A Framework for Examining the Building of ICT Capacity in Developing Nations: Role of Cultural and Institution

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ABSTRACT

Information and communication technologies (ICTs) have been acknowledged as key to the economic and social development of developing nations. There are divergent views on the importance of ICT development for developing nations. Those who oppose ICT expansion argue that developing nations should use scarce resources in building roads, education and medical facilities rather than ICT. Thus the building of a nation's ICT capacity would be influenced by several institutions. However, prior research has focused predominantly on how governmental institutions influence the building of ICT capacity. In this paper we propose a framework for examining the building of ICT capacity in developing nations that has four major components: institutional entities, institutional interventions, culture and environmental factors. We present some theoretical propositions that can be used to test our proposed framework. While the list of entities and propositions is not exhaustive, we believe that this work provides a useful initial roadmap to understanding the impact of the interplay between culture and institutional factors on the building of ICT capacity in developing nations.

Keywords

ICT Capacity, institutions, culture, institutional theory, institutional interventions, developing nations, environmental factors

INTRODUCTION

Many institutions, researchers, and governments perceive growth in ICT building as key to the economic and social development of a nation. ICT has been touted as a driver of growth for transforming the social, economic, political and cultural conditions of developing nations (Deliktas & Kok, 2003; Hicks & Streeten, 1979). For instance, ICT is expected to help expand the productive capacity of these nations by creating new work opportunities (Chen & Zhu, 2004; Crafts, 2003). Some institutions in the development community, such as the World Bank and IMF, consider ICT as essential to growth in developing nations; others disfavor the building of ICT capacity arguing that developing nations should use their scarce resources to invest in good roads, hospitals and education, and not on ICT (Sunden & Wicander, 2002). Notwithstanding the differences in the views among the actors in the development community, both sets of actors play an influential role in directing ICT investments in developing nations. However, prior research studies have focused predominantly on government institutions and their actions or interventions (Foster, Goodman, Osiakwan, & Bernstein, 2004; Ndukwe, 2003; Silva & Figueroa, 2002).

In this paper we propose a framework that presents first a broader view of institutional entities, as well as culture and other environmental factors that influence the building of ICT capacity in developing nations. The list of entities and environmental factors presented in this paper is not however exhaustive; in fact we recognize that the factors of interest in any study on ICT capacity will be dictated by the specific goals of the research. For instance, if the goal is to evaluate the influence of governments on the building of ICT capacity then that variable (i.e. the government entity) will be the main independent

variable. However, additional variables may be of interest as moderators of the relationship between the building of ICT capacity and the government entity.

We present some theoretical propositions that can be used to test our proposed framework. We believe that the paper provides a useful and initial roadmap to understanding the interplay between culture, institutional and environmental factors on the building of ICT capacity in developing nations.

LITERATURE REVIEW

Institutional theory has its origins in the works of Alfred Schutz and social constructionism. The work of Berger and Luckman (1967) on institutionalization has served as the basis for many approaches to institutionalization in the literature. According to Berger and Luckman (1967)

> "Institutionalization occurs whenever there is a reciprocal typification of habitualized actions by types of actors. Put differently, any such typification is an institution. What must be stressed is the reciprocity of institutional typifications and the typicality of not only the actions but also the actors in institutions… Institutions further imply historicity and control… Institutions also, by the very fact of their existence, control human conduct by setting up predefined patterns of conduct, which channel it in one direction as against the many other directions that would theoretically be possible."

In a similar vein, institutionalization represents the routinization of roles and practices in a society (Silva and Figueroa, 2002) where actors (i.e. members of the institution) of a certain type will perform actions of a specific type. Furthermore, actors' conduct is controlled by institutionally predefined patterns of conduct that inhere to the institution over a shared history and control. For our purposes, this suggests that institutions and their actors can be observed with an understanding that an institution possesses power and control that is imbued to its agents or actors as patterns of conduct or actions.

King et al. (1994) adopted institutional theory to articulate a framework depicting the role of institutions and the attendant actions (institutional interventions) directed at influencing the adoption of information technology innovation. The framework proposed by King et al. (1994) classified the potential institutional interventions that may be undertaken into five categories namely, knowledge building, knowledge deployment or subsidy, standard setting, and innovation directive. Since then other studies in the information systems discipline have also used institutional theory. Silva and Figueroa (2002) employ institutional theory and the framework of King et al. to analyze the institutional interventions of the most powerful actors in Chile in the expansion of ICT in that country; this study also serves to contrast the Chilean experience to the King et al. conceptual framework.

Prior research that has looked at institutional issues has focused predominantly on government institutions (Foster, et al., 2004; Ndukwe, 2003; Silva & Figueroa, 2002). While Silva and Figueroa (2002) used the institutional approach, they only discussed institutions that they considered as powerful organizations. Although they mention a chamber of commerce and international agencies, most of the discussion focuses on government interventions.

Most extant ICT frameworks concentrate on specific technology instantiations such as e-participation initiatives (Phang & Kankanhalli, 2008) and internet diffusion (Foster, et al., 2004). However, Meso, Datta and Mbarika (2006) developed a framework that relates ICTs (broadcast and information technology) to governance in developing nations. ICTs consist of a large array of technologies, and societies and nations have many institutions and bodies vested with varying degrees of socio-political power and influence that can shape the nature and set of ICT initiatives adopted successfully. To the best of our knowledge, existing ICT frameworks have not taken a broader view that accounts for the interplay between the many interested social institutions, and the broad array of technologies that are necessarily subject to the control and influence of social institutions.

In this paper we develop a conceptual framework for analyzing the building of ICT capacity in developing nations. Our framework accounts for a broad view of the institutions instrumental in the building of ICT capacity and the interventions at their disposal. In addition, we consider the moderating effects of culture.

Our framework consists of institutional entities and their interventions, culture and environmental factors such as, the country's economic capacity and infrastructure. Furthermore, in our framework an institution (or a set thereof) is considered part of the environment when that institution is not part of the key institutional entity (entities) whose actions or interventions

are the locus of analysis. It has been shown for instance that Internet diffusion in developing nations is influenced by the level of commitment of organizations in the commercial, education, health and public sectors (Foster et al., 2004). Not only do these institutions influence internet diffusion but also they affect the building of ICT capacity (Waverman, Meschi, & Fuss, 2005).

Hofstede (1980) defines culture as "a collective mental programming of the people in an environment" (1980, p.43). Therefore, the culture of the actors or institutions influences the structures that may be enacted. Table 1 below provides brief descriptions of the dimensions of culture as defined by Hofstede (1980, 1983).

Dimension	Definitions
Power Distance	The extent to which a society accepts the fact that power in institutions and organizations is distributed unequally (1980, p.45).
Uncertainty Avoidance	The extent to which a society feels threatened by uncertain and ambiguous situations (1980, p.45).
Individualism vs. Collectivism	Individualism implies a loosely knit social framework in which people are supposed to take care of themselves and their immediate families only, while collectivism is characterized by a tight social framework in which people distinguish between in-groups and out-groups to look after them and in exchange for that they feel they owe absolute loyalty to it (1980, p.45).
Masculinity vs. Femininity	Masculinity expresses the extent to which the dominant values in society are masculine, i.e. assertiveness, the acquisition of money and things and not caring for others, the quality of life or people (1980, p.46). In feminine societies men can assume nurturing roles, quality of life is important to both men and women and there is equality among the sexes (1980, p. 49)
Long-Term vs. Short-Term orientation	Long-term orientation can be said to deal with virtue regardless of truth. Values associated with Long-term orientation are thrift and perseverance; Values associated with Short-term orientation are respect for tradition, fulfilling social obligations, and protecting one's 'face'. (1983)

Table 1: Definitions of Culture Dimensions (Hofstede, 1980, 1983)

ICT FRAMEWORK

Figure 1 is the proposed framework for examining the building of ICT capacity in developing nations. In this section we describe the framework and its components. The framework consists of institutional entities and their interventions, culture and environmental factors such as, the country's economic capacity, and infrastructure.

organizations we refer to as institutional entities include government, commercial and education (Foster, et al., 2004). Not only do these institutions influence ICT diffusion but also they affect the building of ICT capacity (Waverman, et al., 2005). Furthermore, in our framework an institution (or a set thereof) can be considered part of the environment when that institution is not part of the key institutional entity (entities) whose actions or interventions are the locus of the research.

Other environmental factors include a country's economic capacity, its infrastructure, the political stability, and regional socio-economic development. Key entities and environmental factors (specifically other institutions) have indirect (via interventions) and direct influence on the building of ICT capacity in a nation. Direct influence of institutional entity may be the case where the research goal is to examine whether a particular form of government such as a democratically elected one versus military rule influence the building of ICT capacity.

However, in the framework, we propose that the influence of key institutions in the building of ICT capacity will be enacted through the interventions available to the institutions. An institution such as the IMF has various mechanisms by which it can intervene to influence the building of ICT capacity. For example, the IMF can directly fund development projects, organize conferences, provide knowledge and skills to and urge the formulation of policies by governments for the purpose of building ICT capacity.

Our framework includes a culture component. We use Hofstede's (1980, 1983) five-dimensional model of culture where culture is defined as "a collective mental programming of the people in an environment" (1980, p.43). This model can be applied both at the national and organizational levels (Hofstede, Bond, & Luk, 1993). We propose that culture moderates the relationship between the building of ICT capacity and institutional entities, the relationship between the building of ICT capacity and institutional interventions, the relationship between the environmental factors and institutional interventions, the relationship between the building of ICT capacity and environmental factors, and the relationship between key institutional entities and environmental factors.

The environmental factors such as infrastructure (e.g., roads and electricity), and economic capacity (e.g., GDP) influence the building of ICT capacity (Dewan, Ganley, & Kraemer, 2005). Environmental factors (including other institutional entities) potentially circumscribe interventions available to key institutions. Similarly, the interventions can impact the environmental factors. Key institutional entities may influence the environmental factors in much the same way as the environmental factors may influence key institutional entities. Consider a study that seeks to understand the role of government (key institutional entity) on the building of ICT capacity in a country where the power of religious institutions has significant political suasion over citizens, then the government's own power to act could be curtailed by the relative political strength of the religious institutions.
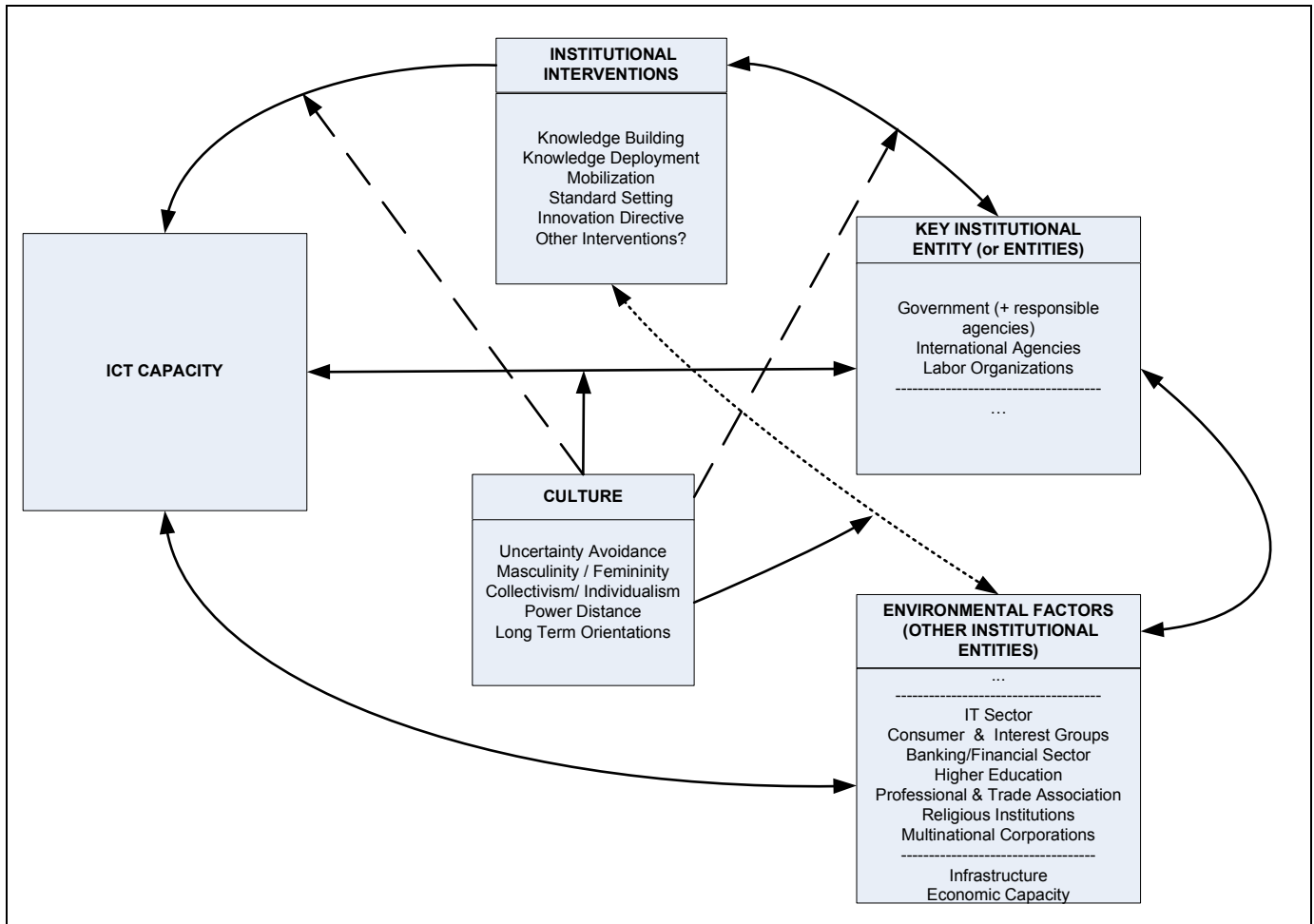
Figure 1. Framework for examining the building of ICT capacity

Institutional Entities

The institutional entities we consider in this study are: *government and its responsible agencies* – responsible agencies include entities created by the government to direct and implement ICT activities for example SITA in South Africa; international agencies (e.g. World Bank, UNCTAD); the financial sector; labor organizations; higher education institutions; NGOs; IT sector; consumer and interest groups;, professional and trade associations; multinational corporations; and religious bodies (e.g., King et al., 1994). In addition to the fact that the list is not exhaustive, in this paper we discuss only a sample of these entities.

International Agencies

International agencies such as the World Bank, the International Monetary Fund (IMF), and the International Telecommunications Union (ITU) have been urging governments of developing nations to formulate technology policies to stimulate the development of ICT infrastructure. These entities have also engaged in programs and indabas aimed at promoting the drive to building and using ICT. For example: the World links for development project (WorLD) funded in concert with the World Bank, USAID and UNESCO was conceived to build a network of schools in developing nations with the aim of linking its students and teachers to their industrial world counterparts (IICD, 2002); In 2001, the Secretary-General of the United Nations formed an ICT task force whose purpose was to work toward bridging the digital divide between developed and developing nations (UN, 2001) and in its 2001-2003 intercessional period, the United Nations Conference on Trade and Development's (UNCTAD) theme, "technology development and capacity building for competitiveness in digital society," reflects its desire to promote human development in developing nations via the building and use of ICT capacity.

The World Summit on the Information Society (WSIS) in 2003 encouraged member states to make substantial investments in ICT with the sole aim of creating an "Information Society" to facilitate effective development, utilization and sharing of information and knowledge and thereby enable full realization of national potential (ITU, 2003).

Government (and or responsible agencies)

Government and or responsible agencies typically execute or participate in ICT expansion decision making as well as implementation of ICT projects. The legislation, policies, programs and political motivation of this institutional entity influence the building of ICT capacity. Governments can develop standards for procedures and ICT procurement intended to introduce cost and operational efficiencies for ICT projects. For instance, the government in the United Kingdom mandates that all government ICT projects use structured methodologies for analysis and design.

Governments can contribute to the building of ICT capacity as they implement policies to ensure fair practice between their nations and potential foreign investors. They can enact favorable foreign exchange policies; reduce tariffs and taxation in order to attract potential foreign investors. For example, Nigeria enacted a 'pioneer status' by which tax exemptions were granted for a period of five years to newly established telecommunication network operators to promote the development of ICT (Ndukwe, 2003). Furthermore, the perception of political stability and a commitment to social and market reforms influence support from international agencies and donor communities that can constrain government potential actions with respect to investments in ICT.

Religious Bodies

Studies show that religion plays an important role in the adoption and use of ICT (Bell, 2006; Campbell, 2005). Bell (2006) maintains that religion is a primary indicator of people's interaction with technologies as it is the primary framing narrative in most cultures. Some religious leaders hold reservations for the use of certain technologies if they perceive ICT as a threat to their faith. However, a proliferation of ICT in religious institutions holds invaluable potential for the propagation of faith principles to the secular world in a subtle manner (Bell, 2006). Bell provided examples such as religious social network portals, and automated phone calling systems as potential and active ways in which ICTs are being employed to deliver religious experiences. In societies where religious bodies see the potential of ICT to transform educational, commercial and religious institutions, then leaders of religious bodies will seek to contribute to the capacity building of ICT. However, in societies where ICT is recognized as a threat to religion then religious bodies may fight against ICT expansion.

Higher Education

In Ghana, Foster et al. (2004) demonstrated that the involvement of two professors from a higher education institution in the development of a needed technology influenced ICT diffusion nationally. The building of ICT capacity requires the local development of ICT skills. Maintaining high graduation rates as well as a high quality of tertiary schooling has been identified as a key determinant of ICT development (Cheung & Lee, 2001). Thus researchers from higher education institutions have the potential to influence government policies related to the building of ICT capacity through their research activities and actual technological products.

Labor Organizations

Labor organizations in developing countries can be highly motivated and organized; ICT policies that are perceived to be a threat to the collective wellbeing can face stiff resistance. The opposite is also true; they can also serve as good allies to ICT policies that serve workers' interests.

Financial Sector

In response to the digital divide, some developing countries have invested extensively in ICT infrastructures (Ngwenyama et al. 2006). However, only a few financial institutions in these countries have taken advantage of available ICT infrastructures to provide online services to their customers (Andoh-Baidoo, Osatuyi, Kah, & Aidoo, 2007). Andoh-Baidoo et al. (2007) suggested strategies that financial sectors can employ to maintain a global competitive advantage by effectively utilizing the ICT infrastructures available to them. In most cases financial institutions have to identify the options available and seek to take advantage of technologies that will enable them to remain competitive. For these financial institutions to realize the benefits that technologies such as internet banking promises, they need to have ICT capabilities that gives all their customers access to their information resources and perform diverse transactions and services from the internet. These services will

require extensive availability of ICT infrastructures throughout the nation and in some situations across nations. Hence financial institutions are one type of industry that can have a genuine interest in the building of ICT capacity in developing nations (Andoh-Baidoo, et al., 2007).

Multinational Corporations (e.g. Sun Microsystems involvement in WorLD)

Some multinational organizations may choose to demonstrate social responsibility through their involvement in programs and projects that seek to minimize the digital divide and enable developing nations to have access to ICT infrastructure, services and or products to enhance human development. For instance Sun Microsystems was actively involved in the WorLD program (IICD, 2002). On the other hand, multinational corporations as vendors may get involved in ICT capacity building initiatives because of their vested interest in selling and promoting specific services and products.

Culture

From Hofstede's (1980) conceptualization of culture, the five dimensions are: power distance, uncertainty avoidance, individualism-collectivism, masculinity-femininity, and long term orientation (Hofstede, 1980, 1983). The role of culture in the building of ICT capacity is discussed below in relation to the five dimensions.

Power Distance

People in a nation with low power distance are more likely to adopt a technology than those with higher power distance(Erumban & Jong, 2006). In a nation with high power distance the actions and activities of people in authority are not questioned. In such environments the formation of consumer advocacy groups may not be useful as they may not be able to represent consumers' concerns. However, in a lower power distance nation, people may have confidence in questioning the programs of the government and national institutions. Individuals as well as groups such as consumer advocates may be able to challenge government's programs including plans and budget for the building of ICT capacity. Thus individuals and groups are more likely to influence the building ICT capacity in a nation with a low power distance than those with a high power distance.

Masculinity - Femininity

Masculine communities are assertive. In masculine culture genders are distinct –men focus on material success, and women on the quality of life. In feminine societies social gender roles overlap –both men and women value quality of life. Thus masculine societies are more likely to support the building of ICT capacity than feminine societies.

Uncertainty Avoidance

A society with high uncertainty avoidance is more likely to be comfortable with the status quo than a low uncertainty avoidance society. For the high uncertainty avoidance society ICT may present challenges that may create uncertainty in how the society behaves. As the society prefers to avoid changing the way things are done, these cultures may not appreciate the building of ICT capability. On the other hand, low uncertainty avoidance societies may be more interested in learning about ICT so that they can relate with the developed world. Thus low uncertainty avoidance societies are more likely to support the building of ICT capacity than high uncertainty avoidance societies.

Individualism-Collectivism

In individualistic cultures, people think about themselves and their immediate families. However, for collectivist cultures, the group interest supersedes the individuals' interest. In individualistic cultures, each member is motivated to excel and to cater for themselves. Competition in individualistic cultures is keen. Institutions will be challenged to provide ICT expansion to support the numerous needs of the entire community. For instance, every member of a family may have their own computer and or laptops. There may be a need to increase network capacity to support the community. However, in a collectivistic society a single computer may be adequate for the entire family which reduces the "pressure" on institutions to expand ICT capacity. Thus individualistic societies are more likely to support the building of ICT capacity than collectivist societies.

Long Term Orientation

A Society with a long term orientation will expect that building ICT capability will enable citizens develop human and other resources necessary for the nation to compete globally. Short term orientation nations however will expect that citizens are given their share of the national resources to have "good time" now since they cannot predict what will happen in the future and want to enjoy the present time. Thus nations with a long term orientation culture will seek high ICT capacity than those with short term orientations.

Environmental Factors

As already mentioned in a previous section above, environmental factors can include those institutional entities that are not part of the key institutional entity that is the locus of analysis. Other environmental factors include economic capacity and infrastructure.

Economic Capacity

Several developing nations suffer from insufficient funds to acquire ICT infrastructures. Nations with low GDP and less potential for GDP growth are less likely to devote enough if any resources to build ICT capacity.

Infrastructure

Inadequate infrastructure is a common challenge faced in developing nations (**Dewan**, et al., 2005). Infrastructure in this context means accessible roads, electricity, man-power, and ICT resources.

Institutional Interventions

King et al (1994) proposed five categories of institutional interventions using the sociology notions of regulation and influence. The categories are: (1) knowledge building; (2) knowledge deployment or subsidy; (3) mobilization; (4) standard setting; and (5) innovation directive. These interventions are enacted by one or several institutions, some of which have been discussed in previous sections above, these interventions can directly and indirectly impact the building of ICT capacity

Propositions

Based on the discussions on how interaction of institutional entities and their interventions, culture and environmental factors influence the building of ICT capacity in developing nations, we present some theoretical propositions that can be used to test the proposed framework. We believe that based on the specific research goal, propositions involving the different dimensions of culture, institutional entities and environmental factors could be developed and tested to validate our proposed framework.

1. The building of ICT capacity will be higher for nations with low power distance than those with high power distance (Erumban & Jong, 2006)
2. The building of ICT capacity will be higher for nations with low uncertainty avoidance than those with high uncertainty avoidance (Erumban & Jong, 2006)
3. The building of ICT capacity will be higher for nations with a masculine culture than those with a feminine culture (Erumban & Jong, 2006)
4. The building of ICT capacity will be higher for nations with an individualistic culture than those with a collectivist culture (Erumban & Jong, 2006)
5. The building of ICT capacity will be higher for nations with long term orientation than for those with short term orientation (Erumban & Jong, 2006)[1]
6. The building of ICT capacity will be higher for nations with high GDP than those with low GDP (Dewan, et al., 2005)
7. The building of ICT capacity will be higher for nations with high infrastructure for those with low infrastructure (Meso, et al., 2006)

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[1] The direction of influence proposed by the Erumban and Jong is opposite to our proposition.

8. The building of ICT capacity will be higher for nations with high political stability than nations with low political stability (Meso, et al., 2006)
9. The building of ICT capacity will be higher in nations with stronger institutional support for knowledge building (Silva & Figueroa, 2002).
10. The building of ICT capacity will be higher for nations where key religious bodies do not perceive ICT as a threat to religious values (Bell, 2006).

CONCLUSIONS

Information and communication technologies have been identified as key to the economic and social development of developing nations. Researchers have looked at government interventions aimed at building ICT capacity however, the role of other social institutions and culture has not been adequately studied. In this paper we proposed a framework for examining the ICT capacity building of developing nations. This framework has the following major components: ICT capacity, institutional entities, institutional interventions, culture and environmental factors. We presented some theoretical propositions that can be used to test our proposed framework. While the list of entities and propositions are not exhaustive, we believe that the paper provides a useful, initial roadmap to understanding the impact of the interplay between culture and institutional factors on the building of ICT capacity in developing nations.

FUTURE RESEARCH

A limitation of this paper is that the proposed framework is not tested empirically. For future research we plan to conduct case studies to empirically evaluate the framework and test propositions in the context of several developing nations. The nature of the framework is such that it would be evaluated and refined incrementally.

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