

## Notes from the Field

# Broadening the Agenda for ICTs for Poverty Reduction: PICTURE–Africa

**Ophelia Mascarenhas**  
mascar@udsm.ac.tz  
Professor  
University of Dar es Salaam  
(Retired)  
Regional and National  
Coordinator  
Poverty and Information  
Communications  
Technologies In Urban and  
Rural Eastern Africa  
(PICTURE–Africa)  
P.O. Box 35102  
Dar es Salaam  
Tanzania

## 1. The Explosive Growth Since the Last ICT4D Forum

Since the last Harvard Forum on the use of ICTs and development, the most outstanding change has been the explosive growth in the use of mobiles and the Internet with corresponding changes in the ways people communicate, do business, transfer money, and get and send information, as well as in the ways they deal with crises such as illness, death, and natural disasters. According to the United Nations Commission for Trade and Development (UNCTAD), 2008 was a milestone year because more than 50% of the world's population had some level of connectivity (UNCTAD, 2008). The figures are outstanding—in 2007, there were 3.3 billion mobile phones and 1.9 trillion text messages, the latter alone generating an income of US\$52 billion for the mobile phone operators. Growth rates for mobiles have been the highest in Africa for the last decade. For instance, in Tanzania, the proportion of the population that had access to any telephones increased from 1.2% in 2000–2001 to 25% in 2007 (URT NBS, 2009). The growth of the Internet has also increased globally although at significantly lower rates than the mobiles but the gap in access and use of the Internet between the developed and developing countries is also decreasing (UNCTAD, 2008).

In view of these developments, there has been extensive literature on the role of ICTs. Several studies have emphasized the positive role of ICTs in economic growth and the reduction of poverty. A study based on data from 113 countries over a 20-year period found that a 1% increase in connectivity can result in a growth in GDP of 0.03% (Von Braun & Torero, 2006). For mobiles, this figure is even higher; a 1% growth in mobile networks resulted in a 5% increase in GDP per capita (Djiofack-Zebaze & Keck, 2009). Flor (2001) found a negative correlation between the use of ICTs and the human poverty index in Southeast Asia: the higher the use of ICTs, the lower the rate of human poverty. Others argue that ICTs are powerful tools for empowerment and income generation in developing countries, as well as for increasing access to other social services (Kenny, 2002; McNamara, 2003).

However, others have urged caution in making a one-dimensional relationship. Using ICTs as an engine of growth is complex (Bollou & Ngwenyama, 2008): Development is not merely a matter of technology; it needs a sound political economy (Athreya, 2004). And while ICTs are critical for getting and sending information, the role of information in development itself is contentious (Surmaya, Grimshaw, & Lowe, 2005).

It is against the background of this debate that IDRC approved funding for a three-year research project to provide a better understanding of the

## BROADENING THE AGENDA FOR ICTS FOR POVERTY REDUCTION

role of ICTs in poverty reduction. The study was to be carried out in four countries in Eastern Africa—Kenya, Rwanda, Tanzania, and Uganda—with a total population of 123 million people. The research project has become known as *Poverty and Information Communications Technologies in Urban and Rural Eastern Africa (PICTURE–Africa), Case Studies from Kenya, Rwanda, Tanzania and Uganda*. The four countries have varying rates of economic growth, with two countries—Kenya and Uganda—being categorized as having medium human development, and with Tanzania and Rwanda being categorized as having low human development (UNDP, 2007). They also have differences regarding access to ICTs, resulting in ICT Development Index scores that range from 1.62 for Kenya to 1.21 for Uganda, 1.17 for Rwanda, and 1.13 for Tanzania (ITU, 2009).

### 2. PICTURE–Africa

The main research question of the study is the following: How and to what extent does a change in the use of ICTs result in a change in the level of poverty status of households? The main methodology involves a quantitative survey of 400 households in each of the four countries—a total of 1,600 households—undertaken twice, in 2007 and 2010, with each quantitative survey to be followed up by a qualitative survey. When the analysis of the second data set is finished, the two will be compared to identify households where there have been positive or negative changes in the use of the ICTs and corresponding changes in the status of poverty, and then conclusions will be drawn from this comparison about the impact of ICTs on poverty. The findings are then to be further verified through in-depth interviews with some of the households where significant changes have been identified.

PICTURE–Africa uses a multi-dimensional approach to poverty based on the sustainable livelihoods (SL) framework (DFID, 1999). The SL identifies five clusters of assets or capital: financial, physical, human, social, and natural. PICTURE–Africa uses the first four. While natural resources are important for poor communities, the duration of the study was too short to be able to show impacts on natural resources. In order to operationalize the framework, some proxy variables were selected for each of these dimensions. The dimensions and their proxies,

shown in parentheses, are as follows: **financial capital** (household expenditure and income); **physical/assets** (housing, owning household appliances such as a refrigerator, electric stove, television, motorcycle/car, etc.); **human capital** (education); **social capital** (services such as water, electricity, and sanitary services). Two other dimensions were added: **inclusion** (belonging to groups and participation in government institutions) and **vulnerability** (number of selected shocks experienced during the two years prior to the quantitative survey, such as major illness or death in the family, drought/flood, theft, or loss in business).

For ICTs, the study uses a systems-based approach rather than focusing narrowly on the technologies alone. This approach recognizes that communication and the information that results from it are shaped as much by technical factors as they are by the economic and social contexts in which they operate. Thus, the system has three components: technical, economic, and social. *Technical* includes end user technologies, access infrastructure, and applications used; *economic* includes cost structures, institutions such as mobile network owners and Internet service providers, and regulatory frameworks; and *social* includes the users, their business and social networks, other intermediaries such as CSOs or financial institutions interested in promoting ICTs, and content. The answer to the research question depends on the finalization of the two sets of surveys and the comparison of the data from both. This presentation is based on the first set of quantitative and qualitative surveys only.

### 3. Findings from the Study to Date

A poverty baseline was created using the international poverty line of US\$2 per capita, adjusted to purchasing power parity of the gross domestic product in dollars (PPP\$) and calculated for a month (May, Dutton, & Mascarenhas, 2010). Using this baseline, about 40% of the sample of 1,613 households were below the poverty line, with the highest proportion (60%) being in Tanzania and the lowest (26%) in Kenya. Money-metric poverty intersected with all the other indicators of poverty (see Table 1, which provides the scores for each of the dimensions of poverty).<sup>1</sup>

For each dimension, a mean score was calculated

1. The scores were calculated using different systems for different variables. The methodology is detailed in Appendix I of May, Dutton, and Mascarenhas (2010).

Table 1. Descriptive Statistics of the Dimensions of Household Poverty (n = 1,569).

Indicator	Not poor	Poor	All
Financial: Income	3.08	0.59	2.00
Physical/Assets	3.17	1.95	2.64
Services	2.79	1.41	2.19
Vulnerability	1.32	1.21	1.27
Capability	7.80	5.70	6.89
Exclusion	0.62	0.79	0.72
Per capita expenditure (PCE) (PPP\$)	240.49	45.72	155.99

Source: May, Dutton, & Mascarenhas (2010).<sup>2</sup>

Table 2. ICT Ownership of Households (%) (n = 1,606).

ICT	Tanzania	Kenya	Rwanda	Uganda	All
Radio	66.7	79.3	72.8	61.1	70.0
TV	23.7	39.3	23.5	9.8	24.1
VCR/DVD	12.0	19.8	16.9	4.5	13.3
Landline	1.8	0.5	3.2	1.0	1.6
Computer	1.8	1.8	9.1	1.3	3.5
Internet connection	0.3	0.8	2.2	0.0	0.8
E-mail address	5.1	16.8	29.2	22.1	17.3
Mobile phone	54.2	67.9	55.8	68.2	60.7
Any ICT	78.9	88.0	80.4	88.2	71.5

by giving each household a score, and then taking an average of these scores for the non-poor and the poor. The idea was to show the relative difference between the average for the poor and the average for the non-poor for each of the selected dimensions of poverty.

A range of end user ICTs was used in assessing the relationship with poverty. These included radio, television, fixed line, public phones, mobiles, and Internet/e-mail. The relationship with ICTs was assessed from the perspectives of both access and usage. The most important ICT for both groups was the radio (70%), followed by the mobile telephone (60.7%). By comparison, ownership of e-mail addresses was low at 17.3% (see Table 2).

Access to mobiles and e-mail was also assessed at the individual level for all members of the household. Individual ownership of mobiles was highest in

Kenya (43%), followed by Uganda (40%), while access to e-mail was highest in Rwanda at 20%, followed by Kenya (10%) and Uganda (9.6%). For both ICTs, access was the lowest in Tanzania, at 18% for mobiles and just 1.2% for e-mail.

There was a wide variety of mobile applications, from banking to sending and receiving e-mail, listening to music videos, and photographing—all depending on the sophistication of the handset—but the most frequent applications were making and receiving calls, sending and receiving SMS, sending and receiving alerts about missed calls (popularly known as beeping or buzzing), and sending and receiving airtime. SMS and missed call alerts were used more by females and the poor than by males and the non-poor. More of the poor were receiving airtime than the non-poor. The most frequent purpose for using the mobiles and the Internet was

2. The score ranges for the categories were as follows: Financial, 0.07 to 32; Physical assets, 0 to 5; Services, 0 to 3; Capability, 0 to 18; Vulnerability, 0.17 to 2 with higher the score the lower the level of Vulnerability; Social Exclusion, 0 to 8.

## BROADENING THE AGENDA FOR ICTS FOR POVERTY REDUCTION

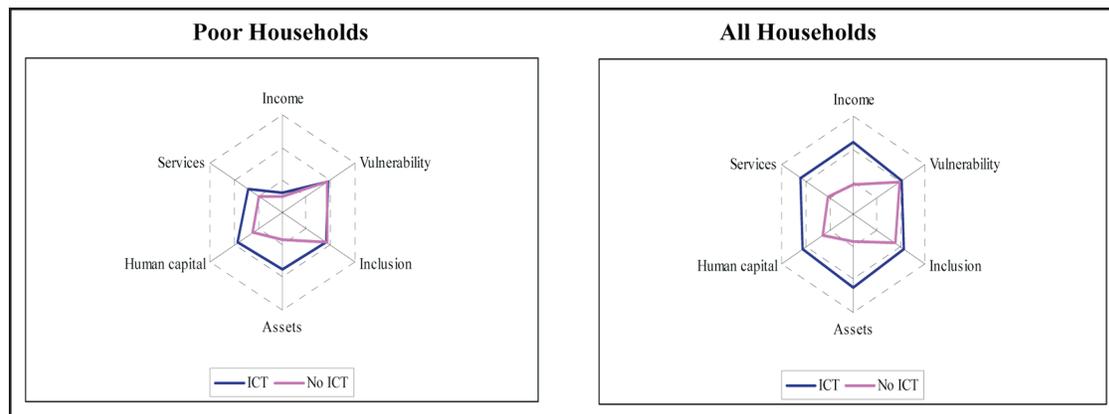


Figure 1. Multi-Dimensional Poverty and ICT Access.  
Source: May, Dutton, and Mascarenhas (2010).

social communication, but mobiles were also being used to transfer money, to get assistance during crises, and to get jobs, as well as for business purposes. Direct benefits, in terms of savings in time and travel, were mentioned in all four countries, but the most important benefit was the ability to communicate and be connected.

### 3.1 Linkages Between ICTs and Poverty

The main objective of PICTURE–Africa is to show the impact of ICTs on poverty. However, this will only be possible when the analysis of the data from the second quantitative survey—carried out in the first half of 2010—becomes available. A comparison of the data from the second quantitative survey will enable us to identify households where there have been changes in the ownership and use of ICTs, and to compare these with changes in the selected multi-dimensional aspects of poverty.

Nevertheless, data from the first quantitative survey illustrated significant correlations between access to ICTs and the selected dimensions of poverty: financial resources, physical capital, capability, exclusion, and vulnerability. For social capital, in some of the proxy dimensions (belonging to groups and participating in decision making in local government), the relationship was almost insignificant.

The linkages were evident. For financial capital, those with ICTs had almost twice the per-capita expenditure (PCE) as those without ICTs overall, but even in the households that were below the poverty line (the poor), those with ICTs had a higher PCE than those without ICTs. The relationship with edu-

cation was very strong. Education made a difference for those with ICTs, even in the economically poor households: The mean number of years of education in households without ICTs was 4.5 years, compared with 7.4 years for those with ICTs. The critical threshold was secondary education. The relationship with ICT and the five dimensions of poverty is summarized in Figure 1 above. *Income* represents financial capital, *services* represents social capital, and *assets* represent physical capital.

In addition to the various dimensions of poverty affecting the access to and usage of ICTs, there were other constraints that show the relationship between ICTs and poverty is complex. There were differences by geographical location, with the rural people being the worse off, as well as significant gender differences at the individual usage level. The odds of having ICT in rural areas were half those in urban settlements, and males were 1.5 times more likely to have access to ICTs than females (May, Dutton, & Mascarenhas, 2010). For the rural areas, the lack of electricity was a major constraint in the use of the mobiles. Costs for re-charging could be high relative to rural incomes.

There were also deficiencies in the ICT system (ICT infrastructure, costs, institutions, etc.) in some of the countries. For instance, in Tanzania, there were very few agents outside the main urban areas to handle the formal transfer of funds using M-Pesa and Zap compared to the number in Kenya. As a result, while there were nearly 7 million mobile owners in Kenya who transferred money in 2009 using

M-Pesa, there were only 1 million in Tanzania. In the latter country, the other formal system of sending money is the post office or the banks. Those who did not have access to those two systems had to use the more difficult and expensive transfer of funds using mobile airtime. The sender would remit money in the form of airtime, which the receiver would then try to sell in order to get the cash. In the rural areas, the buyer would usually be a shop-keeper who also sells airtime vouchers. The buyer would discount the amount of airtime being bought by 20%, leaving the receiver with 80% of the amount of money that was originally sent.

At another level, not all networks are accessible in the rural areas. Again taking the example of Tanzania, the most widely accessible mobile network is Zain. Some networks have started reducing the cost of making calls, but these lower costs are only available to customers within a specific network. This means that the rural people cannot take advantage of the competitive prices of a specific network such as TIGO because this network is not widely accessible in the rural areas. In Rwanda, the state has taken a proactive role in promoting the use of the Internet/e-mail through a diffusion of Internet cafés. Nevertheless, 75% of the Internet cafés are in the urban areas. As a result, even in Kenya and Uganda, with their noticeably higher access to digital ICTs, participants in a follow-up qualitative survey stated that radio is the most important ICT in the rural areas, closely followed by mobiles.

#### **4. Implications of the Research Findings**

The findings show that there is great potential for ICTs to reduce the many dimensions of poverty. The use of the mobile has given the poor some opportunities in addressing poverty through better communications not only by reducing isolation and exclusion, but also as a means to transfer and receive money, get information about economic opportunities, and save time and costs on personal visits.

There is recognition of this role among the communities in Eastern Africa. Both those below the poverty baseline and those above it are investing in ICTs, especially in mobiles. The versatility of the mobile, in terms of its portability, its easily acquired usage skills, the ability to control the costs of its

usage through less expensive alternatives such as beeping and SMS, and the decreasing costs of its handsets, has resulted in an increasing ownership of mobiles and appreciation of the technology's benefits. For instance, in Tanzania, in a follow-up qualitative survey that involved discussions with various focus groups (businesspersons, males, females, professionals), the almost universal opinion of the participants was that the most significant change that had taken place in their lives in the last 10 years was the improvement in communications, especially via mobiles. An analysis of the ownership of mobiles in Tanzania also reflected this view. In the non-poor households, mobiles had taken over radio as the most important ICT, but it was also the second-most important ICT owned by the poor.

However, the access and usage rates are low overall, and they are even lower for the poor, especially in the rural areas. All the scores for the poverty dimensions correlated positively with scores for access to and use of ICTs, especially the financial capital and human capability. The supply side of ICTs was also a constraint to access. Many people in the rural areas were not able to access all the networks, so they could not take advantage of the competitive cost reductions offered by some networks. As a result, there is an urban-rural divide that prevents the rural communities from taking full advantage of the new technology. The unequal access also results in the rural communities having to pay higher costs for both calling on the mobile and other associated services, such as transferring money using airtime.

This phenomenon has come about partly because of the current attitude of the governments in most of the four countries, which have preferred to leave the provision of ICTs largely to the private sector. While this has had its benefits through competitive pricing among service providers, the benefits have been skewed in favor of the urban areas, with their greater concentrations of better-off populations. Where the government has taken some proactive measures to redress this gap and increase equitable access, as in Rwanda and Uganda, the use of ICTs is relatively higher, especially the use of the Internet. In contrast, in Tanzania, ICTs are being promoted mainly as a modern communications technology rather than as a tool or a strategy to address poverty. As such, ICTs are not an integral part of the National Strategy for Growth and Reduction of Poverty. Given Tanzania's history of poor-performing

## BROADENING THE AGENDA FOR ICTS FOR POVERTY REDUCTION

state-run institutions during the heyday of socialism, a more sustainable model may be a public-private partnership for providing greater access to ICTs in the rural areas, rather than a state-run institution.

Data on the ownership and use of the ICTs showed a very strong link with education, with secondary education being the critical threshold even for the ownership of mobiles. As mobiles get more sophisticated, educational levels will affect their full use, such as accessing local and international content via the Internet. Furthermore, although the extent of the use of the mobiles is exciting, the greater potential for ICTs to contribute toward the reduction of poverty lies in the use of the Internet. In the long run, communication by Internet is cheaper than by mobiles. For instance, it costs 1,000 Tanzanian shillings to use the Internet for an hour, in which one could communicate with several persons using the e-mail or carry out one hour of talking via SKYPE. For a mobile, that amount is equivalent to about three minutes of local calling—at the most, one call, or one minute of an overseas call. The Internet also has greater scope for access to information in multi-media formats. Some examples from the field include the female tailor who wanted to find innovative dress designs to attract more customers, or the small-scale manufacturer of wrought iron products who wanted new designs of gates and security window grills. The mobile did not help; the Internet did. The mobile, as a phone, has several limitations compared with the Internet, but the latter requires a higher level of education and greater skills in manipulating the technology.

The findings of the survey found considerable levels of unequal access to ownership and usage of ICTs by gender, particularly at the individual level. Although, in many cases, this inequality was related to poverty, in other cases, it was prevalent even in the non-poor households, particularly where the ICT had to be shared within the household, indicating unequal gender relations as the cause. Such differential access for females will affect the household, the community, and the country negatively in the long run, since females constitute the greater proportion of the population and have a greater responsibility for the care economy (caring for the young and providing the household with basic necessities).

Methodologically, a multidimensional approach to poverty, rather than a monetarist approach, gives

a better understanding of the impact of ICTs on poverty. For instance, it underlines the importance of the capability aspect as represented by mean years of education. Even within the poor households, those with ICTs had a higher number of years of education than those without. The study will take this relationship to the next level to assess impact after the second set of quantitative and qualitative surveys becomes available. There are still many unanswered questions, such as why the data on exclusion/inclusion or vulnerability did not correlate well. There is also a need to consider other variables for assessing exclusion in view of the findings on the lesser access to the rural areas and by gender.

## 5. Meeting the Challenges

Broadening the agenda for ICTs for poverty reduction poses many challenges. However, only three are presented here.

### ***5.1 Challenge of Integrating ICTs into the Livelihood Strategies***

First, it has to be recognized that ownership of ICTs, in and of itself, will not result in reduced poverty. The real benefit lies in the usage and the impacts of such usage. The data from the quantitative survey revealed that most of the calls were for social purposes—calling friends and family members. This was further confirmed by group discussions in the follow-up qualitative survey. While this is useful for creating a feeling of being connected and included, it does not contribute toward enhancing the financial capital needed for household expenditure, paying for education, paying for basic services, or purchasing assets. The real challenge, then, is how to integrate ICTs into the main livelihood strategies. For increasing financial capital, appropriate and timely information is needed on aspects such as prices prevailing in the potential markets, opportunities for getting employment, and sources of commodities. At the moment, this is done on a personal level by calling someone, which depends on the availability of that person(s). Local content via the Internet or the mobile is largely undeveloped.

There are some good entry points. Mobile banking, such as M-Pesa from Vodacom or Zap from Zain, is one such entry point that can provide banking services for communities lacking access to banks. Some of the mobile networks have dedicated numbers for communities to get critical information,

such as results from school exit examinations, bank balances, assistance from the police, etc. In urban areas, utility bills, such as those for electricity and water, can also be paid via the mobile. This initiative has come from the mobile operators, who use it to attract more customers and greater usage of their own mobile networks. However, it is a model worth exploring as a way to provide information to the farmers and micro business operators, so that they, too, can increase their incomes.

### **5.2 Challenge of Use of ICTs in the Decision-Making Process**

Mobiles also offer opportunities for good governance and empowerment. In all four countries, there are real-time participatory programs aired on the radio or shown on the television where the audience can call in with comments. In most cases, the caller uses the mobile phone to make the comments. The scope for such participation and empowerment has been enhanced through community radio and local television stations that can provide more opportunities for the local communities to voice issues pertinent to their situations. There are a number of limitations in the number of calls that can be accepted by the commentator, the cost of such calls, and the rural-urban and male-female divides. Nevertheless, it is a tool for communities to participate in the policy and decision-making processes, and thereby, to enhance their inclusion into mainstream development. The initiative for these public participatory programs has come from the media—owners of radio and television stations—but the government could support such programs in a public-private partnership program.

### **5.3 Challenge of Making the Internet as Attractive as the Mobile**

The low level of overall Internet use is also a challenge. Most people in the rural areas have not heard about the Internet. The phenomenal growth in the ownership and use of mobiles is the result of the attractiveness of the technology, which requires low levels of skills and education, is relatively cheap to acquire, and is convenient to use, even when working. The question is how to use these principles in making the Internet/e-mail as attractive as the mobile.

There are several challenges here. To use the Internet, the potential user has to have various skills: *technical skills* to manipulate the technology, such as

knowing how to use the keyboard; *structural skills* to understand the language and formats in which the information is conveyed; and *strategic skills* to be able to sift through the large volume of information to select the most appropriate information (Pruulmann-Vengerfeldt, 2008; Torero & Von Braun, 2006). All these skills require a minimum of secondary education in a population where the highest level is primary education. In addition, there is the cost of purchasing the equipment and the connection. One can avoid these costs by using public access points, such as the Internet cafés. However, this will still not solve the need for the three types of skills required to use the Internet effectively.

Nevertheless, at least in the urban areas, e-mail is being utilized, as evidenced by the use of the public access points, such as the Internet cafés. What are the attractions? What kind of educational levels make a difference, and how can these be provided in the current context of development? A greater understanding of the pull factors is required in order to come up with a strategy to make the Internet/e-mail more popular than it is at present.

## **Conclusion**

The data from the first quantitative and qualitative surveys from PICTURE–Africa confirms the relationship between ICT access and use and the multi-dimensions of poverty. What remains to be found is the direction of this relationship, which requires a second time point. This will be supplied in the second wave of such surveys.

The overall relationship was mediated by both geographical location and gender. Rural people had significantly lower access to ICTs, both because of higher levels of poverty in these areas, and because of greater deficiencies in the ICT system. Rural populations had unequal access to mobile networks and were therefore unable to take advantage of competitive price reductions within the networks. They also had to pay higher prices for airtime and support services such as recharging their phones. Individual males were more likely to own ICTs than individual females.

The digital ICT preferred by both the poor and the non-poor groups was the mobile. The wide range of applications and purposes of use show that the mobile has considerable potential to reduce poverty, particularly if the usage can be integrated into

## BROADENING THE AGENDA FOR ICTS FOR POVERTY REDUCTION

the livelihood strategies by providing access to the timely and appropriate information needed to improve these livelihoods. Overall, the use of the Internet was low, a fact that will need to be addressed in view of the better potential benefits of the Internet/e-mail for addressing poverty in the long term. ■

### References

- Athreya, V. (2004). Dimensions of poverty and use of technology to achieve poverty reduction. *GKP South Asia Regional Meeting, Bangkok*, June 2004.
- Bollou, F., & Ngwenyama, O. (2008). Are ICTs investments paying off in Africa? An analysis of total factor productivity in six West African countries from 1995–2002. *Information Technology for Development, 14*, 294–307.
- Department for International Development (DFID). (1999). *Sustainable livelihood guidance sheets*. London: DFID
- Djiofack-Zebaze, C., & Keck, A. (2009). Telecommunications services in Africa: The impact of WTO commitments and unilateral reform on sector performance and economic growth. *World Development, 37*, 919–940.
- Flor, A. G. (2001). ICT and poverty: The indisputable link. *Third Asia Development Forum on "Regional Economic Cooperation in Asia and the Pacific."* Bangkok, Asian Development Bank, June 11–14, 2001.
- International Telecommunication Union (ITU). (2009). *Measuring the information society: The ICT development index*. Geneva. International Telecommunication Union.
- Kenny, C. (2002). Information and communication technologies for direct poverty alleviation: Costs and benefits. *Development Policy Review, 20*, 2.
- McNamara, K. S. (2003). *Information and communication technologies, poverty and development*. Information for Development Program. Washington, DC: The World Bank.
- May, J., Dutton, V., & Mascarenhas, O. (2010). *Regional synthesis report on poverty and information and communications technology in urban and rural Eastern Africa (PICTURE-Africa): Case studies from Kenya, Rwanda, Tanzania and Uganda*. Natal, South Africa: University of Kwa-Zulu, Natal.
- Pruulmann-Vengerfeldt, P. (2008). Digital stratification: A closer look at the included and excluded in the digital Estonia. In N. Carpentier et al. (Eds.), *Democracy, journalism and technology: New developments in an enlarged Europe* (pp. 169–181). Tartu, Estonia: Tartu University Press.
- Surmaya, T., Grimshaw, D. J., & Lowe, L. (2005). *Connecting the first mile: Investigating the best practice for ICTs and information sharing for development*. Bourton-on-Dunsmore, Rugby, UK: ITDG Publishing.
- Von Braun, J., & Torero, M. (2006). Introduction and overview. In *Information and communication technologies for development and poverty reduction: The potential of telecommunications* (pp. 1–20). Washington, DC: International Food Policy Research Institute.
- United Nations Conference on Trade and Development (UNCTAD). (2008). *WSIS follow-up report, 2008*. New York: United Nations.
- United Nations Development Programme (UNDP). (2007). *Human development report, 2007/08*. New York: United Nations.
- United Republic of Tanzania National Bureau of Statistics (URT NBS). (2009). *Household budget survey, 2007*. Dar es Salaam: National Bureau of Statistics.