

ICT INVESTMENT IMPACTS ON FUTURE LEVELS OF DEMOCRACY, CORRUPTION, AND E-GOVERNMENT ACCEPTANCE IN EMERGING COUNTRIES

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Abstract

Structuration theory and the theory of network society are used to guide an investigation of the extent to which ICT investments in emerging countries impact future levels of democracy, corruption, and e-government acceptance. Using structural path modeling and data from fifty emerging economies, this paper finds that an emerging country's acceptance of the e-government paradigm is contingent upon its levels of corruption and institutionalized democracy, which in turn are contingent upon the country's ICT investment levels. The specific details and implications of these findings for policy-makers are discussed.

Keywords: *ICT, democracy, corruption, e-government, structuration, network society, development*

Introduction

As the international community continues to focus on information and communication technologies (ICTs) as a means of accelerating development, ICT investments remain at the center of the global development policy debate. Despite this vigorous international interest, only a few scientific investigations have been undertaken to date that specifically examine the role of ICT investments in facilitating development. Compounding this problem is the fact that many global leaders who possess the requisite social and political capital to effect real change in the developing world also possess competing or contradictory agendas, and have hitherto been unable to agree as to how the limited resources earmarked for development should best be allocated. In the interim, literally billions of human beings are living in squalid, unstable environments with little or no hope of bettering their circumstances, or of ever enjoying the benefits and opportunities that are all too often taken for granted by individuals living in developed societies. It is for this reason that a sense of urgency exists regarding the establishment of a rigorously researched body of scientific knowledge that evaluates the role of ICT investments in facilitating and accelerating worldwide development.

In an effort to contribute to the resolution of this problem, the current paper uses both structuration theory (Giddens, 1984) and the theory of network society (Castells, 2000) to guide an investigation that quantitatively assesses the impact of ICT investments on future levels of democracy, corruption, and e-government acceptance in emerging countries. It is hoped that this investigation will provide some insight into the complex social and temporal processes that underlie the relationship between ICT investments and an emerging country's sociopolitical structures, and that the results presented herein can usefully inform the debate surrounding the allocation of the international community's limited development resources.

A Structured View of Society

Few would now argue that societies are static entities. Beginning with the philosophies of Auguste Comte and Herbert Spencer in the 19th century, societies have come to be seen as living organisms that evolve and change over time (Comte, 1998 [1830]; Spencer, 2004 [1874]). Concomitant with this perspective is the notion of a structured societal composition;

much like the tissues that comprise a human body, societies are composed of functionally interdependent subsystems. Quoting Spencer (1874), "It is also a character of social bodies, as of living bodies, that while they increase in size they increase in structure. A low animal, or the embryo of a high one, has few distinguishable parts; but along with its acquirement of greater mass, its parts multiply and simultaneously differentiate. It is thus with a society." This perspective was further advanced by Emile Durkheim, who argued that the natural division of society into subsystems enhances social stability and solidarity (Durkheim, 1997 [1893]).

More recent work on the structure of society has led to the identification of five primary societal structures: ecology, polity, technology, economy, and culture (Fuchs, 2003). The ecological realm consists of the natural environment in which a society exists; it is from this realm that societies obtain the natural resources necessary to achieve their goals. The polity realm refers to a society's political and governmental structures. The technological realm refers to the use of tools and technologies by the members of a society as a means of meeting their needs and achieving their goals. The economic realm refers to a society's system of production, distribution, and consumption. Finally, the cultural realm refers to the set of norms and values that are shared by a society's members. The nature of the interdependent relationships among these five societal structures is addressed by Anthony Giddens in his explication of structuration theory (Giddens, 1984). This theory posits that a duality exists between a society's members and its structures insofar as the actions of the members both define and are constrained by the structural components of the society. Given that the members of a society act in all five structural realms, each societal structure influences and is influenced by the other structures. Implicit in this theoretical framework is the notion that a societal structure will not adapt instantaneously to changes in another structure, but rather that the structural adaptations will occur over time. Changes in technology, for example, can be expected to impact the future constitution of a society's political, economic, cultural, and ecological systems, which, in turn, will alter the way in which the society later uses its technology. It is for this reason that temporal effects must be considered -- and indeed anticipated -- when conducting research into societal change.

ICT Investments, Corruption, and Democracy

While political systems should ideally exist to support a society's needs and values, emerging countries are frequently plagued by political corruption (Rose-Ackerman, 2004). Those who possess political power and engage in corrupt activities violate the trust placed in them by society as custodians of the common good. What drives corruption among government officials varies widely, with personal gain and the desire to maintain or increase power being commonly cited motivations (Jain, 2001b). Regardless of what might lead a particular government official to step across the threshold of corruption, he or she will decide to do so only when the anticipated benefits outweigh any ethical considerations, and the risk of detection and subsequent punishment is perceived to be low (Meier and Holbrook, 1992). It is for this reason that one must look beyond an emerging country's political structures to explain the prevalence of political corruption.

As discussed previously, structuration theory posits that changes in a society's technological structure will impact the society's other structural components over time. With respect to the relationship between a society's technological and political structures, Castells puts forth a theory of network society that ties a society's information networks to its distribution of power and influence (Castells, 2000). This theory posits that as a society evolves into one based on knowledge and information, the power within that society becomes increasingly decentralized; i.e., access to information yields a more balanced distribution of power among those to whom the information is available. When information regarding government activities flows freely and openly between a society's members, the result is a reduction in information asymmetry between the citizens and the government, thereby yielding improved transparency and a lower prevalence of corruption (Basu, 2004; Lederman, et al., 2005). As ICTs allow for the rapid dissemination of news and information regarding government policies and activities to those who are connected to an emerging society's information networks, and as ICT investments both expand access to those networks and improve the efficiency with which information is transmitted throughout the society, an increase in ICT investments can be expected to result in lower levels of political corruption.

As the ability of citizens to access and share information that was previously unavailable grows, the political power in an emerging society becomes increasingly concentrated in the hands of the citizenry (Castells, 2000). Given that both government "by the people" and open access to information are characteristics of democracies, emerging societies will progressively adopt and exhibit democratic principles and ideals as they become more and more information-centric (Selian, 2006; Soper, et al., 2006); i.e., ICTs alter the extent to which information is freely exchanged within a society, which in turn impacts the society's uptake and support of democratic processes. In the context of the theoretical discussion above, this implies that the ability of a society to deliver information to its citizens -- as defined by its technological structure -- will

impact the nature of the society's political environment and subsequent development. Thus, when an emerging country's ICT infrastructure enables news and information to be rapidly disseminated to an informed citizenry, a democratic government and low levels of political corruption can be expected to emerge -- quoting Thomas Jefferson, "information is the currency of democracy." Conversely, the institutionalization of democratic principles is expected to be limited and political corruption to be more rampant in societies that do not possess a robust ICT infrastructure. These conjectures form this paper's first two hypotheses:

Hypothesis 1: Increasing ICT investments will yield future increases in institutionalized democracy in emerging countries.

Hypothesis 2: Increasing ICT investments will yield future decreases in political corruption in emerging countries.

E-Government and Development

In the e-government paradigm, ICTs serve as a conduit through which government services and information can be delivered to stakeholders. The adoption of e-government has been found to reduce costs, enhance productivity, and improve transaction efficiency (UNDESA, 2003). E-government has also been credited with increasing the profitability of firms (Thompson, et al., 2005), improving government transparency and accountability to citizens (Basu, 2004; Jaeger, 2003), and enhancing policy-making efficiency and responsiveness (Leitner, 2003). Perhaps most important, however, is the potential role that e-government can play in fostering global development. Governments of emerging societies can employ the principles and practices of e-government to leapfrog over years of development challenges (Mold, 2004; Padget, 2005). In so doing, not only could those societies realize improved government transparency and stakeholder access, but they could also create new opportunities for foreign investment and economic growth (USAID, 2005). By fundamentally changing the way in which governments do business, the e-government paradigm is effecting nothing short of a revolution in global governance. Given the tangible and intangible benefits of e-government, and the potential of the e-government paradigm to accelerate development, an understanding of the factors that drive an emerging society to adopt e-government is both timely and desirable.

Democracy, Corruption, and E-government Acceptance

When an emerging society's political environment is such that the government is controlled by the people (as in a democratic society), the theories discussed previously provide several reasons for believing that the society will be amenable to acceptance of the e-government paradigm. Given that the primary role of government in modern democratic societies has become one of service provision (Giddens, 1998), the e-government paradigm will be attractive to the members of those societies as e-government provides an efficient channel for citizens to access government services and information (UNDESA, 2003). Furthermore, the theory of network society (Castells, 2000) predicts acceptance of the e-government paradigm by the citizens of democratic emerging societies, as in so doing those citizens are acting to maintain their political power and ensure transparency and openness in the provision of government services and information (Alcock and Lenihan, 2001). Conversely, the e-government paradigm is unlikely to be accepted by societies in which democratic principles and values are not institutionalized, as the government officials in those societies will seek to preserve their power by limiting and suppressing the ability of the citizenry to access information regarding governmental policies and actions.

Given that e-government enables the open and transparent provision of government services and information, the e-government paradigm is unlikely to be accepted in highly-corrupt emerging societies, as information transparency makes engaging in corrupt activities much more difficult (Bhatnagar, 2004; Cho and Choi, 2004; Jain, 2001a). Those possessing political power in corrupt emerging societies will therefore strive to maximize the information asymmetry between the government and the citizenry so as to preserve their power while minimizing the chance of their corruption being detected. Conversely, when corruption in an emerging society is low, the society will be amenable to accepting the e-government paradigm insofar as the openness and transparency gained from doing so will help to ensure that corruption does not proliferate in the future. Given these considerations, e-government acceptance in emerging countries is believed to be driven both by the extent to which an emerging country has institutionalized democratic principles and values, and by the extent to which political corruption exists within the emerging country. These two conjectures form this paper's final two hypotheses:

Hypothesis 3: Increasing institutionalized democracy will yield future increases in e-government acceptance in emerging countries.

Hypothesis 4: Decreasing political corruption will yield future increases in e-government acceptance in emerging countries.

The four hypothesized relationships that together comprise this paper's research model are depicted in Figure 1 below.

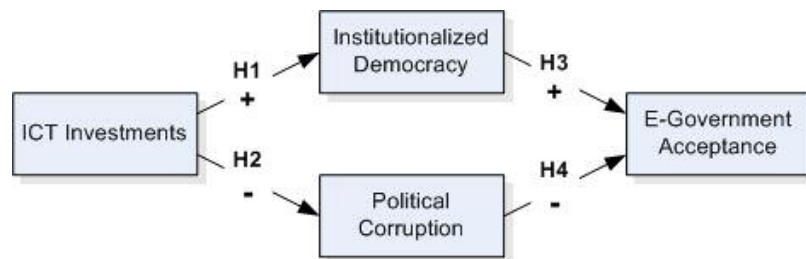


Figure 1. Research model.

Data and Methodology

Following past research (Aguiar, et al., 2004; Soper, et al., 2006), Standard and Poor's categorization of low and middle-income emerging markets was used to identify the set of fifty emerging countries for this analysis (S&P, 2000)¹. Data for each of the constructs were acquired from pre-validated secondary sources. The dependent 'e-government acceptance' construct was operationalized as the United Nations' E-government Web Measure Index, as defined in the UN Global E-government Survey (UNDESA, 2005). This measure quantitatively assesses the coverage and sophistication of e-government services in the target nation. As this measure considers both the availability and the maturity of e-government in a given country, it is believed to be a high-quality proxy for the extent to which that country has accepted the e-government paradigm. The 'political corruption' construct was operationalized as Transparency International's Corruption Perceptions Index, which assesses the extent to which corruption is perceived to exist among the public officials in a given country (TI, 2004). This measure is widely considered by social scientists to be the leading indicator of international corruption levels (Lambsdorff, 2005). The 'institutionalized democracy' construct used in the current study was adopted from the Center for International Development and Conflict Management (Marshall and Jagers, 2006). This measure considers institutionalized democracy to consist of three interdependent components, all of which are weighted equally in the construction of the index: (1) the ability of citizens to express preferences about alternative leaders and policies, (2) constraints on the exercise of power by the executive, and (3) the guarantee of civil liberties to citizens in acts of political participation and in their daily lives. Finally, the 'ICT investment' construct was adopted from the 'ICT expenditure' measure found in the World Bank Group's World Development Indicators database (WBG, 2007). Specifically, this measure quantifies the percentage of a country's GDP that is spent on computer hardware, software, computer and communications services, and wired and wireless communications equipment (WBG, 2007). Per the temporal considerations noted in the theoretical discussion above, it was necessary to acquire multiple years of data for each of the emerging countries in the dataset. As data for the 'e-government acceptance' measure were only available from 2003 through 2005, the dataset is restricted to that timeframe. Partially data-driven research designs such as this are common in studies of this type (Soper, et al., 2006).

The data from the four sources described above were compiled into a single repository. A missing value analysis was then conducted which revealed that approximately 3.56% of the data were missing. In light of this finding, the data were subjected to Little's MCAR test (Little, 1988), the results of which indicated that the data were missing completely at random (X^2

¹ Data from the following fifty emerging countries were used in this study: Argentina, Bahrain, Bangladesh, Botswana, Brazil, Bulgaria, Chile, China, Colombia, Cote d'Ivoire, Croatia, Czech Republic, Ecuador, Egypt, Estonia, Ghana, Hungary, India, Indonesia, Jamaica, Jordan, Kenya, Latvia, Lebanon, Lithuania, Malaysia, Mauritius, Mexico, Morocco, Namibia, Nigeria, Oman, Pakistan, Peru, Philippines, Poland, Romania, Russian Federation, Saudi Arabia, Slovak Republic, Slovenia, South Africa, Sri Lanka, Thailand, Trinidad and Tobago, Tunisia, Turkey, Ukraine, Venezuela, and Zimbabwe.

=3.207, $df = 2$, $p = ns$). As the MCAR assumption had not been violated, data imputation was deemed appropriate for handling missing values. Following past research in this area (Soper, et al., 2006), the Markov Chain Monte Carlo (MCMC) multiple imputation method was used to impute missing values (Gilks, et al., 1996; Rubin, 1987). The utilization of multiple imputation is doubly beneficial in that it prevents the loss of statistical power associated with listwise deletion, and avoids the biases that are inevitably introduced into a dataset when cases with missing values are deleted (Schafer, 1997). Finally, the data were standardized into Z-scores by year, and a time-lagged dataset was computed to reflect the temporal component of the hypothesized relationships. As the dataset contained observations for just three years, it was possible to compute only a one-year time lag for the model constructs. Specifically, ICT investment values from 2003 were used to predict democracy and corruption levels in 2004, which in turn were used to predict e-government acceptance levels in 2005. The efficacy of the empirical model was assessed using a structural path model with maximum likelihood estimation (Bentler, 2006), which is depicted in Figure 2 below.

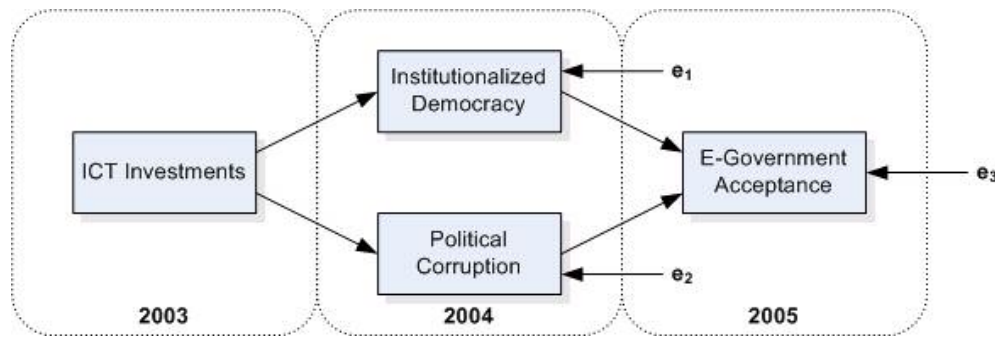


Figure 2. Structural path model.

Structural path modeling was chosen as the analytical approach for the current study both because it allowed for the simultaneous estimation of the model's interfactor relationships, and because it does not assume a zero error variance. The results of the empirical analysis are presented below.

Results and Discussion

The results obtained from the analysis of the structural model can be usefully classified into three categories: (1) global model fit statistics, which provide an indication of how well the observed data correspond to the theoretical model; (2) linear submodel analyses, which indicate the proportions of variance accounted for by each of the submodels within the overall model; and (3) parameter estimates, which describe the nature and direction of the interconstruct relationships.

Global Model Fit

As in other statistical applications, the Pearson Chi-Square (X^2) provides a measure of how poorly the specified model approximates data in the population; i.e., as the value of the Chi-Square increases, the global fit of the structural model decreases. The Chi-Square test examines the null hypothesis that the specified model perfectly fits the population. Failing to reject the null hypothesis therefore indicates good model fit, and as such, nonsignificant p-values are desirable (Steiger and Fouladi, 1997). The Comparative Fit Index (CFI) is widely used to assess the improvement in fit of a structural model over and above the null model. A CFI of greater than 0.95 is desirable when assessing model fit (Hu and Bentler, 1999). The Standardized Root Mean Square Residual (SRMR) provides a standardized measure of the difference between the observed covariance matrix and the predicted covariance matrix. In addition to Chi-Square considerations, a combinatorial rule in which the SRMR is less than 0.08 and the CFI is greater than 0.95 is currently recommended for claiming good model fit (Hu and Bentler, 1999). With these considerations in mind, the global model fit statistics for the current study are presented in Table 1 below.

Table 1. Assessment of global model fit.

Fit Statistic	Value
Chi-Square:	0.042 (2 df)
Chi-Square Probability:	not significant
CFI:	0.999
SRMR:	0.010

As shown in the table, all of the criteria for good model fit were met by the data used in the study. More specifically, the structural path model was able to reproduce the observed covariance matrix with a high degree of accuracy, thereby lending support to the overall efficacy of the research model. In light of this support, examinations of the linear submodels and interconstruct relationships were undertaken, the results of which are provided below.

Linear Submodels

In addition to examining measures of model fit, the predictive and explanatory efficacies of the research model are evidenced by the proportions of variance accounted for by the model's linear subcomponents and their associated effect sizes. These values are provided in Table 2 below.

Table 2. Assessment of linear submodels.

Dependent Construct	Independent Constructs	R ²	Effect Size
E-government Acceptance	Institutionalized Democracy Political Corruption	0.302	0.433
Institutionalized Democracy	ICT Investments	0.049	0.052
Political Corruption	ICT Investments	0.095	0.105

As shown in the table, small to medium-sized effects were observed with respect to the impact of ICT investments on future levels of democracy and corruption in emerging countries, while a large effect was observed with respect to the impact of democracy and corruption on future levels of e-government acceptance in those countries (Cohen, 1988). These results indicate that ICT investments can usefully predict future levels of democracy and corruption in emerging countries, which in turn can be used to usefully predict future levels of e-government acceptance.

Parameter Estimates

Finally, an examination of the model parameter estimates provides insight into the nature and direction of the relationships between the empirical model's constructs. The model parameter estimates and their associated significances are shown along the interconstruct paths in Figure 3 below.

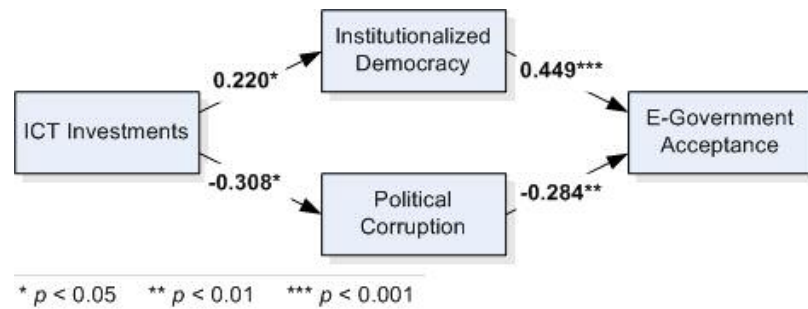


Figure 3. Model parameter estimates

As shown in the figure, all of the parameter estimates were statistically significant. The positive relationship between ICT investments and future institutionalized democracy lends full support to Hypothesis 1. When information is freely exchanged among the citizens of an emerging society, the degree to which democratic principles permeate the society's political fabric will inevitably increase. A fine example of this phenomenon can be found in the case of China, the government of which expends vast resources in an effort to curb the spread of democracy by controlling the flow of information over its ICT networks. Despite these efforts, the democratizing power of China's rapidly expanding ICT infrastructure has resulted in an ever-increasing acceptance of democratic ideals and institutions among the Chinese people (Ogden, 2002). The negative relationship that was observed to exist between an emerging society's ICT investments and its level of political corruption lends full support to Hypothesis 2, and highlights the importance of information and communication technologies to societal development. When those possessing political power within an emerging society are unable to restrict the flow of information regarding government activities and policies to the society's citizens, corruption is constrained, and accountability and transparency flourish.

As expected, a strong positive relationship was observed to exist between institutionalized democracy and e-government acceptance, while a strong negative relationship was observed to exist between political corruption and e-government acceptance. These results lend full support to Hypotheses 3 and 4, respectively. Per the findings from Hypothesis 1, the citizens of emerging societies with a high degree of institutionalized democracy are likely to have access to a comparatively robust ICT infrastructure. In these societies, e-government is seen not only as a convenient and cost-effective way to access government services, but also as a means of ensuring government openness, accountability, and transparency. The combination of these benefits, enabled by the underlying technological structure of the society, leads highly-democratic emerging societies to be more accepting of the e-government paradigm. Conversely, those who possess political influence in highly-corrupt emerging societies have little motivation to make government services available to their citizens, as doing so would jeopardize their positions of power. These societies, which are characterized by limited ICT resources, lack an underlying technological structure that is conducive to acceptance of the e-government paradigm.

Concluding Remarks, Limitations, and Directions for Future Research

As emerging societies develop and information technologies are inseparably woven into their social fabric, it will become increasingly important to examine technology adoption from a societal level; i.e., to understand how the structural characteristics of a society impact its adoption of different information paradigms. To that end, the current paper utilized structuration theory and the theory of network society to develop a research model linking an emerging society's technological structure to its acceptance of the e-government paradigm via its political environment. Specifically, the model evaluated herein posited that emerging societies that make comparatively large ICT investments will spawn a future political environment characterized by low levels of corruption and high levels of institutionalized democracy, and that such an environment will result in the society's acceptance of the e-government paradigm. Validation of the research model was carried out using structural path modeling with pre-validated secondary data for fifty emerging countries across three years. As predicted by the paper's theoretical framework, an emerging country's acceptance of the e-government paradigm was found to be contingent upon its levels of political corruption and institutionalized democracy, which in turn were found to be contingent upon the country's ICT investment levels.

This paper's findings have many implications for emerging countries: First, the research model demonstrates how ICT investments impact levels of institutionalized democracy and political corruption within emerging societies. With respect to these results, political corruption was found to be the most influenced by ICT investments, although the impact of those investments on democracy cannot be discounted. Those working to increase democracy or lessen political corruption in emerging countries should therefore consider these results when setting expectations regarding the impact of ICT investments. Conversely, the research model also demonstrates how restricting the flow of information allows corrupt, authoritarian regimes to maintain their influence in emerging societies. For better or worse, information availability and accessibility clearly plays a pivotal role in determining the nature of an emerging country's political environment.

In linking an emerging society's political environment to its acceptance of the e-government paradigm, the empirical model also provides a societal-level framework for explaining why e-government initiatives are accepted by some emerging societies and rejected by others. With respect to these relationships, efforts to improve e-government acceptance in emerging societies must focus on lowering political corruption and increasing institutionalized democracy, both of which can be accomplished, at least in part, through investing in ICT. Finally, a society's acceptance of the e-government paradigm can be looked upon as an important milestone among those in the development and globalization circles, as the success of e-government necessarily requires that an emerging society possess both good governance and a technological structure that supports the free exchange of information.

As with all research efforts, there are several limitations to this investigation that must be acknowledged. First, due to data availability issues, the research model has only been evaluated using a one-year time lag. As more data become available, the research model put forth herein should be reevaluated using lengthier time horizons and at different levels of analysis (state, local, etc.). Second, the set of emerging countries from which the results reported herein were derived are widely dispersed geographically, culturally, and economically. While the utilization of this diverse set of countries may enhance the generalizability of the results, considering such inter-country differences would yield greater insights into the relationships being investigated. Next, there undoubtedly exist other philosophical and theoretical models whose views regarding the structure of society differ from those on which this research is based. Although the validation undertaken herein provides evidence in support of the theories used to develop the research model, that evidence is insufficient to dismiss all opposing philosophical and theoretical viewpoints. Finally, there may well be other ecological, economic, cultural, political, or technological characteristics (e.g., system design characteristics) that contribute significantly to a society's acceptance of the e-government paradigm. For this reason, it is imperative that work in this area continue to explore the complex relationships between an emerging society's technology and its other structural components. In so doing, we as a discipline can provide the best scientific advice possible to world leaders who are seeking to lift their citizens out of poverty.

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