ABSTRACT

Using secondary data from 99 countries and IT impact literature as the guiding theoretical perspective; we examine the payoffs from e-government in the form of national performance. We do this by initially examining the relationship of e-government development with the first order government process efficiency parameters (resource spending efficiency and administrative process efficiency). Subsequently we examine the association of these first order efficiency outcomes with the two second order dimensions of national performance (reduction of social divide and business competitiveness). Our analysis reveals significant association of ‘e-government development’ with both the first order ‘government efficiency parameters’. Further analysis reveals significant relationships of ‘government efficiency parameters’ with the dimensions of ‘national performance’. Important role of ‘national business competitiveness’ in the reduction of ‘social divide’ is brought forth through post-hoc analysis. Through this research, we make some important contributions which have implications for researchers, practitioners, public administrators, and policy makers.

Keywords: business competitiveness; e-government; government efficiency; IT impact; reduction of social divide; secondary data

INTRODUCTION

E-government can be defined as the use of 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 citizens, businesses, employees, and other stakeholders. In recent times, e-government has generated a lot of interest among researchers. Studies on e-government can be roughly classified into three broad areas: e-government development and evolution (Kunstelj & Vintar, 2004; Layne & Lee, 2001; Srivastava & Teo, 2004; Tan & Pan, 2003), e-government adoption and implementation (Koh et al., 2005; Li, 2003; Melitski et al., 2005), and the impact of e-government on citizens and
businesses (Banerjee & Chau, 2004; West, 2004). Though research in all the three identified areas is important, governments, policy makers, practitioners, and academics are often intrigued by the payoffs from e-government. The facts that research on e-government impact is still in a nascent stage, and its relationship with national performance has not been adequately addressed in previous research, are the prime motivators for this research.

The link between information technology (IT) investments and organizational performance, termed as IT payoffs, has been researched by numerous scholars (Brynjolfsson & Hitt, 1996; Devaraj & Kohli, 2003; Melville et al., 2004). The practical relevance of IT impact continues to motivate researchers to investigate the relationship between IT and performance (Srivastava & Teo, 2007). Although IT impact research continues to be a major component of information systems (IS) research, relatively few studies have been conducted to gauge the relationship of e-government with national performance. Past research on the e-government impact has highlighted some of the benefits it offers for citizens, businesses, and governments. E-government has not only helped in improving service delivery (Kibsi et al., 2001; Von Haldenwang, 2004; West, 2004) and increasing democratization (Von Haldenwang, 2004; West, 2004), but has also helped in reducing corruption and increasing government transparency (Banerjee & Chau, 2004; Cho & Choi, 2004; Von Haldenwang, 2004; Wong & Welch, 2004). Most e-government payoff variables investigated in past studies are intermediate process variables, which may eventually impact the national performance (Barua et al., 1995). But this link has not been clearly examined in the current e-government literature. In our study, we address this gap by conceptualizing the relationship between e-government development and national performance, mediated through intermediary payoff variables. We construe national performance as consisting of two dimensions: reduction of social divide and business competitiveness. Further, we posit that e-government development impacts government process efficiency (resource spending efficiency and administrative process efficiency), which in turn impacts national performance on the two construed dimensions. Through our research, we investigate the relationship between e-government development and first order impacts, and consequently the linkage between first order efficiency variables and higher order performance variables (Barua et al., 1995; Melville et al., 2004).

Further, most e-government studies are either conceptual (Kibsi et al., 2001; Layne & Lee, 2001; Warkentin et al., 2002; Wimmer, 2002), or case studies (Heeks, 2002; Lee et al., 2005; Li, 2003; Srivastava & Teo, 2005). Though e-government literature also has some theoretically-grounded empirical survey studies (Phanget al., 2005; Bretschneider, 1990), such empirical studies are relatively few and are often limited to analyzing a particular e-government implementation within a country (Kaylor et al., 2001; Norris & Moon, 2005; McNeal et al., 2003; Moon, 2002; West, 2004). Cross-country and country level empirical studies are very few (for example, Wong & Welch, 2004; Singh et al., 2004). Moreover, empirical studies assessing the impact of e-government are even fewer (for example, Jain, 2003). In their review of IT impact research, Melville et al. (2004) have also stressed the paucity of IT impact research at national and cross-country levels. To fill these research gaps, we use data from
99 countries to analyze the relationship of e-government development with national performance mediated by the intermediate efficiency variables.

The rest of the article is organized as follows. First, using IT impact as the guiding theoretical framework, we explicate the relationship of e-government development with national performance. Next, conceptualizing IT impact as a mediated phenomenon, we posit that the relationship of e-government with national performance (reduction of social divide and business competitiveness) is mediated through efficiency-enhancing intermediary variables (resource spending efficiency and administrative process efficiency) as shown in the research model in Figure 1. Subsequently, using this data, we test the hypotheses so formulated and finally end the discussion with a set of implications and conclusions arising out of this study.

**THEORY AND HYPOTHESES**

**E-Government Impact**

Previous research has shown that IT may contribute to the improvement of organizational performance (Brynjolfsson & Hitt, 1996; Melville et al., 2004; Mukhopadhyay et al., 1995). To measure the impact of IT, researchers have used multifarious measures of organizational performance, like productivity enhancement, inventory reduction, cost reduction, competitive advantage, etc. (Devaraj & Kohli, 2003; Hitt & Brynjolfsson, 1996; Melville et al., 2004). Studies have used both intermediate-level measures as well as organizational performance measures for exhibiting the impact of IT. Barua et al. (1995) made a distinction between the intermediate mediating variables and organizational outcome impact variables. In their research, they presented a model which incorporated both, that is, first order

![Figure 1. Research model: E-government payoffs](image-url)
effects impacting operational variables like inventory turnover, as well as higher level variables (like market share) impacted by first order variables.

Researchers have conceptualized the intermediate variables mediating the impact of IT on firm performance in a number of ways. For example, Weill (1992) identified intermediate mediating variables as “conversion effectiveness factors” and Francalanci & Galal (1998) proposed managerial choices as the intermediary variables which mediate the relationship between IT and firm performance. In a similar vein, Soh and Markus (1995) conceptualized IT assets (IT conversion process) which mediate the relationship between IT investment and organizational performance. To have a fuller understanding of IT impact, it is imperative to conceptualize IT as having first as well as higher order effects (Melville et al., 2004). The first order effects are mostly related to process efficiency whereas higher order effects are the impacts of these processual efficiency enhancements on organizational performance measures (Barua et al., 1995; Brynjolfsson & Hitt, 2000; Subramani, 2004; Subramanian & Shaw, 2002). Apart from creating value at the business unit and process level, IT may also impact performance at the country level of analysis by improving the efficiency as well as effectiveness of the country (Alpar & Kim, 1990; Dewan & Kraemer, 2000). In our research, we conceptualize the relationship of e-government development with the intermediate variables related to efficiency, which in turn are associated with the country performance measures.

Governments in countries have multifarious objectives, which can be broadly classified into two kinds. First, social objectives, which deal with improving the quality of life of their citizens by reducing poverty and removing social inequalities, which we refer to as reduction of social divide, and second, economic objectives of making the nation and its businesses more competitive which we name business competitiveness (Drazen, 2001; Mansoorian & Myers, 1997; Mok & Lau, 2002). Governments achieve these objectives through policy making, program administration, and ensuring compliance (U.S. Government, 2002). We posit that e-government may be instrumental in achieving these ultimate national performance objectives (reduction of social divide and business competitiveness) through intermediate efficiency-enhancing processes.

Mok and Lau (2002) highlighted the importance of efficient resource allocation by governments to achieve their social and economic objectives. In the current networked era, organizational linkages within and among organizations are opening up new ways in which firms not only acquire and convert factor inputs but also assimilate and use information from various sources for increasing their competitiveness (Hammer, 2001; Straub & Watson, 2001). In a similar vein, e-government may be helpful in getting more accurate information about citizens and businesses. In addition to this, e-government will improve the access of the government to its citizens and businesses and vice versa. This will help in a more accurate and efficient resource allocation and spending, implying that government spends its resources in an effective way thereby avoiding wastages. Thus, the level of e-government development in a nation should help governments plan their resource spending in a prudent way, thereby minimizing wastages and consequently directing spending on projects that
create maximum value for the citizens and businesses. Hence we hypothesize:

**H1a:** E-government development in a country is positively associated with the nation’s government resource spending efficiency.

Past studies have shown that IT has been instrumental in impacting the general working scenario in organizations and businesses by significantly reducing the costs of information dissemination, acquisition, and processing (Dern, 1992; Stewart, 1995). IT facilitates relatively smooth information flow, thereby considerably reducing information asymmetries (Alba et al., 1997; Kulkarni, 2000). This helps in making organizations more efficient. In a similar vein, e-government not only helps in providing more accurate information facilitating better decisions by the government but also helps in bringing down the processing time by reducing and simplifying the number of working procedures.

Some years ago, obtaining an import export license in Singapore required applicants to fill out 21 different forms and then wait for 15 to 20 days for the 23 government agencies to process the request. After the government launched TradeNet (an electronic data interchange network for trade administration), applicants have to submit only one online form, and they may receive a license as soon as 15 seconds later (Kibsi et al., 2001). In a fully integrated e-government system, vertical and horizontal integration, within and across various ministries and government offices, reduces the processing time for citizens and businesses drastically. In such a networked e-government scenario, citizens and businesses may interact with multiple government agencies through a one stop portal, resulting in an increased “administrative process efficiency” for the government through the reduction of bureaucratic red tape. Thus, we hypothesize,

**H1b:** E-government development in a country is positively associated with the administrative process efficiency of the nation’s government.

E-government helps governments become more efficient in their processes by increasing their proficiency and responsiveness (Banerjee & Chau, 2004; West, 2004). Efficiency in administrative processes has a cascading effect on other aspects of government efficiency, e.g., shorter response time may help governments plan their resource allocation and spending in a more accurate fashion. Further, an enhanced administrative process efficiency coupled with the more accurate information (since the information is received directly and does not need retyping) that it receives through the e-government channels will help governments make “informed and timely decisions” related to their spending. Thus, an increase in administrative process efficiency will help enhance government’s resource spending efficiency. Hence we have the next hypothesis,

**H2:** Government administrative process efficiency in a country is positively associated with the nation’s resource spending efficiency.

To fulfill the social and economic objectives of the government, the intervening processes of service delivery and resource allocation should be efficient (Mok & Lau, 2002). We posit that the impact of e-government on the process efficiency variables
will translate to national performance variables related to the two objectives of “reduction of social divide” and “business competitiveness.” Efficient resource spending implies a better distribution of resources to the areas where it is really needed, thus helping citizens and businesses in the required proportions. Efficient resource spending by the government will help the nation not only in achieving social objectives (poverty and social inequality reduction) but also will help in improving business competitiveness by contributing efficiently to their development. Hence we hypothesize:

**H3a:** Government resource spending efficiency in a country is positively associated with the nation’s reduction of social divide.

**H3b:** Government resource spending efficiency in a country is positively associated with the nation’s business competitiveness.

In a similar vein, a government which has simple and quick administrative processes will not only process business proposals more efficiently but will also process the implementation of “reduction of social divide programs” in a shorter time. The reduction in red tape in the government coupled with increased information flow through e-government channels will not only help the government make faster decisions, but also more accurate and useful ones. Thus, government administrative process efficiency helps in the reduction of national social divide as well as assists enhancement of national business competitiveness.

**H4a:** Government administrative process efficiency in a country is positively associated with the nation’s reduction of social divide.

**H4b:** Government administrative process efficiency in a country is positively associated with the nation’s business competitiveness.

Increased business competitiveness in a nation results in multifarious benefits not only for businesses but also for citizens. An increase in business competitiveness implies an improvement in the microeconomic condition of the country, which is translated into increased wealth in the country (Porter, 2005). This increased wealth in the nation can be used by governments to achieve their social objectives. More so in the presence of e-government and increased administrative process and resource spending efficiencies, we posit that business competitiveness positively influences reduction of social divide. Thus, we hypothesize,

**H5:** A nation’s business competitiveness is positively associated with its reduction of social divide.

**METHODOLOGY**

**Data**

For a meaningful testing of hypotheses, we require data from a large number of countries aggregated at the national level. Collecting large-scale primary data from over a hundred countries is constrained by the amount of resources and time available for conducting such research. Hence, for the purpose of testing our hypotheses, we explored numerous reliable secondary
data sources which have been used in past research. Finally, for testing the formulated hypotheses, we used two secondary data sources: the United Nations Global e-government Readiness Report (UN Report, 2004) and the World Economic Forum Global Competitiveness Report (WEF, 2005). Data from United Nations Global e-government Readiness Reports have been used by past studies such as Siau & Long (2004, 2006), Srivastava & Teo (2006a, 2006b), and data from World Economic Forum Global Competitiveness Report have been used in studies such as Delios and Beamish (1999) and Gaur and Lu (2007).

The Global E-government Readiness Report (UN Report, 2004) and the World Economic Forum Global Competitiveness Report (WEF, 2005) were the two most recent reports available at the time of the study. Though WEF has been publishing global competitiveness reports for a number of years now, the UN started publishing the United Nations Global e-government Readiness Report only recently in 2003. Hence, we used cross-sectional data from two reports: the UN report (released late 2004) and the WEF Global Competitiveness Report (released early 2005) for our analyses. Both the data reports used in this study were released by the agencies within a period of few months, hence they are contemporary and comparable (although the years are different). The data from the UN e-government readiness report cover 191 countries and data from the Global Competitiveness Report cover 117 countries. As the variables used in this study were taken from both of these reports, it was essential to consider data only for those countries which were available in both reports. After analyzing the two reports for the common countries (data points), we had data from 99 countries for analyses. The list of these 99 nations (divided into high and low income nations) is given in Appendix 1A. We also provide a continent-wise classification of the 99 countries in Appendix 1B.

Although using secondary data for research provides some advantages, such as easy reproducibility, ability to generalize the results arising from larger datasets, etc., it has some limitations (Kiecolt & Nathan, 1985; UIOWA, 2004). Secondary data research is often constrained by the kind of data available in the data sets (Atkinson & Brandolini, 2001; Rabianski, 2003). But considering the fact that secondary data research is an accepted norm in many of the important management disciplines like strategy, finance, international business, etc., and direct collection of large scale cross-country data by individual researchers may not be feasible, we decided to use the above mentioned secondary data sources for our cross-country research.

Constructs, Variables, and Measures

As depicted in our research model (Figure 1), there are five constructs in this study: e-government development, the two “government process efficiency constructs,” namely, resource spending efficiency and administrative process efficiency, and the two “national performance constructs,” namely, reduction of social divide and business competitiveness. In our research model, we conceptualize e-government impact translating to national performance (reduction of social divide and business competitiveness) through the efficiency enhancements in resource spending and administrative process efficiency. The measures for various constructs have been directly taken from the two reports
mentioned above. We next provide a brief description of the constructs and measures employed in this study.

**E-Government Development**
The construct of e-government development is indicated by the Web Measure Index from the UN e-government readiness report of 2004. The Web Measure Index is based upon a five-stage model, ascending in nature and building upon the previous level of sophistication, of a country’s online presence. For countries which have established an online presence, the model defines stages of e-readiness according to a scale of progressively sophisticated citizen services (UN Report, 2004). Countries are coded in consonance with what they provide online and the stage of e-government evolution they are presently in. The five stages of e-government on which the country Web sites were coded were based on the UN’s five stage e-government evolution model in which the stages are: emerging presence, enhanced presence, interactive presence, transactional presence, and networked presence. The Web Measure Index is an indicator of the sophistication and development of the e-government Web sites of that particular country and has been used in past studies as a measure of e-government development (Siau & Long 2004, 2006; Srivastava & Teo, 2006a, 2006b).

**Resource Spending Efficiency**
Resource spending efficiency refers to a government’s prudence in utilizing its funds. The construct of Resource Spending Efficiency is based on the indicator for “Wastefulness of Government Spending” taken from the Global Competitiveness Report of 2005. “Resource spending efficiency” indicates whether the public spending provides necessary goods and services not catered to by the market or whether the spending is done in wasteful propositions. High “resource spending efficiency” indicates that the government funds are being utilized for meeting the actual requirements of its citizens.

**Administrative Process Efficiency**
Administrative Process Efficiency refers to the government’s efficiency in executing its routine operations. The construct of Administrative Process Efficiency is based on the indicator for “Extent of Bureaucratic Red Tape” taken from the Global Competitiveness Report of 2005. The measure as used in our research indicates the efficiency in government operations and the extent to which bureaucratic red tape is not impeding the processing time. High “administrative process efficiency” indicates that the government is efficient in conducting its routine administrative processes and there is less waiting time for citizens and businesses when dealing with government.

**Reduction of Social Divide**
Reduction of Social Divide is a measure of success of governments in their welfare objectives. Social upliftment, poverty alleviation, removal of social inequality, etc., appear as some of the most important welfare objectives of governments across the world. We posit that governments doing well on the social objectives succeed in having a significant reduction of social divide in the country. In our study, reduction of social divide is based on the indicator for “Government Effectiveness in Reducing Poverty and Inequality” taken from the Global Competitiveness Report of 2005.
The Business Competitiveness of a nation is an indicator of the micro-economic capabilities of its constituents. Unless the micro-economic capabilities of the national constituents improve, macro-economic, political, legal, and social reforms will not bear full fruit in terms of the nation’s prosperity. Competitiveness is thus related to a nation’s standard of living and prosperity (Porter, 2005) and is measured by the GDP per capita adjusted for purchasing power parity, the values for which are taken from the Global Competitiveness Report 2005.

While forming the various indexes, the reporting agencies carried out suitable statistical procedures for ensuring their validity and reliability (UN Report, 2004; WEF, 2005). For example, in their report the reporting agencies have highlighted the use of multiple respondent expert surveys in each nation, where the responses from respondents within a nation were examined for internal consistency before being included in the index calculation. A brief description on their reliability and validity are given in Appendix 2.

RESULTS AND DISCUSSION
Before testing our research hypotheses, we present the descriptive statistics of the sampled nations in Table 1. We also divide the nations into two groups of high income and low income nations (as per the World Bank classification scheme) to have a better understanding of the differences that exist in the values of the research variables across the two sub-samples. From the figures in the table, we see that there is a significant difference in the level of e-government development between the high income and low income nations. This result is consistent with some of the past studies on e-government (e.g., Melitski et al., 2005), which suggests a difference in the digital government capabilities among the 30 developed nations belonging to the Organization for Economic Cooperation and Development (OECD) and lesser developed (non-OECD) nations. In addition to e-government, we observe differences in other efficiency and performance figures for the two sub-groups.

For testing the hypotheses, we employed partial least squares (PLS) (Barclay, et al., 1995; Chin, 1998; Wold, 1989). The advantage of using PLS is that it enables us to examine complex theoretical models (having more than one level of theoretical linkage) as is the case in our study (Gefen et al., 2000). PLS imposes minimal demands in terms of sample sizes, measurement

Table 1. Descriptive statistics: High and low income countries

<table>
<thead>
<tr>
<th></th>
<th>All Nations (n=99)</th>
<th>High Income Nations (n=52)</th>
<th>Low Income Nations (n=47)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td><strong>Std. Dev.</strong></td>
<td><strong>Mean</strong></td>
<td><strong>Std. Dev.</strong></td>
</tr>
<tr>
<td>E-Government development</td>
<td>0.446</td>
<td>0.255</td>
<td>0.602</td>
</tr>
<tr>
<td>Resource spending efficiency</td>
<td>3.289</td>
<td>0.870</td>
<td>3.637</td>
</tr>
<tr>
<td>Administrative process efficiency</td>
<td>5.180</td>
<td>0.417</td>
<td>5.350</td>
</tr>
<tr>
<td>Reduction of social divide</td>
<td>3.517</td>
<td>1.046</td>
<td>3.952</td>
</tr>
<tr>
<td>Business competitiveness</td>
<td>0.308</td>
<td>0.274</td>
<td>0.509</td>
</tr>
</tbody>
</table>
scales, and residual distributions to validate a model compared to other structural equation modeling techniques (Wold, 1989; Gefen et al., 2000; Mahmood et al., 2004). Another advantage is that the PLS analysis is distribution free and does not assume true independence of the variables, leading to more reliable results (Gefen et al., 2000; Tobias, 1999). PLS is also robust against other data structural problems such as skew distributions and omissions of regressors (Cassel et al., 1999). Many information systems (IS) studies have found it to be an effective method of analysis (Bock, et al., 2005; Subramani, 2004). Moreover, the exploratory theory development stage that e-government research is currently in makes PLS a suitable choice for analyzing the data in our study. The results of our analyses are presented in Figure 2.

From the results (Figure 2), Hypothesis 1a, which states that there is a positive association between e-government development and resource spending efficiency, received strong support (path = 0.38, t = 3.32, p<0.01). Hypothesis 1b, which states that e-government development is positively associated with administrative process efficiency, was also strongly supported (path = 0.46, t = 6.86, p<0.01). Hypothesis 2 was not supported (path = 0.05, t = 0.46, ns), indicating the lack of a significant relationship between administrative process efficiency and resource spending efficiency. One possible reason is that the resource spending may be more of an external-driven process rather than being influenced by internal administrative process efficiency. The result signifies the greater role of citizens and businesses in
providing information and also influencing government for facilitating efficient resource allocation and spending.

Hypothesis 3a, which indicates a link between resource spending efficiency and reduction of social divide, was strongly supported (path = 0.78, t = 13.82, p<0.01). Hypothesis 3b was also strongly supported (path = 0.47, t = 7.00, p<0.01), establishing the association of resource spending efficiency with business competitiveness. These results establish the intermediate role of resource spending efficiency in the relationship between e-government development and national performance on both the dimensions of reduction of social divide as well as business competitiveness.

It indicates the presence of intermediate variables in the e-government impact process, thus extending the work on IT impact in the e-government context. Surprisingly, Hypothesis 4a, which indicates a positive association between administrative process efficiency and reduction of social divide, was not supported (path = 0.02, t = 0.36, ns). Hypothesis 4b was strongly supported (path = 0.47, t = 8.46, p<0.01), indicating a strong link between administrative process efficiency and national business competitiveness. The relationship between business competitiveness and reduction of social divide was also significant (path = 0.18, t = 2.34, p<0.05), thus providing support for Hypothesis 5. Further, the proposed model explains a significant amount of variance (83.6%) in reduction of social divide and business competitiveness (54.8%).

The lack of support for hypothesis 4a is interesting and also surprising as it apparently refutes past IS studies on IT impact which indicate that improvement in administrative process efficiency should create an impact on its performance parameters (Barua et al., 1995; Subramaniam & Shaw, 2002). Studies on e-government in the past have also shown positive impacts on different performance metrics including those related to social objectives (Banerjee & Chau, 2004; Von Haldenwang, 2004; West, 2004). A result indicating nonassociation of administrative process efficiency with reduction of social divide no doubt raises an important counter-intuitive issue which needs further exploration. There can be two plausible reasons for this non-significant result. First, there is actually no relationship between administrative process efficiency and reduction of social divide. Second, the impact of administrative process efficiency on reduction of social divide is realized fully through business competitiveness (since in our model that is the only other significant path from administrative process efficiency to reduction of social divide). Some past studies on IT impact have shown the importance of understanding the path of impact realization through intermediate mediating variables (Barua et al., 1995; Hitt & Brynjolfsson, 1996; Mukhopadhyay et al., 1995; Subramaniam & Shaw, 2002). To analyze this aspect, we did the PLS analysis again without the construct of business competitiveness in the structural model, the results of which are shown in Figure 3.

We observe that in the revised model, the path from administrative process efficiency to reduction of social divide becomes significant (path = 0.10, t = 2.17, p<0.05). This brings forth a very interesting finding about the relationship between administrative process efficiency and reduction of social divide. In the presence of the path between administrative process efficiency to reduction of social divide through business competitiveness, the direct path between administrative...
process efficiency and reduction of social divide becomes insignificant (Figure 2). This indicates that the relationship between administrative process efficiency and reduction of social divide is fully mediated through business competitiveness. The result is interesting as it indicates that in our hypothesized model, even a second order impact (business competitiveness) serves as a mediating variable for another second order impact (reduction of social divide). The result makes an important contribution in enriching our understanding about the complex process of e-government impact assessment at the national level. Further, it brings forth the important role of business development in a nation, as it is not only related to enhancing national business competitiveness but also is instrumental in helping governments achieve social equity objectives.

**LIMITATIONS**

The key limitation of this study is the reliance on secondary data for our analyses. We analyze data only from those countries that were present in our secondary data sources; for example, we could not include countries like Hong Kong and Taiwan in our analyses, as data for these countries were not available in the UN report. Taking into consideration the fact that we have large-scale data from 99 countries, omitting some of the countries may not make a substantial difference in the results. Moreover, for an analysis such as ours, which aims to analyze data across nearly a hundred countries, we have to depend on established secondary sources of data, as collection of primary data would entail a huge amount of resources.

Another limitation of this study is the use of cross-sectional data for analyses.
Although we hypothesize only for an association between the variables, there is an implicit causality embedded in the structural model. Analysis using longitudinal data would have provided us greater confidence for causality assumptions. Though the WEF has been publishing global competitiveness report for a number of years now, the UN started publishing the United Nations Global E-Government Readiness Report only recently since 2003. Hence, we do not currently have sufficient data to do a meaningful longitudinal time-series analysis. Future studies can conduct such an analysis. Moreover, cross-sectional data analysis has been used in similar e-government studies (e.g., Siau & Long 2004, 2006; Srivastava & Teo, 2006a, 2006b). Despite these limitations, our study is one of the first to understand the role of intermediate variables associated with e-government impact in a cross-country scenario.

**IMPLICATIONS**

Through this research, we make some important contributions which have implications for research as well as practice.

**Implications for Research**

*First,* most studies on e-government are either conceptual or case studies. There is a dearth of quantitative empirical studies on e-government (Norris & Moon, 2005). Moreover, there are relatively few studies on e-government which address issues from a global perspective. Our empirical study, which uses secondary data to analyze e-government development and its impact from a cross-country perspective, fills these gaps in the e-government literature. Future research can make use of other innovative sources of secondary data for better understanding of the role of e-government.

*Second,* there are few studies that analyze the impact of IT at the country level of analysis (Melville et al., 2003). Moreover, studies which address the relationship of e-government with national performance are even fewer (Banerjee & Chau, 2004; Wong & Welch, 2004). Through this research on the relationship between e-government and national performance on the two dimensions of reduction of social divide and business competitiveness, we enrich the IT impact literature by analyzing contexts not explicitly explored in the past.

*Third,* in our research we conceptualize an e-government impact model as having first order association with efficiencies (resource spending efficiency and administrative process efficiency), which in turn are related to reduction of social divide and enhancement of business competitiveness. Analyzing e-government payoffs through intervening mediating variables gives a more accurate and fuller understanding of the path through which e-government development is associated with national performance. Past IT impact studies have used models with intervening variables in various other contexts. Our study is one of the first to take a processual mediated view of e-government impact.

*Fourth,* there are very few studies on e-government which use rich sources of secondary data for cross-country studies. Our study is a case in point and exhorts future researchers to use other innovative cross-country secondary data sources to make inferences about e-government from a global perspective.

*Fifth,* another aspect that is brought out in our study is the non-significant role of government administrative process efficiency in enhancing resource spending effi-
ciency. Future research can investigate the role and impact of administrative process efficiency as well as other intermediary variables like the actual usage and quality of e-government (Devaraj & Kohli, 2003) on national performance.

Implications for Practice
In addition to the implications for research, our study has several important implications for public administrators and policy makers. First, our study highlights the importance of considering intermediate process variables when considering the relationship of e-government with national performance. Specifically, our research suggests that the development of e-government is significantly associated with resource spending efficiency and administrative process efficiency of governments. Enhancement of these efficiencies in turn is positively associated with national performance on the two dimensions of reduction of social divide and business competitiveness. Thus, government efficiency mediates the relationship between e-government development and national performance. Instead of looking for direct benefits from e-government, public administrators and policy makers should make use of e-government in areas where they require an enhancement of efficiency.

Second, our results show that a second order impact on one dimension of national performance may impact the other dimension of national performance. Specifically, in this research we see that the relationship between government administrative process efficiency and reduction of social divide is fully mediated by business competitiveness. This result reiterates the important role of business competitiveness in attaining social equity objectives. The result has implications for policy makers to encourage greater focus on the business development in a nation as it is not only related to the business competitiveness but is also associated with lesser social divide. Business competitiveness may thus help nations alleviate poverty and achieve social equality. Hence, concerted efforts should be made by governments in both directions.

Third, the study provides policymakers with a framework for conceptualizing and visualizing the impact of e-government. Consideration of multiple efficiency variables may help them to better understand and identify areas of critical importance for e-government implementation. The results of this study can also be helpful for public administrators in justifying investments in e-government projects.

CONCLUSION
The recent spur in e-government implementations by governments across the world is motivated by the expectations of anticipated payoffs. Accenture in its recent report mentioned:

Electronic government (e-government) enables high performance. It enables better outcomes for less cost—maximum value from every resource expended. In the process it helps governments transform service delivery, so that they meet their obligations to their stakeholders in the most efficient and cost-effective way possible. (Accenture, 2004, p.2)

Although, e-government promises a lot to the citizens, there are very few studies which analyze the relationship of e-government with the various performance parameters. Understanding the impact of e-government development by governments

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and policymakers is vital for the effective implementation and administration of government plans and policies (UN Report, 2004; Von Haldenwang, 2004). In this research using the IT impact perspective, we analyze the way in which e-government can help nations achieve their social and economic objectives. The study brings forth the significant relationships of e-government development with administrative and resource allocation efficiencies, which in turn are related to the social equity and business competitiveness of a nation.

REFERENCES


ence on Information Systems (PACIS 2004), Shanghai, China.


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### ENDNOTES

1. Classification of nations based on Gross National Income (GNI) per capita is given by the World Bank and is available at [http://www.worldbank.org/](http://www.worldbank.org/) For our study, instead of using the four groups as defined by the World Bank, we grouped low income and lower middle income countries as *low income nations*, and high income and upper middle income countries as *high income nations*.

2. The full description of the model is available at [http://www.unpan.org/egov2.asp](http://www.unpan.org/egov2.asp)

### APPENDIX 1A: LIST OF COUNTRIES ANALYZED (HIGH AND LOW INCOME CLASSIFICATION)

<table>
<thead>
<tr>
<th>High Income Countries:</th>
<th>Argentina, Australia, Austria, Bahrain, Belgium, Botswana, Canada, Chile, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Malaysia, Malta, Mauritius, Mexico, Netherlands, New Zealand, Norway, Panama, Poland, Portugal, Russian Federation, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Trinidad and Tobago, Turkey, United Arab Emirates, United Kingdom, United States, Uruguay, Venezuela</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Income Countries:</td>
<td>Algeria, Bangladesh, Bolivia, Bosnia and Herzegovina, Brazil, Bulgaria, Chad, China, Colombia, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, Gambia, Georgia, Ghana, Guatemala, Honduras, India, Indonesia, Jamaica, Jordan, Kenya, Macedonia, Madagascar, Malawi, Mali, Morocco, Mozambique, Namibia, Nicaragua, Nigeria, Pakistan, Paraguay, Peru, Philippines, Romania, Serbia and Montenegro, Sri Lanka, Tanzania, Thailand, Tunisia, Uganda, Ukraine, Vietnam, Zimbabwe</td>
</tr>
</tbody>
</table>

Total Number of Countries Analyzed = 99

### APPENDIX 1B: LIST OF COUNTRIES ANALYZED (CONTINENT-WISE)

<table>
<thead>
<tr>
<th>Continents</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>Algeria, Botswana, Chad, Egypt, Ethiopia, Gambia, Ghana, Kenya, Madagascar, Malawi, Mali, Mauritius, Morocco, Mozambique, Namibia, Nigeria, South Africa, Tanzania, Tunisia, Uganda, Zimbabwe</td>
</tr>
</tbody>
</table>
APPENDIX 1B: CONTINUED

<table>
<thead>
<tr>
<th>Region</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td>Bahrain, Bangladesh, China, Cyprus, Georgia, India, Indonesia, Israel, Japan, Jordan, Korea, Malaysia, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Turkey, United Arab Emirates, Vietnam</td>
</tr>
<tr>
<td>Europe</td>
<td>Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Macedonia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Serbia and Montenegro, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom</td>
</tr>
<tr>
<td>North America</td>
<td>Canada, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Trinidad and Tobago, United States</td>
</tr>
<tr>
<td>South America</td>
<td>Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, Venezuela</td>
</tr>
<tr>
<td>Oceania</td>
<td>Australia, New Zealand</td>
</tr>
</tbody>
</table>

APPENDIX 2: NOTE ON RELIABILITY AND VALIDITY OF DATA USED

The Global Competitiveness Report (2005) and the UN e-Government Readiness Report (2004) have been prepared by two leading agencies (namely, the World Economic Forum and the United Nations) which have long experience and expertise in collecting and interpreting global data. The data from both reports had two components, hard data and survey data. Some indices, like business competitiveness, rely completely on hard data while others, like e-Government development, resource spending efficiency, administrative process efficiency, and reduction of social divide are based on an expert survey conducted by the UN and the WEF. For ensuring reliability and validity of all the constructs, it is important to have an overview of the methods undertaken by the two agencies.

The country-level data was collected by the WEF through a number of partner institutes who were given a uniform set of guidelines which were strictly adhered to. Some of these guidelines included taking responses only from CEOs or equivalent rank company officials, facility for the respondents to answer in their preferred language (30 language versions were presented; the reliability of expression was ensured by the partner institutes), etc. A stratified random sampling procedure was adopted to ensure representation of the spectrum of companies in the country. In all, 10,993 respondents participated in the survey which corresponds to an average of 94 respondents from each country. A renowned leader in the field of survey research, Gallup International, was consulted with at the early stages and all suggestions given by them were adhered to. The data from respondents within countries were checked for internal consistency by analyzing the standard deviation of the responses. Apart from ensuring internal consistency, it was important to tackle the issue of perception bias, that is, “a systematic positive or negative bias found among all respondents in a given country; for example, some might believe that people in a certain country are generally more positive about their own economic
environment than people in another country, who might be pessimistic” (WEF, 2005). To minimize chances of perception bias, two techniques were adopted. First, the questions were framed in a way that asks the respondents to compare their own country to world standards, rather than thinking in absolute national terms. Secondly, wherever possible, the survey data were compared with hard data on similar issues.

The UN also followed similar procedures for ensuring validity and reliability for their survey. The most important issue in the case of the UN survey was the training of the researchers who actually carried out the Web survey. Multiple researchers were used to rate the Web sites according to the stages of e-Government Web development. Detailed guidelines were provided for choosing the Web sites and features for classification and analysis. In all, a total of over 50,000 online features and services from 178 countries across six sectors were assessed, ensuring a wide coverage with reliable and consistent methods (UN Report, 2004). Since the two agencies (namely, the World Economic Forum and the United Nations) followed rigorous procedures as described above for ensuring the reliability and validity of the indices, data from these reports were used directly for analyses.

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