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How does Information Technology effect Development? Integrating Theory and Practice into a Process Model

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ABSTRACT

The concept of development suggests that countries and regions grow to become self-sustaining partners in what is being called the global economy. In more recent years this concept has been synonymous with the emergence of an “information society” whose wheels are oiled by information sharing and the application of knowledge. Some international agencies even propose that information and communications technologies enable development to be achieved more effectively and efficiently. While success stories abound, there is a recognition that not all investments in information technology bring about growth or economic development. So the question remains: how does information technology effect development? Following an overview of contemporary perspectives on development, this paper offers a model of socio-economic development and analyses what is known about the role of IT in bringing about development. In drawing upon an analysis of descriptive case studies, this paper concludes a Model of IT for Development.

Keywords

Economic Development, Social Development, Information Technology for Development (ITD), Information and Communication Technology (ICT), United Nations (UN), Millennium Development Goals (MDGs).

INTRODUCTION

Various notions of Development have abound as social, political and economic processes converge. The social concept of development suggests that people participate in improving their circumstances through the development of healthcare, education, environment and community services (Hamelink, 2002). It is seen to be political in that foreign policies dominated by political interests drive decisions related to aid, governance and trade (Sewell, 1999). The concept of Development is most often referred to as an economic phenomenon in that poverty is seen to be overcome through the implementation of economic indicators that drive monetary and fiscal policies. In more recent years, Development has become synonymous with the United Nations (UN) Millennium Development Goals. As laid out in the United Nations Millennium Development, a resolution adopted by the UN general assembly entails eight Millennium Development Goals (MDG). These are to 1) Eradicate extreme poverty and hunger 2) Achieve universal primary education, 3) Promote gender equality and empower women, 4) Reduce child mortality, 5) Improve maternal health, 6) Combat HIV/AIDS, malaria and other diseases, 7) Ensure environmental sustainability, and 8) Develop a global partnership for development (United Nations General Assembly Resolution 55/2, 2000). This resolution, adopted by all the UN heads of government, aims to achieve these goals through concerted collaborative efforts among governments and the international agencies with which they work. To add to this mix, globalization has brought about greater inter-dependencies among developing and developed nations. Ajayi (2003) argues that globalization offers new opportunities, including expanded markets and acquisition of new technologies and ideas. The closed economies risk marginalization and must take steps to co-ordinate their trade strategies (Ajayi, 2003).

Given rapid globalization and the need for concerted effort towards development, the need for social and economic analysis has become even more paramount. Such analyses point to a connection between Information Technology (IT), economic growth and the achievement of the MDGs (Lee, 2003; Qiang et al, 2003; World Bank, 2003; UN ICT Task Force, 2004). International Agencies use macroeconomic models to predict the effects of government policies relating to information technology investments and services on economic growth. These models are used to inform decisions relating to monetary or fiscal policy, development aid and trade agreements. Governments use these macroeconomic models to evaluate aid projects and their effects on economic growth. While these models play a pivotal role in decision making, they often cannot explain why certain IT policies do not have the effects intended of them, or why certain investments in IT infrastructure do not bring about social and economic change. The analysis of time-series data does not take into account the proliferation of underground economies, a withdrawal of resources from data gathering agencies and the growing obsolescence of past

classification and measurement conventions and often diminish the reliability of macro-economic aggregates for some purposes (von Furstenberg and Esfandiari, 1988).

In addition, the use of microcomputers and packaged software for complex modeling and forecasting of macro-economic trends has reduced the cost of providing macroeconomic analysis services and opened up opportunities for sharing of data and collaboration among Latin American countries and the USA (Fullerton, 1992). However, these models are only as good as the data that is fed into them and in Latin American countries six months is the longest term that can be predicted with any accuracy (Fullerton, 1992). This makes it difficult to forecast macroeconomic trends into the long term or compare the data among countries with accuracy. This may lead to predictions that cannot always be verified nor may be sufficiently accurate. Joseph A Schumpeter (2002) adds that economic theory of development is based on a set of static assumptions that if held true will bring about a certain set of results. However the reality of development lies in that it is an ever changing, complex phenomenon that alludes researchers trying to define it into variables. Fullerton (1992) explained that just one model he developed for a sector for a Latin American Country had over 100 variables. He concludes that good forecasts always rely upon local observations as much as they do on strong theoretical and empirical frameworks. Even in an era of unprecedented computational advances, successful economists must have an ear to the ground (Fullerton, 1992).

Social development is very close to the ground as it aims to improve the lives of people through action in the field. Interpretive information systems research is also close to the ground as it highlights the contextual factors affecting the use and implementation of IT. A plethora of case and field studies have been carried out (see volumes 7-11 of the Journal of IT for Development, the Electronic Journal of Information Systems in Developing Countries and other IS Journals) that provide key insights into the use and implementation of IT in developing countries. Some of these studies have been valuable in highlighting issues related to the implementation of IT in education (Rodrigues and Govinda, 2003; Rodrigo 2003; Scheepers and de Villiers, 2000), healthcare (Braa *et al.*, 2004; Mosse and Sahay, 2005; Kimaro and Nhampossa, 2005), software development (Chudnovsky and Lopez, 2005; Han 2000), reduction in poverty (Cecchini and Scott, 2003; Kenny 2000) and off-Shore outsourcing (Preis-Heje *et al.*, 2005; Hawk and McHenry 2005). The lessons learned from these studies are that bottom-up approaches tend to work better than top down approaches and government policies should facilitate drivers for social, institutional alongside economic growth. The value of case studies has been recognized by international agencies, governments and the World Symposium on the Information Society (WSIS). The WSIS process has instituted procedures for "stock-taking" in which experiences in IT projects effecting development are recorded.

If the qualitative case studies and stock taking are so valuable, why do these studies not inform policy makers and investors? In particular, this paper investigates the question; how does IT effect development? Following a brief discussion of contemporary perspectives on development, this paper offers a socio-economic model of development that integrates two very different but complementary perspectives. In this way, a framework for presenting research in this area is offered. This model is further shaped through an analysis of rich case studies that describe specific ways in which IT effects development. Insights from these multiple case studies are generalized to theoretical statements that explain how particular information and communication technologies effect development. The resulting process model adds to existing models in this area by providing an integrated macro-economic and social perspective for research and practice in global information systems.

CONTEMPORARY PERSPECTIVES ON DEVELOPMENT

Development is in itself complex, yet it is studied as a macro-economic phenomenon with static and well defined parameters. In theory, development economics considers the relationship between aid to developing countries and economic growth. In practice this relationship has been shaded by political and cultural factors that affect trade agreements and sourcing of goods and services. Apthorpe (1994) suggests that development theory as we have grown to know it has not been informed by relief aid, practices and studies. The roots of development economics lie in the assumption that the objective for economies is their fitness not health and economic development thinking has revolved around machine metaphors (Apthorpe, 1994). In his theory of economic development Schumpeter (2002) adds that economic development is seen as a static phenomenon. He explains that "given a particular population in a certain geographic environment, with a particular set of needs, that is socially and economically organized in a particular way, with given methods of production and stock of goods, we can ask what are the quantities and prices of all goods that will be produced and exchanged under these circumstances?" (p.94). Economic development thus assumes that the behavior of people and production processes is predictable and only adjusts to constant changes in the environment in a purely passive manner.

The reality of nations and regions is that they are constantly changing in response to predictable as well as unpredictable changes in their environments. Governments respond to change through policy making which is assumed to be a rational decision making process but is often political. Apthorpe (1999) suggests that policy practice is actually about who is included

and what ignored or excluded. The style of policy discourses is to talk as though that were not so, but as though the data were inclusive, the process rational and the remedy simply knowledge or research based (Apthorpe, 1999; p382). Development policy he suggests is embedded in discourse and composed of “urgent and unavoidable utterances” that distinguishes itself from its practices and operations by treating them as something else called implementation. At the same time policy discourse has recourse to neat, easily available and powerfully constructed sets of institutional, legislative and financial resources (Apthorpe, 1999).

This suggests that in order for development research to inform the practice of development policy and implementation, there needs to be a greater analysis of the social processes affecting development. To this Apthorpe (1994) adds that development economics grapples with institutional building and re-building – what sociologists and others know as organizations. The nature of development is that its effects are wide ranging with social, organizational and political consequences. It appears that in order to comprehend this ubiquitous yet ill-understood phenomenon, an inter-disciplinary approach is required (Apthorpe, 1994). In particular the concept of development in social science explores how reality is constituted in the development process (Arce, 2003). The social development perspective enables a broader understanding of development to be achieved through top down national policy making processes as well as bottom up, “micro level” traditions like the actor oriented approach, which works upwards from individual level actions (Arce, 2003). Social development activities are designed to raise living standards, increase local participation in development and address the needs of vulnerable and oppressed groups (Midgley, 2003). The practice of social development is very pragmatic and is carried out by community workers, aid officials, policy makers and other practitioners who are driven by pressing practical matters. As a result the study of social development remains an eclectic and pragmatic set of activities driven by good intentions rather than well-defined theoretical principles (Midgley, 2003).

Given that both social and economic development are key to the study and practice of development, this paper follows a socio-economic definition in which development is considered to be the improvement of social systems as well as economic growth. The concepts described thus far on social and economic development are summarized in the following model of social and economic development (Figure 1).

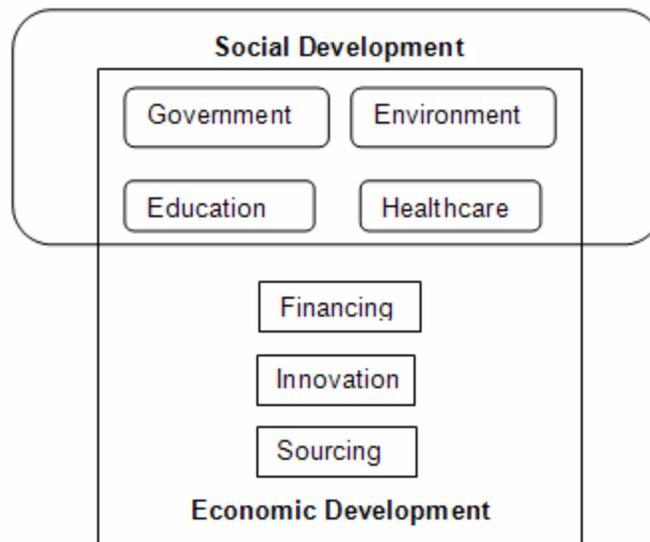


Figure 1: Socio-Economic Model of Development

This model of development encompasses the practice of social development by depicting the key areas in which it’s activities are most prevalent: government, healthcare, the environment and education. The social perspective on development adds a more dynamic perspective to the concept of development and enables it to be investigated as a product of human activity systems. This view is in fact closer to the reality of development and has had the greatest effect on the practice of development. At the same time, economic development is seen to contribute to development through financing in the form of loans, aid and/or trade agreements, the use of knowledge and expertise for innovation and the sourcing of raw materials, goods and services needed for production. These can inform public policy and impact education and healthcare.

Economic development theory can also help study changes in economies. Schumpeter’s contribution to development economics is the concept that economies go through cycles of growth. He suggests that through technical and organizational

progress, development takes place as knowledge progresses. New technical innovations can bring about development if they offer opportunities for new enterprises. In addition to being an economic phenomenon, Schumpeter suggests that development is essentially a disturbance of equilibrium of the economy which he suggests is a static one. The third characteristic of development according to Schumpeter is that it occurs in waves or separate partial developments that follow one upon the other. While development brings about gains in value it also leads to losses in value (Schumpeter, 2002).

This socio-economic model offers a set of basic building blocks through which the effect of changes or interventions, such as IT implementations on development, can be studied. It adds to existing models (Sein and Harindranath, 2004) in that it offers an integrated, global perspective to the implementations of ICTs. The implications of this process model lie in enabling the effects of IT on social and economic development to inform research and practice. The following section outlines a qualitative research approach to the investigation of the effects of IT on development. This research approach is then used to analyze rich descriptions of case studies in IT for development which lead to the development of a theoretical model.

RESEARCH APPROACH

This research follows an interpretive approach. According to Klein and Myers (1999) Information Systems (IS) research can be classified as interpretive if it is assumed that our knowledge of reality is gained through social constructions such as language, consciousness, shared meanings, documents, tools, and other artifacts. Walsham suggests that interpretive methods of research in IS are “aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context” (Walsham, 1995). Sein and Harindranath (2004) suggest that in order to understand how IT effects development, the IT artifact should be the focus of investigation and contribute to theory building on development. Within interpretive research, theory is developed through a process of generalizing from empirical statements to theoretical statements. Lee and Baskerville (2003) suggest that analytical generalization of qualitative descriptions to theory can take place when the researcher is generalizing to theory. Lee and Baskerville offer a form of generalizability in which the researcher generalizes from empirical statements to theoretical statements. They suggest that this offers generalizability of measurements, observations, or other descriptions to theory and the generalizability of the resulting theory beyond the sample or the domain that the researcher observes (Lee and Baskerville, 2003). To this Walsham (1995) adds that from the facts or a rich description of a case, the researcher can generalize to concepts, to theory, to specific implications, or to rich insight.

Methods

As this investigation first aims to discover what is known about the relationship between IT and Development, rich descriptions from published case studies on IT for Development were gathered and generalized into concepts and relationships between these concepts. This will result in the development of theory. In developing the criteria for selection of case studies, the work of (Schultz and Leidner, 2002) was drawn upon. The case studies were selected based on the following criteria 1) the studies were informed by real need 2) they had rich empirical findings, and 3) explored pragmatic, practical organizational applications. In addition, studies in which data was collected through interview, observations and other primary qualitative techniques were chosen for this study. Like Schultze and Leidner (2002), the results of this research contribute to the creation of an analytical infrastructure that allows researchers to ask questions about the conditions under which a certain kind of IT for Development solution, is more appropriate than another. As the focus of this paper is IT for Development situated in practice, activities identified in the literature review were gathered into meaningful groupings.

INFORMATION TECHNOLOGY FOR DEVELOPMENT

Information Technology for Development (ITD) entails the implementation, use and management of Information Technology infrastructures to stimulate social and economic development. In recent years the term Information and Communication Technology (ICT) is being used to recognize that information technology has a powerful communication component. However, in the literature both terms IT and ICT are used interchangeably to denote the same concept. The World Bank definition is representative of the way in which the term ICT is used: “...comprises hardware, software, networks, and media for the collection, storage, processing, transmission and presentation of information” (World Bank, 2003; p.1). For the purpose of this paper, IT is considered to be the meta-level concept which denotes the technology as well as processes that when implemented and used have the potential to bring about certain effects. The term ICT is used to describe the type technology under consideration.

Steinberg (2003) suggests that ICT is highly versatile and can help support development efforts if employed judiciously. The key issue is not unequal access to computers but the unequal ways that computers are used (Warschauer, 2003). Assessing the potential value of ICT in supporting development requires us to address 1) the extent to which it can enrich people’s lives by bringing ideas and experiences to those in the most isolated villages; 2) the technology’s record with respect to achieving

specific development objectives; and 3) its contribution to overall development and sustainability (Steinberg, 2003). The growth of the Internet has opened up new opportunities for companies in the developed world to work with developing countries. Among the most significant of these opportunities is the use of off-shore outsourcing strategies that enable access to skill and expertise located in very different parts of the world. This has meant that world economies are becoming increasingly interdependent. To reflect this trend, the field of Information Technology for Development has moved beyond the issues faced by developing countries alone and has become a global phenomenon. The debate on the place of IT for development has moved towards the question of: how can this technology be employed to meet a variety of diverse challenges? This question is investigated in the following sections.

FINDINGS ON IT FOR DEVELOPMENT

Research on the effects of IT on development has been informed by a rich mix of social science and information systems concepts which consider IT implementation and use to be embedded in social systems. From the rich descriptions of these case studies, key insights are highlighted, compared and contrasted. This enables a theoretical model to be developed. These studies throw valuable light on aspects of social and economic development that are connected to IT. The following sections summarize the key findings from a selection of case studies that provides the most insight and depth into how ICT technology and process bring about development.

Access to Information, Knowledge and Expertise

In their study of information systems for rural micro-enterprise in Botswana, Duncombe and Heeks (2002) suggest that the role of ICT in enabling information and knowledge is important for both social and economic development. They found that there was a reliance on localized, informal social networks for their information for the information needs of the rural micro-enterprise. Information from these networks was of poor quality and not readily available; it appeared to fail the poorest and most disadvantaged entrepreneurs. ICTs represented an unaffordable addition to costs and the benefits of using them were not apparent. Duncombe and Heeks (2002) suggest that there is a role for the ICT intermediary in providing the needed information on markets, customers and suppliers. Puri and Sahay (2003) suggest that through communicative action local communities were able to articulate their understanding, knowledge and views. This input informed a socio-technical approach to designing a GIS that utilized scientific knowledge and technical infrastructure and at the same time addressed local needs and priorities.

Telecentres appear to be addressing this need for information. Salvador *et al* (2005), suggest that propose telecenters and cyber cafes are a prevalent means of increasing access for the digital have nots. Following an analysis of the literature and direct ethnographic research in several public places in six countries, Salvador *et al* (2005) offer design perspectives for stimulating innovation in the provision of computing and communications. They found that increasing access through currently existing, local businesses where people already gather and where proprietors already possess existing business relationships with suppliers and customers. In their study of how ICT reduced poverty in rural India, Cecchini and Scott (2003) found that a government owned computer network reduced the time and money poor villagers spend trying to communicate with public officials and provided immediate, transparent access to local government data and documentation. For minimal fees, these “telekiosks” provided necessary certificates avoiding villagers the common practice of paying bribes and provide information such as crop prices enabling farmers to negotiate better terms. Grameen Telecom of Bangladesh operates a variant of the telecentre concept in rural areas, in which a Grameen Bank member borrows money from the microfinance institution to purchase a cellphone and sells air time to villagers to repay the loan and earn income (Kenney, 2000).

Competitiveness and Access to Markets

The cases studies suggest that ICTs enable access to both global and local markets. Pries-Heje *et al.*, (2005) suggest that economic factors are driving software development projects onto globally dispersed models as offshore outsourcing becomes more common. As diffusion of technology is a key aspect of each of these determinants of competitiveness, they analyze the development of strategies for the diffusion of Short-cycle-time software development into and within Russia. Short-cycle-time development is sometimes called agile development or Internet-speed development and uses a number of techniques to move software quickly into production. These techniques are spreading rapidly among software developers worldwide. The analysis reveals a complex interaction of political, economic, and technical elements enabling and inhibiting the development of knowledge that supports the innovation diffusion necessary for companies to compete for offshore contracts.

Chudnovsky and López (2005) analyze the evolution, present situation, and prospects for the Argentine Software and Information Services (SIS) sector. Chudnovsky and Lopez conduct a survey of firms in the SIS sector in Argentina and conclude that to be competitive in the SIS sector firms need to work on marketing and management capabilities and that the diffusion of quality certifications. Because SIS firms in Argentina have focused primarily on the domestic accountancy and management market, they enjoy advantages derived from the specific requirements of the domestic regulations and their knowledge of the business culture and the needs of their local clients. Kenney (2000) found that in Kenya, a rural farming cooperative established a relationship through electronic mail with EarthMarketplace, a US organization, to sell local produce directly to the American market - by-passing the distributor and increasing the revenues of local farmers.

Administrative efficiencies

The results of an IDRC funded project providing Africa with internet connectivity has meant that new opportunities for development are opening up (Adam, 1996; Jensen, 2002). Africa now has 5 million internet subscribers (Steinberg, 2003). In particular the reform of public administrations and traditional institutions are made possible through the ICT. Qureshi (1998) suggests that in as much as networking may have been an answer to the apathy and acquiescence of the authoritarian regimes in Africa, it also brought with it the promise of additional investments. Similar administrative efficiencies were found in the computerized milk collection centres in Gujarat which have integrated electronic weights, electronic fat testing machines and plastic card readers ensure fair prices for farmers who sell milk to dairy cooperatives and were under-paid in the manual system. The computerization has led to increased transparency, faster processing, shorter queues and immediate payment to farmers (Cecchini and Scott, 2003).

Nidumulo et al (1996)'s study of the Governorates project initiated by the Egyptian Cabinet's Information and Decision Support Centre illustrates how immense efficiencies in government was achieved through the computerization of rural government activities. De Vreede *et al* (2003) suggest that Group Support Systems (GSS) can play a significant role in enabling participative development strategies to achieve concrete results. They conducted 35 GSS sessions in Tanzania and South Africa to explore the use of GSS with respect to: computer literacy, top management endorsement, referent power, communication preference and satisfaction with use. In South Africa, top management displayed very open and non-conservative behavior towards the technology, while in Tanzania hesitance from top management can be expected to be the greatest hindrance for GSS acceptance and application. Walsham and Sahay (1999) analysis of a GIS implementation in a number of districts suggest that improved participation, training and interventions in educational processes and administrative structures are essential for the successful use of the technology.

Learning and increased labor productivity

In their study of Health Information Systems Programs (HISP) in South Africa, Mozambique, India, Tanzania, Ethiopia, Malawi, Mongolia, Cuba, Nigeria and China, Braa et al, (2004), trace the evolution, scale and sustainability of HISP over a period of 10 years. The HISP network comprises of partners in universities and ministries that work together for the development of health information systems, training and education. The development process required intense political negotiations and participation among users through multiple prototyping cycles. These were supported by ongoing education and training of health workers as part of Masters level university courses. As a result of collaboration among universities in this network, a masters program in health informatics was stabled. Among the key contributions of this study are the development of sustainable networks through which research and innovations are spread to address local requirements, collaboration among faculty and researchers in the different institutions enabled a wealth of experience and learning to be transferred through education into practice. Education is seen to be strengthened through the implementation of ICT. Information systems have been implemented to support research and education at the University of Mauritius. The development of ICT skills was seen to be key as this project was funded and monitored by the Ministry of Information Technology and Telecommunications of Malaysia (Rodrigues and Govinda, 2003). Computerization of schools in the metro-Manila area was used primarily to teach computer-literacy and programming (Rodrigo, 2003). The establishment computer-supported co-operative learning centres brought about greater computer literacy training and collaborative development of training materials in various rural communities in South Africa (Scheepers and de Villiers, 2000).

Contribution to poverty reduction

Cecchini and Scott (2003) found that while microfinance is crucial in helping poor villagers mitigate and cope with risk, it is also the most costly model of service delivery for banks. Smart cards with an embedded microchip containing information on clients' credit histories and software providing loan tracking, financial projections and branch management information helped a microfinance institution in Andhra Pradesh reduce transaction costs and reach a greater number of poor people and

their micro-businesses more efficiently. In his descriptions of country experiences, Kenney (2000) concludes that as the costs of internet service provision reduce through privatization, the greater the impact of ICTs will be on poverty reduction. In addition, the participative development and use of a GIS enabled more effective use of scarce water resources and implementation of new cropping techniques enabled farmers to increase their productivity (Puri and Sahay, 2003).

Improvements in healthcare delivery have been shown to reduce poverty. Cecchini and Scott (2003) illustrate how telemedicine diminishes the cost and hardship of long distance travel for medical attention and diagnosis, and medical list-serves can deliver at minimal cost recent medical findings to health workers lacking research and technological facilities. Kimaro and Nhampossa (2005) identify technical compatibility and institutional cooperation to be key to enabling the health information system implementation to be successful.

MODEL OF INFORMATION TECHNOLOGY FOR DEVELOPMENT

The above cases highlight certain effects that ICT can have on social and economic development if implemented appropriately to support local needs. The connection between per capita income and ICT is well documented (Minges *et al.*, 2003; Qiang *et al.*, 2003; Avgerou 1998). A World Bank report suggests that ICT has a positive impact on development in that ICT can support development strategies and accelerate progress towards the Millennium Development goals. In particular “if ICT is appropriately deployed to take into consideration people’s differing needs, it can become a powerful economic, social and political tool for the poor and those who work to eradicate poverty” (World Bank, 2003). This report suggests that there is a correlation between the human development index (HDI) and the Networked economy index (NEI) as there is a link between welfare and the existence and use of ICTs in developing countries. The effect takes place at different levels: At the macroeconomic level there is a reduction in transaction costs, increased market coverage, improved competitiveness across borders. There is social inclusion and political empowerment through eGovernment solutions. Education through distance learning, knowledge networks, Teacher Training and Materials. Healthcare efficiencies are enabled through early identification and treatment of epidemics, distribution of clinical information and access to research by medical professions (World Bank, 2003). Together with findings from the case studies, these effects are mapped on to the theoretical model of social and economic development to reveal a cyclical process through which development can take place. This is illustrated in the following figure 2:

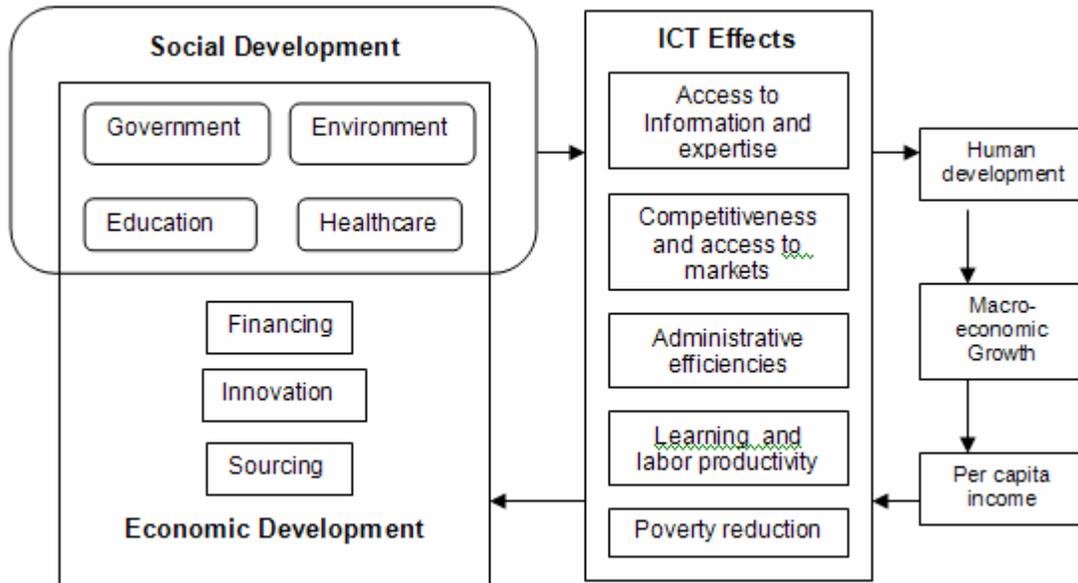


Figure 2: Model of IT for Development

This process model suggests that when social and economic development activities are able to benefit from ICT implementations, the ICT effects are better access to information and expertise, increased competitiveness and access to new markets including global markets, administrative efficiencies from low transaction costs, increase in labour productivity through learning and poverty reduction. In practice and as illustrated in the case studies, the ICT effects are interrelated and for each implementation, these effects can occur in different places at various points in time. Should the effects of ICT

implementations be positive, the cycle of development will involve an increase in human development, macro-economic growth through the use of better tools and techniques. This will lead to an increase in per capita income and perpetuate a positive spiral for social and economic development. An upward spiral can also stimulate additional growth factors such as foreign direct investments in factors of production. However, should ICT implementations not be appropriate to local needs, the reverse can occur and perpetuate a downward spiral. For example, lack of access to information or expertise brought about by the lack of access to information kiosks or inappropriate support for community networking, reduces the ability of a farmer or merchant to sell goods at the most favorable price, thus reducing income generated by their efforts. Similarly the implementation of information systems that intend to provide better access to government services and information can bring about administrative inefficiencies by locking out citizens that have no means or ability to use the information system.

SUMMARY AND CONCLUSIONS

This paper has provided an overview of contemporary perspectives on social and economic development. In recognizing that the theoretical foundations for social development are in their formative stages, a theoretical model for social and economic development is provided and used to guide a review of case studies in the effect of ICT on development. The results of these case studies are distilled into a set of ICT effects that together with processes can bring about development. This forms a model of IT for Development where IT is seen to encompass ICT and processes such as training, participation, healthcare provision, administration and knowledge networking. This social and economic model depicting the effects of ICT is the primary contribution of this paper. This framework contributes to what is known about the relationship between IT and Development by integrating what is currently known and offers macro-economic and social perspectives to addressing information systems that are increasingly global.

Further research should aim to ascertain the relationships illustrated in this model through further case or field studies and test this model against further quantitative data. Macro-economic analyses provide predictive power and the ability to tune economies using policy making and legal tools. Qualitative case studies provide descriptive power to complex and emerging phenomena and provide valuable insight into why and how certain groups or communities respond to IT interventions in the ways that they do. Together both forms of analyses could provide powerful predictive and descriptive power to an investigation of how IT can bring about Development. This integrated framework enables researchers to address global information systems issues using multiple research methods.

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