THE ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN RURAL SOCIO-ECONOMIC DEVELOPMENT IN AFRICA

Maxwell C.C. Musingafi[1] --- Shupikai Zebron[2]

[1]*Faculty of Applied Social Sciences; Development Studies, Peace, Leadership & Conflict Resolution, Masvingo, ZOU*

[2]*Faculty of Applied Social Sciences; Department of Counselling, Mashonaland West, ZOU*

ABSTRACT

In this paper we discuss the role, challenges, and benefits of information and communication technology (ICT) in the rural areas development efforts and processes in Africa. Modern ICT is largely about the capability to electronically input, process, store, output, transmit, and receive data and information. The efficient use of ICT, driven by better high-speed internet (broadband) access, is widely recognised as key to raising productivity and stimulating innovation in the global village. During the last decade, largely due to the spread of mobile phone technology in rural areas, ICTs have demonstrated the positive and significant impact they can have on economic development by improving the business environment in rural areas. ICT provides access to market and business information, brings financial services literally to the hands of rural consumers, helps local communities organise and link themselves, and, through the connection with others, exchange know-how and ideas. ICT plays a significant role in promoting entrepreneurship and economic progress in rural areas, contributing to improve the competitiveness of agriculture and forestry, the quality of life and diversification of the rural economy. High-quality Internet provision helps unlock the potential of rural areas, and thus makes them more attractive places to live. ICT helps existing businesses to perform tasks more effectively and efficiently and respond to their demand for rapid access to diverse kinds of information.

Keywords: ICT, Literacy, Development, Poverty, Africa, Information technology.

1. INTRODUCTION

In this paper we discuss the role, challenges, and benefits of information and communication technology (ICT) in the rural areas development efforts and processes in Africa. We argue that modern ICT is largely about the capability to electronically input, process, store, output, transmit, and receive data and information. We believe that the efficient use of ICT, driven by better high-speed internet (broadband) access, is the key to raising productivity and stimulating innovation in the global village. We observe that during the last decade, largely due to the spread of mobile phone technology in rural areas, ICTs have demonstrated the positive and significant impact they can have on economic development by improving the business environment in rural

areas. Our argument is that ICTs play a significant role in promoting entrepreneurship and economic progress in rural areas, contributing to improve the competitiveness of agriculture and forestry, the quality of life and diversification of the rural economy. This paper takes the following format: orientation and background information; research methods; conceptual discussion on ICTs and rural areas; barriers and challenges to ICTs adoption in rural areas; and finally conclusion statement.

1.1. Bacground to the Study

According to Sibanda, Musingafi and Chikudza (2011), information and communication technologies (ICT) have a potential for economic growth and social empowerment. They further argue that rural economies can benefit from ICT by focusing on social production, social consumption and social services. They believe that ICT applications can enhance poor people's opportunities by improving their access to markets, health, and education. The further argued that ICT can empower the poor for its application expand the use of government services, and reduce risks by widening access to micro finance. It is, however, important to note that sustained development using rural informatics is possible only if ICT interventions are able to respond to the local needs and re-adjust as per the prevailing knowledge of the rural areas (Musingafi, Dumbu and Dube).

The following are ten key strategies contained in the Geneva Action Plan which African heads of states and governments agreed to in December 2003:

- to connect human residential areas with ICTs and community access points;
- to connect all educational institutions with ICTs;
- to connect research institutions with ICTs;
- to connect all information centres with ICTs;
- to connect hospitals with ICTs;
- to connect all public and government departments with ICTs;
- to ensure that all global communities have access to television and radio services;
- to ensure that more than half the world population have access to ICTs within their reach; and
- to facilitate the presence and use of all world languages on the Internet. (Kundishora, 2010)

The Geneva Action Plan further noted that different countries of the world would operate within their economic capacities in their endeavours to attend to these action plans with the aim of bringing about a global information society.

According to Kundishora (2010), ICTs are now exerting considerable pressure on educational systems in several African countries. Many countries in Africa are now advocating for a review of their curricula to facilitate infusion of ICT (ICT literacy) from early stages of education through to tertiary levels (Gelb *et al.*, 2008). Kundishora (2010) further observes that distance education has been further enhanced with modern ICT systems and structures. He thinks that a certain level of education and appreciation of ICTs is necessary in order to at least

understand and work with ICTs. Structured training programmes must be developed and provided for those who left the education mainstream before the advent of ICTs including those at workplaces and the life-long learners in general (Riggs, 2011).

ICT and the Internet have also enhanced linkages between training institutions at national, regional and international levels (Riggs, 2011). Most universities now operate campus wide area networks with gateways to other similar institutions. This facilitates collaboration and exchange of research and development information. Several countries in Africa are collaborating on National Research and Educational Networks with support from partners outside Africa (Kundishora, 2010).

According to Musingafi, Dumbu and Dube. (2011), capacity building is important if the society is to accept, adopt and use ICTs. They argue that there is need for publicity, debate and exposure to ICTs. For people to be actively involved and own the whole process, the macro-ICT policy should adequately provide for capacity building and life-long learning.

2. RESEARCH METHODS

This study was based on an extensive review of theoretical literature. The following sources were consulted to ensure a balanced review of both primary and secondary sources of relevance: published academic works, academic journals, Internet sights, workshop reports and minutes, as well as magazines and newspapers.

3. CONCEPTUALISING ICTS

Information and communication technology is a general term that describes any technology that helps to produce, manipulate, store, communicate, and/or disseminate information (Wertlen). Thus, ICT is about the enabling tools that facilitate storage, handling and sharing of data and information. In fact, modern information and communication technology is largely about the capability to electronically input, process, store, output, transmit, and receive data and information (Musingafi, Dumbu and Dube , 2011).

In this paper we focus on developmental issues and see ICT as a vehicle to the desired destination (i.e. development). Instead of just talking of ICTs we thus talk of Information and Communication Technologies for Development (ICT4D). This refers to the use of (ICTs) in the fields of socioeconomic development, international development and human rights. The argument behind this is that more and better information and communication furthers the development of a society. Aside from its reliance on technology, ICT4D also requires an understanding of community development, poverty, agriculture, healthcare, and basic education (Zelenika and Pearce, 2013). It thus concerns with directly applying information technology approaches to poverty reduction.

We however note that although technology is important as an enabling factor for both information and knowledge management, it is essential to realise that technology is only one of the components (Siles, 2004). Our argument is that human resources take centre stage in every successful information and knowledge management system. Only when a culture of information

and knowledge sharing exists, is it possible to truly benefit from the growing technological possibilities (Musingafi, Dumbu and Dube, 2011).

According to Siles (2004) a range of ICTs and approaches can be identified. Selection of the type and use of ICTs must be based on appropriateness to the needs and expectations of the end user. Literacy levels, gender, language, culture and social norms are some of the considerations in choosing the appropriate ICT (Musingafi, Dumbu and Dube, 2011). Modern ICTs include Internet, Radio, TV, Mobile phones, PDAs, Computers, RFIDs and the multitude of various information systems generated and supported by them (Kundishora, 2010).

The wide ranging use of ICT is seen as a driver of change, especially at the policy level (Barton, 1997). It has been argued that for successful adoption and use of ICTs, full involvement of communities is required; not just as beneficiaries but as people who need to trust services and technologies. Thus, the planners of the use and dissemination of ICT and exchange of knowledge should assess what other programmes should be integrated. Relevant stakeholders within the community should be involved (Mchombu, 2004). Environmental scanning and situation analyses help in the identification of current behaviours by matching appropriateness of ICT to knowledge needs. Age of the target population, service providers and policy makers may determine openness to adoption of ICT, whereas disabilities such as blindness and deafness may exclude these sections of communities (Kundishora, 2010).

4. THE GOALS OF ICT IN AFRICA

As observed by Riggs (2011), in general, ICT goals in Africa include the following:

- to encourage networking of services and applications;
- to promote e-commerce and trade promotion programmes for goods and services;
- to promote Internet access to exchange and access digital content;
- to promote and facilitate the establishment of e-government;
- to promote e-education and on-line services;
- to ensure that network security is strong; and
- to build and develop e-society and ICT human resources

5. RURAL AREAS

A rural area can be defined as an area characterised by sparse population, and where the manufacturing base is mostly weak due to poor development or the absolute unavailability of the required infrastructure (Sibanda, Musingafi and Chikudza, 2011). Agriculture, commercial farmers, subsistence farmers, small towns and villages, including nature reserves and other natural resource based activities provide the basis for many livelihoods in rural areas.

According to Sibanda, Musingafi and Chikudza (2011), the world over, geographic distance and barriers constrain the rural population in its access to the many facilities modern civilisation has to offer; that urban populations have easy access to. The characteristic dispersed pattern of rural settlement increases the cost of technical infrastructure development (e.g. of road, electricity, gas, telecommunication, water and sewerage networks), as it impairs the rural

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populations in their access to commercial centres (i.e. jobs outside agriculture) and to administrative and service centres, including institutions providing educational, health care and information services (O'Flaherty, 2003).

Rural areas, especially remote rural areas, have traditionally been characterised by economic disadvantages such as labour-intensive agricultural production, lack of economies of scale and inadequate infrastructure (Sibanda, Musingafi and Chikudza, 2011). These result in relatively low per capita incomes selective out-migration of economically active and/or young workers, high dependence on declining services and a restricted range of job opportunities. One of the main reasons for these distance related problems is the relative isolation of many rural communities, lack of communications to urban centres, inferior access to a wider spectrum of customers, suppliers of business services and finance (Riggs, 2011). Other constraints include the relatively limited demand for non-agricultural rural labour in these areas, relatively poor infrastructures especially transport, services and the various forms of voice and data communication (Siles, 2004).

Inadequacies such as these impact the quality of life of the rural populations and are a serious constraint to rapid enterprise development in the rural areas. The potential gains arising from the lower labour costs achievable in those areas are, however, outweighed by the high costs of development of technical infrastructure systems, which the investors planning to develop their operations in a rural area, would need to incur. As a result, the disparities between the rural and the urban environment tend to widen.

According to Sibanda, Musingafi and Chikudza (2011), the main forces of change affecting the rural areas the world over (Africa included) are:

- continued depopulation of many peripheral, remote or sparsely populated regions, plus the decline of rural economies, and the loss of rural services, in many of these same areas;

- the rapid expansion of cities, the outward movement of people and of industrial activity, and massive growth of built development of all kinds which often occur at a pace existing rural communities cannot absorb, and with a scale and style of development which submerges the rural character and culture and may destroy the architectural and natural heritage.

- pollution of soil, water and air, and the spoliation of many lands and forests, by agricultural and other effluents and by unwise practices of land management;

- the widespread degradation of landscape and cultural quality by ill-conceived development of recreation and tourism;

- the general trend towards centralisation of commerce industry and government, and towards standardisation of culture that have done much to diminish both the diversity of regional culture and the ability of rural people to determine or influence their own lifestyle; and

- the worldwide economic crisis and rapid political instability.

It has been however noted that the impact of these changes varies from one region to another. Nevertheless, as further observed by Sibanda, Musingafi and Chikudza (2011), the results include the following:

- growing regional diversity, inequality and widespread poverty in many rural regions;

- poor housing facilities and provision of services in most rural areas;

- loss of cultural vitality in many areas;

- damage to the ecosystem including landscape, wildlife and the health of soil and water systems;

- loss of architectural riches and of regional and local cultures; and

- a reduction in the ability of local populations to express their own ideals, to influence policies which affect them and to take their own initiative.

6. THE NEXUS BETWEEN ADOPTION OF ICTS AND RURAL DEVELOPMENT

As observed by Gelb *et al.* (2008), effective adoption of information and communication technologies (ICT) has not only a proven record in many parts of the world but a demonstrated potential to attain significant economic, social and environmental benefits at local, national and global levels. The impact that ICT has on the socio-economic environment, businesses and individuals has made it an important policy area for community, national and regional measures in pursuit of development objectives.

In rural areas it has been established that ICT is highly relevant to improving the competitiveness of agriculture and forestry and improving quality of life and diversification of the rural economy (Commission of the European Communities Secretariat, 2009a). Access to the Internet has been established as one of the tools that can enhance more of the potential of rural areas and make them more viable places for people to live. In fact ICTs help existing rural businesses to perform tasks more effectively and efficiently. ICTs respond to their demand for rapid access to diverse kinds of information. They create greater scope for new businesses to start up, and make it easier for them to deliver vital resources. As a result, entrepreneurship and economic progress in rural areas could be strong if the economic environment is favourable.

As far as the changing job scene is concerned, individuals and organisations of all kinds are beginning to take advantage of the new ICTs. Companies are gradually adopting ICT solutions for their business dealings, using electronic exchange systems (including e-commerce) for bargaining, marketing, ordering and payment procedures on the Internet, for example. Similarly, distance cooperation methods are beginning to be used in non-market activities, combining groups and individuals in virtual working networks (Wertlen).

The increase in distance exchanges and cooperation is being accompanied by a rise in the importance of e-working or teleworking. The nature of the technologies used means that organisations can subcontract more and more work externally (Wertlen). As observed by Riggs (2011), the networking economy can thus offer individuals and development institutions in rural areas great prospects for employment and open the door to jobs previously performed in companies or institutions, generally in urban areas or in areas close to cities. Business companies in remote areas can also be in direct contact with customers on the other side of the world and thus have access to business opportunities that in the past would have been unthinkable (Riggs, 2011). At the same time these companies are able to retain a much greater portion of the added value in the area where they are located.

In rural areas of developing countries, the promotion of economic development is closely linked with income generation (Riggs, 2011). Thus, livelihood opportunities are enhanced by improving the access of

small-scale producers and small businesses to markets for goods, services and commodities, to basic services (e.g. education, vocational training or finance) and to information on market conditions (Wertlen).

It has been established that improving the business environment for rural producers in a way that allows them to participate in and benefit from local, national and international markets is a key driver for rural economic development. Riggs (2011), notes that improving access to markets, however, requires overcoming a number of challenges that frequently prevent rural producers from being competitive. Some of these challenges have been identified as follows:

- lack of market orientation in their production;
- dependence on a small number of economic activities;
- inaccessible residential areas characterised by sparse population density;
- poor road network and transport infrastructure;
- widespread insecurity and lack of effective rule of law;
- inadequate basic services; and
- dysfunctional land and property ownership structures (Riggs, 2011).

According to O'Flaherty (2003), ICT can provide rural businesses with access to information on price, market conditions or know how. It has been further argued that ICT can be a major driver to the enhancement of access to agricultural financial services. This contributes to improvements in agricultural productivity and food security for the population. Also ICT has been found to have the capacity to generate new business opportunities. It improves the business environment by reducing transaction costs and improving the investment climate. In fact, connection of rural areas to national and global information, knowledge, or social networks, new mobile technology motivates young entrepreneurs to stay in rural areas.

6.1. Barriers, Constraints and Challenges Facing ICT Adoption in Rural Africa

According to Sibanda, Musingafi and Chikudza (2011), most of the problems faced by projects attempting to introduce ICT's into rural areas stem from the combination of impoverished low population density spread over vast areas and inept or corrupt governments, that have no interest in delivering services to these areas. They argue that this situation leaves many millions of people without proper road access, electricity, water and sewerage services, and telephone.

Sibanda, Musingafi and Chikudza, (2011) categorized barriers to ICT adoption in rural Africa into primary barriers, distance barriers, economic barriers, information barriers and social barriers. They identified primary barriers to the adoption of ICTs in rural Africa as follows:

- exorbitant costs for wired technologies resulting the high penetration of mobile communications as opposed to fixed telephone lines;
- lack of effective electricity supply;
- the high level of illiteracy translates to no support and maintenance readily available for ICTs; and
- harsh environmental conditions.

Distance barriers are the general factor in intermediate and remote rural areas that influences increased costs of business and entrepreneurs' endeavour, transport and cultural activities and negatively affects the quality of rural life. Thus distance barriers makes most services like cultural and shopping centres, administrative and governmental structures, educational facilities, social and health services and

many others inaccessible to the majority of rural inhabitants. Lower population densities result in lower public transport densities and increased waiting times.

Economic barriers – These include both input and marketing (output) costs. In most cases producers have to import inputs at high cost. Due to small consumer markets they also have to export products out of the area. This increases the costs burden for their products and services. This problem can be addressed by a combination of increased awareness about rural areas, eTransactions and by increased development of production of regional special products, investment and tourism.

Information barriers – Currently the amenities of many rural areas are "invisible" to the "outside world" (inhabitants of other areas, urban centres or citizens of other states – rural tourism, local products etc.). Overcoming information barriers in this sense means implementation of ICT to enable a full bi-directional access of rural inhabitants to information via data and voice services. The expected outcome is that more business and tourist visitors will come to rural areas to invest and/or spend their money.

According to Sibanda, Musingafi and Chikudza, 2011).The following is a list of some of the constraints and challenges to ICT adoption in rural areas (note that the list is not exhaustive):

- lack of financial resources;
- skills development and retention;
- making ICT more intuitive and conversational;
- enriching and diversifying the knowledge base;
- validating local language communications;
- gaining and maintaining trust in the system;
- local information for local use; and
- the trustworthiness of the content.

These challenges could be overcome through policy and regulatory interventions that provide incentives for the operators to invest (e.g. through public private partnerships or universal service schemes). In this context, development cooperation organisations have an important role in strengthening the capacities of regulatory institutions and in promoting sound policies. These policies – elaborated in dialogue with rural communities – can significantly contribute to narrowing the "digital divide" (Wertlen).

Beyond the policy level, development cooperation organisations can also address the demands of rural customers that are typically not catered by the market (Barton, 1997). Their engagement in development partnerships with the private sector can stimulate new business activities and at the same time buffer risks by sharing responsibilities.

3. CONCLUSION

In this paper we argued that the efficient use of information and communication technology (ICT), driven by better high-speed internet (broadband) access, is widely recognised as key to raising productivity and stimulating innovation in the global village. It has been observed that during the last fifteen years, largely due to the spread of mobile phone technology in rural areas, information and communication technologies (ICT) have demonstrated the positive and significant impact they can have on economic development by improving the business environment in rural areas. Inthis paper we have argued that ICT

provides access to market and business information, brings financial services literally to the hands of rural consumers, helps local communities organise and link themselves, and, through the connection with others, exchange know-how and ideas. We thus conclude that high-quality internet provision can help unlock the potential of rural areas, and can make them more attractive places to live.

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