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Information and Communications Technology in Developing, Emerging and Transition Economies: An Assessment of Research

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ABSTRACT

Information and communications technology (ICT) is a crucial driving force in economic globalization and the principal enabler in building a highly connected world. However, despite the ever-increasing importance of ICT in developing economies, the mainstream information system research remains focused on ICT in the limited number of highly developed countries. Comparatively little research is being reported that specifically addresses the issues that arise from using ICT in developing, emerging and transition economies. In this paper, we review twenty-five papers in this topic area that have been published in past proceedings of the Americas Conference on Information Systems (AMCIS). Based on this review, trends and shortcomings in the existing research are discussed and new research opportunities are proposed.

Keywords

Developing economies, emerging economies, transition economies.

INTRODUCTION

World economies are classified by the World Bank according to their gross national income (GNI) per capita. Economies with low to middle per capita income (below \$9,200) are considered *developing economies* and represented about 84% of the world population and 22% of the world GDP in 2005 (World Bank 2007).

A subgroup of developing economies may be labeled as *emerging market economies*, a term generally attributed to van Agtmael (1984) and referring to countries or regions with low absolute, but fast growing, per capita income, and with administrations that are sincerely dedicated to economic liberalization (Arnold and Quelch 1998). The term *transition economies* (or *transitional economies*) designates economies in transition from communist style central planning to free market systems (Roztocki and Weistroffer 2008b). Most transition economies can also be classified as emerging economies.

Developing countries typically have comparatively low standards of living, and underdeveloped industrial and commercial foundations, in contrast to the relatively small set of *developed* countries, which are characterized by generally high standards of living, on-going and self-sustaining economic growth, and a well-developed infrastructure.

Low per capita income is often related to high levels of unemployment, low consumer demand for non-essential goods, and a shortage of highly paid job opportunities, resulting in low levels of personal savings and slow capital formation. Thus typical problems of many developing countries include low consumer spending, a shortage of skilled labor, thin capital markets, and weak infrastructures (Hoskisson, Eden, Lau and Wright 2000).

These characteristics of developing, emerging, and transition economies substantially effect business investments and operations. So, for example, international companies operating in these markets may need to offer their products at lower unit prices than achieved in developed countries in order to reach the generally less affluent consumers. Such reduced prices may be realized by using lower cost (and perhaps lower quality) components in producing the items. Also, the shortage of available capital and skilled labor makes it hard for local businesses to emerge and grow, and the underdeveloped infrastructure makes marketing of products challenging.

Emerging economies, with low absolute level of economic development but with fast growth rates, characteristically provide more dynamic but less stable environments for conducting business than either developed or more slowly developing countries or regions (Roztocki and Weistroffer 2004a). In part, this instability in the business environment results from the dependency on trade with, and capital flow from the developed countries. Thus even a small shift in demand or economic decline in developed countries, may lead to severe recession in emerging economies. Often, emerging economies have a

substantial rising middle class population with growing personal income, creating increasing domestic demand for new products and services. This demand is sometimes accelerated thru consumer loans, as the new customers require access to financing while trying to catch up with living standards in other parts of the world. This creates many new business opportunities for domestic industries, but also draws global competitors into these newly opening markets.

Transition economies, in the process of moving away from a central planning system, often still suffer from the legacy of lingering government bureaucracy and managerial attitudes not totally attuned to a free market economy. Before opening up, the business environment in transition economies was characterized by large, state owned enterprises, and massive government control (Verhoeven, Dessens and Jansen 2008). Many details of business activities were decided by central planners, and the executives of state owned enterprises were mostly engaged with fulfilling prescribed production targets (Filatotchev, Buck and Zhukov 2000). As a result, management had different priorities and acted in a different way from what is typical in free market economies. For example, making a profit was considered less important than satisfying basic consumer needs and providing employment for the populace. There was little incentive to improve efficiency (Roztocki and Weistroffer 2008a; Roztocki and Weistroffer 2008b), and many enterprises were fully dependent on state allocation of needed resources to maintain operations (Kornai 1986). This dependency on state guidance and the neglect of market forces led to a managerial approach often characterized by indecisiveness, as the executives of state owned operations carefully avoided any decisions or actions that might be perceived negatively by the authorities (Aharoni 1981).

Although information and communication technology (ICT) is used extensively in developing, emerging, and transition, economies, published research dealing with ICT specifically in these "new" economies is clearly underrepresented in the mainstream information systems literature. The bulk of published work still focuses on observations from developed countries.

Thus, the objective of this paper is three-fold. First, we point to several differences in using information and communication technology (ICT) in developing, emerging and transition economies as compared to mature, developed economies. Second, based on a systematic review of twenty-five papers published in the proceedings of the Americas Conference on Information Systems (AMCIS), we assess the current state of research in this area. Third, we identify several research gaps, which may guide potential authors in their research endeavors. Though we realize that AMCIS is only one of many outlets for research in this topic area, we think that AMCIS proceedings may offer a fairly representative reflection of current research trends. Much academic work is presented at conferences and published in proceedings before it reaches academic journals, and AMCIS seems to have the right balance between inclusiveness and selectivity so that important new research directions are not precluded, while at the same time distraction by trivial or insubstantial material is avoided.

INFORMATION AND COMMUNICATION TECHNOLOGY IN DEVELOPING ECONOMIES

Sustained economic development requires a well-developed infrastructure and a substantial number of high-value-added industries. Thus in developing economies, ICT is often regarded as an enabler and catalyst for successfully shifting away from economic dependency on low-value-added industry sectors, such as agriculture and raw materials extraction. ICT as a communication and collaboration-enabling tool may be used to compensate for the scarcity of other resources. However, many of the lessons and much of the experience from developed countries, and the business models and strategic tools developed in that context, are of limited validity and offer inadequate applicability in developing economies.

As an example, measuring the progress of ICT implementation by looking at the portion of the population owning computers with individual Internet access may be reasonable in developed economies, but this is generally not a good gauge in developing countries (Roztocki, Weistroffer, Monar and Nasirin 2007). Even though there may be only moderate individual ownership of ICT, many people in developing economies have access to the Internet through workplace, family, neighbors, Internet cafes, public libraries, educational institutions, etc.

By the same token, business models proven successful in developed economies may not transfer readily to developing economies. Rather, new and innovative models, attuned to the social and business environment in developing countries are needed. An example of a successful business model in a developing economy has been phone sharing. GrameenPhone in Bangladesh sold more than 100,000 mobile phones to so-called phone ladies who provide airtime to members of the community for a modest fee (Qureshi, Keen and Kamal 2007). This kind of sharing of technology, not likely to be profitable in developed countries, provides some additional advantages, aside from saving cost. As much of the population in rural areas of developing countries is unskilled in the use of modern technology, sharing such technology provides not only access to the technology itself, but also user support for the technology.

The strategic objectives for ICT investments in developing economies are also often different from objectives in developed countries. Rather than using technology as a substitute for expensive human labor (Bingi, Leff, Shipchandler and Rao 2000),

in developing economies where labor costs are relatively low but capital is in short supply, technology may be applied to compensate for an otherwise poor infrastructure.

Overall, though the use of ICT in developed and in developing countries differs substantially, ICT plays a critical role in business growth in developing economies. While local firms may use ICT to improve business effectiveness by compensating for the shortage of other resources, international corporations expanding into developing markets may use ICT to maintain effective links to their headquarters located in developed economies. In summary, it may be reasonably expected that the external business environment in developing, emerging and transition economies substantially affects ICT adoption and use, as depicted in Figure 1.

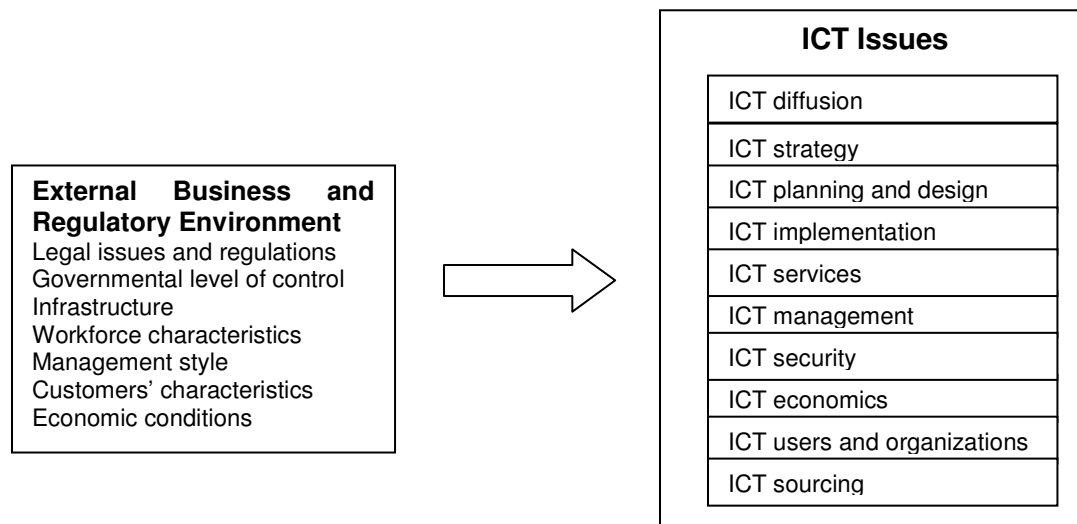


Figure 1. Impacts on ICT Issues

The general importance of ICT to development and the inapplicability of many research results and models obtained in developed economies for developing economies means that there is tremendous opportunity for research dealing with ICT specifically in developing economies. The “flattening” of the world (Friedman 2005) due to ICT facilitated globalization also should call for increased academic attention to developing markets in the field of ICT research. So far, however, and in spite of Walsham and Sahay’s (2006) conclusion that ICT research in developing countries has matured in recent years, most mainstream ICT research still concentrates on applications in developed economies. Thus, relatively little ICT research directly related to developing economies has been reported in the major information systems journals.

Avgerou (2008) provides a fairly comprehensive review and interpretation of the existing literature on ICT in developing countries, pointing out a distinctive research agenda that has been formed in these studies. Avgerou points out that two focus areas of the literature on ICT in developing countries are ICT as a strategic resource for macroeconomic development and the contribution of ICT to improving social services and institutions. Our objective here is not a comprehensive literature review nor to develop any new theory, but rather we look specifically at the issues and recent trends reported at the Americas Conference on Information Systems (AMCIS), where for several years now there have been tracks concentrating particularly on ICT in developing, emerging, and transition economies. In this paper we provide an overview of past contributions presented at AMCIS, with the purpose of highlighting current research directions that have been pursued and pointing to gaps and further opportunities in this research. Our assertion is that research trends evidenced at AMCIS are likely indicative of the more general research trends.

RESEARCH PAPERS ON ICT IN DEVELOPING, EMERGING AND TRANSITION ECONOMIES AT AMCIS

Our overview is based on a sample of twenty-five papers presented at AMCIS in the years 2004-2008, as listed in Table 1. In addition to papers reporting on original research, we also included overviews, such as mini-track introduction papers, in our sample. The rationale for this inclusion is that such papers often contain valuable ideas about the status of research in a particular topic area.

| Author(s) | Focus of Investigation | Country | Source of Data |
|--|--|--------------------------|--|
| (Bagchi, Putnam and Tang 2004) | ICT investments across countries with differences in ICT infrastructure levels | multiple (49 countries) | World Bank WDI database |
| (Ding 2004) | international joint venture formation in companies from developed and emerging economies | China | case studies |
| (Roztocki, Pick and Navarrete 2004) | ICT Investments in developing countries (mini-track introduction) | not specified | not applicable |
| (Roztocki and Weistroffer 2004b) | using activity based costing for evaluating ICT investments in emerging economies | not specified | not applicable |
| (Roztocki and Weistroffer 2005) | framework for evaluating ICT investments in emerging economies | not specified | not applicable |
| (Wenger, Dhillon and Caldeira 2005) | ERP implementation and its effect on shift of power | Portugal | case studies |
| (Brown and Gunawardena 2006) | educational-based ICT projects | Laos, Sri Lanka, Vietnam | case studies |
| (Chevers and Duggan 2006) | software process maturity and discipline | Jamaica | limited survey |
| (Johnston, Muganda and Theys 2006) | chief information officers | South Africa | survey |
| (Laosethakul, Oswald and Boulton 2006) | critical success factors for e-commerce | Thailand | case studies |
| (Nasirin, Morar, Birks, Zainuddin, Choo and Wafa 2006) | outsourcing | Malaysia | survey |
| (Negash 2006) | investments in telecommunication | multiple (87 countries) | World Telecommunication Indicator database |
| (Rupino da Cunha and Videira 2006) | using balanced scorecard for evaluating ICT investments in emerging economies | Portugal | case studies |
| (Soja 2006) | ICT implementation in emerging economies | Poland | survey |
| (Suri and Hara 2006) | community information capacity building through ICT | India | case studies |
| (Bharati 2007) | software services/industries | India | online directories and websites |
| (Gunawardena and Brown 2007) | educational-based ICT projects | Laos, Sri Lanka, Vietnam | case studies |
| (Niwe, Mbarika, Samake and Niyitegeka 2007) | global diffusion on the Internet | Uganda | case studies |
| (Roztocki et al. 2007) | research on and in developing and emerging economies (mini-track introduction) | not specified | not applicable |
| (Soper 2007) | ICT impacts on democracy, corruption, and E-government acceptance | multiple (50 countries) | World Bank WDI database |
| (Thompson and Brown 2007) | diffusion of ICT and national ICT strategy | Jamaica | case studies |
| (Al-Jabri 2008) | end user adoption of ERP systems | Saudi Arabia | survey |
| (Prasad and Heales 2008) | ICT and business value in a global economy | Fiji | survey |
| (Soja 2008) | enterprise system implementation in emerging economies | Poland | survey |
| (Whitaker, Melville, Plice and Dedrick 2008) | Internet business practices / use of Internet for competitive advantage | multiple (10 countries) | survey and case studies |

Table 1. List of the papers in our sample

Most papers in our sample (seven) deal with ICT investments in a somewhat general context but primarily focus on economics of ICT as one of the categories listed in Figure 1. Bagchi et al. (2004) compared ICT investment growth between countries at varying levels of ICT maturity using World Bank data. Ding (Ding 2004) looked at joint venture formation of companies from China, a transition economy, and from developed countries. (Roztocki and Weistroffer 2004b) proposed using activity-based costing for evaluating ICT investments in emerging economies. This work was expanded in a later paper (Roztocki and Weistroffer 2005) that added fuzzy logic and multi-criteria decision making to the proposed framework. (Rupino da Cunha and Videira 2006) examined the implementation and use of balanced scorecard for ICT investment evaluation in a Portuguese company. And Negash (2006) researched investments in telecommunications using the World Telecommunication Indicator database. Yet another study in the economics of ICT category looked at the effect of ICT and business value in Fiji (Prasad and Heales 2008),

Several of the other papers (five) deal with enterprise systems implementations in emerging economies and could be assigned to the ICT implementation category listed in Figure 1. Two studies (Soja 2006, 2008), using a survey of ICT practitioners, looked at key challenges in enterprise system implementation in Poland. And Al-Jabri (2008) studied the effects of end-user perceptions and expectations on enterprise resource planning (ERP) system adoption in Saudi Arabia. Still other papers looked at educational-based ICT projects in east Asia (Brown and Gunawardena 2006; Gunawardena and Brown (2006), with the objective of identifying key factors necessary for a successful technology implementation project management in emerging economies.

Four papers are in the ICT diffusion category from Figure 1, including software process maturity and diffusion of ICT in Jamaica (Chevers and Duggan 2006; Thompson and Brown 2007), global diffusion on the Internet in Uganda (Niwe et al. 2007), and critical success factors for e-commerce diffusion in Thailand (Laosethakul et al. 2006).

A different study (Wenger et al. 2005) also investigated ERP implementation but this time in a medium-size, privately owned real estate management firm in Portugal. The main focus of this research was shift in power as a consequence of ERP. Thus this study could be categorized as ICT impact on users and organizations. In a different study in this category, Soper (2007) researched ICT impacts on democracy, corruption, and E-government acceptance.

One study looked at community information capacity building through ICT in India (Suri and Hara 2006) and proposed a framework for designing and deploying ICT in developing countries. Thus this paper could be assigned to the ICT planning and design category.

A study in the ICT management category, looking at issues concerning chief information officers (CIOs) in South Africa (Johnston et al. 2006), reported that some of the biggest concerns of CIOs in South Africa are related to security and control.

Further topics investigated include outsourcing in Malaysia (Nasirin et al. 2006), in the ICT sourcing category, software services in India (Bharati 2007), in the ICT services category, and Internet business practices across multiple developing countries (Whitaker et al. 2008), in the ICT strategy category.

FINDINGS AND IMPLICATIONS

Our analysis confirms several previously reported observations, while revealing some additional particulars that call for further attention. For example, the specific topics of investigation, the most frequently used research methodologies, and the most common sources of data indicate that there may be a lack of support for research requiring more expensive resources (Roztocki et al. 2004). Case studies, which may be more cost efficient than other approaches, particularly if they accompany paid consulting work, seem to be the most prevalent research methods by researchers in developing, emerging, and transition economies (Roztocki et al. 2007). However, the use of surveys appears to be on the rise, perhaps indicating an increase in research funding.

Moreover, our analysis indicates that the research is broadly dispersed with respect to research topics as well as the contexts in which they have been studied. However, a majority of papers in our sample (sixteen) focus primarily on three topics: ICT diffusion, implementation, and economics.

In contrast, several topic areas seem to not be very investigated, indicating much potential for future research. For example, there seems to be little research on ICT strategy in developing economies, or how ICT may be leveraged to gain competitive advantage in global markets. Only one paper in our sample (Whitaker et al. 2008) examined this aspect. Also concerns of ICT security unique to developing economies appear to be under examined, with only one paper in our sample dealing with this issue (Johnston et al. 2006). This paper indicates increasing awareness of ICT security needs in South Africa, an emerging economy.

Regarding specifically ICT in transition economies, two papers investigated enterprise system implementation in Poland (Soja 2006, 2008), one paper looked at joint venture formation in Chinese companies (Ding 2004), and three others included some of the transition economies in multiple country contexts (Bagchi et al. 2004; Negash 2006; Soper 2007). Research on the unique problems that accompany ICT implementation in transition economies seems to be particularly sparse and fragmented.

Moreover, many of the papers in our sample seem to stand in isolation, and are not well integrated with the existing literature, and most papers reference primarily mainstream research conducted in developed economies. In other words, it is not always articulated in the papers how the external business and regulatory environment in developing, emerging and transitional economies affects various ICT issues, as depicted in Figure 1.

LIMITATIONS AND FINAL REMARKS

In this paper, we presented the results of a systematic review of twenty-five papers published in AMCIS proceedings. Although this number is relatively small and thus presents some limitation on the validity of the conclusions drawn, our study may serve as a starting point that provides some, if imperfect, indication of what is being done and what needs to be investigated more. A more extensive review of the literature, which we plan to do, would of-course provide a more detailed and accurate picture.

To conclude, we believe that despite this limitation, our paper makes an important contribution as it provides a foundation and ideas for future projects and may help interested researchers direct their attention to areas particularly in need of investigation.

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