Innovation Opportunities from e-Government Readiness Benchmark

Carlos Mitsuru Murasse, (PhD)
Jamerson Viegas Queiroz, (PhD)
Christian Luis da Silva, (PhD)
Faimara do Rocio Strauhs, (PhD)
Federal Technological University of Parana, Brazil

Doi: 10.19044/esj.2018.v14n14p205 URL:http://dx.doi.org/10.19044/esj.2018.v14n14p205

Abstract

Research on e-government as well as its practice continues to bring challenges, especially for developing countries. The stage model is a frame of reference toward e-governance, where citizens are actively involved and the initiatives are collaborative in nature. Countries have been benchmarked on the e-government development and readiness indexes have been used to decision making. The aim of this paper is to investigate whether readiness benchmark on e-government can foster innovation. The result suggests that e-government readiness indexes can foster some strategies related to technological or social innovation, and an innovation process measurement can improve the comprehension of the scenario.

Keywords: E-government, E-participation, E-readiness Benchmark, Innovation Process Measurement

Introduction

E-government as a research topic was almost unknown until the end of 1990 but had an almost explosive growth in 2000s (Heeks & Bailur, 2007). The implementation of e-government services can take various forms ranging from a single website with contact information to an interactive and consolidated portal to integrated services at all levels of government. A stage models is a common frame of reference of e-government development and capture the visionary path towards e-governance, where citizens are actively involved in political and administrative decision making (Lee, 2010).

E-government initiatives are often collaborative in nature, bringing together various units of government, private sectors, nongovernment organizations, and citizens as key stakeholders. Various attributes of e-governance can be mapped onto characteristic features of innovation, thereby

equating e-governance with an innovation management process in the public sector (Potnis, 2010).

The transformation from government to e-government involves mediating the relationships between the three spheres of governance (political, civil, and administrative) with information technology. E-participation has a clear association with e-government in advanced stages and refers to the use of new technologies to change or transform the involvements of citizens in deliberation or decision-making processes. The purpose of e-participation is to increase the participation of citizens in e-governance (Sæbø, Rose, & Skiftenes Flak, 2008).

This paper aims to investigate the United Nations e-government readiness benchmark, measured by e-government and e-participation indexes, to determine whether and how the readiness measurement can foster innovation in the public sector.

I.
Methods

To measure the extent to which the United Nations e-government surveys and indexes assess e-governance as an innovation in the public sector, a framework with seven constructs and nineteen sub-constructs, as proposed by the Innovation Management Measurement Framework (IMMF) (Adams, Bessant, & Phelps, 2006) and a conceptual content analysis (Potnis, 2010) in which the categories represent innovative management concepts are used to analyze surveys reports from United Nations e-government Survey.

As a part of the research method, a computer aided conceptual content analysis was carried out, using NVivo (version 11) to calculate the frequency count for all of the concepts in the surveys. The conceptualization, constructs and subconstructs and the seven pick lists were applied as developed by Potnis (2010). The frequency counts of concepts derived from the IMMF were calculated as percentage normalized scores (PNSs). The PNSs represent a distribution of innovative management concepts in each survey, which enables a cross-sectional study. In this paper, we choose to adapt the Potnis's method to emphasize an evolutionary study, whereby we compare our results with those obtained by Potnis (2010).

Background

The term "electronic government" was virtually unknown before 1997, even though it seems to have been first used in the 1993 U.S. National Performance Review by vice-president Gore. E-government is considered as a pivotal concept in several research domains, particularly computer science, information systems, public administration, and political Science. The majority of e-government researchers reject crude technological determinism

in favor of a recognition that human or social factors have at least some roles to play (Heeks & Bailur, 2007).

In common words, e-government is about the communication between the government and its citizens via computers and a Web-enabled presence (Evans & Yen, 2006). However, it is difficult exactly define e-government. The main concern of e-government is to make government work better by providing information and services, regardless of the technology employed (Yildiz, 2007), and several definitions relate it with some technology, especially the Internet. The United Nations defines e-government as "utilizing the internet and the World Wide Web for delivering government information and services to citizens" (Nations, 2001).

E-government Stage Models

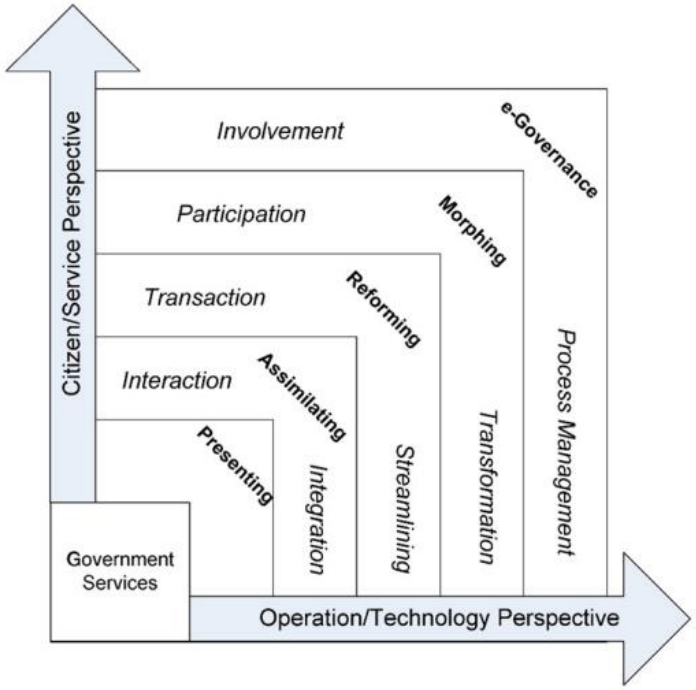
The implementation of e-government services can take various forms ranging from a single website with contact information to an interactive and consolidated portal to integrated services at all levels of government. Therefore, to adequately discuss benchmarking, the e-government definition must be supplemented by a classification of e-government stages of development or maturity. Several stage models have been proposed for e-government especially in the early 2000s (Affisco & Soliman, 2006; García-Sánchez, Rodríguez-Domínguez, & Frias-Aceituno, 2013; Layne & Lee, 2001; Lee, 2010; Rorissa, Demissie, & Pardo, 2011; Valdés et al., 2011).

One of the earliest e-government development classifications was created by Layne and Lee (2001). Based on technical, organizational and managerial feasibilities, Layane and Lee (2001) suggest that e-government is an evolutionary phenomenon and therefore its initiatives should be accordingly derived and implemented, in four stages of a growth model for e-government: (1) cataloging, (2) transaction, (3) vertical integration, and (4) horizontal integration. These four stages are explained by two dimensions: the complexity involved and different levels of integration

In 2010, Lee considered contemporary e-government stage models incongruent with each other, as they were based on different perspectives and use rather different metaphors. He analyzed twelve representative stage models – Gartner Group (2000), Deloitte Research (2000), Layne and Lee (2001), Hiller and Belanger (2001), Scott (2001), United Nations (2001, 2008), World Bank (2002), Netchaeva (2002), Accenture (2003), West (2004), Siau and Long (2005), and Anderson and Henriksen (2006) – and translated them in five metaphors using a qualitative meta-synthesis approach: Presenting, Assimilating, Reforming, Morphing and e-governance. From the content analysis of each stage model, two distinct perspectives became apparent: Citizen/Service perspective and Operation/Technology perspective.

The final result was condensed in a common frame of reference, as presented in figure 1 (Lee, 2010).

Figure 1 - A common frame of reference for e-government stage models



Source: Lee (2010).

Lee (2010) claimed that this common frame of reference of e-government stage models can be used to explicate all other stage models in the contemporary literature and is also expected to capture the visionary path of e-government development toward e-governance where citizens are actively involved in political and administrative decision making.

Assessment of innovation process in e-Government

The e-government initiatives are often collaborative, bringing together various units of government, nongovernment organizations, citizens and the private sector as key stakeholders. Various attributes of e-governance can be mapped onto characteristic features of innovation, thereby equating e-governance to an innovation in the public sector. Moreover, in the context of the United Nations definition of e-government as an innovation in the public sector, e-governance can be referred to as an innovation management process (Potnis, 2010).

To assess e-government initiatives, a holistic innovation measurement methodology in the form of the IMMF is applied. The IMMF is one of the most widely accepted and most updated comprehensive frameworks available

in the literature to assess the performance of innovations. The IMMF measures innovation management using a lens formed by seven inductively derived constructs (framework categories) and nineteen subconstructs (measurement areas), as presented in Table 1 (Adams et al., 2006; Potnis, 2010).

Table 1 - Constructs and subconstructs from the IMMF.

No.	7 constructs from the IMMF	Subconstructs
1	Inputs	• People • Physical and financial resources • Tools
2	Knowledge Management	• Idea generation • Knowledge repository • Information Flow
3	Innovation Strategy	• Strategic orientation • Strategic leadership
4	Organization and Culture	• Culture • Structure
5	Portfolio Management	• Risk/return balance • Optimization tool use
6	Project Management	• Project efficiency • Tools • Communications • Collaboration
7	Commercialization	• Market research • Market testing • Marketing and sales

Source: Potnis (2010)

The Inputs construct is concerned with providing resources of innovation activities and focuses on resource management (human, physical and financial) and research and development expenditure. The Knowledge Management is concerned with obtaining and communicating ideas and information that underlie innovation competencies, which include idea generation, absorptive capacity and networking, as well as managing explicit and implicit knowledge and gathering and using information. The Innovation Strategy is about the commitment of senior management to innovation, which includes specifying and communicating a direction (vision) for innovation linked with overall business goals and providing the supportive leadership required to materialize such innovation. The Organizational Culture and Structure is concerned with the organizational culture and structure with which staff work, because it has been widely demonstrated that the perceived work environment (comprising both structural and cultural elements) affects the level of innovation in organizations. The Portfolio Management emerged as a key theme to successful product innovation because of its process of selecting innovation projects and allocating resources to obtain a portfolio that optimizes the trade-off between returns and risks. The Project Management is concerned with the processes that transform the inputs into a marketable

innovation, managing mainly the efficiency, communication and collaboration while working on projects. The Commercialization is concerned with introduction of new process or products to the market using significant marketing capabilities such as market investigation, market testing and promotion (Adams et al., 2006; Potnis, 2010).

Typically, in conceptual content analysis, a dictionary of items is defined to measure the occurrence of constructs. Words as well their segments and combinations relevant to constructs and sub-constructs are known as concepts, and the process of defining those concepts is known as conceptualization. Conceptualization was carried out by forming "pick lists" to store concepts for all constructs. Seven pick lists were developed for collecting concepts based upon seven constructs from the IMMF (see Table 2) (Potnis, 2010).

Table 2 – Pick lists representing concepts from IMMF

No.	Constructs from the IMMF	Pick lists Representing representing concepts
1	Inputs	formal system*, develop* tool*, design* tool*, resource*, research and development, RandD, government expenditure*, government expenses, input*, funding*, fund, funds, investment cost, investment costs, implementation team*, workforce employee*, government employee*, staff*, government investment*, implement* software*, implement* hardware*, infrastructure*, skill*, proficienc*, training*
2	Knowledge Management	Idea, ideas, intellect*, intelligen*, knowledge*, information*, data*, feasibility*, reform*, capacity*, capabilit*, chang*, informed, informat*
3	Innovation Strategy	allocat*, strateg*, objective*, goal*, policy*, decision*, commitment*, commit, commite*, innovat*, leader*, plan*, planning*, orient*, vision*, manager*, conflict, resolution*, managerial, attitude*, champion*, frame*, mechanism*, manner*, control*
4	Organization and Culture	cultur*, environment*, flexible organization*, democra*, autocrat*, authorit*, admin*, centraliz*, decentraliz*, interaction* frequenc*, social*, political*, tradition*, economic*, education*, scope for creativity, autonom*, incentive*, in-house, structure, structures, office integration*, integrat*, office*, context*
5	Portfolio Management	Competitive advantage*, selection of technolog*, resource* optimiz*, allocation*, allocation of resource*, strategic choice*, technological choice*, return* on investment*, returns, risk*, evaluation*, merit*, demerit*, internal rate* of return*, net present value*, optimization tool*, align*
6	Project Management	Information and Communication Technologies, ICT*, portal*, website*, site*, technology, technologies, web, electronic, internet, online, form, forms, digital, digitized, digit*
7	Commercialization	Publicity, popular*, commercial*, market*, new service*, new product*, sale*, distribution*, joint*, combined*, delivery, function*, consumer*, customer*, buy*, provid*, service*, governance, access, application*

Source: Potnis, 2010

E-government Readiness Benchmarking

The first decade of academic research on e-government was dominated by studies that focused on the observation and evaluation of the output of e-government initiatives. These studies were practically useful because they explained which government performance indicator (i.e., cost, transparency, efficiency) was improved as a result of a particular e-government effort. Such external examination is a deductive approach to e-government. These studies are generally exploratory and descriptive; therefore, they do not reveal what happens inside the black box of e-government (Yildiz, 2007).

Benchmarking and assessing e-government is therefore necessary to monitor performance and progress and identify areas for improvement. Such measurements have already been initiated by various organizations, in which the multidimensional nature of the assessment is shown. The concept of e-government evaluation, however, is very broad and a search over existing literature unfolds completely different studies and non-comparable results. Therefore, it is essential to classify these evaluations into three categories according to their unit of analysis (Siskos, Askounis, & Psarras, 2014): (i) evaluation of governmental websites; (ii) evaluation of actions, policies, and investment plans of online services as a part of an e-government plan and strategy; (iii) evaluation and comparison of countries performance in the field of e-government (benchmarking).

According to Alshawi, Alahmary, & Alalwany (2009), e-government evaluation must consider the perspectives of all stakeholders and the e-government value indicators gotten from the evaluation criteria which include the key issues perceived by each stakeholder. Although each of these approaches aimed to address a particular aspect of evaluation, only a few evaluation studies combined some of the tangible and intangible risks with the benefits of e-government, including the organizational, social, political, or cultural impact of the system. The proposed evaluation criteria were classified into three groups: the technical issues group, the economic issues group, and the social issues group (Alshawi, Alahmary, & Alalwany, 2009).

The e-government readiness measurement represents a particular area of policymaking and research within the e-governance initiatives. The e-government readiness primarily assesses the extent to which governments are equipped to deliver services online and exploit ICT for internal functioning. E-government readiness index represents a more focused line of research within the broad spectrum of electronic governance literature. E-government readiness index has been motivated by the need to evolve a common indicator to assess the inclination of nations toward implementing e-governance. It was conceived to allow nations to gauge their status on the implementation of e-governance (benchmarking) relative to others. It is also meant to alert policymakers to specific strengths and weaknesses that can be suitably

addressed to enable e-governance. Additionally, the rankings are perceived as representatives of national capabilities and can motivate citizens adoption of e-governance (Ayanso, Chatterjee, & Cho, 2011).

The e-government readiness is a measure of the scope and density of e-government, related to the quality of delivered services and satisfaction of stakeholders. Because of different cultural characteristics, different nations may experience different levels of e-government scope and density (Khalil, 2011). In most countries, the maturity of e-government is measured by the electronic service delivery. However, in many countries, there is a gap between the supply and demand of e-services. The lack of motivation, digital skills, and physical access to e-services are main reasons for the lag in e-government implementation (van Djik et al., 2007).

Education (intellectual capital) is the most powerful single predictor for the attitudes toward e-government services and their adoption. Adoption rates increase as attitudes become more positive with increased levels of education. Considerably less is known about household combinations and the ways they are related to the use of public e-services, but it can be assumed that people living in a household with children would also use more public e-services to satisfy their diverse needs (Taipale, 2013).

Readiness indicators can be more useful when grouped by geo-economic criteria. Within Latin America, the technological background and overall necessity for e-government differs. Argentina, Brazil, and Mexico rank the highest number of internet service providers and internet users. Latin American nations currently rank near the bottom, in terms of Internet diffusion, but they are among the world leaders in Internet diffusion rates. This raises the issue of global and internal digital divides, given that e-government cannot be fully successful with partial connectivity (Lau, Aboulhoson, Lin, & Atkin, 2008).

The e-readiness indexes present some limitations. A study from four e-readiness indexes (accessibility, e-information, e-petition, and e-participation), and the clickstream data analysis of the Korean central government units from 2003 to 2005 evaluates whether better e-readiness induces more use of the e-government websites. There are empirical evidences that only the e-information index was significantly correlated with the website usage (Park, Choi, & Bok, 2013).

According to Bannister (2007), there are four current benchmarks of e-government that are published on a regular basis: (i) The eEurope benchmarks (prepared by Capgemini) commissioned by the EU Directorate General for Information Society and Media, (ii) Accenture's e-government leadership reports, (iii) The Brown University Global E-Government Survey, and (iv) The United Nations Online Network in Public Administration and Finance report (Bannister, 2007).

The United Nations e-government development (readiness) index (EGDI) is part of an effort to assess the use of technology by national governments. The recent surveys focus on both the readiness of member nations to plan and implement critical ICT-based service deliveries as well as citizens engagement in important governmental activities (Ayanso et al., 2011). Mathematically, the EGDI is a weighted average of three normalized scores on the three most important dimensions of e-government: scope and quality of online services (Online Service Index, OSI), development status of telecommunication infrastructure (Telecommunication Infrastructure Index, TII), and inherent human capital (Human Capital Index, HCI) (United Nations, 2014b).

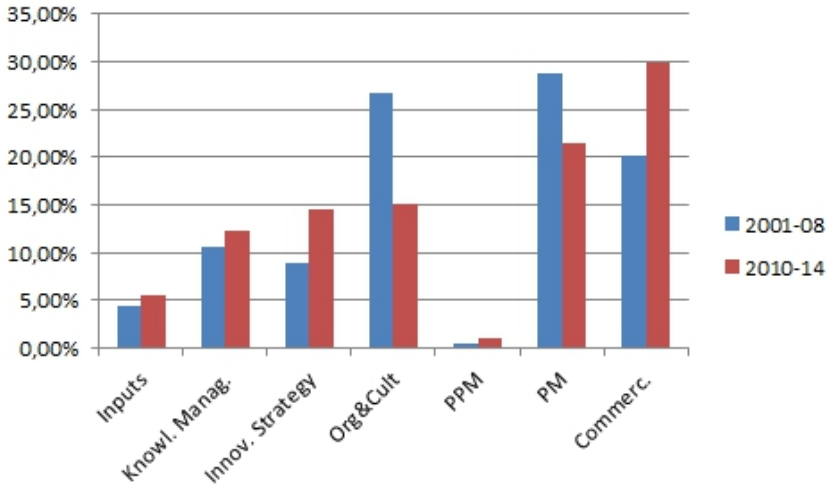
Another measure used in the United Nations survey is the EPI, which is qualitative in nature, evaluating the use of e-government by each country. The survey developed three categories to analyze this information: e-information, e-consultation, and e-decision making. Finally, this information was evaluated in terms of quality, relevance, usefulness, and willingness. Countries where the participation of citizens is actively encouraged have higher EPI scores (Evans & Yen, 2006). The EPI reflects on the e-participation facilities deployed by the government. The purpose of this measure is to offer insight into how different countries use online tools to promote interaction between citizens and government, as well as among citizens. The EPI is a qualitative assessment based on the availability and relevance of participatory services available on government websites; therefore, the comparative ranking of countries is for illustrative purposes (United Nations, 2014b).

Results and Findings

Using the constructs and applying the pick lists derived from the IMMF (Adams et al., 2006; Potnis, 2010), the conceptual contents of the United Nations e-government surveys were analyzed and the PNSs of the IMMF from 2010-2014 surveys were calculated. The Commercialization IMMF construct scores very high in contrast with the other concepts of the framework, which scored very low, such as Project Portfolio Management and Inputs Management.

The primary result was compared with the previous PNSs of the 2001-2008 surveys (Potnis, 2010). From the 2001-2008 surveys, the Project Management, Organization and Culture and Commercialization IMMF constructs scores higher. From the 2010-2014 surveys, Commercialization and Project Management IMMF constructs scores higher. The most significant changes during the period were: (i) the decrease of Organization and Culture, (ii) the increase of Commercialization, (iii) the decrease of Project Management and (iv) the increase of Innovation Strategy (Figure 2).

Figure 2 – Evolution of IMMF PNSs



Source: United Nations e-Government surveys and Potnis (2010).

We did not collect sufficient elements to identify determinant factors of these changes; this could be the subject of another study. As possible hypotheses, the shift from Organization and Culture and Project Management to Commercialization can mean more delivery of interactive services by governments, and the persistent very low score of Project Portfolio Management may be a signal of incompatibility with the e-government context, because of the high complexity of stakeholders and decisions criteria.

The reduction of the gap in PNS between Project Management and Knowledge Management can indicates more balancing between hardcore technical components such as ICTs and soft components such as people, information, and processes, and thus can be considered an advance towards reduction of digital divide.

The PNSs for Project Portfolio Management remain very low although it is over ten years. The multiplicity of stakeholders, possibly with divergent interests, and the intangibility of the performance criteria contribute to a very complex decision scenario that makes the adoption of the portfolio approach difficult in e-government.

Conclusion

The multidimensional assessment of e-readiness as proposed from United Nations benchmark is partially aligned with the multidisciplinary nature of e-government and the bidimensional stage model proposed by Lee (2010). The EGDI is formed by an online service dimension which incorporates some potentially innovative strategies, for example “Bridging the digital divide”. This strategy can be innovative (challeging) or not, depending on the context (culture and e-government maturity in a stage model).

In general, readiness indicators have a large acceptance and are useful to evaluate the predictors and outputs of initiatives. Our findings suggest that indicators which measure outputs have more potential as enablers of future innovation in determining circumstances, but they are not able to determine the innovation. The United Nations EGDI can be partially considered as an output indicator.

The IMMF approach enriches the measurement of e-government readiness in two ways. First, it adds to the focus on innovation, which can be useful to evaluate e-government policies and initiatives from the values added to the societal point of view, especially those of the stakeholders. Second, from the evaluation of the innovation process embedded in the e-government process, an internal view of the process is presented, which allows a better understanding of how the process impacts the whole scenario. However, known differences between private sector and public sector suggest that the constructs of IMMF should be adapted. For instance, the Portfolio Management is harder to apply when there are multiple stakeholders and intangible criteria.

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