DOES GOVERNANCE MATTER?
INVESTIGATING THE IMPACT OF GOVERNANCE ON E-GOVERNMENT MATURITY

Completed Research Paper

Satish Krishnan¹
School of Computing
National University of Singapore
satishk@comp.nus.edu.sg

Thompson S.H. Teo
School of Business and
School of Computing
National University of Singapore
bizteosh@nus.edu.sg

Abstract

Utilizing the growth theory and the theory of complementarities as the guiding theoretical lenses, this study examines the impact of governance dimensions, namely, voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption on e-government maturity in a country. Based on publicly available archival data from 183 countries, for a cross-sectional period of 2004 to 2008, our results generally supported the hypothesized model. Results indicate that voice and accountability was negatively related to e-government maturity. Also, while political stability, government effectiveness, regulatory quality and rule of law were positively related to e-government maturity, control of corruption was not significantly associated with it. Further, while regulatory quality (and control of corruption) positively moderated the effect of government effectiveness (and rule of law) on e-government maturity, the relationship of voice and accountability with e-government maturity was not contingent on political stability. Our findings contribute to the theoretical discourse on “governance–e-government maturity” by identifying the critical roles of governance dimensions in a country, and providing indications to practice on enhancing its e-government maturity by managing governance dimensions.

Keywords: E-government maturity, governance, growth theory, archival data

¹ The first author would like to thank Mr Sumanaruban Rajadurai for his assistance and support.
Introduction

E-government, defined as the use of the information and communication technologies (ICTs) and the Internet to enhance the access to and delivery of all facets of government services and operations for the benefit of its stakeholders, is continuously transforming public service delivery (Krishnan and Teo 2012). Notwithstanding the massive amount of resources invested in e-government maturity, defined as the extent to which a government in a country has established an online presence (West 2005), the purported benefits of e-government continue to be an “elusive dream” for many governments worldwide (Chan et al. 2008). This is, indeed, due to the high rates of failures in e-government implementations. To illustrate, a study conducted by Heeks (2008), in the context of developing countries, indicates that 35% of e-government initiatives were “total failures” with the initiative being never implemented or immediately abandoned after implementation. Further, the study reports that 50% of e-government initiatives were “partial failures” due to undesirable outcomes. These statistics suggest that despite numerous motivations and service targets underlying public institutions, maturity of e-government is a challenging task faced by governments in most countries. As an attempt to help policy makers and practitioners to face the aforesaid challenge, our study aims to identify the key factors affecting e-government maturity.

Previous research in information sciences (e.g., Morgan and Cong 2003) and development studies (e.g., Jessop 1998; Meso et al. 2006) has connected technology with governance, defined as the collection of processes and institutions that creates the conditions for ordered rule and collective action (Jessop 1998; Kazancigil 1998). In recent years, there has been much debate over the need for effective governance mechanisms in a country, and the impact of such mechanisms on the growth and maturity of public sector technological innovations. For instance, the United Nations’ (UN) survey report on e-government indicates that “good governance has the potential to contribute to the transformation of the public sector, resulting in greater cost savings, enhanced efficiency and reduced administrative burden” (UN Report 2008, p. 8). Kaufmann et al. (1999a), by construing governance as consisting of six dimensions, namely, voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption, established that there is a positive causal connection between governance and growth. While the first two dimensions represent political governance, the middle two and the last two dimensions correspond to economic and institutional governance respectively.

Extant studies examining the impact of governance on e-government maturity are limited in three ways. First, most investigations tend to be “micro” in orientation, focusing on “particular aspects” of impact of governance on e-government maturity with reference to “particular region or country” (e.g., Moon 2002). Although the need for looking at macro-level (i.e., cross-country level) perspective is largely stressed in past literature (Srivastava and Teo 2008), researchers with few exceptions (e.g., Krishnan and Teo 2012) often ignored or overlooked them due to the lack of cumulative theoretical development in e-government research to develop an empirical study addressing macro-level issues (Heeks and Bailur 2007). Second, most studies connecting governance and e-government has been undertaken via a qualitative case study approach (e.g., Mandon et al. 2007; Norris and Moon 2005). While such studies can capture the richness of the context in which the research object is embedded in, they are less likely to address the broad macro-level issues due to the complexity of the phenomenon. Third, extant studies provide contradicting responses to the question of impact of governance on e-government maturity. For instance, while one group of research points to the negative impact of governance on e-government maturity (e.g., Singh and Das 2007), others found no significant effect between governance and e-government maturity (e.g., Das et al. 2011). One reason might be due to the fact that these studies have not considered different dimensions of governance (Kaufmann et al. 1999a), which in turn might have different effects on e-government maturity. Further, to our best of knowledge, there is no single study examining the complementary roles of governance dimensions (within political, economic, and institutional governance) on e-government maturity. Thus, taken together, it is evident that there is a dearth of quantitative empirical studies examining the impact of governance on e-government maturity from a macro perspective. Motivated by these gaps in the literature, the key research questions (RQs) we address in this study are:

RQ1: Does governance in a country affects its e-government maturity?

RQ2: Do governance dimensions (within political, economic, and institutional governance) complement each other in affecting e-government maturity?
Specifically, by utilizing the growth theory and the theory of complementarities as the guiding theoretical lenses, and by building on the previous literature on governance and e-government maturity, we argue that e-government in a country will mature when its governance is good. Further, we argue that the dimensions within a country’s political, economic, and institutional governance complement each other in enhancing its e-government maturity. We believe that our study would illuminate the understanding of the contributions of governance dimensions at the national-level by providing a macro-perspective of its impacts on e-government maturity. Specifically, our findings will contribute to the theoretical discourse on “governance–e-government maturity” by identifying the roles of governance dimensions in a country, and providing indications to practice on enhancing its e-government maturity by managing the governance dimensions.

The rest of the paper is organized as follows. First, by using the growth theory and the theory of complementarities as our guiding theoretical lenses, we explicate the significance of governance in enhancing e-government maturity. This is followed by the section on research design. Thereafter, using archival data from 183 countries (see Appendix for the list of countries) for a cross-section of 2004 to 2008, we test the hypothesized model. We then discuss the results and the implications for future research. The final section provides concluding remarks with a restatement of the value of our study.

Theory and Hypotheses

Growth Theory

We use growth theory as our foundation for explaining e-government maturity (Siau and Long 2006; 2009). Growth theory is an economic theory investigating the reasons for growth and development, and can be broadly classified into three types, namely, classical growth theory, neo-classical growth theory, and new growth theory. These theories were originally proposed to explain the causal factors of actual growth, differences in growth rates over time and space, and policies for raising growth rates (Hacche 1979). Classical growth theory considers the increases in capital and labor as the main causes for growth. New growth theory extends the reasons for growth and development to technological progress and creativity (Lucas 1988; Romer 1986; 1990), and conceives that technology is an endogenous variable rather than an exogenous variable (as believed in neoclassical growth theory). Specifically, new growth theory attributes growth to three key elements, namely, human capital, research and development, and pro-growth trade policies. These theories, extended by researchers from time to time, support the notion of governance in enhancing growth and development (Barro 1997; Chong and Calderon 2000; Gradstein 2004; Kaufmann et al. 1999a; Mauro 1995; Svensson 1998). In sum, growth theory explains aggregate factors leading to growth, which are important aspects of economic performance that affects the multi-dimensional socio-economic environment associated with growth and development (Siau and Long 2006). Given that e-government maturity is a “comprehensive social phenomenon” (Siau and Long 2006, p. 50), its maturity, according to growth theory, can be explained by governance dimensions (Krishnan and Teo 2012; Meso et al. 2009).

Governance, in broader terms, refers to the collection of processes and institutions that create conditions for ordered rule and collective action (Jessop 1998; Kazancigil 1998). According to the International Bank for Reconstruction and Development (IBRD 2002), “strengthening governance institutions” is one of the key millennium development goals. As noted by Kaufmann et al (1999a), governance includes the process by which governments are selected, monitored and replaced (i.e., political governance), the capacity of the government to effectively formulate and implement sound policies (i.e., economic governance), and the respect of citizens and the state for the institutions that govern economic and social interactions among them (i.e., institutional governance). According to the World Bank (1994), “good governance” is epitomized by (1) openness and predictability in policy making; (2) professionalism in bureaucracy; (3) accountability of government; and (4) participation of civil society in public affairs; all behaving under the rule of law. In line with Jessop’s (1998) and Kazancigil’s (1998) definition of governance, Kaufmann et al. (1999a) proposed six dimensions of governance (or good governance) in a country, namely, voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption. Table 1 presents a brief note on these six dimensions.
Table 1. Governance Dimensions and Description

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice and Accountability</td>
<td>Captures the extent to which a country’s citizens are able to participate in selecting their government, as well as freedom of expression and association, and a free media.</td>
</tr>
<tr>
<td>Political Stability</td>
<td>Measures the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including domestic violence and terrorism.</td>
</tr>
<tr>
<td>Government Effectiveness</td>
<td>Captures the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies.</td>
</tr>
<tr>
<td>Regulatory Quality</td>
<td>Captures the ability of the government to formulate and implement sound policies and regulations that permit and promote development.</td>
</tr>
<tr>
<td>Rule of Law</td>
<td>Captures the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.</td>
</tr>
<tr>
<td>Control of corruption</td>
<td>Captures the extent to which public power is exercised for private gain, as well as “capture” of the state by elites and private interests.</td>
</tr>
</tbody>
</table>

As noted by Meso et al. (2009), the concept of governance is gaining increasing focus as a national-level construct owing to the rapidly growing domain of e-government within ICT research. Further, in their archival study of developing countries, they indicated that governance has the potential to influence the kind of information systems (IS) that are getting developed. Likewise, Madon et al. (2007) established that effective implementation of government-based IS for the provision of services is impacted by the macro-level policy making organs; thereby shaping the type of system that eventually gets implemented. Another study by Moon (2002), found that institutional factors significantly contributed to the adoption of e-government among municipalities. Norris and Moon (2005) showed that the level of adoption and sophistication of e-government systems are correlated with the presence of well-developed institutional factors. A study conducted by West (2004a) highlighted the importance of institutional arrangements and governance mechanisms in ensuring e-government development. This has also been stressed by Von Haldenwong (2004). Similarly, McNeal et al. (2003) established that legislative professionalism and professional networks are associated with extensive use of e-government. Most recently, Srivastava and Teo (2010) found that the quality of public institutions in a country is significantly related with the level of its e-government development.

According to Chadwick and May (2003), there are three models of governance evident in contemporary e-government implementations. First, in the managerial model, governance is seen as providing the citizenry with pertinent information services in an open, transparent, and timely fashion. Second, in the consultative model, governance is comprehended as (1) receiving feedback and opinions from the general public in a successful manner; and (2) using the opinions in policy-making process to inform and/or influence future governmental actions. And finally, in the participatory model, governance is perceived as open communications (i.e., voicing of one’s concerns), where the opinions are not necessarily directed only to government but to all players within the governance communications space. Taken together, as highlighted in UN-Report (2008), governance revolves around governmental collective action “to advance the public good by engaging the creative efforts of all segments of society, thereby influencing the strategic actions of the stakeholders” (p. xvi).

While strengthening the concept of governance within e-government development is an important step towards improving the coordination of procedures and systems within and across government agencies and organizations (UN-Report 2008), it should be noted that governance is a broader construct than is perceived within e-government (Meso et al. 2009). That is, governance is not the exclusive preserve of national governments (Peters and Pierre 1998). Rather, it entails multiple disparate players such as citizenry, commercial firms and special interest groups among others. Further, Larmour (1995) indicates that governance connotes either of the two things. Whereas the first is “effective government,” referring to the performance of a government (judged by parameters such as economic growth, poverty rate and living standards), the second relates to the “freedoms” accruing to a country’s citizens owing to their government’s actions. In sum, the concept of governance is not only related to autonomous self-governing
networks of institutions but also transcends government in a country (Meso et al. 2009). Governance is thus responsible for (1) creating an arena that facilitates the participants in all aspects of the economy to easily evolve, learn and adapt (Meso et al. 2006); and (2) assuring political stability, economic stability, equitable distribution of power and national resources, and an environment conducive to the growth and development of e-government.

**Theory of Complementarities**

The theory of complementarities is an influential theory within the strategic management literature. Teece (1986) introduced the concept of complementary assets (or resource complementarities), which are resources or capabilities that allow firms to capture the profits associated with a strategy, technology, or innovation. He suggested that for commercializing the design for a new product in a profitable way, a firm needs access to complementary manufacturing and distribution facilities on favorable terms. Even if other firms can imitate the new product, they will not be able to gain competitive advantage from this imitation if they do not have access to the necessary complementary assets. In the Resource-Based-View (RBV) literature, resource complementarities have been conceptualized in two different ways (Ravichandran and Lertwongsatien 2005). First, according to the resource copresence view (or interaction perspective), firm resources are considered complementary when the presence of one resource enhances the value or effect of another resource. That is, a resource produces greater returns if certain other resources are present than it would produce by itself. Second, the resource channeling view argues that complementarities arise when resources and capabilities are used in mutually reinforcing manner (i.e., channeling resources).

While the concept of complementarities was originally proposed to study a firm-level phenomenon (Teece 1986), several researchers have extended its core arguments to different levels (e.g., country-level) and established its usefulness in different empirical settings. For instance, Srivastava and Teo (2008), extending the complementarity perspective, established that e-government in a country in association with complementary assets such as human capital, public institutions, and macro-economic conditions has the potential to enhance its business competitiveness. Consistent with them, in this study, we, by drawing from resource copresence view of the complementarity perspective of the RBV, argue that the dimensions within political, economic, and institutional governance complement each other in enhancing e-government maturity. An application of the concept of governance dimensions (within political, economic, and institutional governance) as complementary to each other can explain why only some countries are able to attain high levels of e-government maturity. Complementary assets, in our case, can be defined as the dimensions of governance that are required to attain high levels of e-government maturity in the presence of other dimensions within political, economic, and institutional governance. For instance, if a governance dimension (e.g., voice and accountability within political governance) requires another dimension (e.g., political stability within political governance), only countries scoring high on that dimension will be able to attain high levels of e-government maturity. That is, dimensions within political, economic, and institutional governance will complement each other in enhancing e-government maturity. In ensuing sections, we discuss the hypotheses connecting the governance dimensions and e-government maturity.

**Hypotheses Development**

**Relating Political Governance to E-Government Maturity**

Political governance refers to the process by which the governments are selected, monitored and replaced, and is construed to consist of two dimensions, namely, voice and accountability, and political stability (Kaufmann et al. 1999). Voice and accountability is an important dimension of governance because citizens as well as government institutions have a role to play in delivering governance that works for the poor and that enhances democracy. As noted in Goetz and Jenkins’ (2001; 2002) static model of voice and accountability, voice refers to a variety of formal and informal mechanisms through which people express their preferences, opinions and views, and accountability refers to the nature of relationship between two parties (e.g., citizens and government officials). Further, accountability concerns the requirement that officials answer to stakeholders on the disposal of their powers and duties, act on criticisms or
requirements made of them and accept responsibility for failure, incompetence or deceit (UNDP 1997). According to Kaufmann et al. (1999a), voice and accountability concerns the civil liberties and political rights of the individuals, their freedom of expression, electoral participation, and independence of media. Citizens’ ability to express and exercise their views has the potential to influence government priorities. Further, they have the capacity to shape the governance processes by demanding transparency and accountability. Government in a country will be accountable to the needs and demands of its citizens only when they are clearly articulated (i.e., when their “voice” is effective). In the context of public sector reform, “effective” voice and accountability mechanisms in a country have a potential to transform governmental actions and decisions by (1) demanding appropriate channels for deliberative, participatory decision-making in public policy; and (2) addressing the demand-side aspects of public service delivery, monitoring and accountability. Given this, it is appropriate to argue that such mechanisms will help in (1) strengthening the links between citizens and local government; and (2) assisting local authorities and service providers to become more responsive and effective. In sum, when voice and accountability is effective in a country, the level of sophistication of online public services will progress beyond basic information publishing to transactional and connected service. Therefore, we posit:

**H1:** Voice and accountability is positively associated with e-government maturity.

Political stability, on the other hand, involves the likelihood of premature overthrow of government (e.g., coup d’etat), domestic violence and terrorism, and forced discontinuities in policies (Kaufmann et al. 1999a). In short, it is a measure of the degree of turbulence in a country (Meso et al. 2006). A large number of theoretical studies suggest that political instability may adversely affect economic growth. For instance, Cukierman et al. (1992) argue that governments in politically unstable and polarized countries are more likely to adopt inefficient or suboptimal policies, including the maintenance of inefficient tax systems, higher current government consumption, or the accumulation of larger external debts, which, in turn, adversely affect long-run economic growth. Sadowsky (1993; 1996) linking political stability with foreign direct investment (FDI) and with the risks associated with such investments, established that the greater the degree of turbulence, the more risky it is to invest in the country. Meso et al. (2006) emphasized that the level of political stability in a country has the potential to influence the level of engagement by local citizens in productive economic activity. That is, in situations of high political instability, citizens will be more likely to retire their productive resources, transfer them to more stable environments, or convert them into assets that will protect them against possible loss of life and wealth, thereby resulting in economic productivity loss. Such a situation is not only limited to economic development and prosperity but also can affect other dimensions of national development such as social development and ICT-led developments. For instance, Kasigwa et al. (2006, p. 78) in their discussion on the role of ICTs and their sustainability in the context of developing countries, indicated that “technological infrastructure and political stability are crucial factors for ICT-led development.” Further, as ICT-led developments such as e-government is a major transformational exercise in change management, strong political leadership and stable political conditions are required for e-government applications to (1) overcome resistance and barriers; (2) change mindsets; (3) push through organizational change; and (4) sustain investment (Sudan 2005). Another exploratory study by Al-Solbi and Al-Harbi (2008), specific to the context of Saudi Arabia, highlighted political instability in Middle East as a critical determinant affecting the success of e-government in Saudi Arabia. Further, they generalized by arguing that such an instability in any region or country will reduce ICT-led investments and will have a negative impact on the ICT-led developments in that region or country. Hence, we propose:

**H2:** Political stability is positively associated with e-government maturity.

Further, by drawing from the resource copresence view of the complementarity perspective of the RBV, it is logical to presume that voice and accountability, when combined with political stability will lead to higher levels of e-government maturity in a country. That is, political stability of a country, according to Weill’s (1991) phenomenon of “conversion effectiveness,” will influence the effect of voice and accountability on e-government maturity. More formally, we therefore hypothesize:

**H3:** Political stability positively moderates the relationship between voice and accountability and e-government maturity.
Relating Economic Governance to E-Government Maturity

Economic governance pertains to the capacity of the government to effectively formulate and implement sound policies, and is construed to consist of two dimensions, namely, government effectiveness and regulatory quality (Kaufmann et al. 1999a). The goals and objectives of a government in a country can be multifarious ranging from economic to social (Srivastava and Teo 2007). Whereas economic objectives are concerned with making a nation (and its businesses) competitive, social objectives are related to enhancing the lives of its citizens by reducing poverty and social inequalities. It is a widely acknowledged thought that governments can accomplish such objectives only when they are committed to its stakeholders (i.e., citizens and businesses) in delivering goods and services (Kaufmann et al. 1999a). In other words, governments should be “effective” in producing and implementing good policies and systems, and delivering public services online to achieve such objectives. That is, governments will be instrumental in developing e-government initiatives and delivering online public services only when its (1) national institutions are effective; (2) resource allocation is efficient; (3) quality of public administration is effective; (4) civil servants are competent; and (5) civil service is independent from political pressures (Kaufmann et al. 1999a). For instance, a few years ago, in Singapore, applying for licenses was a daunting task for many startups and existing businesses. As most business activities commonly were under the purview of more than one agency, many businesses had to visit different agencies to apply for licenses, which resulted in significant opportunity and compliance costs for them. After the government launched the Online Business Licensing Service (a seamless system for businesses to apply for required licenses), applicants have to submit only one online form, and the average approval processing time was reduced by 65%, from an average of 21 to 8 days (Teo and Koh 2010). Such development and level of sophistication in delivering online public service was possible only due to the government’s effectiveness and its commitment to its citizens and businesses. Therefore, we propose:

**H4:** Government effectiveness is positively associated with e-government maturity.

Regulatory quality in a country, on the other hand, is focused on the policies themselves (Meso et al. 2006). According to Kaufmann et al. (1999a), regulatory framework is concerned with the incidence of market-unfriendly policies such as price controls or inadequate bank supervision, as well as perceptions of the burdens imposed by excessive regulation in areas such as foreign trade and business development. Similarly, Radaelli (2007) stated that improvements in regulatory performance include targets of burden reduction, cost effective regulation, and increased reliance on market-friendly alternatives to regulation. As noted in the new growth theory, formulation of policies concerning pro-growth trade is a required condition for growth and development (Romer 1986; Lucas 1988). A large scale study conducted by the World Economic Forum indicated that the regulatory environment in a country is a critical determinant that facilitates its ICT-led innovations and investments (Dutta and Mia 2010). Similarly, Schware (2005), in his report prepared for the “World Summit on the Information Society,” stressed the need for effective (or high quality) regulatory frameworks for the adoption and use of e-applications. Further, he indicated that regulatory reforms establish a positive enabling environment for ICT-led developments in a country. Another study by Neto et al. (2005), established that regulatory reforms can play an important role in promoting competition and ICT investment, causing ICT prices to drop and extending access to more advanced ICT services. Further, they indicate that differences in regulatory quality generally account for a large part of the gap in technology use among countries. Hence, when the quality of regulatory framework is high, it is more likely that e-government services would progress beyond basic information publishing. That is, the level of sophistication of e-government will mature from emerging information services to transactional and connected services (UN-Report 2010). Hence, we posit:

**H5:** Regulatory quality is positively associated with e-government maturity.

Further, by drawing from the resource copresence view of the complementarity perspective of the RBV, it is appropriate to argue that an effective government in a country in presence of high quality regulatory frameworks will complement each other to add towards its e-government maturity. Therefore, we posit:

**H6:** Regulatory quality positively moderates the relationship between government effectiveness and e-government maturity.
Relating Institutional Governance to E-Government Maturity

Institutional governance pertains to the respect of citizens and the state for the institutions that govern economic and social interactions among them, and is construed to consist of two dimensions, namely, rule of law and control of corruption. Rule of law concerns the extent to which agents have confidence in and abide by the rules of society (Kaufmann et al. 1999a). These include perceptions of the incidence of crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts. Together, these indicators measure the success of a society in developing an environment in which fair and predictable rules form the basis for economic and social interactions, and importantly, the extent to which property rights are protected. Meso et al. (2006) found that the rule of law lies at the crux of the national development efforts. Further, they highlight that the legal framework to create an efficacious judiciary to administer the law, “forms a quintessential part of governance” (p. 194). Further, Schware (2005) stressed the need for harmonizing the legal frameworks across countries for ensuring the cross-border interoperability of the Internet-based applications. This result was also observed by Satola et al. (2004) in their research on 23 countries in the East Asia and Pacific region. Further, Neto et al. (2005) highlighted that ICT activity (in a country) depends significantly on appropriate legal frameworks (particularly, respect for the “rule of law”). Another study by Guermazi and Satola (2005, p. 23) established that “it is critical for countries to adopt enabling legal environments that support e-development.” As legal frameworks and laws provide a range of civil and criminal penalties and enforcement procedures, they are particularly essential to advance the e-government development agenda of a country. This is also observed in a recent longitudinal study by Dutta and Mia (2010). Specifically, they note that legal frameworks facilitate ICT penetration and ICT-led innovations. Therefore, we posit:

\[ H7: \text{Rule of law is positively associated with e-government maturity.} \]

Corruption, a complex term having various connotations (Ojha et al. 2008), is believed to play a substantial role in explicating growth and development of nations including the implementation and maturity of national e-strategy (Yoon and Chae 2009) such as e-government. Jain (2001), in his review, defines corruption as the acts in which the power of public officials is used for personal gains in a manner that contravenes the rules of the game. The acts of corruption, according to the United Nations Office on Drugs and Crime (UNODC 2004), can take many forms, including bribery, embezzlement, theft, extortion, abuse of discretion, favoritism, exploiting conflicting interests, and improper political contributions. Corruption in a country buckles the reward structure spelled out by the government regulations and institutions (Senior 2004), and often leads to unproductive behaviors (Rodriguez et al. 2005). It is widely acknowledged that control of corruption in a country can facilitate its growth and development by strengthening institutions, lowering business costs, encouraging domestic and foreign investments, and deteriorating a perverse incentive system. On the other hand, a country in which corruption is endemic is usually plagued with widespread economic inefficiency (UNDP 2008). Extant studies have shown that the existence of corruption in a country will hinder the growth of e-government (and other ICT-led developments) and will affect its level of sophistication (or maturity). For instance, Yoon and Chae (2009, p. 34) indicated that “corruption actually lowers the effectiveness of national e-strategy and its implementation.” Further, another study by Kim et al. (2009) suggested that countries should embed effective strategies for fighting corruption in the design of the e-government system and stressed the need for stronger leadership in implementing such systems. This was also emphasized by Lio et al. (2011). A few studies have acknowledged that corruption might hinder the introduction of ICTs (e.g., Oruame 2008; Quibria et al. 2003). In sum, when the level of control of corruption in a country is higher, the level of its e-government maturity will be higher. Hence, we propose:

\[ H8: \text{Control of corruption is positively associated with e-government maturity.} \]

Further, by drawing from the resource copresence view of the complementarity perspective of the RBV, it is logical to presume that rule of law, when combined with control of corruption will lead to higher levels of e-government maturity in a country. That is, control of corruption in a country, will influence the effect of rule of law in enhancing e-government maturity. More formally, we therefore posit:

\[ H9: \text{Control of corruption positively moderates the relationship between rule of law and e-government maturity.} \]
Control Variables

Control variables are used to account for factors other than the theoretical constructs of interest, which could explain variance in the dependent variable (Ravichandran and Lertwongsatien 2005). In our study, it is likely that variables other than governance dimensions could affect e-government maturity. Prior research has found that the economic condition of a country (e.g., Feng 1997; Singh et al. 2007) and regional differences (e.g., Siau and Long 2006) will affect e-government maturity. Therefore, we controlled for their effects in our study. Figure 1 depicts our research model of relationships among governance dimensions (as defined by Kaufmann et al. (1999a)) and e-government maturity.

---

Research Design

To test the formulated hypotheses, we gathered archival data (for each of the main constructs) for two reasons. First, collecting large scale primary data from over hundred countries is constrained by the amount of resources and time available for conducting such research (Krishnan and Teo 2012; Srivastava and Teo 2008). Second, archival data, as suggested by some researchers (e.g., Jarvenpaa 1991) offers several advantages, namely, (1) easy reproducibility; (2) ability to arrive at more generalizable results arising from larger datasets (Kiecolt and Nathan 1985); and (3) robustness to the threat of common method bias (Woszczynski and Whitman 2004). The primary sources of data were the Global E-Government Reports (West 2004b; 2005; 2006; 2007; 2008), the World Bank’s Worldwide Governance Indicators Database, and the United Nations Statistics Division’s National Accounts Main Aggregates Database. We used the data directly from these reports/databases as the data collecting agencies are trustworthy and followed rigorous procedures for ensuring the reliability and validity of data. Hypotheses were tested via a cross-sectional analysis of 183 countries by utilizing multiyear averages from the aforesaid reports/databases for a period of 2004 to 2008. According to Hair et al. (2006), 50 is the minimum number required to avoid degrees of freedom and efficiency problems. Further, multiyear averages provide more accurate and stable estimates than single year datasets (Wiggins and Ruefli 2005). The concept of using multiyear averages over single year datasets is consistent with what has been done in previous country-level studies from reference disciplines (e.g., Brouthers et al. 2008; Habib and Zurawicki 2001; Voyer and Beamish 2004). We used a five-year cross-section of 2004 to 2008 due to data limitations pertaining to the construct of e-government maturity. While the maturity scores are available
from 2001 to 2008, the methodology behind the computation of the scores – the components and their weights – remained the same only from 2004 to 2008, thereby enabling the calculation of averages only for those years. In sum, we had e-government maturity scores over five years from 2004 to 2008; thus, suitable for calculating average scores for our analysis.

Operationalization of Constructs

The independent construct, governance was construed to consist of six dimensions, namely, (1) voice and accountability; (2) political stability and absence of violence; (3) government effectiveness; (4) regulatory quality; (5) rule of law; and (6) control of corruption (Kaufmann et al. 1999a). The values for these dimensions range between -2.5 and 2.5, with the higher values corresponding to the better governance. These six dimensions (or measures) have since been adopted by the World Bank and employed as indices of governance in the world development reports (IBRD 2002). In a separate article published in the same year, Kaufmann et al. (1999b) showed that aggregated variables are richer and better predictors of governance than the individual governance measures that are currently published annually by a wide group of organizations. Further, they demonstrated that aggregating individual variables allows for the coverage of many more countries and for the standardization of the resulting measures, thereby facilitating cross-country comparative research. Data for these measures were taken from the World Bank’s Worldwide Governance Indicators Database, and have been used in past studies like Krishnan and Teo (2012) and Meso et al. (2009). It should be noted that the World Bank followed rigorous procedures for ensuring the reliability and validity while forming governance indices. First, multiple sources were used to gather the governance data. This included surveys of (1) households and firms; (2) commercial business information providers; (3) non-governmental organizations; and (4) public sector organizations. Second, a three-step procedure was followed to construct each of the six aggregate governance measures: (1) assigning data from individual sources to the six aggregate indicators; (2) preliminary rescaling of the individual source data to run from 0 to 1; and (3) using an unobserved components model (a statistical tool) to make the 0-1 rescaled data comparable across sources, and then to construct a weighted average of the data from each source for each country.

The dependent construct, e-government maturity, reflecting the demonstrated behavior of e-government in a country, measures the extent to which a government has established an online presence (West 2005). Operationally, the extent to which a government develops an online presence is characterized by the features implemented in government websites, such as the provision of online publications, access to various government-related databases, and support for non-native languages (West 2008). Implicitly, e-government maturity represents a continuum of developmental stages, from publishing information to supporting transactions, with some countries having progressed further than the others (West 2007). This conceptualization of e-government maturity is focused more on technological sophistication than political activity (Kim and Grant 2010). The scores for this construct were obtained from the Global E-Government Reports (West 2004b; 2005; 2006; 2007; 2008) and has been used in past studies like Singh et al. (2007). Several stringent procedures, namely, (1) choosing appropriate websites for analyses; (2) deciding on the criteria (or features) for analyses; and (3) using foreign language readers to evaluate government websites that are not in English, were followed while computing the maturity scores. Further, these scores were based on the assessment of the websites of executive offices (such as a president and prime minister), legislative offices (such as parliament or people’s assemblies), judicial offices (such as major national courts), cabinet offices and major agencies serving crucial functions of government (such as health, human services, education, and economic development).

The control variable, economic conditions of a nation, according to Porter (2005), depends both on the value of nation’s products and services, measured by the prices they can command in open markets, and also on the efficiency with which they are produced. Hence, consistent with extant studies (e.g., Srivastava and Teo 2010), we used Porter’s productivity paradigm for operationalizing economic conditions in terms of GDP per capita (in US dollars), the values for which were obtained from the United Nations Statistics Division’s National Accounts Main Aggregates Database. The other control variable, regional difference was operationalized as the country-level difference across various regions of the world. Based on UN’s regional groupings, we classified countries into five groups (i.e., Americas (e.g., United States); Europe (e.g., Denmark); Africa (e.g., Congo); Asia (e.g., India); and Oceania (e.g., Australia)) and controlled for their effects in our study.
Analysis and Results

Table 2 presents the descriptive statistics and correlations of all variables of our study. As shown, e-government maturity and governance in countries was of moderate quality on average, with the mean scores on (1) e-government maturity being 27.89; and (2) all the dimensions of governance being below zero. Also, correlations among most variables were significant at p<0.001. Further, while most correlations among variables were below the threshold value of 0.8, indicating minimal concern for multicollinearity (Gujarati 2003; Gujarati and Porter 2009), the correlation of government effectiveness with control of corruption (r=0.84), and the correlation of regulatory quality with rule of law (r=0.82) were above 0.8, indicating a potential for multicollinearity. However, considering that these variables measure distinct parameters (Kaufmann et al. 1999a), and are used as standard measures of governance in the world development reports (IBRD 2002), the high correlations may not seriously affect the results. Further, our use of the robust method of moderated multiple regression to test the hypotheses generally mitigates any undue influences (Hair et al. 2006). Nevertheless, we followed up with the diagnostic statistical collinearity tests that measure variance inflation factor (VIF). VIF assesses the effect that the other independent variables have on the standard error of a regression coefficient (Hair et al. 1997). Some researchers suggest that multicollinearity is not a significant problem if the value of VIF is below 10 (Hair et al. 2006). The results of these tests revealed that our VIFs ranged from 2.02 to 4.41. That is, all the independent variables had a VIF below the conservative value of 5; thus, the concern in our model appeared to be minimal.

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Econ. Cond.</td>
<td>8.17</td>
<td>1.61</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. Reg Diff.</td>
<td>2.78</td>
<td>1.20</td>
<td>-28</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. Voc. And Acct.</td>
<td>-0.07</td>
<td>1.00</td>
<td>53</td>
<td>-37</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4. Pol. Stab.</td>
<td>-0.06</td>
<td>0.07</td>
<td>55</td>
<td>-14</td>
<td>55</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5. Govt. Efft.</td>
<td>-0.05</td>
<td>0.99</td>
<td>74</td>
<td>-25</td>
<td>69</td>
<td>66</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6. Reg. Qual.</td>
<td>-0.05</td>
<td>0.98</td>
<td>71</td>
<td>-30</td>
<td>72</td>
<td>64</td>
<td>75</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7. Rule. Law.</td>
<td>-0.07</td>
<td>0.99</td>
<td>69</td>
<td>-14</td>
<td>71</td>
<td>68</td>
<td>74</td>
<td>82</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8. Corrupt. Ctrl.</td>
<td>-0.05</td>
<td>0.99</td>
<td>70</td>
<td>-25</td>
<td>68</td>
<td>62</td>
<td>84</td>
<td>74</td>
<td>75</td>
<td>-</td>
</tr>
<tr>
<td>9. E-Gov. Mat.</td>
<td>27.89</td>
<td>5.54</td>
<td>53</td>
<td>-14</td>
<td>37</td>
<td>27</td>
<td>65</td>
<td>63</td>
<td>55</td>
<td>57</td>
</tr>
</tbody>
</table>

Note. N=183. M=Mean; SD=Standard Deviation. aLog-transformed variable. Decimal points omitted for correlations. All correlations (except those underlined) are significant at p<0.05 (2-tailed).

We used moderated multiple regression, a hierarchical regression analysis technique for testing the research hypotheses as it is an established method for testing the interaction effects and has been used in many similar studies in the fields of IS, international business, and macro-economics. We adopted the method recommended by Aiken and West (1991) for examining the interactions in regression methods where we first “centered” or “linearly-rescaled” each of the two variables by subtracting the mean from each country’s score for each variable to reduce the effect of multicollinearity between the interacting term and the main effect\(^2\) (Lance 1988). All interaction terms were assessed simultaneously so that their effects could be seen in the context of the overall model (i.e., in the presence of other interaction effects) (Kankanhalli et al. 2005). Specifically, as a first step, the control variables, economic condition and regional difference were entered into the regression equation. In steps 2 and 3, we entered independent variables (i.e., all six dimensions of governance) and three interaction terms respectively into the regression equation. A summary of our results are presented in Table 3. The R\(^2\) value of 0.65 and adjusted

\(^2\) As recommended by the Associate Editor (AE), we also utilized residual centering (Lance 1988) in comparison with mean centering to reduce the effect of multicollinearity between the interaction term and the main effect. However, no major differences were found in the test of interaction, its coefficient in the model or its standard error, and R\(^2\) values.
R² value of 0.63 (F=26.69, p<0.001) indicated that the overall model was effective in explaining the variance in e-government maturity. The change in R² value between steps 2 and 3 of regression was 0.07 (change in F=13.24, p<0.001), indicating that the outcome of the third step (i.e., testing of moderation effects) could be interpreted.

Table 3. Regression Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>βa</th>
<th>Hypothesis Test</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1: Controls</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic Condition</td>
<td>0.64***</td>
<td></td>
</tr>
<tr>
<td>Regional Difference</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>Model R²</td>
<td>0.40</td>
<td></td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.38</td>
<td></td>
</tr>
<tr>
<td>Model F</td>
<td>56.79 ***</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2: Main Effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voice and Accountability (VA)</td>
<td>-0.35**</td>
<td>H1 was not supported</td>
</tr>
<tr>
<td>Political Stability (PS)</td>
<td>0.29*</td>
<td>H2 was supported</td>
</tr>
<tr>
<td>Government Effectiveness (GE)</td>
<td>0.43 ***</td>
<td>H4 was supported</td>
</tr>
<tr>
<td>Regulatory Quality (RQ)</td>
<td>0.36**</td>
<td>H5 was supported</td>
</tr>
<tr>
<td>Rule of Law (RL)</td>
<td>0.28*</td>
<td>H7 was supported</td>
</tr>
<tr>
<td>Control of Corruption (CC)</td>
<td>-0.03</td>
<td>H8 was not supported</td>
</tr>
<tr>
<td>Model R²</td>
<td>0.58</td>
<td></td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.54</td>
<td></td>
</tr>
<tr>
<td>∆R²</td>
<td>0.18</td>
<td></td>
</tr>
<tr>
<td>Model F</td>
<td>39.93 ***</td>
<td></td>
</tr>
<tr>
<td>F Change</td>
<td>16.86 ***</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3: Interaction Effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VA × PS</td>
<td>-0.01</td>
<td>H3 was not supported</td>
</tr>
<tr>
<td>GE × RQ</td>
<td>0.22*</td>
<td>H6 was supported</td>
</tr>
<tr>
<td>RL × CC</td>
<td>0.19*</td>
<td>H9 was supported</td>
</tr>
<tr>
<td>Model R²</td>
<td>0.65</td>
<td></td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.63</td>
<td></td>
</tr>
<tr>
<td>∆R²</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>Model F</td>
<td>26.69 ***</td>
<td></td>
</tr>
<tr>
<td>F Change</td>
<td>13.24 ***</td>
<td></td>
</tr>
</tbody>
</table>

*Note. N=183. aThe betas reported is based on standardized coefficients. *p<0.05  **p<0.01  ***p<0.001 (2-tailed).

As shown in the table above (step 2), among six dimensions of governance, five were significant. Whereas voice and accountability was negatively associated with e-government maturity (β=-0.35, p<0.01), political stability was positively associated with it (β=0.29, p<0.05). Hence, H1 was not supported and H2 was supported. While unexpected, the finding pertaining to voice and accountability is interesting and will be discussed in greater detail in the next section. Next, as shown in the table, government effectiveness (β=0.43, p<0.001) and regulatory quality (β=0.36, p<0.01) were positively associated with e-government maturity. Therefore, both H4 and H5 were supported. Also, while rule of law was positively associated with e-government maturity (β=0.28, p<0.05), control of corruption did not have a significant
relationship with it (β=-0.03, n.s). Hence, H7 was supported and H8 was not supported.

Turning to the interaction effects (i.e., step 3 in the above table), while the relationships of government effectiveness and rule of law with e-government maturity were positively moderated by regulatory quality (β=0.22, p<0.01) and control of corruption (β=0.19, p<0.01) respectively, the relationship of voice and accountability with e-government maturity was not moderated by political stability (β=-0.01, n.s). To determine if the patterns characterizing the significant interactions conform to the directions as proposed in the research hypotheses, we graphed the interaction effects (see Figures 2a and 2b). This procedure was recommended by Cohen and Cohen (1983) for all interaction cases. In addition, to examine the consistency of the proposed direction throughout the range of independent variables, we performed simple slope analysis as recommended by Aiken and West (1991). This analysis reflects whether the slopes relating the independent and dependent variables differ from zero.

As shown below, while Figure 2a presents the ordinal interaction of regulatory quality on the relationship of government effectiveness with e-government maturity, Figure 2b presents the disordinal (or cross-over) interaction of control of corruption on the relationship of rule of law with e-government maturity. As shown in the figures, government effectiveness (and rule of law) predicted e-government maturity positively at high levels of regulatory quality (and control of corruption) but negatively at their low levels. In addition, it is evident from the figures that there were little or no differences in e-government maturity values between low and high levels of regulatory quality (control of corruption) when government effectiveness (and rule of law) was low but there were substantial differences in e-government maturity values between low and high levels of regulatory quality (control of corruption) in favor of high regulatory quality (and control of corruption) when government effectiveness (and rule of law) was high. Confirming this, a simple slope analysis revealed that when the regulatory quality (and control of corruption) was high, the relationships of government effectiveness (and rule of law) with e-government maturity were positive and significant. And, when the regulatory quality (and control of corruption) were low, the relationships of government effectiveness (and rule of law) with e-government maturity were negative and not significant.

As power calculations are particularly relevant whenever the null hypothesis is rejected (Baroudi and Orlikowski 1989), we performed a power analysis for H3 and H8, the hypotheses that was not supported due to lack of significance. The objective of this analysis is to determine the accuracy of the conclusion that the hypotheses are truly insignificant at the 0.05 alpha level. Power is the likelihood of a Type II error, and it requires parameters for sample size, alpha level and desired effect size (Meso et al. 2009). According to Cohen (1977), an effect size (d) of 0.2 or less is considered small, that of 0.5 is deemed moderate, while an effect size greater than 0.8 is deemed to be strong. Using the Gpower statistical
program, the calculated power for H3 was 0.94 and for H8 was 0.99, with a sample size of 183 and an effect size of 0.5. This, according to Cohen’s (1977) threshold of 0.80, allows us to conclude that there is negligible Type II error and the lack of significance can be believed. Finally among control variables, while economic condition was positively associated with e-government maturity ($\beta=0.64$, $p<0.001$), regional difference was not significantly associated with it ($\beta=0.03$, n.s).

**Discussion**

Motivated by the gaps that (1) existing research provides contradicting responses to the question of impact of governance on e-government maturity; and (2) there is a lack of empirical studies examining the complementary roles of governance dimensions (within political, economic, and institutional governance structure) on e-government maturity, the purpose of this study was to examine if indeed there is a quantitative merit in the relationships among governance dimensions and e-government maturity in a country from a macro perspective. In particular, by drawing from the growth theory and the theory of complementarities, and by interpreting governance as consisting of six different dimensions, we constructed a theoretical model linking governance and e-government maturity. Empirical validation of the hypothesized model utilizing archival data from 183 countries for a cross-sectional period of 2004 to 2008, led to several interesting findings that deserve mention.

First, among the six dimensions of governance, political stability, government effectiveness, regulatory quality, and rule of law positively influenced the growth and maturity of e-government in a country. Within them, government effectiveness was strongly associated with e-government maturity followed by regulatory quality, political stability and rule of law. This indicates that e-government in a country will progress and reach the stage of maturity only when its government is effective in terms of effective national intuitions, efficient resource allocation, and effectual and high quality public administration. Further, as noted by Dutta and Mia (2010), our findings highlight that the quality of regulatory environment is also a critical determinant that facilitates e-government maturity. In addition, our findings indicate that for the public sector to transform from a bureaucratic organization to an anticipative and responsive government, political conditions in a country must be stable, and its legal frameworks and laws (that provide a range of civil and criminal penalties and enforcement procedures) must be efficient, which in turn would advance the e-government development agenda of a country. Taken together, these findings suggest that economic governance (comprising of government effectiveness and regulatory quality) is more critical (and necessary conditions) for enhancing the growth and maturity of e-government.

Second, our findings also indicates that while voice and accountability dimension of governance contributed to e-government maturity in the negative direction, controlling of corruption in a country did not favor the growth and maturity of its e-government, which could be due to the positive effect of control of corruption on e-government maturity might have been masked by stronger predictors with which it was correlated (e.g., government effectiveness). One possible reason for the finding pertaining to voice and accountability could be due to its possible dual effect. Previous literature suggests that voice and accountability in terms of greater participation, often involving multiple and competing voices, can endanger freedom and rights, impede governability and jeopardize pluralism (Malik and Wagle 2002). In the context of e-government development, there is a risk that increased participation may reduce the quality of dialogue, thereby undermining the governance process and delaying the growth of e-government reaching its maturity level. This finding suggests that there could be other factor(s) that may strengthen relationship of voice and accountability with e-government maturity. For instance, “ability of the institutions” to handle multiple and competing voices may be one factor that could help enhance the potential benefits of voice and accountability on e-government maturity.

Turning to the interaction effects, results indicate that regulatory quality (and control of corruption) complemented the effect of government effectiveness (and rule of law) on e-government maturity. Further, political stability did not interact with voice and accountability in explaining e-government maturity. While there is no single study examining the interaction effects of governance dimensions (within political, economic, and institutional governance structures) on e-government maturity, our results establish the significant complementary roles of them in enhancing its growth and maturity. Taken together, the above observations are refreshing as they are informative. While past studies (e.g., Singh et
al. 2007; Das et al. 2011) indicate that there has been negative to no impact of governance on e-government and maturity, our findings indicate that governance does matter in the context of e-government maturity. Hence, if appropriate governance dimensions are strengthened, they will stand to leverage the e-government maturity of member nations. This is one reason why governance and the strengthening of governance institutions has become one of the key millennium development goals for international development agencies (IBRD 2002).

Implications, Limitations and Future Research

Our study makes several important contributions to the knowledge base of “governance–e-government” literature. First, while most extant studies examining the impact of governance on e-government development are micro in orientation, undertaken via a qualitative case study approach, our study, by making use of publicly available archival data has identified a quantitative merit in the relationships among governance and e-government maturity in a country from a macro perspective (i.e., cross-country level). Second, while extant studies provide contradicting responses to the question of impact of governance on e-government maturity, our study, by construing governance as consisting of six dimensions (Kaufmann et al. 1999a) highlights the imperative need for “strengthening appropriate governance institutions” in a country to promote the growth and maturity of e-government. By doing so, our study highlights that “governance does matter in the context of e-government maturity.” Third, by examining the interaction effects of governance dimensions within political, economic, and institutional governance, our study also contributes to the theoretical base of complementarity perspective. Specifically, among the limited work that has been undertaken to examine the effects of complementarities on competitive advantage, most studies are at the organizational-level; we extend this firm-level argumentation to a macro-level and establish its usefulness in the empirical context of e-government maturity by examining the complementary effects of governance dimensions.

From a practical standpoint, our study makes two important contributions. First, by identifying the governance dimensions that would affect the e-government maturity, our study not only helps practitioners, policy makers, and public administrators to understand why differing levels of e-government maturity continues to prevail, but also shows directions to increase the levels of e-government maturity by effectively managing appropriate governance dimensions. Second, the implications from the interaction plots are insightful to policy makers, practitioners, and public administrators and indicate that they should pay increased attention in managing governance alongside the investments in e-government.

This study has two key limitations. First, we used archival data obtained from three different sources, and hence, we had to depend on the indices as formulated by the reporting agencies. While primary data might have given us a better control over the definition of variables, it is less feasible for small group of researchers to undertake a large scale cross-country data collection given the limited amount of resources and time. But, taking into consideration that these indices have been formulated by reputable and authorized agencies using several suitable statistical procedures (e.g., use of multiple respondent expert surveys in each nation and correcting the internal consistency before index calculation) for assessing validity and reliability of the instrument, relying upon these secondary sources provides a cost-effective way for conducting our study. Second, we analyzed data only from the countries commonly available in all the data sources. For instance, we could not include countries like Hong Kong and Taiwan as these countries were not commonly available in all the sources. Given that we have only six independent variables (excluding the control variables) and sample size as 183, discarding few countries may not make a significant difference in the results. This is due to the fact that the hierarchical regression statistical technique with a sample size of 100 and above will detect fairly small R-square values (10%-15%) with up to 10 independent variables and a significance level of 0.05 (Hair et al. 2006). Despite these two potential limitations, our study is one among the few studies with macro-level orientation to examine “governance–e-government” cohesively under the perspectives offered by growth theory and the theory of complementarities.

Future research may focus on several directions. First, given the unexpected finding concerning voice and accountability and control of corruption, future research may consider identifying ways to realize the benefits from them. Specifically, they may consider studying under what conditions, voice and
accountability, and control of corruption will contribute to the growth and maturity of e-government. Further, future research may also consider utilizing other published indices to validate the findings. For instance, Transparency International’s Corruption Perceptions Index (CPI) might be used in place of World Bank’s Control of Corruption Index. Second, while our study has mainly focused on “objective technology” available with public-sector organizations (i.e., e-government), future studies may consider extending our study in the context of private-sector organizations (i.e., e-business maturity). A comparison from this perspective would be interesting and may add value to both theory and practice. Third, future researchers, in addition to re-examining our study and confirming the findings, may also identify the effects of complementary assets in a country (e.g., information infrastructure and human capital) on the relationships of governance dimensions with e-government maturity. Fourth, future research may consider extending our cross-sectional study to a longitudinal study (when data becomes available) utilizing techniques such as latent growth curve analysis. Such analysis would help to examine the issues of temporal precedence (leads/lags between variables), as well as the evolution of e-government maturity as a function of the levels and trends in the governance variables.

Conclusion

In conclusion, despite an extensive recognition of the potential of governance to promote growth and maturity of e-government in a country, both research and practitioner communities knows relatively less about how different dimensions of governance in a country affects its e-government maturity differently. As an initial step to be taken towards raising awareness for pivotal role of governance in enhancing e-government maturity, we, by utilizing the perspectives offered by growth theory, constructed a theoretical model by construing governance as consisting of six dimensions, namely, voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption (Kaufmann et al. 1996a), and empirically validated it by making innovative use of publicly available archival data. Further, by drawing from the theory of complementarities, we reasoned and demonstrated empirically the interaction effects of governance dimensions within political, economic, and institutional structures in explaining e-government maturity. In sum, our results indicate that “governance matters,” and highlights the imperative need for “strengthening appropriate governance institutions” to promote the growth and maturity of e-government.

References


Goetz, A. M., and Jenkins, R. 2002. Voice, Accountability and Human Development: The Emergence of a New Agenda (Background paper for UNDP), New York: UNDP.


---

Thirty Third International Conference on Information Systems, Orlando 2012 17


**Appendix**

**List of Countries Analyzed**

| Afghanistan, Albania, Algeria, Andorra, Angola, Antigua, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, Central Africa, Chad, Chile, China, Colombia, Comoros, Congo Republic, Congo Democratic Republic, Costa Rica, Croatia, Cuba, Cyprus Republic, Czech Republic, Denmark, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, Gabon, Gambia, Georgia, Germany, Ghana, Greece, Grenada, Guatemala, Guinea Bissau, Guyana, Haiti, Honduras, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Libya, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia, Moldova, Mongolia, Morocco, Mozambique, Myanmar, Namibia, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, North Korea, Norway, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Rwanda, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Sao Tome and Principe, Saudi Arabia, Senegal, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, Sudan, Suriname, Swaziland, Sweden, Switzerland, Syria, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe |

Total number of countries included for data analysis = 183.