7-1-2013

An Empirical Study On The Determinants Of E-Government Maturity: A Fit-Viability Perspective

Gregory Larosiliere
Baylor University - Hankamer School of Business, Waco, Texas, USA, gregory_larosiliere@baylor.edu

Lemuria Carter
North Carolina A&T State University, Greensboro, North Carolina, United States, Ldcarte2@ncat.edu

AN EMPIRICAL STUDY ON THE DETERMINANTS OF E-GOVERNMENT MATURITY: A FIT-VIABILITY PERSPECTIVE

Larosiliere, Gregory, Baylor University, One Bear Place #98005, Waco, Texas, 76798-8005, gregory_larosiliere@baylor.edu

Carter, Lemuria, North Carolina A & T State University, 1601 East Market Street, Greensboro, North Carolina 27411, ldcarte2@ncat.edu

Abstract

E-Government development and diffusion have emerged as fundamental issues for both researchers and practitioners across the globe. Understanding electronic government maturity requires an investigation of its antecedents and an evaluation of facilitating factors that influence the progress of online government information, tools, and services from diffusion to eventual adoption. The purpose of this study is to investigate electronic government maturity and its determinants. In particular, we use the Fit-Viability Framework to assess of e-Government Maturity. The results of partial least squares (PLS) analysis indicate that task-technology fit characteristics account for over 59 percent of the variance in fit. Combined with the country's viable resources, e-government development accounted for 82 percent of the variance in the model. Implications for research and practice are discussed.

Keywords: E-government, Fit-Viability, Task-Technology, Infrastructure.

1. Introduction

Technology adoption in the public sector is constantly evolving. Government agencies are constantly searching for new ways to engage the citizenry through digital innovations. In New Zealand, the Tauranga City Council (TCC) uses e-government software to manage more than US $2 billion of assets and infrastructure. The Municipality of Abu Dhabi uses an online portal to issue more than a thousand permits each month. In the United States, National City in California recently automated the city's Community Development processes (Leavitt, 2011). In 2010, municipalities across the globe spent $8.1 billion on diverse types of digital technologies, by 2016 that number is projected to reach $39.5 billion (Gallen, 2009). Despite the rise in e-Government spending, there has been limited research concerning the fit between the technological capabilities of online government systems and its support of public participation in processes involving government and governance (Macintosh, 2006).

Electronic Government (e-Government) is defined as "the use of information technology to enable and improve the efficiency with which government services are provided to citizens, employees, businesses and agencies" (Carter and Belanger, 2005:5). Understanding electronic government (e-Government) maturity requires an investigation of its antecedents (Tan et al., 2010; Das, Singh, and Joseph 2011; Ifinedo, 2011) and an evaluation of facilitating factors (Krishnan and Teo, 2011b) that influence the progress of online government information, tools, and services from diffusion to eventual adoption (Belanger and Carter, 2012; Carter, 2008; Carter and Belanger, 2005; Moon and Norris, 2005). Using the information and communication technology in the delivery process of government information, tools, and services to its citizens (West, 2004) consists of other processes and factors that support the progress of the development. These processes and factors are defined and developed by various stakeholder groups, such as service users, citizens, businesses, small-to-medium sized (SME) enterprises, public administrators, other government agencies, non-profit organizations, and politicians, of these electronic government developments (Rowley, 2011). In addition, the implementation and upgrade of e-government tools and services must provide a certain level of benefit to the public that would otherwise not be available. In regard to e-government implementation and upgrades, we believe the availability of specific resources (i.e. economic, organizational, and technology) can impede the maturation of online government tools and services. For this reason, we believe e-government service advancements (i.e. maturity) relies on the overall fit between government-related task and technology, as well as the availability of the country's viable resources: realized benefits, readiness of potential users, and mature technology infrastructure (e.g. Singh et al. 2007). However, further research is needed to address the relationship between e-government maturity and e-government specific characteristics (Dwivedi et al., 2011) and e-government readiness (Mishra and Mishra, 2011).

The aim of the paper is to study e-government maturity and its determinants. First, we utilize the Fit-Viability framework (Liang and Wei, 2004; Liang et al., 2007) to investigate the determinants of e-government maturity by factoring the concept of fit between technology and task, as well as the availability of viable resources. Applying a quantitative approach, we empirically test the impact of task-technology fit and viability on e-government maturity at the country level. The paper contributes to the study of e-government maturity in a couple of ways: (1) provides empirical evidence of task-technology fit and viability's impact on e-government maturity and (2) provides theoretical implications for e-government maturity and country general characteristics (i.e. economic, organizational, and technological factors).

The rest of the paper is organized as follows. First, we will examine the Fit-Viability Framework and explicate the dimensions of the model in the context of e-government maturity. Second, using the Fit-Viability frame as our guiding theory, we will discuss the dimensions of the model in the context of e-government maturity. Third, we test the hypotheses formulated in our research model. Fourth, we present our research findings and their significance. Lastly, we conclude the study and discuss the implications and limitations.

2. Theoretical Background

In this section, we draw on the Fit-Viability Framework (Liang and Wei, 2004; Liang et al., 2007) and the Theory of Task-Technology Fit (Goodhue, 1995; Goodhue and Thompson, 1995; Zigurs and Buckland, 1998) to examine e-government maturity and its determinants. The aim of this section is to provide a thorough review of the framework and theory and explain the relationship between e-government maturity, task-technology, and viability.

2.1 Fit-Viability Framework

To assess e-government maturity, we utilize the Fit-Viability Model (Liang and Wei, 2004; Liang et al., 2007). The Fit-Viability Framework originated from an internet portfolio management study (Tjan, 2001), where the primary focus (Figure 1) was to manage a portfolio of internet initiatives (Liang and Wei, 2004) based on the following two business areas: fit and viability. Viability refers to the likely payoff of the investment. The Fit of the initiative measures the degree of match between the investment and the company's current processes and capabilities. The strategic matrix provides two benefits: assess the project's likelihood for success or failure of implementation and provides information about the needs of the project for making pre-project adjustments to fit and viable factors (Liang et al., 2007; Tjan, 2001).

Moreover, the expansion of the earlier framework (Tjan, 2001) yielded the Fit-Viability Model (FVM) to illustrate the dynamic relationship between viability and fit dimensions and its influence on performance (Liang et al., 2007). The significance of the two dimensions for developing the best strategy for an implementation is that fit and viability must be rated high or the project may be at risk for failure (Liang and Wei, 2004; Liang et al., 2007; Tjan, 2001). The model argues that a project is likely to fail if viability score is low, regardless of high fit between the technology and task. The opposite is also argued, where the viability of the implementation is high, but the fit between technology and task is low. Liang et al. (Liang et al., 2007) posit that a project that rates high on fit but low on viability will need to restructure their organization to improve their economic status before implementation begins. With a project that rates high in viability and low on fit suggest the organization is prepared for implementation, but the characteristics of the task and technology lacks fit. In the case of electronic government, the availability of viable resources and the degree of fit between technology and task should be adequate enough to positive impact the maturity of e-government tools and services. Maturation of e-government tools and services relies on the country's capacity (i.e. organizational readiness) and willingness to promote participation with public (i.e. e-participation) and interaction with the public (Infinedo, 2011).

The Fit-Viability framework was further expanded (Liang and Wei, 2004; Liang et al., 2007) with the re-conceptualization of the Task-Technology Fit (TTF) dimension (Goodhue, 1995; Goodhue and Thompson, 1995) and the addition of the Viability dimension (Liang and Wei, 2004; Liang et al., 2007; O'Donnel et al., 2007; Turban, Liang, and Wu, 2010). First, the Task-Technology Fit dimension consists of three constructs: task, technology and fit. Task characteristics refer to the task requirements within the organization (Liang et al., 2007). Zigurs and Buckland (1998) suggest four conceptualizations of task characteristics: task as behavior description, task as ability requirements, task qua task, and task as behavior requirements. In the current study, we extend the context of this construct to assess the government-related actions and tasks that are performed in the country. The technology characteristics refer to the attributes of the technology available within the organization (Liang et al., 2007). Zigurs and Buckland (1998) suggest three conceptualizations of technology characteristics: communication support, process structuring, and information processing. In current study, technology characteristics assess the information communication and technology utilized by government agencies in the country. Second, the Viability dimension, which takes the place of TTF's Individual factor (Liang et al., 2007), consist of three factors: economic, organization, IT infrastructure. The economic factor refers to the economic feasibility of the implementation and upgrades and overall financial health of the organization. In the current study, we extend the context of this construct to assess the financial health of the country. The financial health of the country, much like an organization, can consist of current growth and productivity factors that can indicate a country's ability to provide financial support for e-government project implementations and upgrades (Ifinedo, 2011; Singh et al. 2007). The organization factor refers to the overall readiness of the organization to utilize the system. In the current study, we operationalize the construct to assess the country's overall readiness to utilize the online government tools and services. The IT Infrastructure construct refers to the maturity of the organization's current information communication and technology. In current study, we extend the context of this construct to assess the country's current information communication and technology infrastructure. Prior research has found that a country's technological infrastructure positively influences e-government maturity (Singh et al. 2007). In the next section, we will discuss the fit-viability dimensions of our proposed research model (Figure 1).

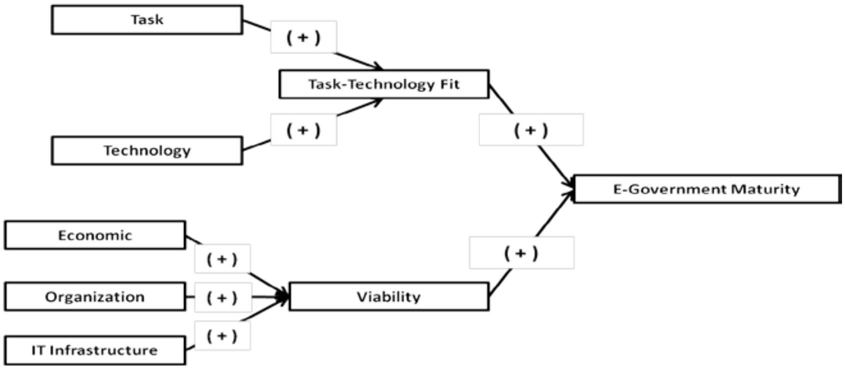

Figure 1. Proposed Research Model

2.2 Task-Technology Fit Dimension

In the context of e-government, we apply the concept of fit to assess the match of technology enabled interaction between the public and government. Through public participation, which includes the supply of information, enhanced consultation, and government interaction with citizens in decision making process, the country is able to establish a degree of convergence between the characteristics of government-related task and technology. By establishing "e-government fit", the interaction between citizen and government (i.e. e-decision-making) can aid in the advancement of online government services and tools (UN Report, 2010). Establishing online government tools and services to enable active public participation in various government and political processes (i.e. e-information, e-consultation, and e-decision making) requires implementing and upgrading the e-government system to match task requirements that would otherwise be performed offline (UN Report, 2010; Carter and Belanger, 2005; Krishnan and Teo, 2011).

Task and Technology

We apply the concept of task and technology characteristics in an e-government context. First, task characteristics refer to the task requirements of government agencies at the country-level. Guided by Zigurs and Buckland (1998), the task characteristics involve various governance and political tasks that involves public participation (Kaufmann et al., 2010). For example, the Task characteristics construct assesses government agencies' ability to develop and implement policies and regulations. The Task characteristics construct also assesses the public and civil services, as well as policy formulation and implementation can positively influence fit because the task requires interaction between the public and government agencies. Second, technology characteristics refer to the information communication and technology utilized in government agencies at the country-level. Guided by Zigurs and Buckland (1998) suggested technology conceptualizations, the technology characteristics consists of technology that supports communication and enables the structuring of interact between government agencies and the public. In current study, technology characteristics assess the information communication and technology utilized by government agencies in the country. Suitable online government tools and services will encourage public participation with government services because the online tools and services will be deemed useful (UN Report, 2010). Both task and technology characteristics assess areas that require public participation and interaction with government agencies. For this reason, we posit:

H1: The country's government-related task characteristics will positively influence e-government fit.

H2: The country's government-related technology characteristics will positively influence e-government fit.

Task-Technology Fit

Task-Technology Fit was initially introduced to measure the impact of fit between task and technology on performance at the individual level (Goodhue, 1995; Goodhue and Thompson, 1995). Zigurs and Buckland (1998) extended the model to assess the impact task and technology fit on performance at the group level. In the current study, we extend the concept of fit at the country-level. Past research focusing on the concept of fit has yielded the following perspectives (Zigurs and Buckland, 1998; Venkatraman, 1989, Drazin and Van de Ven, 1985): matching, covariation, gestalts, moderation, mediation, profile deviation. In the context of e-government, Task-Technology Fit measures the extent to which the information communication and technology meets the task requirements of government agencies that enables public participation in governance process (Macintosh, 2006). In regard to e-government maturity, accommodating the needs of the public with relevant online tools and services will encourage utilization (Carter and Belanger, 2005) while enabling users to participate in political and government process (OECD, 2001; Macintosh, 2006; UN Report, 2010; Krishnan and Teo, 2011). In addition, the public is able to interact with the government concerning advancements to online government tools and services (UN Report, 2010; Durbhakula and Kim, 2011). Through interaction with government agencies, the public will be informed about important issues, as well as provide the feedback that can lead to improvements in the maturity of online government tools and services (UN Report, 2010; Carter and Belanger, 2005; Krishnan and Teo, 2011a). In a recent e-government study, Krishnan and Teo (2011a) found that a country's level of e-participation had a positive influence on the maturation of e-government tools and services. Hence, we posit:

H3: The country's fit between the government-related task and technology characteristics will positively influence e-government maturity.

2.3 Viability Dimension

The Viability dimension refers to the country's available resources that affect the maturation of online government tools and services. The country's economic, educational, and technology readiness can impact future e-government implementation and upgrades. First, the economic factors assess the economic stability and prosperity of the country, which can impact investment in e-government advancements and improvements (Ifinedo, 2011). Prior research (Ifinedo, 2011; Singh et al. 2007) have found that the wealth of the country can impact e-government maturity both directly, as well as indirectly. With economic prosperity, a country will have additional wealth to invest in e-government system upgrades, as well as improvements to the current infrastructure that supports online government tools and services (Ifinedo, 2011). Srivastava and Teo (2006b) found that macro-economic stability positively impacted electronic government development. We assume a prosperous economy will provide countries the adequate funds for future e-government implements and upgrades. Second, the organizational factor assesses the country's overall readiness to utilize e-government advanced functions and features. A highly educated country will have the capacity to utilize online government tools and services (Srivastava and Teo, 2006b; Singh et al. 2007; Ifinedo, 2011). Third, IT infrastructure assesses the country's overall information communication and technology infrastructure (UN Report, 2010). A country with a higher level of technology development would be able to support future e-government implementations and advancements. Past studies (Srivastava and Teo, 2006ab; Singh et al. 2007) have found that the maturity of the country's level of technology development positively influenced the maturation of electronic government tools and services. In a recent e-government utilization study, Ifinedo (2011) found that the availability of quality human

resources, technological infrastructure, and wealth were all significant factors that positively impacted e-government. Hence, we suggest:
H4: The country's viability, measured by economic state, organizational readiness, and maturity of IT infrastructure, will positively influence e-government maturity.

3. Methodology

To test our hypotheses, pertinent data was collected from multiple secondary sources. Four major data sources were utilized: United Nations (UN) e-Government Survey Report (UN Report 2010), World Bank Worldwide Governance Indicators (Kaufmann, Kray, and Mastruzzi 2011), World Bank World Development Indicators (World Bank 2010), and World Economic Forum (WEF) Global Information Technology Report (Dutta and Mia 2011). In our model, e-Government Maturity uses the UN Web Measure Index, which measures the online presence of e-government services at the national and local level based on a five-stage development model, to assess the sophistication and maturity of the country's electronic government tools and services. Past e-government research (Srivastava and Teo, 2006ab, Srivastava and Teo, 2008) have used the Web Measure data item to measure the online presence and level of interactive government services available through the Internet. The following section will present the contents of the two dimensions, task-technology fit and viability, and the theoretical justification and content reliability and validity for constructing the viability dimension as a formative construct.

3.1 Task-Technology Dimension

The Task-Technology Dimension consists of the following constructs: fit, technology, and task. The dimension uses secondary data from the following reputable sources: Global Information Technology Report (Dutta and Mia, 2011) and Word Bank Worldwide Governance Indicator Databank (Kaufmann et al., 2010). First, the Task-Technology Fit construct assesses the extent to which the information communication and technology supports the government-related task requirements at the country level. Past studies (Liang et al., 2007; Turban et al., 2010) have found that the fit between the characteristics of task and technology can lead to increase utilization. By providing the public with the appropriate technology to perform government-related transactions can encourage utilization (Carter and Belanger, 2005). Also, countries that accommodate the public with suitable online tools and services to complete government-related tasks and interact with government agencies, enables the public to participate in the e-government maturation process (Durbhakula and Kim, 2011; Krishnan and Teo, 2011). The UN E-Participation index was used to assess the fit between task and technology characteristics because it measures the overall quality and usefulness of the e-government website in providing information, tools, and services to citizens (UN Report, 2010). E-participation is a suitable item to assess the country's willingness to encourage the public to utilize e-government services and match between the government's online tool and services and government-related tasks.

First, the Technology characteristics construction assesses the extent to which information and communication technologies are utilized by government agencies in the country (Dutta and Mia, 2011). Goodhue and Thompson (1995) describe the technology characteristics construct as technology tools used by individuals to perform their tasks. At the organizational-level, Zigurs and Buckland (1998) define the technology characteristics as computer communication and decision systems that support group meetings and decision making-related tasks (e.g. addressing problems and opportunities). At the country-level, this would be consistent with the country's government agencies utilization of information communication and technology to perform various actions and tasks. Second, the Task characteristics construct refers to the set of government-related actions and tasks that are performed within the country. The Task construct uses two items from the World Bank WGI Databank (Kaufmann et al., 2010): government effectiveness and regulatory quality. First, the government effectiveness item measures the overall quality of public services, civil service, and policy formulation and implementation available to the public. Second, the regulatory quality item measures the government's ability to formulate and implement sound policies and regulations impacting the private sector development. These two items measures the set of government-related actions and tasks that are necessary for public participation. By accounting for various government-related tasks, we are able to assess the complexity of government-related actions and tasks.

3.2 Viability Dimension

The Viability dimension was constructed as a formative construct with the following items: economic, organizational, and IT infrastructure. We validate the formative construct by using the Jarvis et al. (2003) Four Decision Rule to determine the correct type of construct. The first rule, causality of the construct, was satisfied because the economic, organizational, and IT infrastructure, within the context of electronic government maturity, define the construct. The second rule, interchangeability of the construct, was satisfied because each measure had different themes. The third rule, correlation with other constructs, was satisfied with only one variable reaching the highest correlation estimate of .6, which is below the cut-off of .80 and the variance inflation factor (VIF) among the variable scored well below the recommended cut-off of 10.0 (highest score reaching 2.3) (Hair et al., 2009). The fourth rule, antecedents/consequences of the construct, was satisfied since the contents of the construct are composites of very different measures. Lastly, we found additional justification to treat the construct as a formative construct with three autonomous variables based on the conceptual framework and prior literature (Liang and Wei, 2004; Liang et al., 2007; O'Donnel et al., 2007; Turban, Liang, and Wu, 2010). For the aforementioned reasons, the viability dimension was developed as formative construct.

The Viability construct consist of items from various secondary data sources that represent the three formative factors: economic, organizational, and IT infrastructure. First, the Economic construct uses a calculated item the equals the annual percentage change in gross domestic product (GDP Current US$) from the World Bank World Development Indicators Databank (World Bank, 2010). We assume a positive change in gross domestic product is beneficial for a country to provide adequate funding for government projects and upgrades to the current e-government tools and services. Prior research (Ifinedo, 2011; Singh et al. 2007) have found that affluence of the country can impact e-government maturity both directly, as well as indirectly through improved IT infrastructure, Human Capital, and Governance. With economic prosperity, a country will have additional wealth to invest in e-government system upgrades, as well as improvements to the current infrastructure that supports online government tools and services (Ifinedo, 2011). Second, the Organization item uses the UN Human Capital Index (UN Report, 2010), which is a composite of adult literacy rate and gross enrollment ratio for primary, secondary, and tertiary schooling, to assess the country's level of readiness. This item has been used to measure the organizational readiness in past e-government studies (Srivastava and Teo, 2006b; Singh et al. 2007). Third, the IT Infrastructure item uses the UN IT Infrastructure Index (UN Report, 2010), which is a composite weighted average index of six primary indices that define the country's overall ICT infrastructure, to capture the country's level of technological development. In past e-government research (Singh et al., 2007; Srivastava and Teo, 2006b), the data item was used to measure the country's technological infrastructure.

3.3 Control Variables

In the study, we used control variables to account for other contributing factors affecting a country's e-government maturity. First, regional difference measures the country's regional e-government maturity average. Consistent with past studies (Siau and Long 2006; Srivastava and Teo 2010), we account for e-government maturity differences across various region groups (i.e. Americas, Europe, Africa, Asia, and Oceania). Second, economic condition measures the country's gross domestic product per capita (adjusted for purchasing power parity, PPP), which measures the nation's products and services relative to the population size. Guided by Porter's productivity paradigm (Porter 2005), prior research (Singh et al. 2007; Krishnan and Teo 2012; Krishnan and Teo 2012) have used the data item to measure the economic condition and/or affluence (Singh e t al. 2007) of the country. Prior research has found that the regional differences (Srivastava and Teo 2010; Siau and Long 2006;

Krishnan and Teo 2012; Krishnan and Teo 2013) and economic conditions (Singh et al. 2007; Krishnan and Teo 2012; Krishnan and Teo 2012) of a country will impact its e-government maturity. For that reason, we controlled for regional differences and economic conditions in the study.

4. Analysis

We analyzed the data using Smart PLS v.2 (Ringle, Wende, and Will, 2005), a Partial Least Squares (PLS) Structural Equation Modeling (SEM) software application. Structural equation modeling was used in the study for its ability to regress complex models with a small sample size. In addition, structural equation modeling is capable of testing models with formative and reflective constructs and single-item constructs (Gefen et al., 2000). The sample size of 66 countries is sufficient for the number of constructs in our model (Chin, 1998). The analysis procedure consists of factor analysis, convergent validity, and discriminant validity.

Construct	Construct Item	F.Load	AVE	CR	EG_M	Task	Tech	E_Fit	Viab
EGov-M	EGovMaturity	1	1	1	**1**	-	-	-	
Task	Govt_Eff	0.985	0.969	0.984	0.729	**0.984**	-	-	-
	Regul_Q	0.983							
Tech	ICT_Govt	1	1	1	0.670	0.804	**1**	-	-
EGov-F	EGovt_Fit	1	1	1	0.904	0.748	0.710	**1**	-
Viability*	Organization**	-	-	-	0.784	0.876	0.730	.801	**1**
	IT_Infrast**	-							
	Economics**	-							
**The Viability construct is a formative construct – Three items (**)*									
Note: The diagonal values in bold are the square roots of the average variance extracted.									

Table 1. Construct Factor Loadings, Reliability, and Validity

The results of our structural model (Table 1.) provided evidence of reliability and validity. Each construct had a composite reliability above the required threshold of 0.70 with each of construct's items loading above 0.70 in their respective factors (Chin, 1998; Hair et al., 2009). The average variance extracted for each construct loaded above the recommended threshold of .50 (Fornell and Larcker, 1981; Hair et al., 2009). These statistical results provide evidence of achieving convergent validity (Chin 1998). The square root of the average variance extracted (AVE) for each factor was greater than the off-diagonal correlation estimates. This satisfies the requirement for discriminant validity (Chin, 1998). Lastly, we observed that some of the independent variables were highly correlated with (above .80) with one another and required testing for multicollinearity among the variables (Hair et al., 2009). A variance inflation factor (VIF) test was conducted on the construct items in the model for multicollinearity and each of the items had satisfactory estimates of less than 10 (Hair et al., 2009) with the highest score reaching 2.3. Based on the results, we conclude that no multicollinearity problems were present among the independent variables in the model.

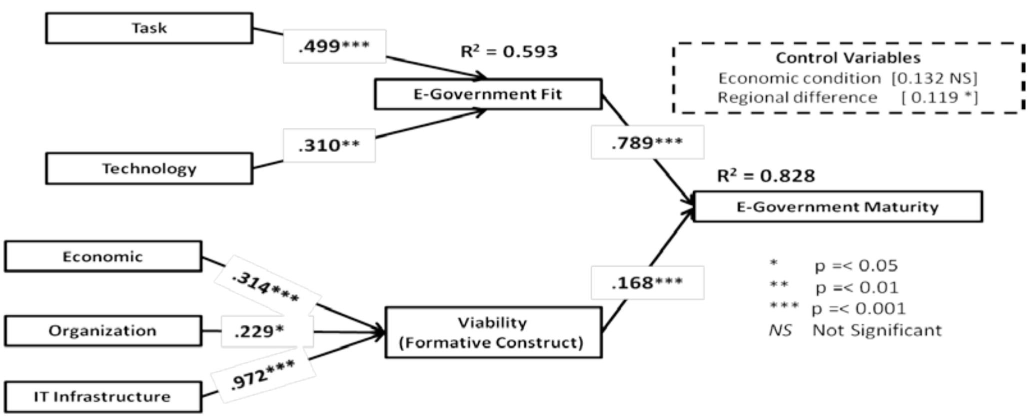

Figure 2. Model Results

5. Results

The results indicate that the latent variables in the structural model (Figure 2.) account for 82.8 percent of the variance in E-Government Maturity. The results of the analysis confirm the following hypotheses were supported: H1, H2, H3, and H4. In the model, Task ($p< 0.001$) and Technology characteristics ($p< 0.001$) positively influence E-Government Fit. Task and Technology accounted for 59.3 percent of the variance in E-Government Fit. The viability construct (formative) had three items (economic, organization, and IT infrastructure) that were statistically significant with the IT infrastructure providing the largest contribution ($b=.972$, $p< 0.001$) among viable resources. Interestingly, the organization factor, which measures the country's human capital, had the smallest contribution among viable resources. Viability ($p< 0.01$) and E-Government Fit ($p< 0.001$) positively influence E-Government Maturity. Lastly, Economic condition did not significantly influence E-Government Maturity, but Regional difference ($b=.119$, $p< 0.05$) significantly influence E-Goverment Maturity. The results provide evidence that E-Government Maturity requires an appropriate level of fit between the capabilities of the technology and the task requirement, as well as a sufficient amount of viable resources available at the national level.

6. Discussion

The viability construct, which consists of economic, organizational, and IT infrastructure factors, had a positive influence on e-government maturity. The country's economic state has been found to be directly associated with e-government maturity, as well as the technological infrastructure (Ifinedo and Singh 2011). In addition, the country's economic state has a positive relationship with its human capital development because the country would have the financial means to accomodate the public with educational and informational resources that would increase educational attainment and overall readiness (Ifinedo and Singh 2011). Future research should investigate the relationship between the economic state and e-government maturity and test the country's characteristics for mediation. Lastly, we were able to assess the relationship between e-government and the country's viable resources and e-government fit and the results contribute to the study of electronic government and ICT development. The proposed model can serve as a viable tool for future research in e-government.

With most research studies, there are limitations that can impede various aspects of its contribution. First, the study uses secondary data from multiple sources in the model and the reliability and validity of the items used may be difficult to assess. However, our data sources (i.e. United Nations) are widely used in electronic government-related academic and industry research. Second, our modest sample size of countries (66 out of a possible 183) left out a number of other countries because the necessary data required to complete an observation was unavailable. However, the sample countries used in the study (Appendix 1.) vary across different geographic locations, types of economies and political governments, and levels of economic development. For that reason, we believe the research results represent countries with different social, economic, and political characteristics. While these limitations exist in the study, we extend the opportunity for future research to resolve these issues and further investigate facilitating factors associated with electronic government maturity.

This study represents an initial attempt to apply Task Technology Fit at a national level. In particular it presents an empirical investigation of the determinants of e-government maturity using the Fit-Viability framework. To accomplish this, we had to operationalize the dimensions of the framework, which to-date, have mostly been investigated qualitatively. As a result we utilized secondary data sources. These sources enabled us to explore e-government maturity at a high-level. Future studies may wish to narrow the scope and evaluate specific types of systems such as online portals, enterprise systems, etc. E-government initiatives consist of a multitude of applications for a multitude of tasks. This study represents an initial attempt to utilize TTF in the e-government domain. Now that we have established this framework as a legitimate tool for exploring e-government, future researchers can utilize a more granular approach to explore phenomenon. Future research should expand the framework to address fit and viability factors unaccounted for in the model (e.g. Individual-Country

Characteristics). Because e-government systems go through stages of development (UN Report 2010), we would suggest future research apply the Fit-Viability framework to study e-Government maturity over time and examine the impact of fit and viability on e-government maturity across different time periods. Lastly, future studies should also employ a mixed methods approach that utilizes both qualitative and quantitative methods to explore this rich domain.

7. Conclusion

The study contributes to IS and e-government literature by (1) applying task-technology fit in the context of electronic government maturity, (2) conceptualizing the viability construct at the country level, (3) confirming the relationship between a country's viable resources factors as determinants of e-government maturity, (4) validating the fit-viability framework with secondary data, and (5) providing theoretical and practical implications for electronic government research. Within the TTF dimension, the task and technology characteristics accounted for over 59 percent of the variability in fit with technology contributing to majority of the fit. It is important for government agencies to implement technology that supports government-related task requirements. Also, results of the study suggest that higher levels of fit between task and technology will positively impact the overall sophistication and development of the country's e-government system. Aside from better serving the public, improvements to e-government online tools and services can benefit the country's e-business development and economic performance (Srivastava and Teo, 2010). The proposed research model highlights factors that impact electronic government maturity at the country-level.

References

Belanger, F. and Carter, L (2012). Digitizing Government Interaction with Constituents: E-government Research in Information Systems. Journal of the Association for Information Systems, 13 (5): Article 1.

Carter, L. (2008). E-government Diffusion: A comparison of adoption constructs. Transforming Government: People, Process, and Policy, 2(3), 2008, 147-161.

Carter, L. and Belanger, F. (2005). The utilization of e-government services: citizen trust, innovation and acceptance factors. Information Systems Journal, 15(1), 5-25.

Chin, W. W. (1998). The Partial Least Squares Approach to Structural Equation Modeling. in: Modern Methods for Business Research, G.A. Marcoulides (ed.), Lawrence Erlbaum Associates, Mahwah, NJ.

Das, A., Singh, H., and Joseph, D. (2011). A Longitudinal Study Of E-Government Maturity. PACIS 2011 Proceedings. Paper 52.

Drazin,R. and Van de Ven, A.H. (1985). Alternative Forms of fit in Contingency Theory, Administrative Science Quarterly, 30(4), 514-539.

Durbhakula, V. and Kim, D.J. (2011). E-business for Nations: A Strudy of National Level E-business Adoption Factors Using Country Characteristics-Business-Technology-Government Framework. Journal of Theoretical and Applied Electronic Commerce Research, 6(3), 1-12.

Dutta, S. and Mia, I. (2011). Global Information Technology Report 2009-2010: ICT for Sustainability. Basingstoke: Palgrave Macmillan. Retrieved March 17, 2011 from http://www.weforum.org/pdf/GITR10/GITR%202009-2010_Full%20Report%20final.pdf

Dwivedi, Y.K., Weerakkody,V. and Marijn,J. (2011). Moving Towards Maturity: Challenges to Successful E-government Implementation and Diffusion. Database for Advances in Information Systems, 42(4), 11-22.

Fornell, C.R. and Larcker, D.F. (1981). Structural Equation Models with Unobservable Variables and Measurement Error. Journal of Marketing Research, 18(1), 39-50.

Gallen, C. (2011). $39.5 Billion Will Be Spent on Smart City Technologies in 2016, Says ABI Research. Accessed on May20,2012 http://www.businesswire.com/news/home/20110908006703/en/39.5-Billion-Spent-Smart-City-Technologies-2016

Gefen, D., Straub,D., and Boudreau, M.C. (2000). Structural Equation Modeling and Regression: Guidelines for Research Practice. Communications of AIS, 4(7), 1-80.

Goodhue, D.L. (1995). Understanding user evaluations of information systems. Management Science, 41(12), 1827-1844.

Goodhue, D.L. and Thompson, R.L. (1995). Task-technology and fit and individual performance. MIS Quarterly, 22(3), 231-236.

Gulati, G.J., Yates, D.J., and Williams, C.B. (2012). Understanding the Impact of Political Structure, Governance and Public Policy on E-Government. 45th Hawaii International Conference on System Science (HICSS), Jan 4-7 2012, 2541-2550.

Hair, J.F., Black, W.C., Babin,B.J., and Anderson, R.E. (2009). Multivariate Data Analysis, 7th ed. Prentice Hall, Upper Saddle River: NJ.

Ifinedo, P. (2011). Factors Influencing E-government Maturity in Transition Economies and Developing Countries: A Longitudinal Perspective. Database for Advances in Information Systems, 42(4), 98-116.

Ifinedo, P. And Singh, M. (2011). Determinants of eGovernment Maturity in the Transition Economies of Central and Eastern Europe. Electronic Journal of e-Government, 9(2), 166-182.

Jarvis, C.B., Mackenzie, S.B., and Podsakoff, P.M. (2003). A critical review of construct indicators and measurement model misspecification in marketing and consumer research. Journal of Consumer Research, 30(2), 199–218.

Kaufmann, D., Kray,A., and Mastruzzi, M. (2010). Governance Matters VII: Aggregate and Individual Governance Indicators 1996-2009. Retrieved March 17, 2011from http://info.worldbank.org/governance/wgi/pdf/wgidataset.xls.

Krishnan, S. and Teo,T. (2011a). Engaging Citizens in Managing Electronic Government Service Quality: A Country-Level Analysis. ICIS 2011 Proceedings, Paper 6.

Krishnan, S. and Teo,T. (2011b). E-Government, E-Business, And National Environmental Performance. PACIS 2011 Proceedings, Paper 100.

Krishnan, S. And Teo, T. (2012). Moderating effects of governance on information infrastructure and e-government development. JASIST, 63(10), 1929-1946.

Krishnan, S, and Teo, T. (2013). Does Governance Matter? Investigating the Impact of Governance on E-Government Maturity. ICIS 2012 Proceedings.

Leavitt, N. (2011). E-Government Bringing City Hall to Your Digital Device. Accessed on May 21, 2012. http://blogs.imediaconnection.com/blog/2011/10/15/e-government-bringing-city-hall-to-your-digital-device/.

Liang, T.P. and Wei, C.P. (2004). Introduction to the special issue: a framework for mobile commerce applications. International Journal of Electronic Commerce, 8(3), 7-17.

Liang, T.P., Huang, C.W., Yeh, Y.H., and Lin, B.S. (2007). Adoption of Mobile Technology in Business: a Fit-Viability Model. Industrial Management and Data Systems, 107(8), 1154-1169.

Kaufmann, D., Kray,A., and Mastruzzi, M. (2010). Governance Matters VII: Aggregate and Individual Governance Indicators 1996-2009. Retrieved March 17, 2011from http://info.worldbank.org/governance/wgi/pdf/wgidataset.xls.

Mishra, A. and Mishra, D. (2011). E-Government - Exploring the Different Dimensions Of Challenges, Implementation, and Success Factors, Database for Advances in Information Systems, 42 (4), 23-37.

Moon, M.J. and Norris, D.F. (2005). Does managerial orientation matter? The adoption of reinventing government and e-government at the municipal level. Information Systems Journal, 15(1), 43–60.

O'Donnel, J., Jackson, M., Shelly,M. and Ligertwood,J. (2007). Australian Case Studies in Mobile Commerce. Journal of Theoretical and Applied Electronic Commerce Research, 2(2), 1-18.

OECD (2001). 'Citizens as Partners: Information, Consultation and Public Participation in Policy-Making,' OECD:Paris.

Macintosh, A. (2006). Characterizing eParticipation in Policy-making, Proceedings of the 37th Hawaii International Conference on System Sciences (HICSS 04).

Porter, M. E. (2005). Building the micro-economic foundations of prosperity: Findings from the business competitiveness index. In The global competitiveness report 2005-06. Geneva, Switzerland: World Economic Forum.

Pudjianto, B. and Hangjung, Z. (2009). Factors Affecting E-Government Assimilation in Developing Countries. Fourth Communication Policy Research, South Conference, Negombo, Sri Lanka. Available at SSRN: http://ssrn.com/abstract=1553651.

Ringle, C. M., Wende, S., & Will, A. (2005). SmartPLS 2.0. Hamburg: University of Hamburg.

Rowley, J. (2011). e-Government stakeholders--Who are they and what do they want?, International Journal of Information Management, 31(1), 53-62.

Siau, K., and Long, Y. (2006). Using Social Development Lenses to Understand E-Government Development, Journal of Global Information Management,14 (1), 47-62.

Singh, H., Das,A., and Joseph,D. (2007). Country-level determinants of e-government maturity. Communications of the Association for Information Systems, 20(40), 632-648.
Srivastava, S.C. and Teo,T. (2006a). Determinants and Impact of e-Government and e-Business Development: A Global Perspective, ICIS 2006 Proceedings, Paper 32.
Srivastava, S.C. and Teo,T. (2006b). Facilitators for e-Government Development: An Application of the Technology-Organization- Environment Framework," AMCIS 2006 Proceedings. Paper 285.
Srivastava, S.C. and Teo,T. (2008). The Relationship between E-Government and National Competitiveness: The Moderating Influence of Environmental Factors. Communications of the Association for Information Systems, 23(5), 73-94.
Srivastava, S.C. and T. Teo,T. (2010). E-Government, E-Business, and National Economic Performance. Communications of the Association for Information Systems, 26(14), 267-286.
Tan,C.W., Benbasat, I., and Cenfetelli, R. (2010). Understanding the Antecedents and Consequences of E-Government Service Quality: Transactional Frequency as a Moderator of Citizens' Quality Perceptions. ECIS 2010 Proceedings, Paper 115.
Tjan, A.K. (2001). Finally, a way to put your internet portfolio in order. Harvard Business Review, 79(2), 76-85.
Tornatzky, L.G. and Fleischer, M. (1990). The Processes of Technological Innovation, Lexington Books, Lexington:MA.
Turban, E., Liang,T.P., and Wu, S. (2010). A Framework for Adopting Collaboration 2.0 Tools for Virtual Group Decision Making. Group Decision and Negotiation, 20 (2), 2010, 1-18.
UN Report. (2010). UN e-government survey 2010. Leveraging e-government at a time of financial and economic crisis. Retrieved March 17, 2011 from http://unpan1.un.org/intradoc/groups/public/documents/un/unpan038851.pdf.
Venkatraman, N. (1989). The concept of fit in strategy research: Toward verbal and statistical correspondence. Academy of Management Review 14, 423–444.
West, D.M. (2004). E-Government and the Transformation of Service Delivery and Citizen Attitudes. Public Administration Review, 64(1), 15–27.
World Bank (2010). The World Development Indicators Database, The World Bank Group, Washington, D.C.
Zigurs, L. and Buckland, B.K. (1998). A theory of task/technology fit and group support systems effectiveness. MIS Quarterly, 22(3), 313-334.

Appendix 1: List of Countries Analyzed

ALGERIA, ARGENTINA, AUSTRALIA, AUSTRIA, BANGLADESH, BELGIUM, BOLIVIA, BRAZIL, BULGARIA, CAMEROON, CANADA, CHILE, CHINA, COLOMBIA, COSTA RICA, CZECH REPUBLIC, DENMARK, ECUADOR, EGYPT, FINLAND, FRANCE, GERMANY, GREECE, HONDURAS, HUNGARY, INDIA, INDONESIA, IRAN, IRELAND, ISRAEL, ITALY, JAMAICA, JAPAN, JORDAN, KENYA, SOUTH KOREA, MALAYSIA, MEXICO, MOROCCO, NETHERLANDS, NEW ZEALAND, NIGERIA, NORWAY, PAKISTAN, PANAMA, PERU, PHILIPPINES, POLAND, PORTUGAL, ROMANIA, SAUDI ARABIA, SENEGAL, SINGAPORE, SLOVENIA, SOUTH AFRICA, SPAIN, SRI LANKA, SWEDEN, THAILAND, TUNISIA, TURKEY, UKRAINE, UNITED KINGDOM, UNITED STATES, URUGUAY, VENEZUELA, VIETNAM
Total Number of Countries = 66