Using ICT as a smart enabler of socio economic development

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Abstract

One of the major challenges facing most developing countries today is how to take full and smart advantage of quite spectacular and far-reaching advances in science and technology not only in promoting national economic development, but particularly addressing the needs of poor and marginalized sections of society. Whilst technology access in the pre-digital era has always been a major barrier to economic and social development in developing countries, this is no longer an absolute barrier for at least three reasons: firstly, the proliferation of distributive and open technologies, and limits to the power of proprietary frameworks; secondly, the increasingly lower delivery cost of new technologies; and thirdly, the emergence of multiple sources of technology innovation and development in civil society with specific emphasis on mobile technology. This paper will outline ways to establish community successes using mobile technology as an enabler in the current era of economic uncertainty. The paper will touch on the challenges faced by rural citizens and offer some tangible examples of how to overcome these.

Keywords

Information technology, developing world, socio economic development

1. Background

Today’s is a world of many divides, one of the most typical being the Digital Divide, which in itself has given birth to or is worsening other economic and social divides. In this world, more suffer and less are able to benefit from technology. This paper aims to promote the importance of and need for inter-disciplinary cooperation for the use and promotion of Information and Communication Technologies (ICT) as a bridge for the Digital Divide within disciplines. Information and communication technologies (ICTs) include any communication device—radio, television, cellular phones, computer and network hardware and software, satellite systems, the services and applications associated with them, such as the Internet, geographic positioning systems (GPS), banking, e-health, e-learning and electronic government services.

A formal definition of Information Technology (IT) terms it as a broad subject concerned with technology as well as with other aspects of managing and processing information. IT also deals with the use of electronic computers and computer software to convert, store, protect, process, transmit, and retrieve information (Christenssen, 2005). The term Information and Communication Technologies (ICT) was coined to reflect the seamless

convergence of digital processing and telecommunications. Contrary to common perception, it is not limited to modern hi-tech gadgets or networks. In fact, ICTs have since long been in use as communication mediums to transmit information, even to very remote places. Examples include postal and radio services. For ease of use, we can divide these technologies into old and new ICTs wherein the former one includes Radio, Television, Telephone, Fax, Telegram, etc., while the latter comprises data networks, e-mail, World Wide Web (or Internet) and cutting-edge wireless and wire line technologies.

The uneven diffusion of technology and the inequality in access to technologies with significant social, economic and political consequences defines the term Digital Divide. This may exist between rich and poor countries, rural and urban areas, men and women, skilled and unskilled citizens and large and small enterprises. There are many reasons for the creation of these divides but this is certain that, if these are not taken care of immediately, the situation for some will keep on worsening until the associated economies collapse.

Digital Opportunity initiatives are those efforts aimed at bridging the digital divide. This paper primarily focuses on the importance of inter-disciplinary cooperation in ICT to bridge these digital divides at country, regional and global level. This cooperation is essential for an overall sustainable socio-economic development process. The topic is very broad, and the complete picture requires many aspects to be considered. This paper will focus only on ICT for Development within the boundaries of South Africa, and then specifically within the Eastern Cape.

2 Problem description

The multiple and varied barriers to implementation and inclusion of ICT in specifically rural areas continue to result in no or limited use of ICT. In general, there is a distinct lack of a holistic strategy or approach to achieve ICT usage in remote and rural areas. The research problem addressed by this paper can therefore be stated as the following:

What evidence from the case study of the Eastern Cape informs towards a holistic approach of ensuring usage of ICT in rural and remote areas?

Studies on using ICT as an enabler in within rural Africa are scarce. Most researchers approach their studies from a technological deterministic point of viewpoint. This paper will attempt to not only approach ICT as the driver of social change but to include a holistic view of ICT as a driver of social change.

3 Research objectives

The main objective of this paper is to identify challenges and issues to inform a holistic approach to enhance ICT usage toward socio economic development in rural and remote areas. This paper will address the following specific research questions:

- What is meant with the term rural citizen?
- What are the prospects of using ICT as enabler for socio economic development?
- How can ICT and mobile phones play an enabling role in for socio-economic development in South Africa?
- What are some practical examples of using ICT in the Eastern Cape?
The next section will provide a brief overview of typical methodologies used in all the practical examples described in this paper.

4 Research methodology
This research presents a mixed method approach to address the multidisciplinary research questions, within a case study methodology, conducted following Yin's guidance in design, preparation, collection and analyses of evidence, and composition of the report (Yin, 2008). The method of data collection is one of classical, applied ethnography, adapted for the particularities of the rural context (Creswell, 2009). It involves data gathering in a Living Lab environment amongst other. The individual projects will provide accounts of social life and culture and utilization of ICT based on detailed observations of what people factually do in the rural communities.

5 Literature Review
5.1 The Rural Citizen
Amongst the common problems facing remote rural communities today are access to basic services (water, electricity, sanitation), housing, poor communication, weak educational systems, gender discrimination and poor health care systems and unemployment (causing poverty),

Corrigan (2009) states that poverty is not just about the income of the poor; it is also about people’s lost creativity and potential to contribute to society. Literature in general highlights that it is about the denial of access to opportunities and choices to lead a decent life; achieve a better standard of living; have more freedom, dignity and self respect — things that matter most for human existence. The white paper on the state of entrepreneurship in South Africa (First National Bank, 2010) summarizes the barriers contributing to the lack of economic growth as:

- The lack of ability and knowledge to spot opportunities in specific industries;
- The challenge of finding funding and convincing funders of the uniqueness of the idea;
- The lack of a social network to support and build the future enterprise;
- The lack of cash flow to maintain the venture;
- The lack of partners with a long term vision to see the business grow;
- Over emphasis of the need for capital as opposed to sufficient numbers of customers.

These barriers are not unique to those in urban areas but are also experienced by rural citizens. The case of rural entrepreneurs is however further inhibited by barriers that include but are not limited to issues such as the lack of access to mainstream supply chains and markets. Often physical remoteness and low economic activity densities contribute to the barriers. The lack of appropriate skills, business and financial support mechanisms and general business ‘know-how’ are also amongst the challenges rural entrepreneurs are facing.
5.2 ICT for Development

Hargittai (1999) and other studies have shown that the rate of IT diffusion is correlated to the general level of socio-economic development. A most recent finding is that ICT plays a vital role in advancing economic growth and reducing poverty (Fourie, 2008). A survey of firms carried out in 56 developing countries finds that firms that use ICT grow faster, invest more, and are more productive and profitable than those that do not (Fourie, 2008).

Dabla (2004) has made comprehensive literature references enticing the relationship between ICTs and Socio-Economic Development. Similarly, Jeremy Grace et al (2004) have deliberated the characteristics and forces in ICTs that can play a pivotal role in the economic growth of a country.

It can therefore be inferred that ICTs can be used to directly influence the productivity, cost effectiveness and competitiveness of industries, which is the advantage upon which developing countries can build their economies. The opportunity to catch up on developed economies in terms of the application of technology and its resulting economic benefits has never been greater. On the other hand, the implication of not being able to adopt ICTs can be disastrous.

5.3 ICT as a tool

ICT can be used as a means, but is not an end. People do not need word processing to survive, but they may need efficient ways of sharing information about livelihoods and employment. ICTs for human development are not about technology, but about people using the technology to meet some basic need. Understanding human requirements takes time and effort. User needs assessments are essential in planning the introduction of ICTs to communities, no matter what their status.

The advantages of previous decades, i.e. abundant natural resources or cheap labour, are no longer the advantages in the newly emerging “Information Society” or “Knowledge Economy”. Developing countries can no longer expect to base their development on their labour advantage. The application of knowledge has now become the critical competitive advantage.

5.4 Potential of ICT to address socio-economic development

In the South Africa, there is a lack of awareness from management level as well as from rural communities in understanding the potential impacts that ICT can have in the rural areas of the country. People are set in their ways, and it will require a paradigm shift to move away from an industrial to an information technology-thinking pattern. Opportunities such as road shows, the implementation of information systems or the development of educational platforms are important to enlighten people on how ICT can be used to boost the local economy.

During 2003, the South African Department of Trade and Industry designed a 5-year e-strategy to promote socio-economic development. The strategy focused on e-government,
software development, e-education, Internet development and e-health. Some initiatives supporting this strategy were implemented, but with limited success.

5.5 Potential of mobile phones

It is believed that encouraging the uptake of mobile phones is the most effective response to the Digital Divide (Fourie, 2008).

In South Africa, there is 80% mobile phone coverage and, even in rural areas, almost everyone has access to a mobile phone (Peyper, 2013). M-health or the use of mobile computing and communication technologies in health care and public health is a rapidly expanding area of research and practice. Mobile devices have also become common tools for a range of functions from clinical decision support systems and data collection tools for healthcare professionals, to supporting health behaviour change and chronic disease management by patients in the community (WHO, 2012). Mobile phones present an enormous promise for health care and for chronic disease control in low- and middle-income areas. In areas where infrastructure and resources are often lacking, m-health initiatives are beginning to provide a wide range of services, including real-time case notification, interactive health messaging, and performance-based incentives for health workers.

The Digital Divide is not the problem in itself but it is low income, under-development of the socio-economic conditions and the lack of literacy that divides the rich from the poor. Evidence suggests that mobile phones are the technology with the greatest impact on development. Mobile phones support long-term growth rates, and their impact is twice as big in developing countries (Odendaal et al., 2011). A more sensible approach to promote ICT would therefore be to donate mobile phones instead of computers.

With a mobile phone there is no need for foreign funding. Mobile phones do not rely on a permanent power supply and can be used by people who cannot read or write. Mobile phones are widely shared and rented. Farmers and fisherman use mobile phones to call markets to obtain the best price for their produce. Small firms use their cellphones to shop around for the best prices for their supply. Mobile phones can also be used to make cash payments without the need for a bank account.

Further advantages that mobile subscribers experience in developing countries are:

- Reduction in transaction costs;
- Enlargement of the area in which trade is performed;
- Reduced need for travel (which is a big advantage, especially for the unemployed); and
- Extended reach of public service delivery in under-serviced communities.

Mobile phones are important, but so is education. There are numerous factors that influence economic growth, but mobile phones appear to be the most effective way to close the digital divide (Fourie, 2008).

6 The Case of the Eastern Cape

6.1 Basic Facts
The Eastern Cape is South Africa’s second largest province, taking up approximately 13.9% of the country’s land area and having a population of around 6.5 million people (SA Yearbook, 2012). The province is the hub of South Africa’s motor industry, and has been earmarked as a key area for growth and economic development based on the excellent, efficient range of transport modalities. The province offers economic opportunities for agriculture, fishing and forestry. The Eastern Cape is largely rural and this, coupled with the vastness of the landscape and the paucity of information and telecommunications infrastructure, inhibits the infiltration of ICT (ECPG, 2009).

6.2 Challenges
The Eastern Cape Provincial Government (ECPG) (2009) identified several challenges as part of the journey to 2014. Some of the highlighted challenges included (ECPG, 2009):

- Lack of integrated infrastructure to support service delivery;
- Lack of a province-wide governance framework with supporting policies and standards;
- Inadequate ICT connectivity infrastructure, specifically in rural areas;
- Shortage of critical IT skills in the province; and
- Lack of technology-driven service delivery.

A further challenge, not unique to the Eastern Cape but relevant in African countries, is that western models are implemented without modification to suit the needs of the specific country (Heeks, 2002). For example, it is argued that in an African context e-government is essentially an imported concept based on imported design. The e-government concepts and designs originated in the West, which is within an environment that is very different from African realities (Baskaran & Muchie, 2006).

6.3 ICT for Health

ICTs, from cell phones to computers and networks, are being integrated into a wide range of development projects. Examples of these include the use of ICT in the Nelson Mandela Bay area to monitor and manage home-based care workers who are delivering a critical service to the public in under-serviced communities. A further example is the use of ICT to combat TB in the region by using mobile health applications. As the chronic disease burden is very high in the province, technology is also used to address mitigating factors such as food security, malnutrition and general wellness education. This section describes two mobile health applications currently in use in the Eastern Cape.

6.3.1 M-health for Schools

It is the aim of this project to demonstrate the use of e-health to improve School Healthcare. E-health is defined as “the cost-effective and secure use of Information and Communication Technologies in support of health and health-related fields, including healthcare services, health surveillance, health literature, and health education, knowledge and research” (WHO, 2012).

growth monitoring including weight-for-height screenings is not only time consuming but also very difficult to implement. Resource challenges in rural developing area as well as relocation of nurses, quality of care and availability of nutrition statistics are not always beneficial. Data recording is a manual process and time consuming. It is with this in mind, that Mobile Malnutrition Screen Tool was developed.

The prototype mobile application illustrated in Figure 1, allows a health worker to electronically capture the biographical data of a child that is stored in a database. Details with respect to nutritional habits are captured, combined with weight and height. The application automatically calculates the body mass index of a child and alerts the health worker to the child’s nutritional status.

The application is developed on an open source platform and runs across mobile devices. It makes use of store and push technology, allowing the health care worker to capture data in areas with limited or no access.

The prototype malnutrition screen tool is currently being tested in a Living Lab environment to provide user feedback on the usability and usefulness of the application.

Figure 1: Screenshots of the Malnutrition Screen Tool

Figure 2 shows screenshots of a mobile health educational application making use of audio and video with same basic information about good personal habits. The application is currently in use in deep rural areas in the Eastern Cape province. Health care workers and school nurses use it for the creation of basic health awareness and education.
Community care workers can provide a vital link between the community and the health system (Kash et al., 2007; Patel & Nowalk, 2010). However, the main challenge for care workers lies in engaging both health service personnel and community members. A further challenge is inadequate support and supervision as well as a lack of appropriate training, which has previously been attributed to staff attrition amongst care workers (Olang’o et al., 2010; Patel & Nowalk, 2010).

While care workers can become important role players in the response to the chronic disease burden, one should consider their needs as well. The SA Medical Research Council illustrated this in an exploratory study, identifying the need of care workers for non-remunerative incentives such as badges, T-shirts and refresher training (Odendaal et al., 2011). With appropriate training, customised to their immediate needs, empowering effects such as motivation, self-esteem, and self-worth can be developed. This in turn can lead to provision of improved quality of health care and higher rates of staff retention (Kash et al. 2007; Patel & Nowalk 2010).

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This research project seeks to fill a gap in a cost-effective e-health approach by building capacity among care workers and creating community awareness of chronic diseases. While at the same time assessing the efficacy of these interventions in different geographical areas. This approach intends to utilise a convergence of ICTs: audio podcasts, mobile phones and an interactive radio series, broadcast via community radio stations.

The initial user experience evaluations have yielded positive results. The Malnutrition Screening Tool is viewed positively by health care workers with an expectation of providing more accurate datasets and at the same time creates a database repository of children that will enable effective monitoring of the nutrition status of children registered on this database.

As far as the mobile health education application is concerned, the impact cannot be measured as yet, but the uptake has been prolific. The application is currently used in 5 rural healthcare clinics with spontaneous sharing of the podcasts and video clips among children in the area. Initial feedback again yields positive user experience factors that include that of a fun element, enjoyable, intrinsic motivation and awareness creation.

7 Conclusion
This paper touched on how ICT can be used to address challenges by strengthening the following key issues:

- **Communication** for easy access, dissemination and sharing of information and knowledge;
- **Productivity** to improve efficiency, competitiveness, and responsiveness of institutions;
- **Accountability** to increase transparency in private and public institutions;
- **Inclusiveness** to increase access to services, information and resources for poor and marginalized groups.

The use of ICTs can make a direct contribution to poverty reduction and improved service delivery. When used appropriately, ICT can provide producers and small entrepreneurs with access to market information, job opportunities, business and technical skills and banking services. These technologies drive innovation, productivity and efficiency gains across industries, contributing to overall economic growth and competitiveness.

The research projects currently executed in the Eastern Cape are aimed at connecting people to their Government Department of Health and healthcare providers thus strengthening service delivery and supporting basic human rights. Finally, through the use of ICTs, field workers, local organizations and communities are linked, enabling them to share knowledge and to find common solutions to some of the region's most pressing challenges.

8 References


