E-GOVERNMENT ADOPTION: AN INTERNATIONAL PERSPECTIVE

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ABSTRACT

E-government diffusion is an international phenomenon that has received much attention in the last decade. Researchers argue that the rate of e-government effectiveness and efficiency as well as the rate of diffusion and adoption depend on a number of factors. Nonetheless, comparative studies detailing how these factors differ across nations are lacking. Previous studies have primarily based conclusions on isolated projects and specific case studies in different countries with very little international perspective. This study examines the e-government adoption across 192 countries within the last decade. The panel data obtained would be analyzed to evaluate the state of e-government diffusion and recommendations would be made. Results and findings of the study shall be presented at the conference.

Keywords: e-government adoption, e-government diffusion, infrastructure, human capital, e-participation.

INTRODUCTION

In the last decade, the e-government systems' diffusion was significant. These systems have received much attention all over the world. The e-government systems usage rate is not the same across countries. For instance, globally speaking, the average usage of these systems by citizens is about 30% but when it comes to specific countries such as Canada this rate is over than 51% (Kumar, Mukerji, Butt & Persaud, 2007). The rate of e-government diffusion can be expected to increase in the coming years more than ever. E-government has been defined as the use of

information technology to enable and improve the efficiency of government provided services to citizens, employees, businesses and agencies (Carter & Bélanger, 2005).

However, there are almost as many definitions as there are perspectives on this subject. Abramson and Means (2001) define it as the electronic interaction between a government, the public and employees. Fraga (2002) goes further to state that e-government is the transformation of public sector's internal and external relationships through net-enabled operations, information technology to improve government service delivery, constituency and participation. The World Bank (2011) put forth extend the e-government definition to include "the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government". It further underscores that these technologies can serve a variety of ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. It further claims that the resulting benefits are less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions (World Bank, 2011).

Consequently, e-government is a nexus of a government and its citizens. E-government has been categorized in the literature to involve four broad categories (Ndou, 2004; Evans & Yen, 2006). It should be noted that some researchers have expanded this basic classification into six and even eight categories (e.g. Hiller & Bélanger, 2001; Fang, 2002). Each of the categories described below defines a bilateral relationship of significant mutual benefits.
- *Government to Citizen (G2C)* indicates that the government and the citizen can communicate information electronically with each other in an effective and efficient manner. One of such examples will include the provision of welfare and health benefits to regulatory and compliance-oriented licensing (Ndou, 2004).
- *Government to Business (G2B)* presents the electronical interaction of governments' agencies with private businesses. The G2B enables government to purchase items, pay invoices and conduct business in a cost-effective way.
- *Government to Government (G2B)* strives to improve efficiency in service delivery while interacting with itself or other governments. It allows for government to be efficient by avoiding redundancies and duplication (Evans & Yen, 2006). An example is the e-sharing of information between government law enforcement agencies and the creation of emergency alert systems that make for quick and timely manner for crime detection and prevention.
- *Government to Employees (G2E)* deals with relationship between the government and its employees. Through G2E, employees can be trained, educated on policy compliance, and even share information with each other. An example of this is the General Accounting Office which has focused on the accounting of intergovernmental transactions, as a case in point (Evans & Yen, 2006).

The advantages of e-government systems are unquestionable. In fact the objective of these systems is to deliver government services to citizens in an effective and efficient manner to increase transparency and accountability (Abie, Foyn, Bing, Blobel, Pharow, Delgado, Karnouskos, Pitkanen & Tzovaras, 2004), lessen corruption (Bertot, Jaeger & Grimes, 2010), grow revenue and/or reduce costs, while profiting from greater convenience (Kim, Pan & Pan, 2007; Ndou, 2004; World Bank, 2011). These advantages are the main reasons behind adopting

e-government by developed and developing countries. Thus, governments and citizens cannot benefit from e-government unless they embrace and adopt these services. Recently, e-government adoption has garnered much focus. Researchers have examined both conceptual and empirical aspects of e-government adoption (see Kumah, Mukerji, Butt & Persaud (2007); Lean, Zailani, Ramayah & Fernando, 2009; Carter & Bélanger, 2005; Al Awadhi & Morris, 2009; Shareef, Kumar, Kumar & Dwivedi, 2011). By using the knowledge of previous frameworks such as the Technology Acceptance Model (TAM) which was first proposed by Davis (1989), the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis & Davis, 2003); and the Theory of Diffusion of Innovation (DoI) (Rogers, 1995), they proposed models for the prediction of e-government adoption by citizens and at differing service maturity levels.

STATEMENT OF THE PROBLEM

Spending on electronic government systems and services is growing fast (Park, 2008; Peristeras, Mentzas, Tarabanis & Abecker, 2009). For instance, the investments in the USA was estimated to increase from $2.9 billion in 2002 to more than $5 billion in 2007 (Chantilly, 2002) and to $5.8 billion in 2009 (Bélanger & Carter, 2008). On another report (The Global E-Government Outlook, 2002), the estimated spending levels on e-government is $10 billion for an advanced South American country; $172 million for an Asian country; and $35 million for a Middle East - North African country. Overall, eighty percent of the governments spend less than one percent of their total federal operating budget on IT related projects, while twenty percent spend up to five percent of their budgets.

Despite the investment of these huge amounts of resources in e-government (Peters, Jansen & Engers, 2004; Hackney, Desouza & Chau, 2008; Peristeras et al., 2009), yet governments have not succeeded in these projects (Park, 2008). Unfortunately the success rate of e-government project implementation in developing and transitioning countries is as low as 15%. Likewise, analyst reports still point out that the return on e-government investments is very low or negative in many cases because these projects often fail to improve service quality (DeBenedictis, Howell, Figueroa & Boggs, 2002; Accenture, 2005; Kinder, 2010). In one survey, respondents (72%) indicated that they do more information gathering than transactions with e-government, since they see these systems primarily as information sources and not as interaction center (Barr, 2007). On the other hand only 25% used it to conduct transactions such as completing and submitting forms online (Webber, Leganza, Schadler, Lo & Lawson, 2007).

Regardless of having the above facts, one should note that these systems are still in high demand. This could be a result of the many advantages that these systems have which are so important for governments. In an attempt to help solve the above mentioned problems, researchers argued that the rate of e-government effectiveness and efficiency as well as the rate of diffusion and adoption depend on some factors. But yet, comparative studies through years have been lacked. It is true that the e-government systems have failed many times, but at the same time studying whether the diffusion and adoption rate of these systems is increasing is important since it shows whether a progress has been made in this field or not. Previous studies' conclusions are based primarily on isolated projects of specific case studies and countries without regard to time

periods. Certainly the importance of these studies is not denied, but studying the improvement of the e-government systems through years is of high importance as well.

STATEMENT OF OBJECTIVES

This study examines the e-government diffusion in 192 countries across four time periods between 2003 and 2010 namely: 2003, 2005, 2008 and 2010. Specifically, this study aims to conduct a comparative study across these periods to answer two important research questions: (1.) has e-government adoption increased since its early introduction about a decade ago? and (2.) are there any important trends that of significance across countries and across time? First, the determinants of e-government adoption and diffusion are identified. Web-measure is identified as a proxy for e-government diffusion and adoption, and is used to serve as the main dependent variable. The predictor variables are identified as human capital, e-participation, infrastructure, and e-readiness. Second, the identified variables are then used to set up a panel of longitudinal data and the Stata statistical software is used to analyze data. The objective of the analysis is to determine the presence or absence of fixed or random effects. Once the prevailing effects are established, the appropriate estimating model is then specified and used to evaluate the research questions. The analytical objectives are: to choose the right estimation model, to observe fixed effects and to examine trends. These results are useful in contributing the current discussion on state of adoption and diffusion of e-government world-wide. It is therefore beneficial to both e-government research and policy-making as it provides empirical perspective in the last decade.

LITERATURE REVIEW AND FORMULATION OF HYPOTHESES

Adoption is the product of the interface between technology and the user. In fact, adoption of e-government by citizens has been found to be hindered by a lack of awareness of technology, the need of infrastructure that supports these systems, low e-maturity levels, and low level of education (Bélanger & Carter, 2008; AlAwadhi & Morris, 2009; Shareef *et al.,* 2011). In general the major ingredients of e-government systems are infrastructure, human resources and information (Ngulube, 2007). In fact, e-government systems are built on ICT tools that rely on the availability of inexpensive, high quality telecommunications services (Schware & Deane, 2003). Thus, a major reason behind the success or failure of e-government project is the extent to which, the governments address technological infrastructure encouraged by appropriate telecommunications policies (Jaeger, 2003). Based on these arguments, two hypotheses can be presented:

> **H.1:** *IT infrastructure positively affects e-government adoption.*
> **H.2:** *E-readiness positively affects e-government adoption.*

As mentioned earlier, e-government is a connection between a government and its citizens. Though, this connection cannot be established without the willingness of both governments and citizens to use these systems which can be called e-participation. E-participation is an indicative of both the capacity and the willingness of the government in encouraging the citizen in promoting deliberative, participatory decision-making in public policy and of the reach of its own socially inclusive governance program. E-participation has been

given a lot of importance from global organizations such as the United Nations (UN) which is supporting e-government implementation all over the world. Thus, we hypothesize:

H.3: *E-participation positively affects e-government adoption.*

Besides, education is another problem related to e-government adoption. In fact, as citizens' education rises, citizens are more likely to have greater access to technologies and likely to embrace these systems quickly and more efficiently. Moreover, citizens who have high skills in the use of emerging technologies are more likely to adapt it towards greater gains of economic and social productivity. In one study, Carter and Weerakkody (2008) found that the internet skill is a significant predictor for e-government adoption. Based on this, we hypothesize:

H.4: *Human capital positively affects e-government adoption.*

A graphical representation for the model and these four hypotheses is presented in Figure 1.

Figure1: Proposed Model
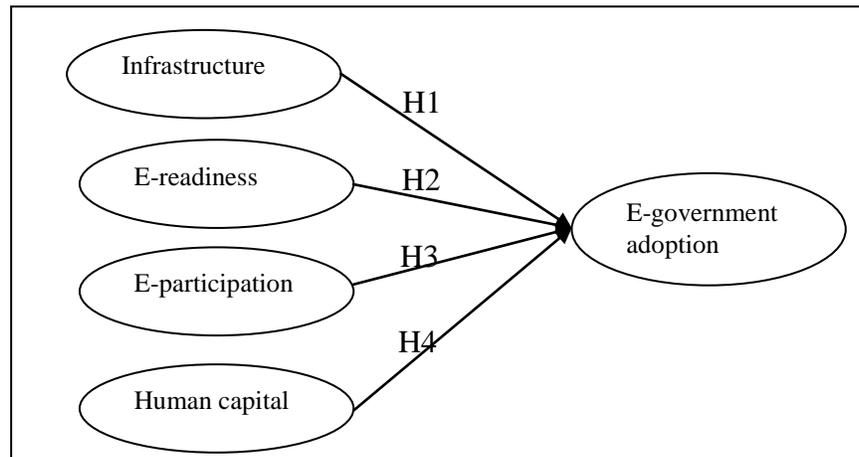
PROPOSED METHODOLOGY

Data

All of the data are retrieved from the United Nations' E-government development database. Because almost every country in the world is included in this study (98%), the sample size is considered very reasonable by all standards for robust analysis and subsequent generalizations.

Variables

The variables considered for this study are web-measure, e-readiness, human capital, e-participation and infrastructure. These variables have been used across the years to determine both the adoption and diffusion of e-government across countries. Web-measure is used in this study as a dependent variable consistent with the World Bank definition which utilizes web-measure as an important overall measure of e-government adoption in a country (United Nations

Public Administration Programme, 2010). As for the predictor variables, e-readiness, human capital, e-participation, and infrastructure are used as key indicators of determining e-government adoption and diffusion as it was found to be consistent with previous studies which have examined either one or many of these variables (see Ebrahim & Irani, 2005; Evans & Yen, 2006).

LIMITATIONS AND CONCLUSIONS

There are some limitations in this research. This study is going to test the relationship of five e-government variables in relation to their ability to influence adoption and diffusion of e-government. This is a clear limitation, because many other determinants have been found to also influence e-government adoption and diffusion. However, the variables used in this study have been found to be both stable and useful in describing the phenomenon. Additionally, longitudinal data for these factors have been consistent through the years, making the study relevant and significant.

As e-government adoption and use continues to draw interest from governments; and as researchers try to model and measure the acceptance of the e-government, it was important to examine how far e-government has come in the last decade. Using a longitudinal data for almost one decade, this study attempts to find whether e-government adoption has increased since its early introduction about a decade ago and/or if there are any important trends that of significance across countries and across time. Results of this study are going to be presented at the conference and it expected that the findings will be useful for governments' decision makers as well as for researchers specialized in e-government. These results are useful in contributing the current discussion on state of adoption and diffusion of e-government world-wide. It is therefore beneficial to both e-government research and policy-making as it provides empirical perspective in the last decade.

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