Journal of the Association for Information Systems
JAIS

Research Article

An Empirical Examination of the Impact of ICT Investments on Future Levels of Institutionalized Democracy and Foreign Direct Investment in Emerging Societies

Daniel S. Soper
California State University, Fullerton
dsoper@fullerton.edu

Haluk Demirkan
Arizona State University
Haluk.Demirkan@asu.edu

Michael Goul
Arizona State University
Michael.Goul@asu.edu

Robert St. Louis
Arizona State University
St.Louis@asu.edu

Abstract

The macro-level impacts of information and communication technology (ICT) investments on institutionalized democracy and foreign direct investment (FDI) levels in emerging societies are examined within a multi-theoretic framework that considers societal structure, power, and globalization-driven societal change. Using multilevel change modeling and longitudinal data from 48 emerging societies across seven years, ICT investments are observed to produce positive direct impacts on future levels of institutionalized democracy and FDI. After controlling for several covariates, the direct impact of ICT investments on future levels of institutionalized democracy in emerging societies is shown to partially explain the observed relationship between ICT investments and future FDI in those societies. The implications of these results are discussed in light of an emerging and exemplary World Bank debate over the historical search for a simple recipe for emerging society development and the need for a new way of thinking represented by what has been referred to as "new structural economics".

Keywords: *ICT, Democracy, Foreign Direct Investment, Emerging Societies.*

* Varun Grover was the accepting senior editor. This article was submitted on 9th September 2008 and went through three revisions.

Volume 13, Issue 3, pp. 116-149, March 2012

An Empirical Examination of the Impact of ICT Investments on Future Levels of Institutionalized Democracy and Foreign Direct Investment in Emerging Societies

1. Introduction

The potential transformative role that information and communication technologies (ICTs) can play in accelerating global development has recently received much scientific and political interest. An increased focus on these technologies by organizations such as the United Nations, the European Union, and the World Bank has elevated ICT investments to a position of central concern in the debate surrounding the formulation of global development policy. Despite this widespread interest, the role of ICT investments in facilitating development is still not well understood. There are two fundamental reasons for this. First, information systems research has traditionally focused on more granular levels of analysis (e.g., organizations, groups, individuals, etc.). Although such analytic lenses have certainly produced valuable insights, a review of the literature showed that the impacts of ICTs at the societal and intersocietal levels of analysis have been largely overlooked in mainstream IS research (Soper, 2008). Second, 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 on how the limited resources earmarked for development should best be allocated. In light of this situation, lenses adapted from both rationalist and constructivist perspectives may be useful in considering the macro-level role of ICT investments in emerging societies. Accordingly, our work utilizes a general systems approach that draws upon several theoretical perspectives to examine the dynamics of ICT impacts in emerging societies within a framework of globalization.

In the context of globalization, the impact of ICT investments on foreign direct investment (FDI) has been identified as an important area of study. FDI inflows to emerging societies are unequally distributed, have been influenced by successive waves of technology invention and adoption, and have become one of the most transparent measures of increasing globalization in the world economy (Addison & Heshmati, 2003; Gholami, Lee, & Heshmati, 2006). From a managerial perspective, these inflows are important to emerging societies for several reasons (Jensen, 2003; Loungani & Razin, 2001): (1) The free flow of capital across national borders facilitates the search for the highest rate of return on investment; (2) FDI inflows typically encourage the simultaneous transfer of corporate governance best practices and the transfer of technology; (3) FDI inflows encourage employee training programs that improve human capital; and (4) Profits generated from productive applications of FDI contribute to higher tax revenues.

Bosworth and Collins (1999) found that, as a percentage of gross domestic product (GDP), FDI inflows encourage nearly equivalent domestic investments in developing economies. They also found that the benefits of FDI inflows are sufficient to offset the risk of allowing markets to freely allocate capital across national borders. Further, ICT proliferation has been identified as a primary driver of FDI in developed societies (Gani & Sharma, 2003). With respect to emerging societies, previous studies have concluded that more assistance should be given to poorer countries to help them break out of what has been referred to as the “low ICT equilibrium” trap (Addison & Heshmati, 2002; Estrada, 2005). This trap is characterized by the inability of poor societies to apply limited public resources to fund ICT, coupled with a concurrent inability to attract FDI that could otherwise encourage further cumulative ICT investment. The result of this trap is a vicious negative cycle.

In addition to concerns surrounding FDI, the role of ICT investments in facilitating democratization has also been identified as an important area of study. One motivator for such research is to ascertain whether multinational corporations ignore the political factors associated with civil rights and liberties within the societies in which they invest. On average, investments made by multinational corporations have been found to be significantly higher in democratic societies (Busse, 2003). The IS literature on the impact of ICT on democracy is sparse, although there are some examples that rate the impact of various web technologies on processes associated with democracy (Becker, 2001; Mohen & Glidden, 2001). Others assess the potential of information technology for improving democracy in developed societies (Grönlund, 2001).

Genealogically, much of the current research on ICT impacts in emerging societies is directly descended from earlier, more granular work that examined the impact of ICTs on firm performance,

labor efficiency, and multi-factor productivity (Brynjolfsson & Hitt, 2000; Jorgenson, 2002; King & Sethi, 1999; Oliner & Sichel, 2000; STOA, 2001). The more recent interest among IS researchers in the relationship between ICTs and global development is partially traceable to these earlier studies. The evolution of research in this area has led to an unintentional effect: Almost entirely absent from the current literature are studies that go beyond examinations of simple binary relationships to consider the more complex dynamics associated with ICT investment impacts in emerging societies. In one notable exception, the author focuses on the nature and direction of links between ICT diffusion and per-capita income, trade and financial liberalization, literacy and education, and freedom indicators in developing countries (Baliamoune-Lutz, 2003). Although this study yielded mixed results, its inclusion of social, political, and economic factors represented an important attempt to introduce constructivist and multidisciplinary perspectives into the research stream -- objectives that are fully consistent with the advancement of this area of research (Walsham, Robey, & Sahay, 2007).

In addition to the lack of understanding about the unfolding causal relationships underlying globalization, many existing globalization-oriented studies suffer methodologically from concerns regarding continuity and change over time (Kittel & Winner, 2005). Further, the preponderance of the literature examining ICTs in emerging societies has focused more on societal characteristics that influence the accessibility and availability of ICTs than on the impacts of those ICTs (Dewan & Riggins, 2005). So there is a sizeable body of research that identifies societal problems that inhibit ICT adoption and proliferation in emerging societies, but very few of those efforts develop prescriptive recommendations that can be used to inform ICT policy-making decisions (Mbarika, Okoli, Byrd, & Datta, 2005).

Historical growth research that included examinations of ICT implications is being re-examined by scholars in institutions like the World Bank. *The Growth Report: Strategies for Sustained Growth and Inclusive Development* (Commission on Growth and Development, 2008), prepared by a commission composed of Nobel prize-winning economists and many other experienced policy makers, states:

> *Economists know how markets work, and they can say with some confidence how a mature market economy will respond to their policy prescriptions. But mature markets rely on deep institutional underpinnings, institutions that define property rights, enforce contracts, convey prices, and bridge informational gaps between buyers and sellers. Developing countries often lack these market and regulatory institutions… We do not know in detail how these institutions can be engineered, and policy makers cannot always know how a market will function without them… At this stage, our models or predictive devices are, in important respects, incomplete* (Commission on Growth and Development, 2008, p. 4).

The "new structural economics framework" being championed by scholars at the World Bank "…starts with the observation that the main feature of modern economic development is continuous technological innovation and structural change" (Lin & Monga, 2010, p. 13). New structural economics advises that foreign direct investment is a more favorable source of foreign capital for developing countries than other capital flows because it is usually targeted toward industries consistent with a country's comparative advantage. Also, "direct investment generally brings technology, management, access to markets and social networking, which are often lacking in developing countries and are yet crucial for industrial upgrading" (Lin, 2011a, p. 211). In new structural economics, market mechanisms play a central role, but government also plays a role in the context of ICTs:

> *Information has the same properties as public goods. The costs of collecting and processing information are substantial. However, the marginal cost of allowing one more firm to share the information is almost zero once the information is generated. Therefore, the government can play a facilitating role by investing in information collection and processing and making information about the new industries that are consistent with the country's latent comparative advantage freely available to firms* (Lin & Monga, 2010a, p. 5).

Growth theory discussion at the World Bank became more focused in 2010 with Lin's February publication discussing new structural economics (Lin, 2011a). There have been and are ongoing debates about the implications of the approach. One interesting point of Lin's ongoing conversation of new structural economics is that he believes a political system has no bearing on applications of the

theory (Lin, 2011b). This implies that government will play the same facilitating role regardless of polity. This paper explores whether that is the case.

In summary, much of the current research examining ICT investment impacts in emerging societies is limited, because it lacks a unified theoretical foundation, it ignores change and continuity over time, it relies very heavily upon rationalist underpinnings, and it generally examines only simple binary relationships. Despite these limitations, the establishment of an Association for Information Systems special interest group on ICT and Global Development, coupled with the recent publication of development-oriented special issues by several major IS journals, indicate that ICT and development research has grown out of its infancy and is well-positioned to play a prominent role in mainstream IS research. The current paper contributes in this regard by developing a framework for understanding ICT impacts at a societal level, and then using that framework to empirically assess such impacts on democratization and FDI – both of which are critical facets of globalization and development. We, thus, begin our investigation in the next section by establishing the study's conceptual and theoretical foundations, followed by the development of our research hypotheses in §3. We then describe our data and analytical methodology in §4, and report upon and discuss our results in §5 and §6. Our investigation concludes in §7 with a summary of our findings, a discussion of the study's limitations, and proposals for future work in this area.

2. Conceptual and Theoretical Frameworks

In the 19th century, influential social philosophers such as Auguste Comte and Herbert Spencer began thinking about societies as living organisms that evolve and change over time (Comte, 1998 [1830]; Spencer, 2004 [1881]). 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 (1881, p. 462):

> *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.*

By the middle of the 20th century, these and other ideas had been distilled into general systems theory (GST), which remains one of the most pivotal and influential forces in the history of management science (Boulding, 1956).

Broadly speaking, GST provides a framework through which intrinsically complex and multifaceted phenomena can be synthesized, advanced, and better understood. GST can be characterized as a hierarchical organizational framework in which complex systems are viewed as a collection of interacting subsystems, which are themselves comprised of lower level subsystems. Discipline-specific theoretical orientations are generally useful in addressing only phenomena in the lower, less complex levels of this nested hierarchy of subsystems. In the context of GST, a major long-term objective of the scientific endeavor is, thus, to iteratively synthesize discipline-specific evidence and theory from less complex systems into an improved multidisciplinary understanding of more complex systems. Such an understanding can then fuel further research at all levels of the general systems hierarchy. GST is, therefore, by nature both integrative and inter-disciplinary, inasmuch as it provides a framework through which theory and research from multiple disciplines can be holistically organized, synthesized, and better understood.

2.1. Societal Structure

With a nod to the early philosophies of Comte and Spencer, societies can be readily characterized as complex systems within the GST framework. This perspective is depicted in Figure 1 below.

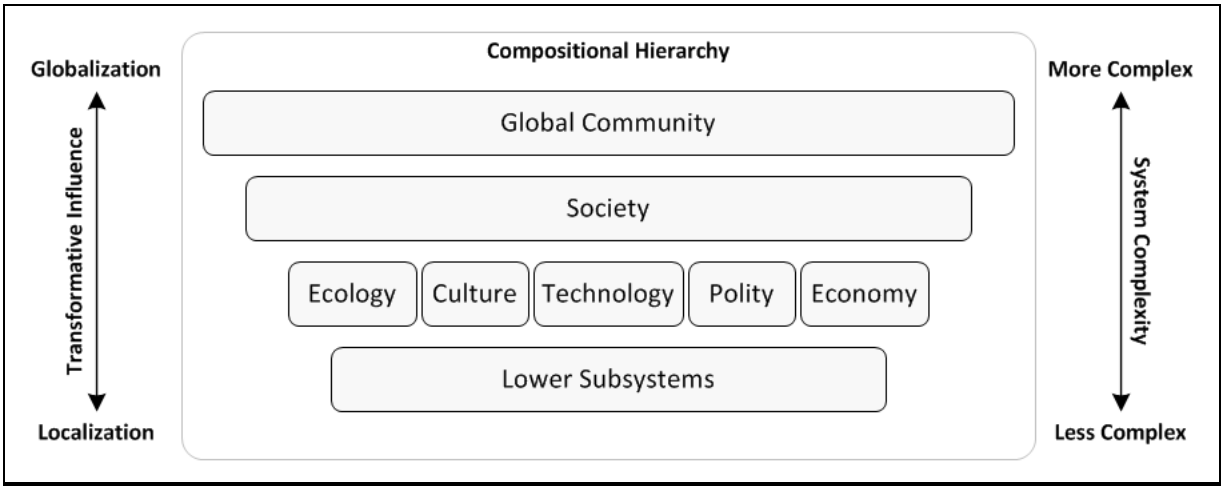


Figure 1. A General Systems View of Societal Composition

As shown in the figure, the global community in which we all live consists of societies and the connections between them. Each society, in turn, consists of ecological, cultural, technological, political, and economic subsystems, as well as the connections between those subsystems (Fuchs, 2003; Fuchs, 2007). In the technological subsystem, humans make use of tools to achieve goals by transforming nature. In the ecological subsystem, humans organize natural resources in such a way that those resources can be used to meet their needs and objectives. In the economic subsystem, humans produce, allocate, distribute, and consume goods and services to satisfy their needs. In the political subsystem, humans establish power structures in order to achieve collective decisions. Finally, in the cultural subsystem, humans produce a set of norms and values that guide and define living conditions and lifestyles.

2.2. Societal Change

While certainly necessary, knowledge of the principal subcomponents of a complex system is not sufficient to understand the system as a whole. One must also understand how those subcomponents are interconnected and how they interact with one another to produce structure and change over time. With respect to GST, societal change can be understood as a function of the transmission of influence by way of human agency across subsystem boundaries. As depicted in Figure 1, when this influence flows horizontally across subsystems at the same hierarchical level, a change in one subsystem can produce changes in one or more of the other subsystems. A major change in a society's technological infrastructure, for example, may have substantial implications for the society's ecology, polity, economy, or culture. In a similar fashion, influence can also flow vertically between the nested layers within a GST hierarchy. A major change at the level of the global community will, for example, cascade vertically throughout the hierarchy, affecting the societies of which it is composed, their subsystems, and eventually, individuals. Conversely, the invention of a revolutionary web technology may initially influence only a small number of individuals. As knowledge of the new technology spreads, its influence may grow to encompass groups, organizations, governments, and perhaps eventually entire societies and the larger global community as a whole. In the context of a society, influence that flows downward from more complex systems to less complex systems can be viewed as the process of localization, while influence that flows upward from less complex systems to more complex systems can be viewed as the process of globalization.

Just as general systems theory provides high-level insight into the structure of a society, a high-level understanding of societal change can be gained through Giddens' influential structuration theory, which views systems as a function of observable patterns of relationships among people and resources (Giddens, 1984). From a structuration perspective, the agency of individuals serves to produce societal structures, which, in turn, influence and constrain the actions and interactions of those individuals (Jones & Karsten, 2008). Actions and structures produce and reproduce one another in an ongoing cycle over time. These structures combine and interact to produce increasingly complex systems that reside on a spectrum that ranges from the local to the global. If a society is analogized to a system in

the above description of Giddens' theory, then the relationship between Giddens' structures and the subsystems of which the society is composed becomes apparent.

The five societal subsystems described above are, thus, interconnected by a conduit of human agency, and it is by way of this agency that the structural properties of one subsystem can influence and affect those of another. Accordingly, a sufficiently large structural disruption will be carried beyond the boundaries of the subsystem in which it originated, and will eventually be felt in one or more of the other subsystems. To visualize these transformative phenomena, one might imagine the surface of a pond that has been divided into five regions, each of which represents one of the five societal subsystems (see Figure 2). A stone thrown into one of these regions from the shore would disrupt the surface of the pond, sending ripples traveling outward. In the context of structuration theory, these ripples are representative of influence as carried by human agency. Depending upon the size and speed of the disruptive stone, the ripples may eventually reach one or more of the other four regions before dissipating. Ripples of sufficiently large amplitude would, of course, not dissipate by the time that they reach the edge of the pond, but would instead reflect and travel back across the surface toward their point of origin.

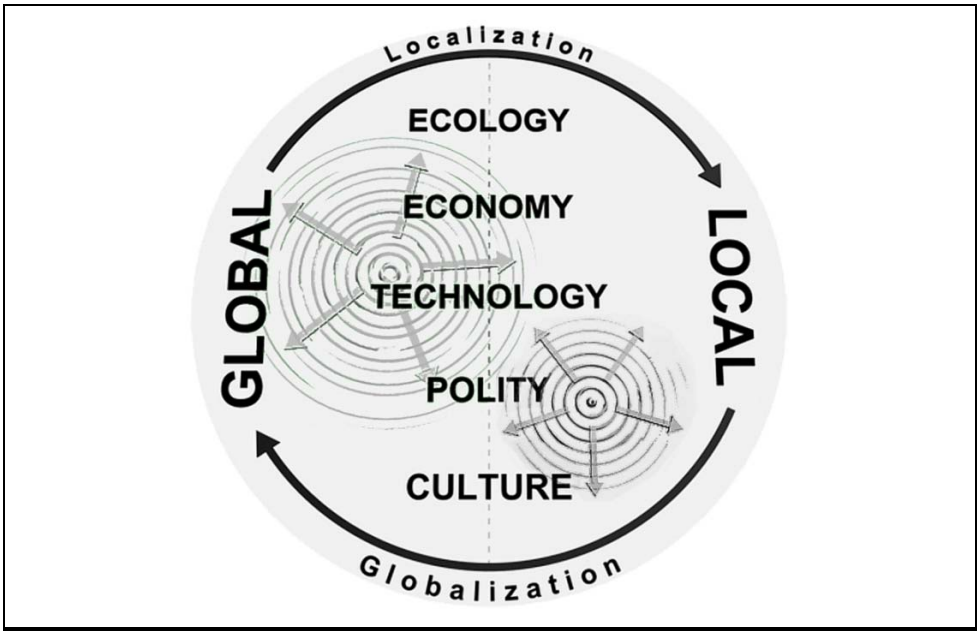


Figure 2. An Illustrative Model of Societal Structure and Change

This analogy is particularly useful in understanding the concepts of causality and change between and within the structures of which a society is composed. A change in the technology subsystem, for example, will generate ripples of causal influence that may eventually reach and disrupt the other subsystems in a measurable way. These effects cannot be expected to materialize instantaneously, however, as the ripples require time to travel between societal structures.

2.3. From a General Framework to Testable Propositions

The integration of general systems theory and structuration theory described above provides a useful framework for understanding societal structure and change over time, but this framework is generalized, and should not be utilized as a direct source of testable propositions. The development of testable propositions requires that the framework's general concepts be operationalized as specific constructs, and that relevant theory be leveraged in the establishment of interconstruct hypotheses. To facilitate this process, one might consider Figure 3 below, which depicts a non-exhaustive range of studies that are feasible in light of the relationships between societal subsystems described by this framework.

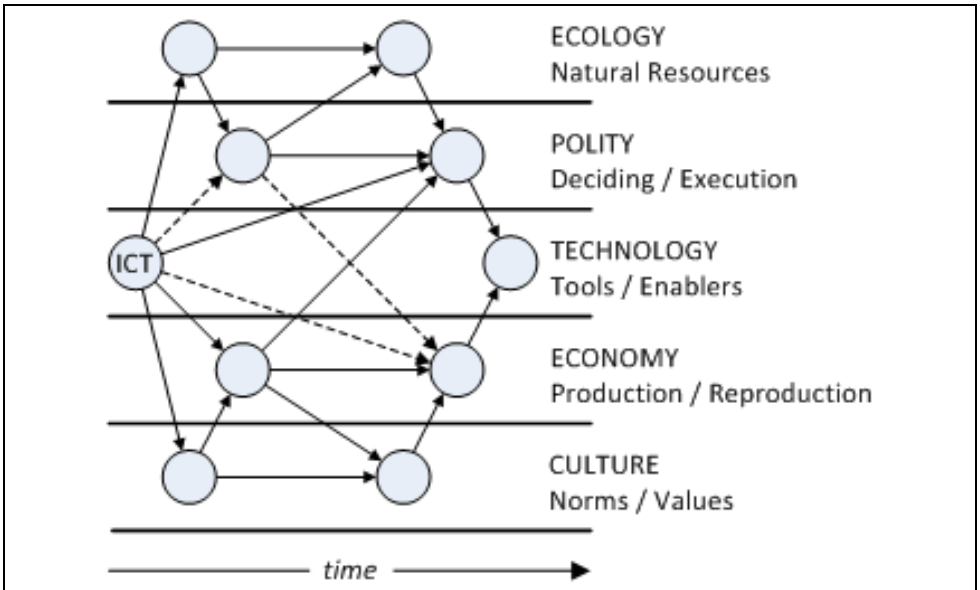


Figure 3. Potential Subsystem Studies

Each circle in the figure above represents a specific construct drawn from a societal subsystem, while each arrow represents a hypothesized relationship. These relationships must, of course, be informed by relevant multidisciplinary or discipline-specific theory. One might, for example, evaluate a research model that investigates the impact of ICT investments (left side of the technology layer) on a particular construct within the polity subsystem (to the right, one layer up), and through the polity subsystem to a construct within the economic subsystem (to the right, two layers down), with the polity construct serving as a mediator between the ICT construct and the dependent economic construct. If theoretically appropriate, a relationship from the ICT construct to the dependent economic construct might also be included in the study in order to assess direct impacts. Thus, traversing different paths in Figure 3 provides a non-exhaustive set of possibilities for the design of societal-level studies with testable propositions, and also provides a framework through which the findings of such studies can be compared and integrated. The specific theories from which the current study's hypotheses were derived are detailed in the following subsection.

2.4. Perspectives on Power and Influence

The general framework put forth above implies that the introduction of new information and communication technologies may have wide-ranging impacts on emerging societies. Insights into the nature of these impacts can be gained by considering the connections between a society's ICTs and its distribution of power and influence. Both Castells' theory of network society (Castells, 2000) and Tammen's power transition theory (Tammen, 2000) provide perspectives that are germane in this regard. Castells proposes that societal members are nodes in a social system network, and that network participation has important consequences for the lives of each member. Nodes in the network connect with other nodes, which, in turn, share similar resources and interests. If a node fails to remain connected with other nodes (via communication), it may be dropped from the network and lose its ability to exert influence. Thus, ICT investments alter existing rules governing social interaction in emerging societies and change both the opportunities to exert an influence and the desire to exert an influence within those societies.

When applied in a societal context, power transition theory also provides several useful insights into the transformative capacity of ICTs in emerging societies. First, this theory suggests that societal participants will, to the extent that their power allows, attempt to influence the ICT investment process in an effort to exert control over resources or other participants, or to create an environment that is conducive to their own objectives. In this regard, the introduction of ICTs can be "…seen as a process that involves interested parties intentionally using their power to affect the nature of the systems that are put in place" (Jasperson, Carte, Saunders, Butler, Croes, & Zheng, 2002, p. 427). Accordingly, many

societal participants will recognize that ICTs can be a force to determine or constrain the behaviors of individuals, groups, organizations, or governments, and will leverage ICTs in an effort to achieve their objectives. Further, in an effort to gain more power or to maintain the existing distribution of power, societal participants will attempt to influence how others interpret the real and potential implications of ICTs for their society. Finally, if ICT investments affect the ability of societal members to access and control resources and information, then those investments will also alter societal power dynamics. The subsequent disruption in the distribution of power will result in either societal upheaval and conflict or the reconciliation of differences through the political processes of negotiation and compromise.

Power is most commonly leveraged to acquire and control resources, and when reacting to the introduction of new ICTs, societal members are generally engaged in complex activities and processes directed toward that end. This behavior is especially relevant in emerging societies where resources are almost always scarce. Transformative processes take time to unfold, so studies aimed at examining such phenomena should utilize longitudinal methodological approaches that are consistent with lengthy time horizons. Jasperson, et al. (2002) speak to this point: "Once power altering IT has been introduced, it takes some time for the organization to reach a new equilibrium state. The indicators of IT's impact on a new equilibrium state are evidenced by new power structures, language, and symbols" (p. 423). From the perspective of the general framework put forth previously, the introduction of new power-altering ICTs into an emerging society generates disruptive ripples that travel outward from the technology subsystem producing changes in the other societal subsystems over time. As the society absorbs the new ICTs, the disruptive ripples dissipate, and a new power equilibrium can be expected to emerge.

Together, these perspectives on power and influence form the theoretical framework for our empirical investigation. For purposes of clarity, Table 1 below provides a summary of the conceptual and theoretical frameworks upon which the current investigation is built. In the next section, we rely upon these frameworks to develop our series of theoretically derived research hypotheses.

Table 1. Summary of Conceptual and Theoretical Frameworks

	Consists Of	Relevant Constructs	Explains
Conceptual Framework	General Systems Theory	▪ Nested hierarchy of systems that range from more complex to less complex	Societal structure
	Structuration Theory	▪ Relationship between individual action and societal structure ▪ Societal change as a function of the transmission of influence by way of human agency	Societal change
Theoretical Framework	Theory of Network Society	▪ Distribution of power according to network participation ▪ Transmission of influence via social network connections	How power dynamics are altered by ICT investments in emerging societies
	Power Transition Theory	▪ Power equilibria ▪ Transition of power and likelihood of conflict	How changing power dynamics alter an emerging society's economic and political structures

3. Hypotheses Development

When considered in conjunction with the gaps in the current literature, the conceptual and theoretical discussions above lead us to a mediational research model that examines the direct and indirect relationships among ICT investments, institutionalized democracy, and FDI in emerging societies over time. A conceptual representation of this research model is shown in Figure 4 below. Note that the research model incorporates at least one element from each of the five societal subsystems described earlier.

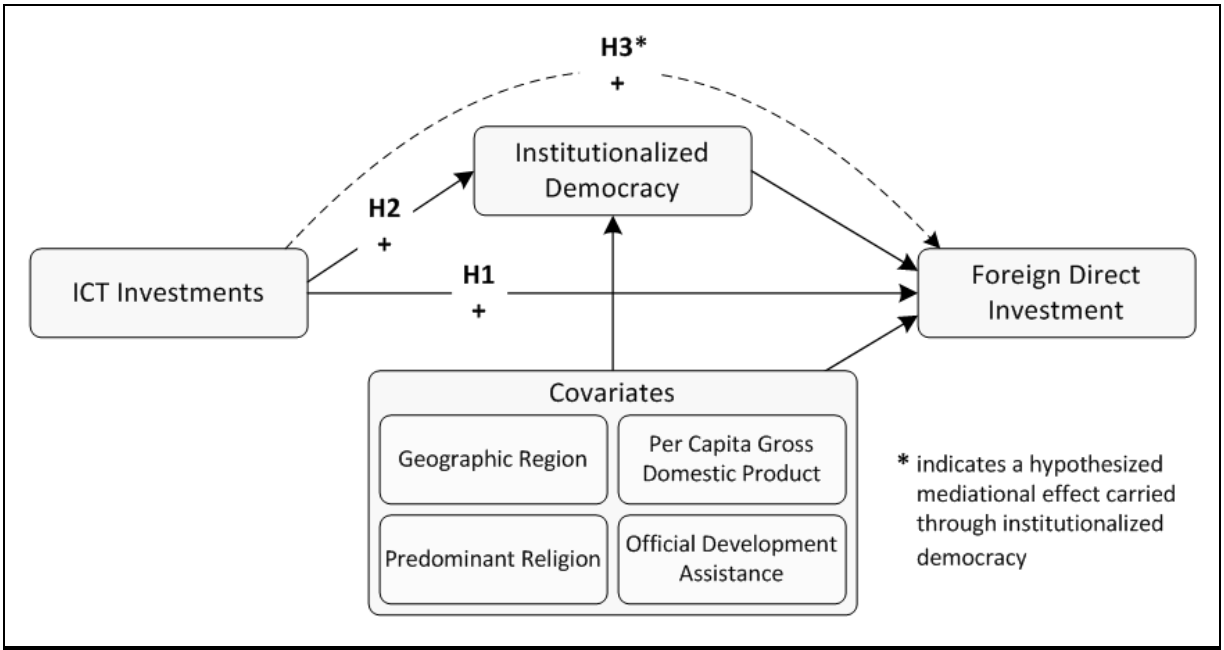


Figure 4. Conceptual Research Model

In the subsections that follow, we describe the three hypotheses shown in the figure above, and detail our theoretical justification for each.

3.1. Hypothesis 1

Our first hypothesis examines the direct relationship between ICT investments and FDI in emerging societies and proposes that future FDI levels depend on ICT investments. Given that ICTs enhance transregional interconnectedness, investment in ICTs in emerging societies widens the reach of networks of social activity and power within those societies. Castells' theory of network society predicts that such an increase in connectedness will expand the ability of participants to exert control and influence from a distance. This increased ability to exert control and influence mitigates uncertainty and perceived risk to invest, and can, therefore, be expected to produce an increase in FDI over time. Furthermore, power transition theory predicts that newly introduced ICTs will be used in ways that work to increase the resources of those who wield them. Thus, ICT investments enhance the capacity of governments and organizations to leverage their human assets and contribute to the creation of an economic environment in which there are increased opportunities for growth and foreign investment. Stated as a hypothesis, this becomes:

> ***H1**: ICT investments have a positive direct impact on future levels of foreign direct investment in emerging societies.*

3.2. Hypothesis 2

Our second hypothesis examines the direct relationship between ICT investments and institutionalized democracy in emerging societies and proposes that ICT investments encourage future democratization in those societies. ICT investments change the rules and opportunities for individuals, groups,

organizations, and governments to interact within an emerging society (Castells, 2000). Large numbers of individuals may suddenly acquire the ability to access and share information and resources that were previously available to only a few. The theory of network society predicts that the introduction of new ICTs will produce a more even distribution of power among those who are connected to the network. Further, power transition theory predicts that connected individuals will find ways of using their newly acquired power to alter societal power structures, such that those structures will be more supportive of their objectives. Accordingly, political activity catalyzed by new ICT investments may facilitate a societal shift away from oppressive power structures, particularly if those power structures do not enable resource sharing.

In authoritarian societies, for example, ICTs can allow ideas and opinions that are contrary to those of the regime to be shared between dissidents and also between those members of the society who may publicly pay lip service to the legitimacy of the regime, but who privately yearn for change. Connecting the members of an oppressed society who are dissatisfied with the regime -- and connecting them with a larger global community -- empowers and emboldens them (Sharansky & Dermer, 2004). Thus, ICTs allow individuals to connect to a larger community, and through their ability to facilitate communication of information and ideas, act as a catalyst for sociopolitical change. These considerations lead to the expectation that ICT investments are positively related to future levels of institutionalized democracy in emerging societies.

> ***H2**: ICT investments have a positive direct impact on future levels of institutionalized democracy in emerging societies.*

3.3. Hypothesis 3

Our final hypothesis considers the role of institutionalized democracy as a mediator between ICT investments and FDI and proposes that the extent to which a society is democratic partially explains the relationship between ICT investments and future FDI levels in emerging societies. The impact of ICT investments on FDI activity depends in part upon the extent to which foreign investors believe an increased sense of interconnectedness will enhance their ability to exert control and influence over the local society, and hence, protect their interests from a distance. In addition to the status of the ICT infrastructure, the ability to exert influence from a distance is also contingent upon the form of government in the target society. There are three reasons for this, all of which imply that democratic societies provide a more stable environment for foreign investment. First, as opposed to the sociopolitical upheaval and use of physical or military force commonly found in authoritarian regimes, a common understanding exists in democratic societies regarding the value of negotiation, compromise, and rule of law in the resolution of interpersonal and interorganizational conflicts. Evidence for this can be found in the fact that, without exception, no two democracies have ever gone to war with one another (Sharansky & Dermer, 2004). Second, the division and distribution of power is more transparent in democratic societies. Third, democratic societies are characterized by ethical and legal principles that safeguard the rights of property owners, thereby reducing investment risk. As such, democratic societies are likely to be more attractive to foreign investors -- a position that is echoed by past research (Busse, 2003). In the context of the current investigation, an emerging society's form of government is, therefore, expected to partially account for the impact of ICT investments on future levels of FDI.

> ***H3**: Institutionalized democracy partially mediates the direct impact of ICT investments on future levels of foreign direct investment in emerging societies.*

4. Analytical Design and Methodology

In this section we describe the data identification, collection, and construct operationalization procedures that were undertaken to develop and test the multilevel change models from which the findings of the current study were derived.

4.1. Identification of Emerging Societies

The principal objective of the current study is to evaluate ICT investment impacts in transitional societies that have not attained first-world status, so it is necessary to formally define and identify such societies. Following past research (Romalis, 2011; Soper, Demirkan, Goul, & St. Louis, 2006), we used the

Standard and Poor's definition of emerging markets to identify an initial set of emerging societies for the current study. According to this definition, a society is emerging if it is classified as low- or middle-income, or if the investable market capitalization of the economy is low relative to the society's GDP (S&P, 2000). We used the 53 unique countries that are classified by the S&P to be emerging as the initial country set for this investigation. A country is a good proxy for a society, because the citizens of a country typically identify with a common set of laws, beliefs, and values that endow them with a shared sense of history, belonging, and solidarity (Durkheim, 1982). Further, we used the World Bank List of Economies (World Bank Group, 2008) to locate any high-income economies in the country set. This process led to the identification and removal of three high-income countries (i.e., Greece, Israel, and South Korea), thereby yielding a set of 50 emerging societies for the analysis. Two additional countries (Jordan and Pakistan) had to be removed from the analysis because more than 50 percent of their data items were missing. The final list of the countries used in the analysis can be found in Appendix A.

4.2. Selection of Analysis Period

The analytic period for the present study begins in 2000 and continues through 2007, the last year for which data from all of the data sources were concurrently available. We begin with the year 2000 because the potential of ICTs in facilitating development was first brought to the forefront of the mainstream global consciousness with the following ministerial declaration issued by the United Nations Economic and Social Council (United Nations, 2000):

> *We recognize a wide consensus that information and communication technologies (ICTs) are central to the creation of the emerging global knowledge-based economy and can play an important role in accelerating growth, in promoting sustainable development and eradicating poverty in developing countries as well as countries with economies in transition and in facilitating their effective integration into the global economy* (p. 1).

This declaration led directly to the creation of the United Nations ICT Task Force, and provided an impetus for ICT investment in emerging societies.

4.3. Operationalization of Constructs

The subsections that follow detail the way in which each of the research constructs was operationalized for the current study.

4.3.1. ICT Investments

ICT encompasses not only the realm of communications devices and computer systems, but also the telecommunications channels that interconnect them. Any measure representing the degree of domestic ICT investments in a society must, therefore, include measures of investments made in all of those technologies. The World Bank Group's World Development Indicators database (World Bank Group, 2007) contains a variable that measures investments in these technologies, so we used it as a measure of ICT investment. Embracing the language of the World Bank (2010, p. 339), we define the ICT Investment measure as: Domestic spending on computer hardware, computer software, computer services, communications services, and wired and wireless communications equipment, as a percentage of GDP. Note that this measure subsumes investments made not only in computer hardware and software, but also in the society's communications infrastructure. For the purposes of the current study, the ICT investment measure was standardized by GDP (in U.S. dollars) to allow valid comparisons to be made across different societies and across different years.

4.3.2. Foreign Direct Investment

The overall degree of direct investment flowing into a society from foreign sources has been used in the literature of many different disciplines to examine emerging economies (Addison & Heshmati, 2003; Bosworth & Collins, 1999; Loungani & Razin, 2001). We used as a measure of FDI the corresponding variable in the World Development Indicators database (World Bank Group, 2007), which excludes investments tied to specific aid and policy objectives. This measure was also standardized by GDP (in U.S. dollars) to allow for valid comparisons across countries.

4.3.3. Institutionalized Democracy

Institutionalized democracy reflects the extent to which a society guarantees civil liberties to its citizens in acts of political participation and in their daily lives, and also constrains the power of the executive by endowing its citizens with the right to express preferences about alternative leaders and policies (Marshall & Jaggers, 2006). Over the past four decades, researchers at the non-profit Freedom House organization have painstakingly evaluated levels of democratic freedom around the world. In so doing, this organization has developed a country-level measure that fully subsumes the above characterization of institutionalized democracy. Specifically, the Freedom House measure considers the extent to which citizens in a given country can: (1) participate in the political process; (2) vote in legitimate elections; (3) freely exercise expressions and beliefs; (4) freely assemble and associate; (5) have accountable representation; (6) have access to an established and equitable system of law; and (7) have social and economic freedoms, including equal access to economic opportunities and the right to hold private property (Freedom House, 2007). This measure is published in the Freedom House annual survey of political rights and civil liberties, which is widely considered to be one of the most definitive reports on freedom and democracy in the world. As such, the Freedom House assessment of democratic freedoms, which is an additive function of political rights and civil liberties as described above, was used in the investigation as a measure of the extent to which a given emerging society has institutionalized the principles of freedom and democracy. For the purposes of the current study, we reversed the scaling of the Freedom House measure to aid in interpretation. In this study, the scale ranges from zero to 13, with larger values representing higher levels of institutionalized democracy.

4.3.4. Covariates

Finally, in an effort to control for other potentially confounding intersocietal differences, several covariates were also included in the dataset. First, we included the geographic region to which each emerging society belongs as a dummy variable, since ecological similarities and differences are known to be a function of geographic proximity (Brown, Stevens, & Kaufman, 1996). We identified the geographic region for each country in the analysis using the United Nations macro-geographic organizational schema (United Nations, 2007). A complete list of the geographic regions used in the analysis can be found in Appendix B. Second, we included the predominant religion of each emerging society as a dummy variable. Deeply ingrained societal religious beliefs are recognized to exert an influence on cultural attitudes, with the size of the impact varying among adherents of different religions and denominations (Inglehart & Norris, 2003). This "predominant religion" variable was constructed using the United States Central Intelligence Agency's World Factbook, which provides demographic information for nearly every country in the world (CIA, 2007). When the predominant religion reported in the CIA World Factbook was not sufficiently specific (e.g., when the religion was reported simply as "Islam" rather than as Sunni, Shia, or Ibadi Islam), we used the U.S. Department of State's Report on International Religious Freedom to make a specific determination (USDOS, 2006). A complete list of the religions used in the analysis can be found in Appendix B.

Acknowledging that the countries contained in the dataset vary widely with respect to the extent of their development, we also included two economic covariates in the research model in an effort to control for the potentially confounding effects of between-society developmental differences. First among these economic covariates was the per capita gross domestic product, which serves as a proxy measure of the standard of living in each society (Baumol & Blinder, 2005). The per capita GDP was computed as the ratio of each society's total population during a given year relative to its total gross domestic product (in U.S. dollars) for that year. We drew data for these computations from the World Bank Group's World Development Indicators database (World Bank Group, 2007). The second economic covariate included in the research model was the quantity of official development assistance (ODA) received by each society during a given year. ODA levels measure the volume of development aid flowing into a country from the members of the Development Assistance Committee of the Organisation for Economic Co-operation and Development (OECD). ODA levels have been shown to reflect perceptions among wealthy nations of the state of well-being in developing nations, with more underdeveloped countries typically receiving more per capita aid (Wall, 1995). We also obtained the ODA values from the World Bank Group's World Development Indicators database (World Bank Group, 2007) and standardized them as a percent of GDP (in U.S. dollars) to allow valid comparisons to be made across countries over time.

A correlation table for all of the variables used in the analysis can be found in Appendix C. The fact that the majority of the coefficients in Appendix C are statistically significant provides preliminary support for our hypothesized relationships and our choice of covariates.

4.4. Data Preparation

We gathered data from the sources noted above and compiled them into a single repository. Following past research in this area (Addison & Heshmati, 2003; Soper et al., 2006), we used the Markov Chain Monte Carlo (MCMC) multiple imputation method to impute missing values (Gilks, Richardson, & Spiegelhalter, 1996). We calculated missing values using 20 imputations per iteration in order to maximize the efficiency and effectiveness of the true value recovery process (Rubin, 1987). This technique not only prevents the loss of statistical power that accompanies listwise deletion, but also avoids the biases resulting from systematic differences between completely observed and incompletely observed cases that are inevitably introduced into a dataset when cases with missing values are deleted (Schafer, 1997). Following data imputation, the unlagged dataset contained values for 50 countries across eight years, yielding a total of 400 cases. We then excluded two countries' data (Jordan and Pakistan) from the dataset because more than half of the data values for those countries were missing, and we did not feel comfortable imputing so many missing values. As a result, our final dataset included 48 countries with 384 cases. We then conducted an a-priori power analysis, which indicated that with six predictors, 97 cases were minimally necessary to detect a statistically significant medium-sized effect of 0.15 while maintaining an acceptable power level of 0.80 (Cohen, 1988; Soper, 2011a).

The general theoretical framework developed earlier considers changes in societal structures over time. Implicit in this framework is the notion that societal adaptations to new resource allocations do not occur instantaneously, but rather are absorbed into a society as time passes. The general theoretical framework, therefore, implies that the impact of ICT investments on institutionalized democracy and FDI will not be instantaneously ascertainable, but rather that those impacts will materialize over time as the ICT investments are absorbed into an emerging society's political and economic substructures. In accordance with this theoretical framework, it was necessary to construct a time-lagged dataset through which the impact of ICT investments on future levels of institutionalized democracy and FDI in emerging societies could be longitudinally assessed. Specifically, we used ICT investment values from 2000 through 2006 to predict institutionalized democracy and FDI levels from 2001 through 2007. This process is depicted in Figure 5 below.

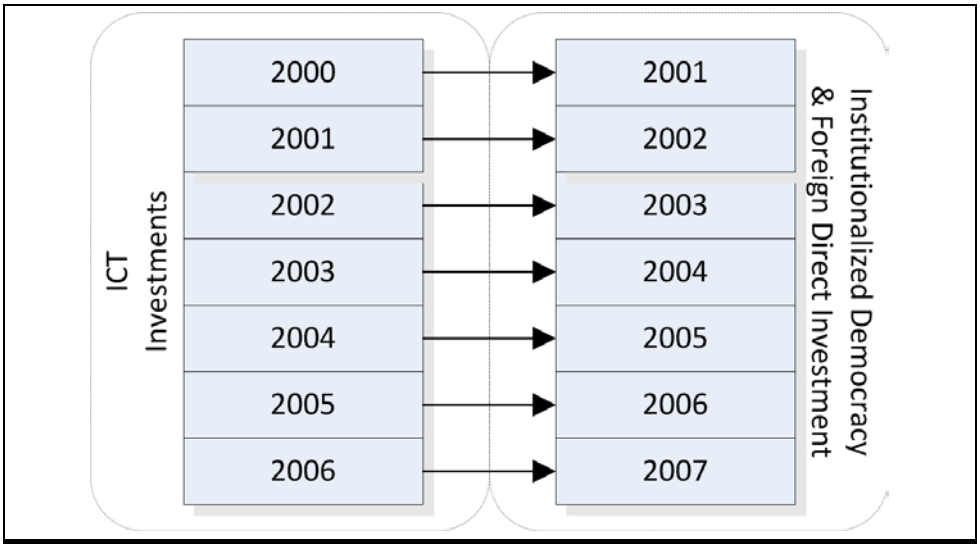


Figure 5. Structure of Time-Lagged Dataset

4.5. Multilevel Models for Change

We assessed the efficacy of the hypothesized relationships in the empirical model with a series of multilevel change models using full information maximum likelihood estimation (Singer & Willett, 2003). In order to fully explore the impact of ICT investments on the dependent constructs, we estimated baseline models that evaluated only the effects of the covariates on institutionalized democracy and FDI. We took this approach to allow the effect of ICT investments over and above the covariates to be determined. Additionally, predictive models that excluded all of the covariates were estimated to better understand the influence of those covariates on the observed effects. Following these tests, complete models were estimated in order to evaluate the study's hypotheses. Finally, comparative models that relied upon non-lagged data were estimated to evaluate the impact of the time lag effect. All of these multilevel change models and their associated hypotheses are detailed in Table 2 below.

Table 2. Multilevel Change Models

Dependent Construct	Level 1 Model	Level 2 Model
FDI (Covariates Only) DEM (Covariates Only)	$\beta_0 + \beta_1(GDP) + \beta_2(ODA) + r$	$\beta_0 = \gamma_{00} + \gamma_{0i}(REL_{0i}) + \gamma_{0j}(REG_{0j}) + u_0$ $\beta_1 = \gamma_{10} + u_1$ $\beta_2 = \gamma_{20} + u_2$
FDI (H1 – No Covariates) DEM (H2 – No Covariates)	$\beta_0 + \beta_1(Time) + \beta_2(ICT) + r$	$\beta_0 = \gamma_{00} + u_0$ $\beta_2 = \gamma_{20} + u_2$ $\beta_1 = \gamma_{10} + u_1$
FDI (H3 – No Covariates)	$\beta_0 + \beta_1(Time) + \beta_2(ICT) + \beta_3(DEM) + r$	$\beta_0 = \gamma_{00} + u_0$ $\beta_2 = \gamma_{20} + u_2$ $\beta_1 = \gamma_{10} + u_1$ $\beta_3 = \gamma_{30} + u_3$
FDI (H1 – With Covariates)* DEM (H2 – With Covariates)*	$\beta_0 + \beta_1(Time) + \beta_2(ICT) + \beta_3(GDP) + \beta_4(ODA) + r$	$\beta_0 = \gamma_{00} + \gamma_{0i}(REL_{0i}) + \gamma_{0j}(REG_{0j}) + u_0$ $\beta_1 = \gamma_{10} + u_1$ $\beta_3 = \gamma_{30} + u_3$ $\beta_2 = \gamma_{20} + u_2$ $\beta_4 = \gamma_{40} + u_4$
FDI (H3 – With Covariates)*	$\beta_0 + \beta_1(Time) + \beta_2(ICT) + \beta_3(DEM) + \beta_4(GDP) + \beta_5(ODA) + r$	$\beta_0 = \gamma_{00} + \gamma_{0i}(REL_{0i}) + \gamma_{0j}(REG_{0j}) + u_0$ $\beta_1 = \gamma_{10} + u_1$ $\beta_4 = \gamma_{40} + u_4$ $\beta_2 = \gamma_{20} + u_2$ $\beta_5 = \gamma_{50} + u_5$ $\beta_3 = \gamma_{30} + u_3$

Where: DEM = Institutionalized Democracy; FDI = Foreign Direct Investment; GDP = Per Capita Gross Domestic Product; ICT = ICT Investments; ODA = Official Development Assistance; REG = Geographic Region; REL = Predominant Religion

Note:
* Denotes a model that was estimated with both lagged and non-lagged datasets
The i subscript on the REG parameters and variables varies from 1 to 8 to model the geographic regions shown in Appendix B
The j subscript on the REL parameters and variables varies from 1 to 6 to model the predominant religions shown in Appendix B

We chose the multilevel model for change as the analytical approach for the current study for several reasons (Singer & Willett, 2003). First, it allowed within-society and between-society change over time to be addressed simultaneously, which allowed the between-society variation upon which the tests of the hypotheses relied to be isolated from the within-society variation in the data. Second, this method did not assume a zero error variance, which allows linear models to be estimated against data whose linearity over time was unknown a priori. Finally, in order to account for heteroscedasticity and autocorrelation over time of the within society residuals, the measurement error within each society was allowed to vary from observation to observation, and successive measurement errors within a society were allowed to be related to one another over time. Together, these properties of the multilevel model for change made it ideal for evaluating the current study's hypotheses.

5. Analysis and Results

Prior to evaluating the study's hypotheses, we undertook several preliminary analyses to: (1) describe the fundamental characteristics of the data used in the study, (2) determine whether systematic variation existed in the dependent constructs, (3) determine the extent to which any such variation was

attributable to within-society or between-society differences, and (4) quantitatively examine the causal nature of the interconstruct relationships in the research model.

5.1. Unconditional Means Model

To better understand the study's data, we evaluated an unconditional means model for each of the three primary time-varying constructs in the research model.
The model is:

$$Y_{ij} = \gamma_{00} + \zeta_{0i} + \varepsilon_{ij},$$

where Y_{ij} is the value of DEM, FDI, or ICT for the i^{th} country in the j^{th} time period, γ_{00} is the grand mean across all countries and time periods, ζ_{0i} is the country initial status effect for the i^{th} country, and ε_{ij} is the residual for the i^{th} country in the j^{th} time period. The results obtained from fitting the unconditional means model are shown in Table 3 below.

Table 3. Unconditional Means Model Results

Research Construct	Fixed Effects	Random Effects (Variance Components)		
	Intercept (γ_{00})	Within-Country (ε_{ij})	Country Initial Status -- Between Country (ζ_{0i})	Intraclass Correlation ($\zeta_{0i} / (\zeta_{0i} + \varepsilon_{ij})$)
DEM	7.714***	0.658***	10.882***	0.943
FDI	3.720***	4.937***	8.370***	0.629
ICT	5.334***	1.406***	2.044***	0.592

***$p < 0.001$

Where: DEM = Institutionalized Democracy
FDI = Foreign Direct Investment
ICT = ICT Investments

The fixed effects intercepts reported in the table reflect each construct's grand mean across its respective timeframe for all of the emerging societies in the time-lagged dataset. The intercept value for the ICT investments construct, for example, indicates that the average level of ICT investment across countries per year was approximately 5.33 percent of GDP. Similarly, the average level of institutionalized democracy was 7.71 (out of 13), and the average level of FDI was 3.72 percent of GDP. All of the p-values for these intercepts were significant at the 0.001 level.

Examining the random effects values in the unconditional means model provides further insight into the nature of the constructs. All of the within-country and between-country variance values were significant at the 0.001 level, so we conclude that the average country's levels of ICT investment, institutionalized democracy, and FDI differed significantly over the investigative timeframe, and that the countries in the dataset differed from each other along these dimensions. The intraclass correlation coefficients shown in the table indicate the extent to which the total variation in the investigative constructs was attributable to between-country differences. For institutionalized democracy, FDI, and ICT investments, these values, respectively, indicated that approximately 94.3 percent, 62.9 percent, and 59.2 percent of the total variation was attributable to between-country differences. These results imply that intersocietal differences account for a substantial portion of the variation observed in the research model's constructs.

5.2. Unconditional Growth Model

In order to gain insight into the change trajectories associated with the primary time-varying constructs in the research model, it was necessary to estimate an unconditional growth model for each of those constructs. This model is:

$$Y_{ij} = \gamma_{00} + \gamma_{10}TIME_{ij} + \zeta_{0i} + \zeta_{1i}TIME_{ij} + \varepsilon_{ij},$$

where γ_{00} is the mean of the construct across all countries at the initial time period, γ_{10} is the average rate of change in the construct per time period for all countries, $TIME_{ij}$ is the j^{th} time period for the i^{th} country, ζ_{0i} is the initial-status country effect for the i^{th} country, ζ_{1i} is the rate-of-change country effect for the i^{th} country, and ε_{ij} is the residual for the i^{th} country in the j^{th} time period. The results obtained from the unconditional growth model are shown in Table 4 below:

Table 4. Unconditional Growth Model Results

Construct	Fixed Effects		Random Effects (Variance Components)		
	Intercept (γ_{00})	Rate of Change (γ_{10})	Within-Country (ε_{ij})	Country Initial Status -- Between Country (ζ_{0i})	Country Rate of Change (ζ_{1i})
DEM	7.420***	0.098*	0.286***	10.606***	0.071***
FDI	2.402***	0.439***	1.924***	4.867***	0.461***
ICT	4.619***	0.238**	0.407***	3.874***	0.150***

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Where: DEM = Institutionalized Democracy
FDI = Foreign Direct Investment
ICT = ICT Investments

The ICT investments intercept value indicates that, on average, a country invested approximately 4.62 percent of its GDP in ICTs during 2000. Similarly, the average level of institutionalized democracy during 2001 was approximately 7.42 units (out of 13), and the average level of FDI was approximately 2.40 percent of GDP. All of these fixed effects intercept values were significant at the 0.001 level.

The fixed effects rate-of-change values provide insight into the nature and direction of the average linear trajectory for each investigative construct over its respective timeframe. For ICT investments, this value was approximately 0.24, indicating that, on average, investments made into ICTs as a percentage of GDP increased by 0.24 percent per year. Similarly, institutionalized democracy in emerging societies underwent an average annual increase of approximately 0.098 units, and FDI increased by approximately 0.44 percent of GDP each year. All of the fixed effects rate-of-change values were positive and significant at the 0.05 level or better.

5.3. Assessment of Within-Society Residual Variation

By comparing the within-country residual variances from the unconditional growth model with those obtained from fitting the unconditional means model, it is possible to determine the extent to which the within-country variation for each investigative construct was systematically associated with the passage of time. These comparisons are shown in Table 5:

Table 5. Comparison of Within-Country Residual Variation

Construct	Within-Country Residual Variation		
	Unconditional Means Model	Unconditional Growth Model	Difference (%)
DEM	0.658	0.286	0.372 (56.5%)
FDI	4.937	1.924	3.013 (61%)
ICT	1.406	0.407	0.999 (71%)

Where: DEM = Institutionalized Democracy
FDI = Foreign Direct Investment
ICT = ICT Investments

The percentage values reported in the "difference" column in Table 5 indicate the proportions of residual variation in the investigative constructs that were systematically associated with the passage of time. All

of the within-society residual variation values from the unconditional growth model were observed to be significant at the 0.001 level (as shown in Table 4), so a statistically significant proportion of the variation in these constructs is not time-varying predictors into Level 1 of the multilevel change models was deemed to be appropriate (Singer & Willett, 2003).

The initial-status and rate-of-change random effects variance components in Table 4 quantify the unpredicted variability in the true initial status for each investigative construct and the unpredicted variability in the true rate-of-change for each investigative construct. All of these values were observed to be significantly different from zero at the 0.001 level, so including time-invariant control variables into Level 2 of the multilevel change models was deemed to be appropriate. In light of these results, we were able to proceed with tests of causality.

5.4. Granger Causality Tests

One of the most significant problems facing research that relies upon time-lagged data is the inability to assess predictions of directional causality. Indeed, the GST and structuration theories detailed previously provide a framework in which a sufficiently large disruption in any of the societal substructures may cause changes in the others, and vice-versa. Relationships between specific research constructs that have been derived from those substructures can be usefully examined using numerical techniques such as multilevel change modeling, but the output produced by such techniques cannot by itself be used to infer directional causality (Meehl & Waller, 2002). To address this problem, Granger causality testing was undertaken to determine the nature of causality between the hypothesized direct relationships in the research model. Pioneered by Nobel Prize-winning economist Sir Clive Granger, these tests allow for an assessment of the direction of causality in time-lagged relationships (Granger, 1969). Using Granger's method, future values of a construct *Y* are Granger-caused by values of a construct *X* if a time-lagged series of *Y* can be more efficaciously predicted by *X* than a time-lagged series of *X* can be predicted by *Y*. Although they have been used successfully in many other disciplines, Granger causality tests remain quite rare in the information systems literature.

Assessing Granger causality for the current study required the computation of a dataset in which the deterministic trends from the non-lagged, imputed data had been removed using the standard first-order differencing technique. Bidirectional time-lagged values were then computed for the three primary constructs, after which Granger tests were conducted to evaluate the nature of causality between the constructs in the research model. Because we wanted to use the same observations in each regression, only five years of data could be used for these tests. The results of these tests are shown in Table 6.

Table 6. Assessments of Granger Causality among Primary Research Constructs

Interconstruct Relationship	Hypothesized Direction	Estimate	t value	p
FDI → Future ICT	No	.126	2.795	.014
ICT → Future FDI	Yes	.480	4.310	.000
DEM → Future ICT	No	.146	2.765	.007
ICT → Future DEM	Yes	.205	2.969	.005
FDI → Future DEM	No	.107	2.749	.033
DEM → Future FDI	Yes	.390	3.882	.000

The causal relationship between each pair of constructs is strongest in the direction hypothesized by the research model. That is, after a one-year time lag, ICT investments were observed to Granger-cause future levels of FDI and institutionalized democracy to a greater extent than vice-versa, with a similar effect being observed between institutionalized democracy and future levels of FDI. Moreover, all three hypothesized relationships were statistically significant. With respect to the nature of the relationship between ICT and FDI, Dutta also found that a robust telecommunications infrastructure Granger-causes an increase in economic activity over time, rather than vice-versa (Dutta, 2001).

In light of the findings of the four preliminary analyses described above, fitting the complete multilevel change models was deemed to be appropriate. After controlling for the potentially confounding effects of the covariates, these models provide a great deal of insight into the extent to which the observed differences in ICT investment levels in emerging societies contribute to future changes in institutionalized democracy and FDI levels in those societies.

5.5. Evaluation of Hypothesis 1

Hypothesis 1 posits that ICT investments have a positive direct impact on future levels of foreign direct investment. The fixed effects obtained from fitting the multilevel change models for testing this hypothesis are presented in Table 7. One-tailed probability values are reported for the ICT investments construct in order to reflect its associated directional hypothesis.

Table 7. Multilevel Change Models Associated with Hypothesis 1 and Evaluation

Fixed Effects						
Model Component	**Model**					
	Covariates Only		**Research Constructs Only**		**Combined Effects**	
	Coeff.	**p**	**Coeff.**	**p**	**Coeff.**	**p**
Intercept	-11.273	.000	1.206	.027	-3.970	.077
Time			0.284	.007	0.229	.030
Lagged ICT Investments (L1ICT)			0.290	.006	0.257	.012
Predominant Religion	N/A	.128				
Geographic Region	N/A	.235				
Per Capita GDP	1.745	.000			0.696	.019
Official Development Assistance	0.025	.794				
Random Effects						
Variance Component						
Country Initial Status	5.306	.000	3.805	.005	3.702	.003
Within Country	3.060	.000	1.505	.000	1.514	.000
Rate of Change (Country * Time)			0.360	.000	0.356	.000
Rate of Change (Country * L1ICT)			0.034	.463	0.018	.646

Note: Because predominant religion and geographic region were represented as a set of dummy variables, it is not possible to present a single coefficient that can be meaningfully interpreted. The General Linear Test was used to determine the statistical significance of the set of binary variables for REL and REG.

Outcome variable: Foreign Direct Investment

The fixed effects obtained from estimating the "covariates only" model indicate that when ignoring the effects of time and ICT investments, only per capita GDP is a significant predictor of future FDI. In contrast, the "research constructs only" model indicates that when the combined effects of the covariates are ignored, both time and ICT investments are significant predictors of future FDI levels. The "combined effects" results indicate that when the research constructs and covariates are considered together, time, ICT investments, and per capita GDP are useful predictors of future FDI levels. Only variables that were significant in either the covariates only or the research constructs only models were considered in order to obtain the combined effects estimates for the test of Hypothesis 1. Their fixed effects estimates and associated random effects estimates are provided in Table 7.

The value reported for the fixed effect of time indicates that on average, a country experienced a statistically significant increase in FDI of approximately 0.229% of GDP per year, after considering the

combined effects of ICT investments and per capita GDP. The fixed effect model for ICT investment indicates that on average, a country will experience an increase in FDI of approximately 0.257% of its GDP for every one percent of its GDP that was invested in ICTs during the preceding year. This finding provides support for Hypothesis 1. Nearly all of the random effects variance components were statistically significant at the .01 level. This implies that additional factors not included in the current multilevel change model may be contributing to the observed levels of FDI in emerging societies over time.

With a view toward evaluating the time lag effect, the fixed effects for a model identical to that shown in Table 7 were estimated using a non-lagged dataset. The results of this test are shown in Table 8.

Table 8. Evaluation of Hypothesis 1 using Non-Lagged Data

Fixed Effects		
Model Component	**Model**	
	Combined Effects	
	Coeff.	**p**
Intercept	-3.865	.093
Time	0.0279	.010
ICT Investments	0.048	.638
Predominant Religion		
Geographic Region		
Per Capita GDP	0.805	.009
Official Development Assistance		
Random Effects		
Variance Component		
Country Initial Status	4.237	.000
Within Country	1.546	.000
Rate of Change (Country * Time)	.388	.000
Rate of Change (Country * ICT)	Note	Note

Note: Lack of variability makes it impossible to calculate the slope and intercept for each country.

Outcome variable: Foreign Direct Investment

The ICT investments value shown in Table 8 was not significant when estimated using a non-lagged dataset. This result indicates that there are no instantaneous effects of ICT investments on FDI levels, and reinforces the theoretical notion that such effects take time to materialize. The difference in the ICT investment coefficients obtained from the lagged and non-lagged datasets shows that the strength of the relationship between ICT investments and FDI increases substantially during the first year following such investments. Given that the ICT investments coefficient obtained from the time-lagged dataset was statistically significant, we conclude that the effects of ICT investments on the ability to attract FDI begin to appear within one year of those investments having been made.

5.6. Evaluation of Hypothesis 2

Hypothesis 2 posits that ICT investments have a positive direct impact on future levels of institutionalized democracy in emerging societies. Table 9 below provides the fixed effects obtained from fitting the multilevel change models for testing this hypothesis.

Table 9. Multilevel Change Models Associated with Hypothesis 2

Fixed Effects						
Model Component	**Model**					
	Covariates Only		**Research Constructs Only**		**Combined Effects**	
	Coeff.	**p**	**Coeff.**	**p**	**Coeff.**	**p**
Intercept	2.640	.120	6.710	.000	8.613	.000
Time			0.100	.041	0.119	.027
Lagged ICT Investments (L1ICT)			0.136	.016	0.111	.031
Predominant Religion	N/A	.077			N/A	.025
Geographic Region	N/A	.037			N/A	.022
Per Capita GDP	0.747	.000			-0.107	.647
Official Development Assistance	0.038	.389				
Random Effects						
Variance Component						
Country Initial Status	5.019	.000	10.027	.000	4.918	.000
Within Country	0.605	.000	0.277	.000	0.282	.000
Rate of Change (Country * Time)			0.083	.000	0.085	.000
Rate of Change (Country * L1ICT)			0.011	.601	0.000	.983

Note: Because predominant religion and geographic region were represented as a set of dummy variables, it is not possible to present a single coefficient that can be meaningfully interpreted. The General Linear Test was used to determine the statistical significance of the set of binary variables for REL and REG.

Outcome variable: Institutionalized Democracy

The fixed effects obtained from estimating the covariates only model indicate that when ignoring the effects of time and ICT investments, an emerging society's predominant religion, geographic region, and per capita GDP are significant predictors of future levels of institutionalized democracy. The research constructs only model indicates that when the combined effects of the covariates are ignored, both time and ICT investments are significant predictors of future levels of institutionalized democracy. The combined effects results indicate that when the research constructs and covariates are considered together, time, ICT investments, predominant religion, and geographic region are useful predictors of institutionalized democracy. Only variables that were significant in either the covariates only or the research constructs only models were considered in order to obtain the combined effects estimates for the test of Hypothesis 2. Their fixed effects estimates and associated random effects estimates are provided in Table 9.

The value reported for the fixed effect of time indicates that on average, there was an increase in institutionalized democracy of approximately 0.12 units per year, after taking the combined effects of ICT investments, predominant religion, and geographic region into account. The value reported for the fixed effects ICT investment indicates that there was an average increase in institutionalized democracy of approximately 0.11 units for every one percent of GDP that was invested in ICTs during the preceding year. This finding provides support for Hypothesis 2. As with the multilevel change model for testing Hypothesis 1, nearly all of the random effects variance components were statistically significant at the .01 level, thus implying that additional factors not included in the current model may be contributing to the observed levels of institutionalized democracy in emerging societies over time.

The fixed effects for a model identical to that shown in Table 9 were estimated using a non-lagged dataset in order to gain insight into the nature of the time lag effect for this hypothesis. The results of this test are provided in Table 10.

Table 10. Evaluation of Hypothesis 2 using Non-Lagged Data

Fixed Effects		
Model Component	**Model**	
	Combined Effects	
	Coeff.	**p**
Intercept	9.025	.000
Time	0.138	.010
ICT Investments	0.041	.434
Predominant Religion	N/A	.023
Geographic Region	N/A	.019
Per Capita GDP	-0.113	.636
Official Development Assistance		
Random Effects		
Variance Component		
Country Initial Status	4.908	.000
Within Country	0.290	.000
Rate of Change (Country * Time)	0.084	.000
Rate of Change (Country * ICT)	Note	Note

Note: Lack of variability makes it impossible to calculate the slope and intercept for each country.
Note: Because predominant religion and geographic region were represented as a set of dummy variables, it is not possible to present a single coefficient that can be meaningfully interpreted. The General Linear Test was used to determine the statistical significance of the set of binary variables for REL and REG.

Outcome variable: Institutionalized Democracy

When estimated using a non-lagged dataset, the ICT investments value was not significant, which implies that there are no instantaneous effects of ICT investments on democracy levels in emerging societies. This observation again reinforces the theoretical notion that such effects take time to materialize. As with Hypothesis 1, the difference in the ICT investment coefficients between the lagged and non-lagged models shows that the strength of the relationship between ICT investments and institutionalized democracy increases during the first year following such investments. In the time-lagged dataset, this relationship is statistically significant at the 0.05 level, thereby indicating that the effects of ICT investments on an emerging society's level of institutionalized democracy begin to appear within one year.

5.7. Evaluation of Hypothesis 3

Hypothesis 3 posits that institutionalized democracy levels mediate the direct impact of ICT investments on future levels of FDI in emerging societies. To test this hypothesis, it was first necessary to estimate a multilevel change model for the direct relationship between institutionalized democracy and FDI. Note that this relationship is not included as a formal hypothesis in the current study, as it has been described elsewhere (Busse, 2003). The fixed effects obtained from fitting this multilevel change model are presented in Table 11. Since Per Capita GDP was found to be a significant covariate, we retained it in the model to allow for a correct estimation of mediation effects (Baron & Kenny, 1986).

Table 11. Relationship between Democracy and FDI

Fixed Effects						
Model Component	**Model**					
	Covariates Only		**Research Constructs Only**		**Combined Effects**	
	Coeff.	**p**	**Coeff.**	**p**	**Coeff.**	**p**
Intercept	-11.273	.000	.899	.172	-4.483	.045
Time			.337	.002	0.271	.011
Institutionalized Democracy			.220	.009	.197	.016
Predominant Religion	N/A	.128				
Geographic Region	N/A	.235				
Per Capita GDP	1.745	.000			.727	.013
Official Development Assistance	0.025	.794				
Random Effects						
Variance Component						
Country Initial Status	5.306	.000	3.225	.032	3.310	.025
Within Country	3.060	.000	1.528	.000	1.535	.000
Rate of Change (Country * Time)			0.395	.000	0.381	.000
Rate of Change (Country * Institutionalized Democracy)			0.018	.432	0.009	.653

Note: Because predominant religion and geographic region were represented as a set of dummy variables, it is not possible to present a single coefficient that can be meaningfully interpreted. The General Linear Test was used to determine the statistical significance of the set of binary variables for REL and REG.

Outcome variable: Foreign Direct Investment

With respect to the evaluation of Hypothesis 3, the only points of interest in Table 11 were the magnitude, direction, and statistical significance of the direct relationship between institutionalized democracy and FDI. This relationship was positive and significant, and because support was found for Hypotheses 1 and 2, it was appropriate to proceed with the mediational analysis. ICT investments were thus added to the multilevel model described above, and the model was re-estimated. The results obtained from fitting this model are presented in Table 12.

The effect of institutionalized democracy levels on FDI remained significant after incorporating the effect of past ICT investments into the multilevel change model. Given that the effect of past ICT investments was also observed to be significant, the results of this analysis indicate that institutionalized democracy acts as a partial mediator for the relationship between ICT investments and future levels of FDI (Baron & Kenny, 1986), thereby lending support to Hypothesis 3. To further evaluate the nature of the partial mediation, the magnitude and significance of the observed mediational effect were assessed using the method described by Sobel (Sobel, 1982; Soper, 2011b). This test uses the sizes and variances of the direct effects in a mediational model to approximate a standard normal score, which is subsequently used to conservatively estimate the scale and significance of the mediational effect. The results of this assessment indicated that in addition to the direct effect observed in the test of Hypothesis 1, institutionalized democracy carries a significant one-tailed indirect effect of ICT investments on future levels of FDI in emerging societies of 0.022 (Sobel test statistic = 1.839, $p < 0.05$), for an average total effect of 0.279% of GDP per year.

Table 12. Evaluation of Hypothesis 3		
Fixed Effects		
Model Component	**Model**	
	Combined Effects	
	Coeff.	**p**
Intercept	-4.805	.033
Time	0.225	.033
Lagged ICT Investments (L1ICT)	0.222	.020
Institutionalized Democracy	0.159	.054
Predominant Religion		
Geographic Region		
Per Capita GDP	.671	.022
Official Development Assistance		
Random Effects		
Variance Component		
Country Initial Status	3.832	.000
Within Country	1.523	.000
Rate of Change (Country * Time)	0.363	.000
Outcome variable: Foreign Direct Investment		

6. Discussion

The theoretical bases regarding local adaptation to globalization are consistent with the finding that ICT investments require time to have an impact on institutionalized democracy and FDI levels in emerging societies, because the subsystems within those societies must adapt to the infusion of ICT. The findings reported above indicate that, on average, the direct positive effects of ICT investments on future levels of institutionalized democracy and FDI in emerging societies begin to manifest themselves at a macro-level within one year. In addition to these direct effects, a significant positive indirect effect of past ICT investments on FDI levels as mediated by institutionalized democracy was also observed to exist. Specifically, current levels of institutionalized democracy were found to partially mediate the direct effect of past ICT investments on current levels of FDI in those societies.

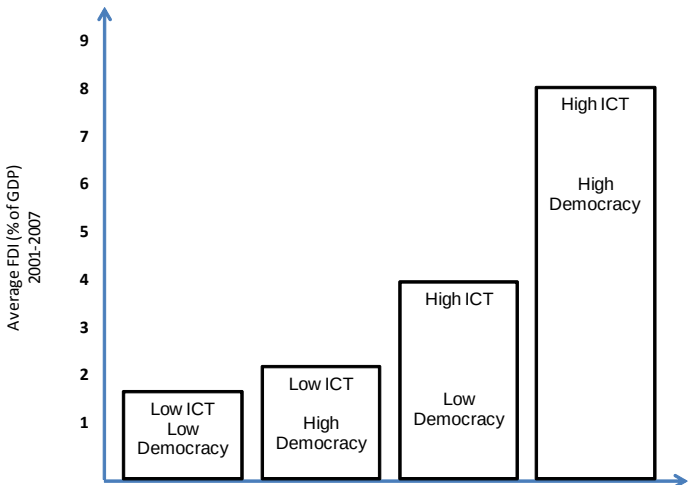
FDI as defined herein considers only those investments made to acquire a lasting managerial interest in an enterprise operating in an economy other than that of the investor. As such, it is ultimately the burden of foreign managers to decide whether and to what extent an emerging society will benefit from their organizations' foreign direct investment dollars. The decision-making process of these managers is thus critical to understanding why certain emerging societies are viewed as sound foreign investment targets, while others are not. Altruistic motivations notwithstanding, these foreign direct investment decisions – like any investment decision – can be considered as a simple function of perceived risk versus expected return on investment (ROI). If the expected ROI is sufficiently high and the perceived risk is sufficiently low, a potential investment option is viable. By improving the economic and political alignment between a foreign investor and an emerging society, and by enabling greater control and monitoring from a remote geographic location, ICT investments serve to mitigate investment risk, thereby making an emerging society more attractive to foreign investors.

The observed direct and indirect effects speak pointedly to two critical underlying managerial concerns: (1) alignment, and (2) control and monitoring. ICT investments were observed to promote future increases in institutionalized democracy within emerging societies, which in turn were observed to be associated with increased FDI activity. The data thus indicate that the introduction of ICT

contributes to the production of a political environment that is comparatively well-aligned with the objectives of the majority of foreign corporate investors. This political alignment is rooted in the legal and ethical principles that typically are a codified component of democratic governance, particularly those associated with the ownership and protection of private property. In addition to this political alignment, the alignment between the potential foreign investor's desired level of ICT capability for an emerging society and that society's actual level of ICT capability also contributes substantially to foreign direct investment decisions. Many organizations seeking to invest in foreign environments have specific ICT needs with respect to their product offerings, production facilities, or supply chain networks. An emerging society that does not possess an ICT profile sufficiently well-aligned with these needs will not be seen by the foreign investor as a viable candidate for investment. Improving the alignment between an emerging society and the needs and objectives of foreign investors is thus one of the principal mechanisms through which ICT investments promote future foreign direct investment activity in emerging societies.

With respect to the mitigation of investment risk, the increased ability to monitor and control operations from a remote location that is afforded to foreign managers by a robust ICT infrastructure contributes substantially to an emerging society's ability to attract FDI. The enhanced interconnectedness that results from ICT investments in emerging societies serves as a conduit for the transmission of power and corporate culture, and expands the ability of network participants to exert control and influence from a distance. This increased ability to exert control mitigates investment uncertainty and decreases perceived risk. Further, ICT can facilitate improvements in the utilization of resources and can expand organizational efficiency. A robust ICT infrastructure thus enhances the ability of foreign managers to leverage and control their remote human and material assets, thereby serving to further mitigate investment risk. In addition to the alignment issues described above, the enhanced control afforded to foreign investors by modern ICT networks is one of the principal mechanisms through which ICT investments serve to attract FDI in emerging societies.

The results suggest that foreign managers evaluate both an emerging society's ICT investment profile and its current political climate when making FDI decisions. At one end of the decision-making spectrum lie emerging societies in which comparatively large past ICT investments have been made, and in which current levels of institutionalized democracy are comparatively high. Such societies are likely viewed positively by foreign investors, and will on average attract the most FDI. On the other end of the decision-making spectrum lie emerging societies in which comparatively low past ICT investments have been made, and in which current levels of institutionalized democracy are comparatively low. Such societies are likely viewed negatively by foreign investors, and will on average attract the least FDI. This situation is depicted graphically in Figure 6, which was constructed using values from the study.



Note: "High" values reflect ICT investment or institutionalized democracy levels in the top quartile, while "low" values reflect ICT investment and institutionalized democracy levels in the bottom quartile.

Figure 6. Impact of ICT Investments and Institutionalized Democracy on FDI

As shown in the figure, emerging societies with comparatively high ICT investment and institutionalized democracy levels will, on average, receive more than quadruple the FDI of societies with comparatively low ICT investment and institutionalized democracy levels. While these findings are interesting in their own right, of particular interest is the nature of the interplay among ICT investments and institutionalized democracy that occurs between these two extremes. High levels of institutionalized democracy can somewhat serve to overcome low ICT investment levels with respect to an emerging society's ability to attract FDI, but not to the same extent that high ICT investment levels can overcome low institutionalized democracy. It would thus appear that within the confines of the modern economic climate, foreign managers assign more value to an emerging society's ICT infrastructure than to its level of institutionalized democracy when making FDI decisions. Thus, investments made into ICTs in emerging societies act not only to directly increase future FDI, but also to increase future institutionalized democracy levels, which, in turn, can serve to attract even greater cumulative FDI.

Finally, while the discussion above highlights the potential of ICT investments to effect positive change in the developing world, the study's findings also demonstrate that limiting ICT investments can be an effective short-term political strategy for slowing democratization, and for isolating or insulating an emerging society from the influence of foreign investors. In an effort to preserve power, authoritarian or xenophobic governments can intentionally act to restrict the promulgation of ICT technologies, thereby limiting the effects of globalization and the institutionalization of democratic norms and ideals within the boundaries of their society. Although there are several visible examples of this strategy at work in the world today, the results indicate that such an approach is not sustainable in the long-term, because democracy and FDI are on average increasing regardless of ICT investment levels (v.s. Table 4). Governments that restrict ICT investments may thus be able to ensure their short-term political survival, but in the long-term such a decision will only condemn an emerging society to fall further and further behind the rest of the world. Conversely, the results indicate that the adoption of an ICT investment strategy which supports the free flow of information may allow emerging societies to narrow the digital divide and finally escape the low ICT equilibrium trap (Addison & Heshmati, 2002).

7. Summary, Limitations, and Concluding Remarks

As ICTs proliferate and are inseparably woven into the fabric of the emerging global society, it will become increasingly important to examine and understand the impacts of those technologies from a macro-level perspective. The current study contributes in this regard by examining the impact of ICT investments on elements of the political and economic subsystems of emerging societies. After controlling for basal growth in the research constructs over time, and consistent with the theoretical framework put forth above, the results indicate that ICT investments can benefit emerging societies in several important ways. First, ICT investments were found to have a positive direct impact on future levels of FDI. Second, ICT investments were found to have a positive direct impact on future levels of institutionalized democracy. Third, ICT investments were found to have a positive indirect impact on future FDI activity when mediated by an emerging society's level of institutionalized democracy. Therefore, to a measurable and significant extent, an emerging society's current level of FDI is directly linked to its level of institutionalized democracy, which, in turn, is linked to its past ICT investment levels. Together, these three findings have important implications not only for local decision-makers, but also for managers contemplating FDI decisions, and for international and non-governmental organizations seeking to facilitate economic and political development within emerging societies.

There are some caveats to these findings resulting from inherent limitations to studies of this type. Although this study explores how ICT investments attracted FDI in 48 low and middle-income emerging societies, there is limited availability of high-quality data for other countries. While common among studies of this type, the data-driven sampling technique limits the study insofar as the sample was not selected randomly. This limitation makes it quite difficult to determine if the results presented here can be generalized to other societies, and highlights the importance of expanding data gathering activities in the developing world.

The lack of data regarding investments tied to specific aid and policy objectives made by development organizations and foreign governments was also a limiting factor, because such investments could not be controlled for in the study. Additionally, the institutionalized democracy measure employed in the study was an aggregation of other measures, so future efforts should seek to assess the extent to which

the subcomponents of that measure contribute to the observed effects. Future studies can also evaluate more lengthy time-lagging horizons, since the current study considered only simple one-year lag effects.

There are other philosophical and theoretical models whose views regarding the structure of society differ from those upon 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 completely dismiss all opposing philosophical and theoretical viewpoints. The variance components in the multilevel change models indicate that there may well be other ecological, economic, cultural, technological, or political characteristics that contribute significantly to a society's levels of institutionalized democracy and FDI. Future studies should look to examine ICT impacts in other subsystems, considering, for example, cultural factors such as gender equality, or ecological factors such as natural resource utilization and environmental sustainability. Such studies may have an immediate impact on strategies to improve how ICTs are leveraged in emerging societies, especially those with the most pressing humanitarian needs. In addition, the analytic lens provided through societal subsystems and the theories integrated here may provide a means to study ICT impacts in developed societies, thereby producing a broader understanding that could contribute to the development of a comprehensive set of best practices for macro-level ICT policy-making.

Even with the caveats above, our findings support the notion that even the *new structural economics* as posited by research leaders in the World Bank needs to reflect on polity dimensions beyond measures of openness in order to advance the approach. As discussed earlier, the impact of ICT investments on FDI activity depends in part upon the extent to which foreign investors believe an increased interconnectedness will enhance their ability to exert control and influence over the local society, and hence protect their investments. Further, the ability to exert influence from a distance is contingent upon the form of government in a developing society. Our findings demonstrate that research lenses that focus on binary subsets of interconnected subsystems and don't reflect the broader socio-economic ripple effects of ICT investments should be carefully interpreted and scrutinized by IT decision makers and policy makers. For example, to conclude from recent Middle east events that mobile telephony and applications like Facebook and/or Twitter are necessary and sufficient ICT investments that can serve as a harbinger of democratic movements and subsequent future FDI flows would be taking our findings way too far. However, an IT manager should understand that adaptations of technology within developing countries can be different – perhaps couched in how they are evolved to best support comparative advantage – but, when no comparative advantage has yet emerged in a developing society, then fundamental relationships like those discussed here represent the most likely pattern. In this sense, we posit that there is a delicate balance between 'one-size-fits-all development theory' and 'new structural economics' that is important for IT decision makers and policy makers to recognize. Investigating this balance in the context of research findings from the information systems field will provide an exciting future for engaging in the contemporary and very important global conversation about economic growth theory.

Finally, we hope that our paper can help to demonstrate both the viability and the value of societal-level analyses in information systems research. In an economic climate increasingly characterized by ICT-driven globalization, we believe that the time has come to extend the traditional boundaries of the information systems discipline beyond the individual, group, and organizational levels of analysis, and lay claim to higher levels of analysis as well. Doing so will ensure that our discipline can bring its unique perspective to bear on what are already becoming some of the most important issues in modern global business. While our paper is by no means the first effort in the IS discipline to foray into this area of inquiry, we nevertheless hope that it highlights the value of such studies, and will contribute to the acceptance of societal-level analyses in mainstream IS research.

References

Addison, T. & Heshmati, A. (2002). *Democratization and new communication technologies as determinants of foreign direct investment in developing countries*. Paper presented at the UNU/WIDER Conference on the New Economy in Development (pp. 1-34), Helsinki, Finland.

Addison, T. & Heshmati, A. (2003). The new global determinants of FDI flows to developing countries: The importance of ICT and democratization. HelsinkiWIDER Discussion Paper No: 2003/45 (pp. 1-29). Helsinki, Finland: World Institute for Development Economics Research.

Baliamoune-Lutz, M. (2003). An analysis of the determinants and effects of ICT diffusion in developing countries. *Information Technology for Development, 10*(3), 151-169.

Baron, R. M. & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173-1182.

Baumol, W. J. & Blinder, A. S. (2005). *Macroeconomics: Principles and policy (10 ed.)*. Mason, OH: South-Western Educational Publishing.

Becker, T. (2001). Rating the impact of new technologies on democracy. *Communications of the ACM 44*(1), 39-43.

Bosworth, B. P & Collins, S. M. (1999). Capital flows to developing economies: Implications for saving and investment. *Brookings Papers on Economic Activity, 1999*(1).

Boulding, K. (1956). General Systems Theory: The skeleton of science. *Management Science, 2*(3), 197-208.

Brown, J. H., Stevens, G. C., & Kaufman, D. M. (1996). The geographic range: Size, shape, boundaries, and internal structure. *Annual Review of Ecology and Systematics, 27*, 597-623.

Brynjolfsson, E. & Hitt, L. M. (2000). Beyond computation: Information technology, organizational transformation and business performance. *Journal of Economic Perspectives, 14*(4), 23-48.

Busse, M. (2003). Democracy and FDI. HWWA Discussion Paper No. 220. Hamburg, Germany: Hamburg Institute of International Economics.

Castells, M. (2000). Materials for an explanatory theory of network society. *British Journal of Sociology, 51*(1), 5-24.

CIA (2007). *CIA world factbook*. Washington, DC: United States Central Intelligence Agency.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2 ed)*. Hillsdale, NJ: Erlbaum.

Commission on Growth and Development (2008). *The growth report: Strategies for sustained growth and inclusive development*. Washington, DC: World Bank.

Comte, A. (1998 [1830]). *Cours de philosophie positive [The course in positivist philosophy].* Paris, France: Hermann.

Dewan, S. & Riggins, F. J. (2005). The digital divide: Current and future research directions. *Journal of the Association for Information Systems, 6*(12), 298-337.

Durkheim, E. (1982). *The rules of sociological method*. New York, NY: The Free Press.

Dutta, A. (2001). Telecommunications and economic activity: An analysis of Granger causality. *Journal of Management Information Systems, 17*(4), 71-95.

Estrada, M. A. R. (2005). *Theoretical analysis of globalization, regional integration, and immigration*. Working Paper: University of Malaya.

Freedom House (2007). Annual survey of political rights and civil liberties. *Freedom in the World Historical Rankings, 35*(1).

Fuchs, C. (2003). Globalization and self-organization in the knowledge-based society. *TripleC, 1*(2), 105-169.

Fuchs, C. (2008). *Internet and society: Social theory in the information age*. New York, NY: Routledge.

Gani, A. & Sharma, B. (2003). The effects of information technology achievement and diffusion on foreign direct investment. *Perspectives on Global Development and Technology, 2*(2), 161-178.

Gholami, R., Lee, S. T., & Heshmati, A. (2006). The causal relationship between information and communication technology and foreign direct investment. *The World Economy, 29*(1), 43-62.

Giddens, A. (1984). *The constitution of society*. Berkeley, CA: University of California Press.

Gilks, W. R., Richardson, S., & Spiegelhalter, D. J. (1996). *Markov chain monte carlo in practice*. London, England: Chapman & Hall.

Granger, C. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica, 37*(3), 424-438.
Grönlund, Å. (2001). Democracy in an IT-framed society: Introduction. *Communications of the ACM, 44*(1), 22-26.
Inglehart, R. & Norris, P. (2003). *Rising tide: Gender equality and cultural change around the world*. Cambridge, England: Cambridge University Press.
Jasperson, J., Carte, T.A., Saunders, C.S., Butler, B.S., Croes, H., & Zheng, W. (2002). Power and information technology research: A metatriangulation review. *MIS Quarterly, 26*(4), 397-459.
Jensen, N. M. (2003). Democratic governance and multinational corporations: Political regimes and inflows of foreign direct investment. *International Organization, 57*(3), 587-616.
Jones, M. R. & Karsten, H. (2008). Gidden's structuration theory and information systems research. *MIS Quarterly, 32*(1), 127-157.
Jorgenson, D. W. (2002). *Econometrics: Economic growth in the information age*. Cambridge, MA: MIT Press.
King, W. R. & Sethi, V. (1999). An empirical assessment of the organization of transnational information systems. *Journal of Management Information Systems, 15*(4), 7-28.
Kittel, B. & Winner, H. (2005). How reliable is pooled analysis in political economy? The globalization-welfare state nexus revisited. *European Journal of Political Research, 44*(2), 269-293.
Lin, J. Y. (2011a). New structural economics: A framework for rethinking development. *World Bank Research Observer, 26*(2), 193-221.
Lin, J. Y. (2011b). *World Bank Chief Economist Justin Yifu Lin speaks at the George Washington University*. Retrieved from http://wn.com/structuralist_economics.
Lin, J. Y. & Monga, C. (2010). *The growth report and new structural economics*. Policy Research Working Paper 5336: The World Bank.
Lin, J. Y. & Monga, C. (2011). *Growth identification and facilitation: The role of the state in the dynamics of structural change*. Policy Research Working Paper 5313: World Bank.
Loungani, P. & Razin, A. (2001). How beneficial is foreign direct investment for developing countries? *Finance and Development Quarterly, 38*(2), 6-10.
Marshall, M. G. & Jaggers, K. (2006). *Polity IV project: Political regime characteristics and transitions*. College Park, MD: Integrated Network for Societal Conflict Research.
Mbarika, V. W. A., Okoli, C., Byrd, T. A., & Datta, P. (2005). The neglected continent of IS research: A research agenda for sub-Saharan Africa. *Journal of the Association for Information Systems, 6*(5), 130-170.
Meehl, P. E. & Waller, N. G. (2002). The path analysis controversy: A new statistical approach to strong appraisal of verisimilitude. *Psychological Methods, 7*(3), 283-300.
Mohen, J. & Glidden, J. (2001). "The case for Internet voting. *Communications of the ACM, 44*(1), 72.
Oliner, S. D. & Sichel, D. E. (2000). The resurgence of growth in the late 1990s: Is information technology the story? *Journal of Economic Perspectives, 14*(4), 3-22.
Romalis, J. (2011). The value of foreign ownership. *Economic and Business Review, 13*(1-2), 107-118.
Rubin, D. B. (1987). *Multiple imputation for nonresponse in surveys*. New York, NY: J. Wiley & Sons.
S&P (2000). *The S&P emerging market indices: Methodology, definitions, and practices*. New York, NY: McGraw-Hill.
Schafer, J. L. (1997). *Analysis of incomplete multivariate data*. London, England: Chapman & Hall.
Sharansky, N. & Dermer, R. (2004). *The case for democracy: The power of freedom to overcome tyranny and terror*. New York, NY: Perseus Books.
Singer, J. D. & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. New York, NY: Oxford University Press.
Sobel, M. E. (1982). Asymptotic intervals for indirect effects in structural equations models. In S. Leinhart (Ed.), *Sociological methodology* (pp. 290-312). San Francisco, CA: Jossey-Bass.
Soper, D. S. (2008). *An assessment of the economic, political, and cultural impacts of ICT investments in emerging societies* (Unpublished doctoral dissertation). Tempe, AZ: Arizona State University (pp. 6-14).
Soper, D. S. (2011a). A-priori sample size calculator. *Free Statistics Calculators (Online Software)*. Retrieved from http://www.danielsoper.com/statcalc3
Soper, D. S. (2011b) Sobel test calculator for the significance of mediation. *Free Statistics Calculators (Online Software)*. Retrieved from http://www.danielsoper.com/statcalc3

Soper, D. S., Demirkan, H., Goul, M., & St. Louis, R. (2006). The impact of ICT expenditures on institutionalized democracy and foreign direct investment in developing countries. *Proceedings of the 39th Annual Hawaii International Conference on System Sciences (HICSS)*, Kauai, HI.

Spencer, H. (2004 [1881]). *The principles of sociology* (Vol. 1). Park Forest, IL: University Press of the Pacific.

STOA (2001). *Developing countries and the ICT revolution: Final study*. Working Paper for the STOA Panel, Luxembourg.

Tammen, R. L. (2000). *Power transitions: Strategies for the 21st century*. New York, NY: Chatham House Publishers.

United Nations (2000). *Development and international cooperation in the twenty-first century: The role of information technology in the context of a knowledge-based global economy*. United Nations Economic and Social Council Ministerial Declaration (E/2000) L.9 (pp. 1-6).

United Nations (2007). *World macro regions and components*. New York, NY: United Nations Dag Hammarskjöld Library.

USDOS (2006). *Report on international religious freedom*. Washington, DC: U.S. Department of State.

Wall, H. J. (1995). The allocation of official development assistance. *Journal of Policy Modeling, 17*(3), 307-314.

Walsham, G., Robey, D., & Sahay, S. (2007). Forward: Special issue on information systems in developing countries. *MIS Quarterly, 31*(2), 317-326.

World Bank Group (2007). *The world development indicators database*. Washington, DC: The World Bank Group.

World Bank Group (2008). *World bank list of economies*. Washington, DC: The World Bank Group.

World Bank Group (2010). *World development indicators*. Washington, DC: The World Bank Group.

Appendices

Appendix A.

The table below lists the countries used in the analyses, and provides a few additional descriptive details.

Exhibit A-1.

Country	Mean GDP 2000 - 2007 (in billions of current USD)	Mean Population 2000 - 2007 (in millions)
Argentina	199.46	38.21
Bahrain	11.65	0.70
Bangladesh	55.09	149.40
Botswana	8.72	1.81
Brazil	781.98	182.46
Bulgaria	24.12	7.82
Chile	101.25	16.04
China	2001.70	1291.50
Colombia	128.33	42.07
Cote d'Ivoire	14.40	18.67
Croatia	37.16	4.44
Czech Republic	104.51	10.25
Ecuador	31.01	12.84
Egypt, Arab Republic	96.84	75.05
Estonia	11.63	1.35
Ghana	11.09	21.20
Hungary	89.49	10.13
India	723.10	1071.29
Indonesia	261.91	215.02
Jamaica	10.42	2.63
Kenya	17.28	34.51
Latvia	14.39	2.32
Lebanon	20.66	3.98
Lithuania	21.76	3.44
Malaysia	125.42	24.93
Mauritius	5.77	1.23
Mexico	767.48	101.58
Morocco	52.79	30.00
Namibia	5.80	1.95
Nigeria	91.70	136.06
Oman	26.96	2.55
Peru	71.78	27.29
Philippines	93.87	83.16
Poland	262.54	38.22
Romania	81.11	21.82
Russian Federation	623.30	144.22

Exhibit A-1. (cont.)

Country	Mean GDP 2000 - 2007 (in billions of current USD)	Mean Population 2000 - 2007 (in millions)
Saudi Arabia	260.15	22.36
Slovak Republic	51.25	5.39
Slovenia	31.02	2.00
South Africa	193.02	46.30
Sri Lanka	21.72	19.33
Thailand	162.48	64.79
Trinidad and Tobago	13.18	1.31
Tunisia	26.14	9.90
Turkey	381.41	69.77
Ukraine	70.41	47.72
Venezuela, RB	135.66	25.90
Zimbabwe	9.18	12.48

Appendix B.

The geographic regions and predominant religions used as covariates in the analyses are provided below.

Exhibit B-1.
Geographic Regions
Caribbean
Eastern Africa
Asia
Europe
Northern Africa
South or Central America
Southern or Western Africa
Middle East

Exhibit B-2.
Predominant Religions
Buddhism
Catholic or Protestant Christianity
Hinduism
Orthodox Christianity
Shia Islam
Sunni or Ibadi Islam

Appendix C.

The correlation values between model variables and their associated significances are shown in the table below.

Exhibit C-1.

	Time	DEM	FDI	GDP	ICT	ODA	REG	REL
Time	1.000							
DEM	0.058	1.000						
FDI	0.242**	0.322**	1.000					
GDP	0.210**	0.274**	0.366**	1.000				
L1ICT	0.258**	0.230**	0.343**	0.270**	1.000			
ODA	0.031	0.009	-0.069	-0.437**	-0.124	1.000		
REG	0.000	0.684**	0.523	0.706	0.421**	.481**	1.000	
REL	0.000	0.643**	0.356**	0.240**	0.310**	0.179**	N/A	1.000

*$p < 0.05$ (two-tailed) **$p < 0.01$ (two-tailed)

Where: DEM = Institutionalized Democracy
FDI = Foreign Direct Investment
GDP = Per Capita Gross Domestic Product
ICT = ICT Investments
ODA = Official Development Assistance
REG = Geographic Region
REL = Predominant Religion

Note: For the first six rows (Time, DEM, FDI, GDP, ICT, and ODA), the correlations are bivariate Pearson product moment correlations. For last two rows (REG and REL), the correlations are multiple correlations for the model in which the continuous column variable is the dependent variable and the (k – 1) binary variables associated the categorical row variable are the independent variables, where k is the number of categories for the row variable. There were not enough observations to compute a meaningful measure of association between the two categorical variables.

About the Authors

Daniel S. SOPER is an Assistant Professor of Information Systems and Decision Sciences in the Mihaylo College of Business and Economics at California State University, Fullerton. He earned his Ph.D. from the W.P. Carey School of Business at Arizona State University, and holds additional graduate and undergraduate degrees from Colorado State University. Dr. Soper's research interests include the impacts of ICTs in emerging countries, mental models, interorganizational knowledge-sharing, digital markets, negotiation support systems, and the history and identity of the IS discipline. His work in these areas has been presented at several prominent IS conferences and has appeared in several leading journals. Dr. Soper also operates The Free Statistics Calculators Website, one of the web's most popular destinations for scientists and researchers interested in quantitative analysis (http://www.danielsoper.com/statcalc).

Haluk DEMIRKAN is a Professor of Information Systems (Clinical Track) and a Research Faculty of the Center for Services Leadership at Arizona State University. His research and teaching focuses on service science & sustainable innovations, strategic project & service management, business-, social-, and cloud services-intelligence & analytics, and information service supply chain management. He has authored or co-authored scores of journal articles and other publications, and recently co-edited two research books entitled "The Science of Service Systems" and "Implementation of Service Systems". His research has appeared in the Journal of Service Research, Journal of Management Information Systems, Journal of the Association for Information Systems, IEEE Transactions on Systems, Man and Cybernetics, and the European Journal of Operational Research, among others. In 2011, he was ranked 50th in the Association for Information Systems' global rankings of IS researchers. He has more than fifteen years of professional work experience in business intelligence & analytics solutions, and earned his PhD in Information Systems & Operations Management from the University of Florida.

Michael GOUL is Professor and Chair of the Department of Information Systems, W. P. Carey School of Business, Arizona State University. Michael's research extends from services computing to analytics/business intelligence and to the attribution of information communications technologies to development. He has served in Association for Information Systems leadership and conference/program chairing roles, and he has published in a wide range of IS research journals. In 2005-06, Dr. Goul was appointed a William J. Clinton Distinguished Fellow by the University of Arkansas Clinton School of Public Service, Little Rock, AR. He was the previous VP of Programs for the Arizona Chapter of the Society for Information Management. Dr. Goul is an Associate Editor for IEEE Transactions on Services Computing, and he has co-edited special issues of Decision Support Systems and Decision Sciences.

Robert St. LOUIS is a Professor of Information Systems at Arizona State University. He received his AB degree from Rockhurst College, and his MS and Ph.D. degrees from Purdue University. He began teaching at ASU in 1969, but spent the period from 1976 through 1981 working full time as a researcher for state and federal agencies. Dr. St. Louis is currently teaching classes on information management, and conducting research in the areas of document search, enterprise performance management systems, and evidence-based decision-making. He has published articles in a variety of journals, including the Academy of Management Journal, Decision Support Systems, the Journal of Econometrics, Communications in Statistics, and Communications of the ACM. He also conducts seminars for the US Department of Labor on data-driven forecasts, and consults with state and federal agencies on predictive analytics.