

USING SELECTED MODELS TO EXPLORE THE CONNECTION BETWEEN INFORMATION AND COMMUNICATION TECHNOLOGIES AND POVERTY REDUCTION IN DEVELOPING COUNTRIES¹

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ABSTRACT

Within the context of development, there is now a general agreement that information and communication technologies (ICTs) are a powerful tool for development and poverty reduction. Thus, the central question for developing countries is not whether ICTs should be introduced for development purposes but rather, what will be the best way to implement ICTs with a focus on poverty reduction, and in a manner that facilitates developing countries to respond to the information society. Various models have been developed to explain the relationship between ICTs and development. This article presents an analysis of the models and assesses their applicability in the context of developing countries. Some of the challenges that developing countries face in leveraging ICTs for development are also highlighted. Finally, the article combines ideas from these models to come up with a tripartite ICT model for development framework that includes the best of all the discussed models.

KEYWORDS

Developing countries, information and communication technologies, ICT models and development, poverty reduction

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1 INTRODUCTION

Globally, it is estimated that a fifth of the world population lives in extreme poverty. Most of the world's poor are found in developing countries, particularly in countries of sub-Saharan Africa. Information and communication technologies (ICTs) such as computers, telephones (fixed and mobile) and the Internet have gained much attention as important tools for socio-economic development and poverty reduction in developing countries (World Bank 1998; DOT force 2001; InfoDev 2005). The World Bank (1998) and UNDP (1999) asserted that ICTs have the potential to improve the welfare of the poor by providing opportunities to increase social capital; improved availability of market information; creation of new economic opportunities; improved economic efficiency and competitiveness; provide better access to health and education facilities and by providing more efficient and effective governance. Hilbert (2001) further explains that ICTs are in fact considered as a new development paradigm. ICTs are also regarded as one of the tools that may help the world to reduce poverty and the achievement of the pro-developmental United Nations Millennium Goals (UNDP 2005).

In that regard, developing countries and their partners in the international development community have devoted considerable attention to the role that ICTs may play in promoting economic growth, combating poverty, and strengthening their participation and competitiveness in the global economy. Different organisations have made massive investments in this area and various projects have been initiated with the aim of making ICTs accessible to people in developing countries.

However, the role of ICT in fostering development and addressing the needs of the poor has been the subject of heated debate in recent years. This has been attributed partly to a high failure rate of the ICTs for poverty reduction projects especially in developing countries (Heeks 1999, 2002b; Benjamin 2001a; Chapman & Slaymaker 2002; Maepa & Mphahlele 2004). Myriad challenges involved in leveraging ICTs in poor countries which in most cases are overlooked or not taken seriously by the proponents of ICTs for development projects is also another source of controversy. The extent to which ICTs can be used to reduce poverty in poor countries is strongly contested (Heeks 1999; Wilson 2001; Mercer 2005). Furthermore, in some cases the role of ICTs in reducing poverty is being overstated and ICTs are regarded as a panacea or a 'magic bullet' that will solve all development problems without clearly understanding the local context, or with ill-conceived expectations of how they would be used (Long & Long 1992; Chacko 2004; Moodley & Cloete 2004).

This article discusses the relationship between ICTs and poverty reduction in terms of theoretical models that were put forward by various scholars. The article analyses the applicability of these models to developing countries so as to present a balanced view of the role and the challenges involved in applying ICTs for development and poverty

reduction initiatives. To use the words of Moodley and Cloete (2004), in order to retain the “hope” that ICTs can play a role in development, it is necessary not to succumb to the seductive “hype” that surrounds technological developments. Álvarez and Calás (1996:42) also emphasise that in order to fully understand the relationship between ICTs and poverty reduction it is necessary to articulate multi-disciplinary and dynamic models capable of considering concurrently the multiple realities, subjectivities, and political agendas enabled by information technologies.

2 RELEVANT SELECTED ICT MODELS FOR DEVELOPMENT

Models are visual representations that use analogies to explain a particular phenomenon (Cohen, Manion & Morrison 2000:13). A model is a simplified representation of a real situation including the main features of the situation it represents (Koutsoyiannis 1979:3). Models are important because the physical world is too complicated to be studied without recourse to models (Kazt & Harvey 1994:4). Accurately formulated models can be of a great help in achieving clarity and focusing on key issues in the nature of a phenomenon (Creswell 2003:121). The models that are discussed below were identified from the available literature. The models include the early thoughts on the relationship between ICTs and development and poverty reduction, the United Nations Development Programme (2001) model which explains how technological innovations such as ICTs relate to human development, the multiple stakeholder model developed by the Washington State University (Mitchell & Gills 2002) and Heeks’ (2005) three models that comprise the onion-ring model, pull and push model and the information chain model. The discussion concludes by presenting a tripartite ICT model for development.

2.1 EARLY IDEAS ON THE CONTRIBUTION OF ICTs TO DEVELOPMENT

Early thoughts on the contribution of ICTs and telecommunication to development and poverty reduction can be traced back to the sixties in the work of Jipp (1963). Others in the same line include the “Missing Link” report of 1984 (International Telecommunication Union (ITU) 1984) and the World Bank development report (1998) to mention a few. Jipp (1963) showed that there was a close relationship between the wealth of a country and its telecommunications infrastructure. This relationship was presented in a form of a curve which is now called the “Jipp curve.” The Jipp curve was the first attempt to quantitatively explore the interplay between telecommunications infrastructure and development.

The “Missing Link” report of 1984 claimed that telecommunications was the “missing link” in development. In other words, a sluggish telecommunications sector was the major reason why some countries were slower to develop than others. As such, a focus on telecommunications development was noted as essential for a country’s economic development. The scope of the “Missing Link” report was limited as it mainly focused on access to fixed-line telephone networks and, to a lesser extent, telex rather than today’s broader concept of information and communications technologies (ICTs). However, ITU widened the domain of the ‘missing link’ in 2002 to include the ‘digital divide’, the term which refers to the different levels of access to the Internet and other ICTs by society (ITU 2002).

The World Bank (1998) also made a major contribution to the early thoughts of the role of ICTs in development. Focusing on the transition from industrial to information economies and the importance of knowledge and information to development, the World Bank (1998) report asserted that:

Knowledge is like light. Weightless and intangible, it can easily travel the world, enlightening the lives of people everywhere. Yet billions of people still live in the darkness of poverty – unnecessarily (World Bank 1998:1).

The report presented ICTs as technologies that may function as a conduit for the information and knowledge required to achieve development. The report was the major building block for the UNDP model described below.

2. 2 UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP) MODEL

The UNDP model depicted in figure 1 shows that ICTs influence human development in two ways. First, it can directly enhance human capabilities. For instance, Internet access for information and communication can directly improve people’s health, nutrition, knowledge and living standards, and increase people’s ability to participate more actively in the social, economic and political life of a community (UNDP 2001). Secondly, the model demonstrates that ICTs may influence human development due to the impact they can have on economic growth through the productivity gains that ICTs can generate. For instance, ICTs may contribute to economic growth by creating new activities and industries which in turn can create new employment opportunities and contribute to national economic growth (UNDP 2001). Lastly, the UNDP model explains that human capabilities and the economic growth which have been prompted by technological advancement can be re-invested back into ICTs development. Therefore, human development and technological advance can be mutually reinforcing.

The UNDP model of 2001 came out as a result of the human development report of 2001 which was devoted to looking specifically at how new technologies will affect

developing countries and poor people. The report explains that the technology divide does not have to follow the income divide. Investments in technology, like investments in education, may equip people with better tools and make them more productive and prosperous. The report further explains that technology is a tool, not just a reward, for growth and development.

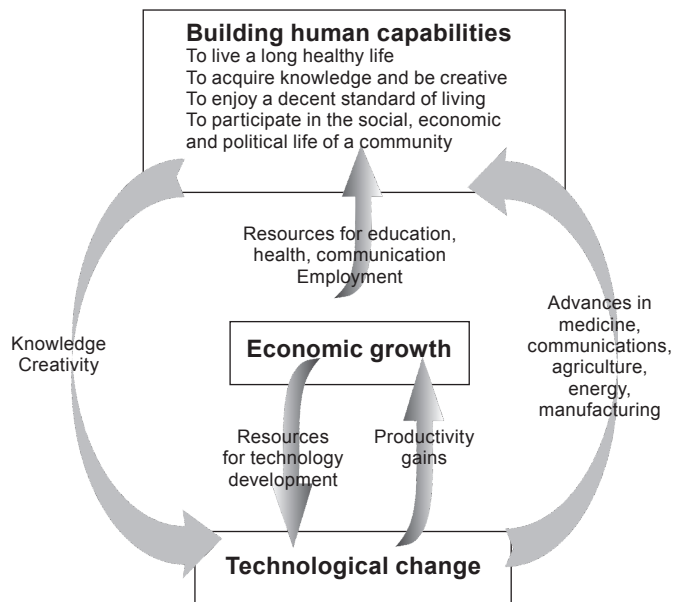


Figure 1: United Nations Development Programme model

Source: UNDP (2001)

The UNDP model is among the growing amount of literature that has come forward to perpetuate the role that new technologies, including ICTs can play in the development process. It is among the many other documents that propagate the hope that ICTs hold for the battle against poverty in the Third World.

Many other international initiatives have also been put forward so as to facilitate the role of ICTs for development in developing countries and help to bridge the digital divide. These include the Africa Information Society Initiative (AISI), the World Summit on Information Society (WSIS), the G-8's Digital Opportunity Task Force (DOT Force); UNDP's Information Technologies for Development Initiative (Info21); the World Bank's Global Information and Communication Technologies Department (GICT); and the World Bank's Information for Development (InfoDev) initiative and the UN's ICT Task Force (UNDP 2000; DOT Force 2001; UN ICT Task Force 2002; AISI 2003; WSIS 2003; GICT 2006; InfoDev 2006).

The applicability of the UNDP model and other related frameworks that support the positive role of ICTs for development in developing countries has mainly been in the form of pilot telecentre projects, telecommunication sector reform policies and the application of ICTs in various sectors of the economy such as health and education to name a few. ICTs have also been applied in delivering government services. Some of these projects have been successful. However, the majority of them have failed either partially or totally (Benjamin 2001b; Heeks 1999).

However, the relationship between ICTs and development established by the earlier literature and the mechanisms that are being used to bring ICTs to developing countries and bridge the digital divide have been heavily criticised (Rodriguez & Wilson 2000; Moodley & Cloete 2004). The predominant perspective of the role of ICTs for poverty reduction has been described as being techno-centric and deterministic (Moodley & Cloete 2004). Unwarranted claims about the future impact of ICTs on the lives of the poor are prevalent in the developed world (Moodley & Cloete 2004).

Given the above, the application of the UNDP model and other related perspectives on the role of ICTs for poverty reduction in developing countries need to be done with caution. It is evident from the literature that simple relationships between development and ICTs may not be realistic. Rodriguez and Wilson (2000:3) pointed out that claims about the link between ICTs and progress are not correct, and in some cases may be dangerously wrong. Furthermore, Mitchell and Gill (2002) pointed out that ICTs are important tools but not a solution in itself for economic or social problems.

For ICTs to effectively influence development other factors also need to be taken into consideration. Some of these include the development and effective implementation of pro-poor national ICT policies so as to ensure that the benefits of ICTs accrue to other sectors like transportation, education and health services (AISI 2003; Etta & Parvyn-Wamahiu 2003; OECD 2004).

It is in that regard that the tripartite ICT development model suggested at the final analysis attempted to take this point into consideration. The model underscores the key role that the enabling environment plays in the application of ICTs to human development and poverty reduction. When all is said and done, the technology has to be affordable, people need to have the knowledge and skills to use it, the technology must have relevant local content and be integrated into peoples' lives and daily routines (PANOS 1998; World Bank 1998; Bridges.org 2004).

2.3 MULTIPLE STAKEHOLDER MODEL OF THE WASHINGTON STATE UNIVERSITY (WSU)

The WSU model that is illustrated in figure 2 was designed by Centre to Bridge the Digital Divide at WSU. The model introduces the idea of multiple stakeholders' in-

volvement in the deployment of ICTs for socio-economic development at the macro level. The parties involved in the process should include the community, the ICT investors and the public policy (Mitchell & Gills 2002). It is through understanding the interaction of these stakeholders that one may be able to attribute socio-economic development to the deployment of ICTs in a defined community.

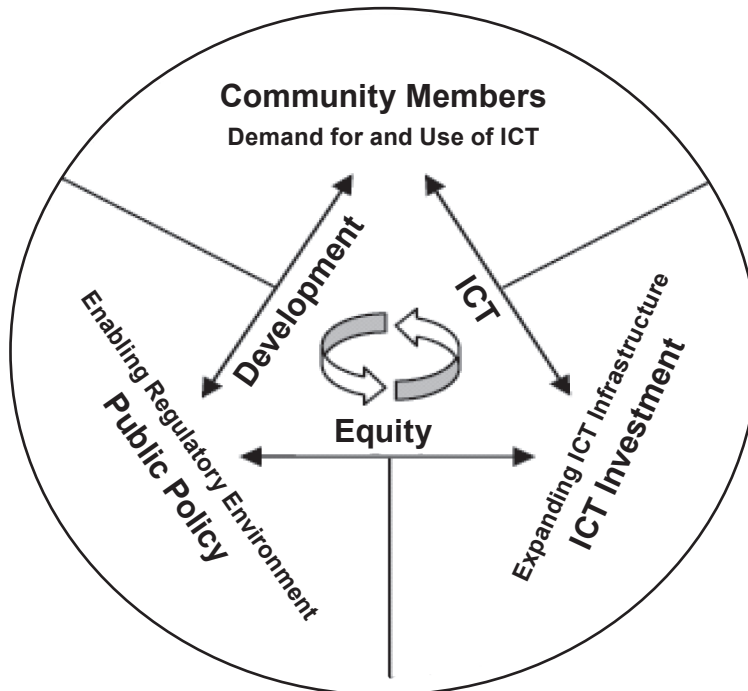


Figure 2: WSU – CBDD multiple stakeholders' model

Source: Mitchell & Gills (2002)

The community represents the top stakeholders in this model because it is the major beneficiary of any initiative to bridge the digital divide. In that regard, the emphasis should be on making ICTs widely available and affordable so that the community might utilize ICTs to expand local education, enhance local health care, improve civic interaction and develop mechanisms for community support. Building the ICT infrastructure is second dimension of the model. However, ICT infrastructure requires a significant capital investment which may only be afforded by the national governments.

In that regard, many governments formulate public policies that enable and regulate the primary builders and providers of the ICT infrastructure. Public policy makers have a responsibility to develop and maintain an enabling regulatory environment that encourages investment by private organizations and businesses in ICT infrastructure. Regulation is important in this case because private companies operating unchecked

in an open telecommunications market may seek to maximise profits by concentrating on the most lucrative segments of the market at the expense of customers who generate low revenue (often households in poor and remote areas become culprits). Telecommunication regulators are essential because they protect the public interest in the absence of state ownership (Parker, Kirkpatrick & Theodorakopoulou 2005).

Wallsten (2002) pointed out that the telecommunication sector regulators have an important role to play in poverty reduction efforts using ICTs. Regulators can fulfil this role by promoting and facilitating universal access to networks and bridging the digital divide. Without efficient and well-grounded regulatory process efforts to use ICTs for poverty reduction are less likely to be successful (Ure 2003). This is because the key to getting right policies for poverty reduction using access to telecommunication networks involves achieving a stable and coherent regulatory framework that works within a developing economy where resources are particularly scarce.

The WSU model supports the whole idea of telecommunication sector reforms so as to bring ICT services to the majority. The model further emphasises the importance of having an effective regulatory regime as a way of leveraging the role ICTs for development. The application of this model in the developing countries context can be seen in the current trends towards liberalization of the ICTs sector in developing countries and the move away from monopoly provision of the ICTs services and the introduction of competition in the sector.

In many developing countries the regulatory agencies have played a very important role in improving the accessibility of ICT facilities, especially in urban areas. However, the challenge of bringing ICTs to rural areas where the majority of people in developing countries live and where poverty is deeply rooted is still huge. In addition, studies have shown that it is not clear whether and how regulators attempt to gauge the views of the poor, and there is a concern that regulators receive most of their information from the regulated firms, politicians and higher income groups or elites (Parker, Kirkpatrick & Theodorakopoulou 2005).

Given the above, to be effective regulators in developing countries need to understand the needs of the poor, their location and the real barriers to their access to adequate services. The regulator will also need to understand the different ways in which the interests of the poorest might be best advanced. Therefore, a lot more needs to be done so as to enhance the role of regulatory agencies in poverty reduction using ICTs.

In that regard, the major emphasis of the WSU model is on regulating the ICTs market so that developing communities may benefit through the application of ICTs. Consequently, WSU is working towards strengthening the regulatory capacities in Africa. The goal of the WSU programme is to enable African telecommunications regulatory

communities to draft advanced level policies that will lead to effective and efficient telecommunications markets (Washington State University (WSU), Centre to Bridge the Digital Divide (CDDD) 2006). As the UND model, the WSU framework tends to be techno-deterministic as it almost equates technological advancement with social progress without taking into consideration the political, social and economic dynamics of individuals, countries and organisations. In fact, according to Loader (1998:15):

The development of the information society is not likely to be characterized by a linear technological progression, but rather through the competing forces of innovation, competitive advantage, human agency and social resistance (cited in Henwood *et al* 2000:15).

Indeed, the other three models discussed in the next section warn against a rather simplistic and deterministic view of the role of ICTs in poverty reduction (Heeks 2005).

2.4. INFORMATION AND COMMUNICATION TECHNOLOGIES AND SOCIO-ECONOMIC DEVELOPMENT MODELS

The three models proposed by Heeks (2005) emphasise the interplay of various factors in the effective implementation and utilization of ICTs for development and poverty reduction in developing countries. The models comprise the onion-ring model, pull and push framework and the information chain approach (Heeks 2005). Heeks' (2005) models underscores the importance of affordability, skills, local content and the synergy between technology and people's lives. The following sub-sections discuss the models in detail.

2.4.1 INFORMATION CHAIN MODEL

The role of ICTs is to handle information. Therefore the contribution of ICTs to socio-economic development must be founded on an understanding of information in development and the information chain (Heeks 2005). The information chain model (see figure 3) shows that raw facts and figures must be obtained and evaluated. The data is then applied or adapted if it is perceived to be useful. The processed data then becomes information that may be used. Resources and certain environmental factors are needed to transform data to usable information. According to Heeks (2005), the resources include:

- Data resources: relevant data need to be available in the first place.
- Economic resources: money, skills, and the technology to access the data.
- Social resources: the motivation, confidence and knowledge to access, assess and apply the data, and people must trust the source.

- Action resources: people must be able to act on the decisions made with the information. This will require enterprise inputs (for example, money, skills, technology and raw materials).

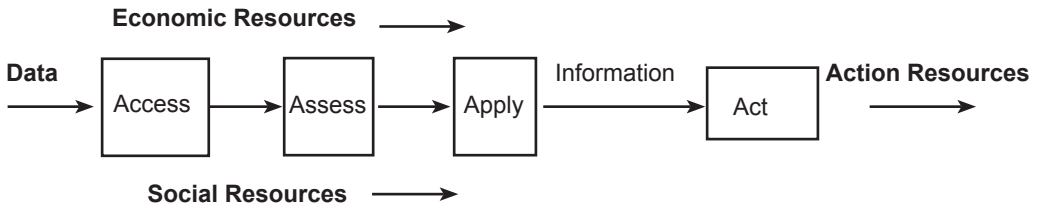


Figure 3: The information chain model

Source: Heeks (2005)

Deficits in any of the resources outlined above may threaten the effective functioning of the ICT information chain and become access barriers for poor people (Heeks 2005). However, in most cases many of the resources needed to facilitate the functioning of the information chain are lacking in most developing countries. An access barrier occurs if one of the resources were missing. It is futile to introduce ICTs to a community and hope that they would reduce poverty without understanding the dynamics of how the resources would come into play.

The application of the information chain model in a study that investigated the role of ICTs in developing countries' small and medium scale enterprise illustrated that ICT application had a huge potential in these enterprises (Heeks & Duncombe 2001). For example, ICTs could lower substantially the communication cost in this sector. However, it was also found that too often in many of these small/micro enterprises data about customers, prices, suppliers, laws and business services was not readily available. In some cases data was available but the entrepreneurs were not able to access it because they did not have knowledge of its existence. In other cases data was accessed but entrepreneurs were not able to apply or act on it due to the limiting economic resources. For instance, entrepreneurs were able to identify new customers but could not afford to purchase materials to supply those customers.

Hellström (2005) used the information chain model as a framework to study an ICT project in Uganda in order to establish how on-the-ground efforts to bridge the digital divide were carried out. Hellström (2005) discovered that the approach to ICT that the project was using was not holistic and the whole information chain was not taken into account. The study also found out that there was a need to create more data resources in terms of locally produced content. Furthermore, economic resources such as telecommunication infrastructure, electric supply, money to buy ICTs and skills

infrastructure to keep the technology working were inadequate, and that constituted a major access barrier.

Therefore, the study recommended that the ICT approach applied to projects in developing countries should have overall goals, establish how information meets those goals, and determining how ICTs might help (Hellström 2005). That means that the whole information chain needs to be taken into account. Heeks (2005) emphasised that unless the whole information chain operates successfully, there can be no contribution of information and ICT to development. Heeks (2005) further insisted that the information chain is the reminder that the disadvantaged remain at a disadvantage because of the divides and inequalities related to accessing information chain resources.

2.4.2 ONION RING MODEL

The onion ring framework illustrated in figure 4 presents an information centred approach to the role of ICTs in socio-economic development. The model (Heeks 2005) underscores the fact that in many e-development projects there is too much focus on the technology. Thus the model suggests that technology must be understood in its context if it is going to contribute to any meaningful development and poverty reduction. As the information chain model, this framework puts a lot of emphasis on the central role that information plays in development. The four lessons that are fundamental to using the model as a tool for socio-economic development are outlined as follows (Heeks 2005):

- To understand the role of ICTs in development, a good start is to understand the role of information first.
- The role of ICTs in development should be understood by embracing and taking into account all other information handling technologies such as old ICTs such as radio, television, etc. However, in most cases these other technologies are ignored and ICTs are placed above other information handling tools.
- The thing that adds value is the information systems and not just the technology.
- The information systems need to be understood within their context which include organisations, institutions, political, economic, cultural factors and the context in which the systems operates.

Projects that ignore these lessons during implementation are bound to fail (Heeks 2005).

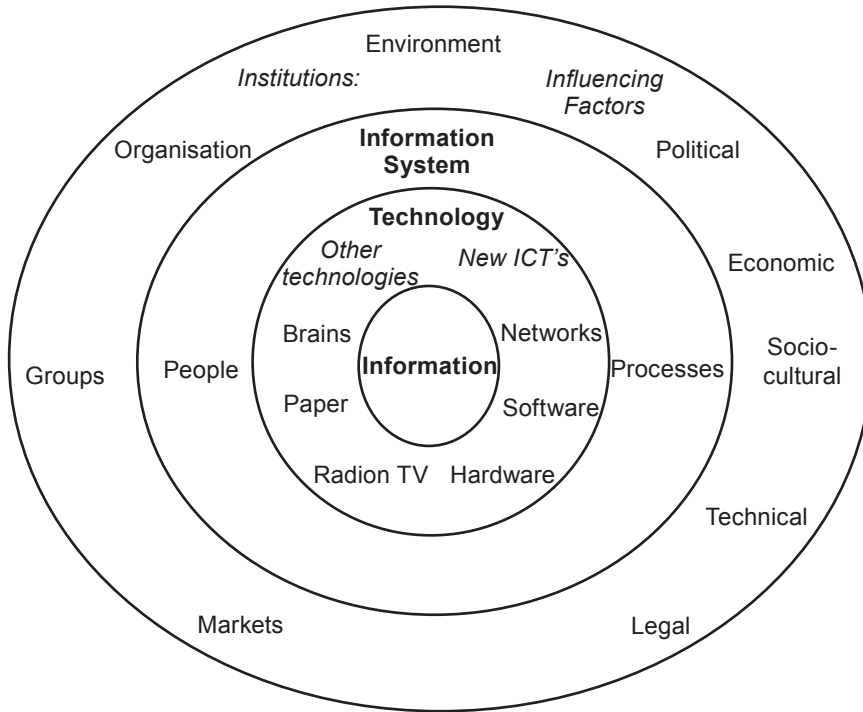


Figure 4: The onion ring model

Source: Heeks (2005)

Thus, the concept of ICTs for poverty reduction should be approached from the information/knowledge centered way in order to achieve a sense of continuity between new ICTs based information systems and old information handling mechanisms such as radio, television, mass media, telephone and oral culture. Placing information first and technology second may facilitate better choices from a range of possible technologies that best meet information needs of a given community. In other words, the approach of ICTs must be information centred, integral to its environment, integrated with development objectives interconnected and indigenised (Heeks 2002a). All the layers of the onion should be taken into consideration if ICTs are to have the desired effect. That means that future development priorities should be i-development (information development) instead of e-development (electronic development) in order for them to have an impact on poverty alleviation. A study of small scale/micro enterprises in Botswana demonstrated that there is a need for an integrated approach in ICTs application if these enterprises were to benefit from ICTs (Heeks 2002a).

2.4.3 THE PUSH AND PULL FRAMEWORK

Figure 5 depicts the push and pull model and demonstrates that there has been a lot of pushing from the supply side in the e-development community. Thus, a lot of emphasis

has been placed on the supply of the infrastructure, the resources and the applications such as e-commerce, e-government and e-health without taking into consideration the demand side of the equation. Furthermore, limited research has been done on user demand of ICTs services (Heeks 2005). To emphasize further the need for the demand side analysis of ICT services, Gillwald (2005) also pointed out that the supply side of the equation must be allied with an adequate understanding of the demand side. Consequently, it is important to find out what factors impact on users and consumers of ICTs technologies if ICTs are to be effectively implemented in developing countries. In the words of Tsubira, Kaggwa and Ongora (2005:214):

Long-term impact and success of rural communications development interventions require base lining and demand side analysis, unfortunately, all studies and analyses to date have taken only a supply-side approach to sector statistics.

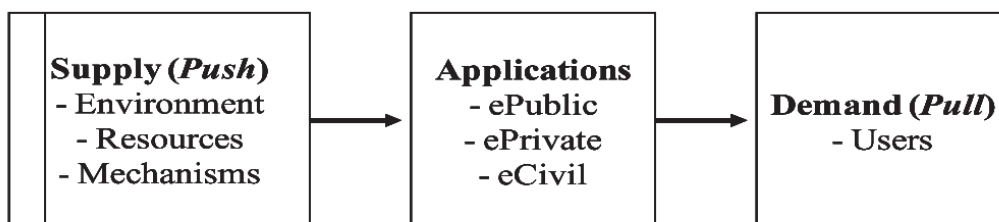


Figure 5: The push and pull model

Source: Heeks (2005)

In order for the ICTs for development project to work there has to be a balance between the supply (push) from the ICT and the demand (pull) from the to-be users of these services. Efforts should also be focused on the stimulation of demand by facilitating the awareness, skill and capabilities of ICT services application.

4 PROPOSED TRIPARTITE ICT FOR DEVELOPMENT MODEL

Despite the development of the various models attributing ICTs to economic development and poverty alleviation, over half of the world's population does not presently have access to even a telephone and the Internet and a fifth of world's population still live in abject poverty. Does it mean that these models are irrelevant to the developing world? Do the models offer a piece-meal approach to how ICTs may be exploited to reduce poverty in the developing world? One is tempted to answer these questions in the affirmative because none of the models discussed in this article in their own right give an effectual framework that may be used to establish the connection between ICTs and

economic development. This is not to say that the models have not made a significant contribution to our thinking about the connection between ICTs and poverty reduction. Indeed, the models form a significant building block for anyone who is interesting in the implications of ICTs to development and poverty reduction. All the models discussed in the foregoing texts provide very valuable and important factors that need to be taken into consideration in explaining the nexus between ICTs and development.

In that regard, the tripartite ICT for development model (see figure 6) that is suggested in this study is a result of ideas distilled from the UNDP model, the multiple stakeholder model of the Washington State University and the onion-ring model, pull and push model, and information chain model. The UNDP model emphasizes the positive role of the application of ICTs for development and poverty reduction purposes and the WSU model underscores the role of multiple stakeholder groups in establishing the relationship between ICTs and poverty reduction with a clear emphasis on the importance of having effective regulatory regimes as a way of efficiently leveraging ICTs for development. On the other hand, the three models by Heeks (2005) give a health warning to a rather simplistic and deterministic view of the role of ICTs for development and poverty reduction. Heeks' (2005) models point to other crucial factors that need to be taken into account before ICTs can play an effective role in development and poverty reduction.

By blending ideas from the previously discussed models, the new model (see figure 6) explaining the relationship between ICTs and development from a more holistic point of view is provided. In other words the proposed model combines ideas from the selected models to come up with a tripartite ICT for development framework that includes the best of all the discussed models. The tripartite ICT for development model proposes that the potential power of ICTs for social economic development as explained by the UNDP model and other related perspectives on the role of ICTs for poverty reduction should be conceptualized within the context of the targeted community. The community is the intended beneficiary of digital access and therefore its demands, needs and its environment need to be understood including the available non digital information systems. The focus should be on information rather than ICTs alone. After understanding the community then it is important to find out how ICTs can be used to meet community needs and enhance the flow of information in the community. That will ensure that supply meets demand.

Furthermore, the proposed model suggests that the focus should not be just on new ICTs, but other old technologies like radio, television, and the way these technologies play a part in poverty reduction should also be taken into consideration. Last but not least, for the technology and the community to work in harmony there has to be an enabling environment in terms of appropriate policies and regulatory environment, a

conducive political environment, appropriate institutional policies, appropriate legal frameworks, appropriate locally developed content and the necessary social services such as health services, and schools. Such a framework is likely to facilitate the use of ICTs for poverty reduction.

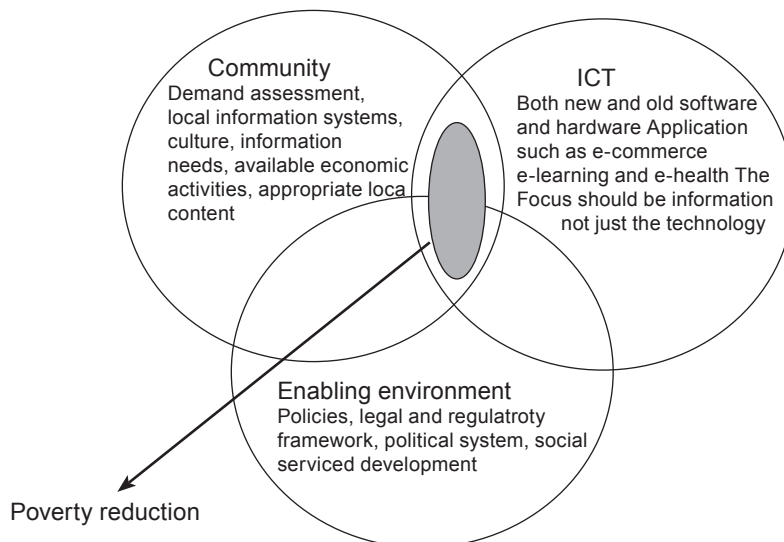


Figure 6: ICT for development model

4 CONCLUSION

This article identified some of the theoretical models that have been put forward to explain the relationship between ICTs and poverty reduction in developing countries. The article has also discussed the applicability of these models in the developing countries' context. The criticism of these models and their failure to address the needs of the poor has been presented. The discussion revealed that the relationship between ICTs and poverty reduction in developing countries is complex and there are no simple and straight forward answers. Additionally, ICTs are not the panacea, and by themselves will not solve most of the developmental and poverty related problems in the developing world. In order to effectively use these technologies for development and poverty reduction purposes, there is a need to address the challenges and barriers that hinder effective utilization of these technologies and adopt a balanced understanding of their role in development and poverty reduction. Most of the models discussed in this article were proposed and implemented without any baseline studies. That partly explains why the projects failed to address the needs of the intended recipients. Admittedly, wireless

technology, particularly the mobile phone has been accepted by many communities in the developing world without any baseline studies. However, there is need to find out why that technology has been successful where other technologies have met limited success. In that regard, more research in this area is still required.

The article winds off by suggesting a tripartite ICT for development model. Although the suggested model is touted as one of the ways of understanding the connection between ICTs and poverty reduction, the way forward would be to test the model and conduct base line studies focusing on demand side analysis as opposed to supply-side approach to the ICT sector. Furthermore, the suggested model cannot demonstrate the relationship between ICTs and poverty reduction in a quantitative manner. Building on this qualitative model, further research may be conducted to establish quantifiable variables that may make the suggested model to be more robust than as the present case.

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