has to dig deep further into many consequences of socio-political-cultural-economical stages of a country. Bridges dot org emphasized studies leading to explore historical background and socio-cultural and political variables such as ethnic homogeneity, population density, political openness, political structure and culture, and other key players [4]. Therefore, an extensive study is desired at the lower level in formulating EGR performance indicators, including their inclusion in the quantification of parameters.

Furthermore, e-Readiness may be seen as an enabler of globalization, but a country's digital competitiveness cannot be just developed in isolation. With other pre-conditions being existed, a national e-readiness environment may allow local industries to foster with longer term economic success, but to obtain the ideal e-readiness condition one has to acquire solid ICT infrastructure, clear regulatory structure, and transparent governance. Hence, e-Government readiness becomes a function of not only a country's state of readiness, but also its technological and telecommunication infrastructure and the level of its human resource development, among other factors, and at a minimum should be based on the level of all three. Otherwise, these e-Government initiatives are unlikely to contribute significantly to the overall national development, and will remain as a fashionable showpiece and available only the privileged few.

Though governments in most of the countries are seeking to reorient their development programs and strategies towards the attainment of knowledge-based economies, but many developing countries are finding it extremely difficult to divert scarce resources towards ICT-led-development when faced with pressing priorities of reducing poverty; as such providing basic health and

education. Furthermore, lack of technical skills and policy building capacity are other barriers to establish effective e-government, e-participation and e-service delivery system at the grass roots [25][17].

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