

## A Comparison of ICT Initiatives in South Africa and Democratic Republic of Congo

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### ABSTRACT

*ICTs have a huge potential to develop communities in both South Africa and Democratic Republic of Congo (DRC). The authors provide an overview of the ICT sectors in DRC and South Africa. This paper highlights the ICT initiatives in South Africa and DRC. The authors compare ICT projects in both countries and recommend enabling conditions for the development of DRC using ICTs. A brief overview of the opportunities that ICTs provide, the role players and type of ICTs used by South African and DRC organizations and communities are provided. Both countries face challenges in implementing ICT4D initiatives. More than just reducing costs of ICTs, major investments in the ICT infrastructure and resources and training the people in DRC to utilize ICTs is crucial for DRC's development.*

### KEYWORDS

**ICT for development, ICT initiatives for DRC, ICT initiatives in South Africa and DRC**

### INTRODUCTION

Information and Communication Technologies for development (ICT4D) means ICT applications and technologies that have a positive impact on the socio-economic development of the region. In this paper, ICT4D initiatives in South Africa and DRC will be compared in education, health and agriculture sectors. Additionally Universal Access to ICT will also be considered. South Africa (SA) is currently one of the countries in Southern Africa where ICT has made a significant impact to the society. SA adopted and implemented several regulations, frameworks of social and economic development. ICT has a huge potential to develop underprivileged communities in South Africa. ICT projects such as Thusongs and other telecentres (Thusongs, 2010), SchoolNetSA (SchoolNetSA, 2011), South Africa National Telemedicine System (SANTS) (South Africa National Telemedicine System, 2004) and Makuleke project (Makuleke project, 2009) have made significant contributions to society.

Democratic Republic of Congo (DRC) is in a reconstruction stage with the aim to reduce poverty and rehabilitate infrastructures. According to the Food and Agriculture Organization (FAO), 50% of the population in DRC is undernourished (Beverly et al., 2009), 80% live on less than USD 0.20 per day (Extractive Industries Transparency Initiative, 2011) and less than 10% of the entire population of DRC has access to electricity (Mbeshherubusa, 2009) which affects the access to certain ICT services.

## **OBJECTIVES**

In this article SA and DRC ICT initiatives will be compared to determine possible impact and role of ICTs in developing underprivileged communities in DRC. The following research question will be answered: What are the recommendations made for DRC's development through ICTs based on SA ICT initiatives?

The sub-objectives of this research are:

1. To identify ICT projects that has led to the development of SA.
2. To determine similar ICT initiatives and services in DRC.
3. To describe challenges in ICT4D in both countries.
4. To compare ICT projects in SA and DRC as well as to recommend enabling conditions for development through ICTs in DRC.

## **ICT SECTOR OVERVIEW**

### **Democratic Republic of Congo ICT Sector**

Universal access and provision of broadband network are some of the challenges faced by DRC with impact on ICT dissemination. Since 2009, DRC has adopted its National ICT Policy (NICT) with specific objectives related to broadband infrastructure; accessibility to telecommunication service; increasing the participation of ICT in economic and social development (HIPSSA, 2010). At this stage, only the broadband infrastructure is in progress. There were no further commitment from the Congolese government in ICT policies with regards to education, health and agriculture. Recently ICT initiatives have been motivated by the government, international organization and private sector such as United Nation Program Development (UNDP), New Partnership for Africa's Development (NEPAD) and Southern African Development Community (SADC). Main ICT initiatives taken by DRC government and the above partners are (Berger Media Info 2011; Gjerstad L., 2007; HIPSSA, 2010 ):

- 1) 2002: Telecommunications law no. 013/2002 of 16 October 2002 - is the first legislation that governs ICT sector.
- 2) 2006: Regulatory Authority for Telecommunication and Post (ARPTC in French), created in 2003, signed the broadband protocol with NEPAD, thereby including the DRC in the East African Submarine System project (EASSy project).

- 3) 2009: Under the leadership of the Ministry of Posts, Telephones and Telecommunications (MPTT,) DRC has adopted its national ICT policy.
- 4) 2011: DRC Interconnection to the submarine fibre optic cables (WACS Project) at Muanda coastal city.
- 5) 2015: Planning to connect all DRC's cities to national backbone.

### **South African ICT Sector**

Amongst the SADC countries, South Africa is doing well in terms of ICT4D. National organizations especially Independent Communications Authority of South Africa (ICASA), Universal Service and Access Agency of South Africa (USAASA) and State Information Technology Agency (SITA) play a major role in ICT regulations. Established in 2000, ICASA takes charge of the broadcasting and telecommunication sector. In 2005, the Convergence Bill promoted convergence and establishment of a legal framework of broadcasting, broadcasting signal distribution and communication sector.

The Electronic Communications Bill renamed the Convergence Bill, promotes interconnection, universal provision of networks as well as empowerment of historically disadvantaged communities (Department of Communications, 2012). For the period 2013-2020, SA government plans to build an effective National integrated ICT policy dealing with ICT convergence and cyber security. Currently, ICT initiative vision in South Africa is led by the presidential National Commission on Information Society and Development (Presidential National Commission, 2012). E-education vision is to provide ICT platforms for learning where learners and teachers increase their computer literacy, skills for full participation in a knowledge society. And E-health is to improve the health care system by ICT use. We have noticed low Internet users due to the lack of appropriate infrastructure and high cost of internet service in DRC. Less TV set due to the lack of electricity in urban and rural area, as well as low purchasing power of the DRC population. Nevertheless, a good average of radio set because they use batteries; as well as a fairly good average of mobile phone subscribers, compared to land line, whose number of subscribers has been steadily improving. Despite this situation, we observe a boom in ICT sector particularly in the mobile telecommunications private sector. But this sector is not well-controlled because DRC lacks tools as national hub for traffic (data and voice) monitoring, frequency radio analyzer to avoid interferences and qualified national experts.

### **RESEARCH METHODOLOGY**

We identified various ICT initiatives in DRC and SA based on literature review. We used various qualitative methods such as content analysis and case study. Based on literature review, we provide various ICT initiative projects that revolve around main categories and themes: education, health, agriculture and universal access project. We

remark that these initiatives are better developed and followed by SA government than in DRC. ICT projects such as Thusongs by GCIS, SA government (Thusongs, 2010) promotes communication between government and people by offering information and government services. Thusongs are similar to the Universal Access project at DRC, where the Community Resource and Learning Center at vanga uses technologies in education as the primary tool and for training community on health. The role players are USAID through dot-EDU, AED, TMG and local communities. Apart from computers, cameras, audio recoder, television, LCD projector, VSAT technology are used. SchoolNetSA (SchoolNetSA, 2011) is an e-learning project used by many SA educators, and was developed for teachers and students to use ICTs in under privileged schools. Computers, printer and internet are used in all the above projects and all three are also educational initiatives in a way.

SNIS (Programme santé 9ème FED, 2008) is a health project by Health Minister (DRC), NGOs, GTZ and Sanru where they monitor diseases by collecting related data using computers and mobile phones to improve quality of care. Similar health project in SA, SMS4AIDS (SMS4AIDS, 2008) uses SMS facility in mobile phone to send reminders for taking AIDS medication to the South African patients. South Africa National Telemedicine System (SANTS) (South Africa National Telemedicine System, 2004) is an initiative by Telekom and Department of Health, to redress the inequitable distribution of health services between urban and rural areas aims to improve health care services in rural areas. e-MuM (Geo-ICT Health, 2011) is an SA initiative that uses mobile phone, watch, Internet to monitor the drug-taking by the chronic patients by using a monitoring system and a reporting system. IFDAP (APC, 2012) is an agricultural project that uses internet, computer and radio by rural women to increase their healthy crop production. They use mobile phone to contact buyers. Makuleke project (Makuleke project, 2009) is also an agricultural project in SA by Vodacom, Alcatel, Manobi that uses internet and mobile phone to help farmers to access to national market via internet and mobile phone.

### **Content Analysis**

Content analysis has been defined 'as a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding' (Krippendorff, 1980). Qualitative content analysis is not merely counting words, but extracting content from texts to examine meanings, themes and patterns that may be manifest or latent in a particular text. The unit of observation is journal article, unit of analysis is sentence unit, and search criteria used for final sampling are potential of ICT, ICT in education, ICT in health, ICT in agriculture, ICT and Universal Access and ICTs in development. Very few journal articles related to ICT sector in DRC satisfied the search criteria. We used a computer program namely ATLAS.ti for mainly managing and coding of the qualitative data including text editing, coding, text retrieval, and category manipulation. We analyze the contents

from journal articles. Journal articles allow us to produce information based on research criteria.

### **Case Study: Health Information System at Ministry of Health – SNIS DRC**

A case study method was chosen another preferred research method for this study, as it allows specific contexts to be studied in greater detail to obtain knowledge that is "useful" and not merely interesting (Olivier, M. S., 1999). A 'typical' case study will be included in this study. A face-to-face interview was conducted with the organizational staff of Ministry of Health (MoH) on 08 October 2012 in Kinshasa, DRC. We conducted interviews with the department of control disease of MoH. We followed the 'tips in conducting interviews' based on Patton's guidelines (Patton, M., 2001). Patton advices to check and test the recording system before interview, well define the scope of the interview and speaking clearly during the interview. After the interview, listen to the start of the recording and keep material in a good condition.

DRC has experienced several epidemic outbreaks each year. During this year, the country had outbreaks of cholera, measles, Ebola. There are also HIV/AIDS, tuberculosis and malaria diseases which affect all provinces of DRC. This case study explores *how* the Epidemiology Division, part of Control disease department, manages all information about diseases and *why* is there a big delay in transmission of health data at central level. The health system of MoH has three levels. The central level is the normative and prescriptive. The intermediate or provincial level provides technical support to health zones. The peripheral, lowest level (health units: health centers, hospitals) i.e. the level of application, implementation of any policy and health directive. The control disease department is responsible for ensuring the surveillance of endemic and epidemic diseases that occur in the country. And epidemiology division monitors epidemic-prone diseases. Monitoring system is in place since 2000, each level requires analyzing data to see disease tendencies and provide the answer when necessary or when the epidemic threshold is reached.

For collecting data: paper forms, Internet, e-mail and rarely phones were used in DRC. At lowest level (health centers and hospitals), they used paper forms on which they have listed all diseases under surveillance. Health personnel record all disease information collected. Epidemiology division has 15 diseases under surveillance. After collecting diseases information, they send it to the central office of the area of health which centralizes those data from health centers and hospitals. Then central offices of area of health send data to province. From health Units to the province level, the data are on paper or in a few cases they use phones specifically voice or SMS technology. At the provincial level, data managers capture these data in the database and send it to the central level via Internet by e-mail, but with weekly delay. An obvious example is the Ebola disease in eastern province at Isiro. The outbreak of Ebola began in May 2012 practically; at central level, the information was received in

August 2012. This shows that the monitoring system is not yet very responsive. During this delay many people died of Ebola virus. The late detection of epidemic phenomena is the biggest challenge of epidemiology division. Technically, this situation is caused by the lack of electricity and Internet availability. The division has a lack of IT training, outdated system, turnover of health personnel. The problem of data access by other department or colleague of division because the system runs in local host basis not client-server or web-based architecture. By gathering and analyzing health data on time, the epidemiology division will be able to respond and improve the quality of health service given to people.

## DATA ANALYSIS AND RESULTS

The comparison process has enabled us to find techniques for qualitative data analysis. Qualitative data analysis has a goal of understanding the search for coherence and data analysis purpose is to develop this understanding. Grounded Theory Method (GTM) is appropriate as an inductive type of research method in interpretive perspective goal. GTM seeks to generate or discover theory that is grounded in data named grounded theory (Glaser and Strauss, 1967). The list of articles and sources used for content analysis are provided in Table 1 where the journal articles are renamed in order to analyze the content. For example the reference to the Turkish Online Journal of Educational Technology 2006, article was renamed TOJET1. In GTM phases: open coding (generate initial concept from data); axial coding (link concepts into families) and selective coding (formalize the relationship in a framework) were developed. In our research we use open coding. Table 2 provides the ICTs potential to develop communities in various sectors in both countries. Table 3 provides enabling conditions for development through ICTs in DRC.

**Table 1. References for qualitative content analysis**

Articles related to DRC
TOJET1 - Nsomwe-a- NFUNKWA, Banza, 2006, " <i>New information and communication technologies in the democratic republic of congo: strategies and measures</i> " The Turkish Online Journal of Educational Technology 2006, Vol. 5, Issue 2, pp. 29-31.
TOJET2 - Nsomwe-a- NFUNKWA, Banza, 2006, " <i>Are the rural schools of the democratic republic of congo ready for the \$100 laptop?</i> " The Turkish Online Journal of Educational Technology 2006, Vol. 5, Issue 4, pp. x-x.
WOFABO1 – Fall, B., 2007, " <i>ICT in Education in the Democratic Republic of Congo (DRC)</i> "; Survey of ICT and Education in Africa, World Fact Book
UNDESA – Dzidonu, C., 2010, "An analysis of the role of ICTs to achieving the MDGs" Paper commissioned by The Division for Public Administration and Development Management of UNDESA

**Articles related to SA**  
 TMM – Tembo, R., and Maumbe, B.M, 2010, E-agriculture Development in South Africa: Opportunities, Challenges and Prospects. In Maumbe, B.M. (Ed). *E-Agriculture and E-Government for Global Policy Development: Implications and Future Directions*. pp19-42, Hershey, PA: IGI Global Publishers.  
 ISTA – Joseph, M., 2011, ‘The Potential of ICTs to Empower Rural Women’, IST-Africa 2011 Conference Proceedings IIMC. ISBN: 978-1-905824-24-3  
 UNDESA - Dzidonu, C., 2010, “An analysis of the role of ICTs to achieving the MDGs” Paper commissioned by The Division for Public Administration and Development Management of UNDESA  
 IJEDICT - Langmia, K.,2005, The role of ICT in the economic development of Africa:The case of South Africa, *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, Vol. 2, Issue 4, pp. 144-156.  
 WOFABO2 – Isaac, S., 2007, ‘ICT in Education in South Africa’, Survey of ICT and Education in Africa, World Fact Book

**Table 2. Potential of ICT**

Count ries	According to the article in the journal	ICT in Educa tion	ICT in Health	ICT in Agri- culture	ICT and Universal Access	ICTs for Development
DRC	TOJET1	√			√	√
	TOJET2	√			√	√
	WOFABO1	√			√	√
	UNDESA			√		√
SA	TMM			√	√	√
	UNDESA		√			√
	ISTA	√	√	√		√
	IJEDICT	√	√			√
	WOFABO2	√			√	√

**Table 3. ICT for development in DRC**

According to article	Enabling conditions for development using ICTs
TOJET1	Sincere partnership with other organizations. Investment in technological infrastructures, human resources.
TOJET2	ICT tools access to student, teacher. Decrease the cost of ICT technology.
UNDESA	Diffusion of ICT will have an impact on the achievement of the Millennium Development Goals (MDGs).

WOFABO1	Define an innovative approach
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## FINDINGS AND DISCUSSIONS

The ICT initiatives identified in the journal articles of the DRC and South Africa demonstrate the potential of ICT as a lever for substantial development. There are a lot of challenges to overcome in ICT4D in the DRC: health, education and agriculture sectors. The case study and journal articles are in agreement that the challenges are different nature and many forms: human and technical.

### A comparison of the ICT initiatives in DRC and SA

UNDESA opined '*South Africa is one of the leading countries in Africa deploying e-health solutions*'. Some ICT solutions such as SMS technology for TB patients are alerted to take medication. Other e-health solutions include e-health smart card system, Cellphone for HIV (Dzidonu, 2010). Telemedicine project such as SANTS aims to redress the inequitable distribution of health services between urban and rural areas through the use of ICT tools. These initiatives, among others, are intended to improve the quality of care through ICTs. DRC - The use of ICTs in health domain in DRC is at initial stage with many constraints electricity, technology and training.

According to UNDESA, ICTs were used in agricultural sector in DRC as a part of Global Forest Watch (GFW) which is a forestry resource monitoring system. IFDAP Project (APC, 2010) a private project, increases healthy crop production of rural women and agricultural knowledge by accessing to internet technology. There is no policy or framework for using ICT in agriculture at national level in DRC. TMM argues in South Africa, '*the growth of e-agriculture is seen as an engine to accelerate agriculture and rural development, promote food security, and reduce rural poverty*'. The increase of agricultural production through ICTs will have an impact on food security, reduce poverty and hunger in rural and urban areas. E-agriculture help to meet the goal 1 of Millennium Development Goals (MDGs): '*eradicate extreme poverty and hunger*'. Hence a systematic e-agriculture policy process must be developed to tackle hunger and poverty.

### Challenges in ICT4D

According to TOJET2, there is a lack of strategies for the use of ICTs in rural areas of DRC and other barriers to the use of technologies such as lack of electricity, lack of telecommunication, high cost of ICTs, outdated systems. The \$100 laptop by MIT solve some issues most schools still lacks chairs, desks, telephone and computer equipment. ISTA gives strategies to empower people specially 'women' in



disadvantaged zones to solve the 'universal access' equation to ICTs services. ISTA argues 'the use of gender sensitive training methods, innovative programs targeted for women' through ICTs is one of the strategies to empower women. DRC can use these strategies to overcome the universal access. In SA health sector has many initiatives: public and private. One of the big challenges is to provide broadband connectivity in rural zones, reduce the cost of technology and to train people as well as health personnel. By becoming member of ISO/TC 215 Health Informatics, SA wants interoperability of all health systems in data interchange process (Mars and Seebregts, 2009). TMM notices a dualistic phenomenon in the agricultural sector the well-developed commercial and subsistence sub sector situated in disadvantaged rural areas in South Africa. The SA government must invest in infrastructure in remote areas, ICT training disadvantaged people to empower them to address this challenge.

### **Recommendation for ICT4D in DRC**

**Invest in ICT infrastructure and resource:** Based on the interviews with Ministry of Health staff, ICT infrastructure and technology are outdated and there is a lack of electricity, internet availability in many areas of DRC. Due to the fact the health data is transmitted with delay, the responses to epidemic or endemic diseases by control disease department of MoH to hospitals and rural health zones is also delayed. WOFBOA1 article also observes the lack of good ICT infrastructure in education sector, as well as internet access in DRC universities with a bad impact on training and learning resources. For TOJET1, partnerships with international organizations can help to solve ICT infrastructure issues. DRC should invest more in the development of ICT infrastructure and in energy availability throughout the country to support ICT deployment, speed of information processing and access by population.

**Reduce cost of ICTs:** According to the case study, the outdated health system must be replaced or upgraded but the cost of ICT is an obstacle. TOJET2 speaks about the inaccessible price of \$100 laptop in rural schools even to teachers. Prices of equipment and services like servers, computers, telephones, mobile phones, Internet access must be affordable for more effective adoption of ICT in all sectors. Technology price must be commensurate with the purchasing power of the population claim to technology dissemination and its accessibility to various layers of the society. TOJET1 proposes an efficient partnership with private sector to reduce connection cost and access to internet. These strategies can contribute to the development of ICT environment.

**Training people on ICT utilization:** The MoH of DRC staff in interviews mentioned the absence of IT training of IT department staff, hospitals as well as health centers. TOJET2 notes this alarming situation in education sector in rural schools where teachers lack ICT skills. WOFBOA1 think on investing on human and learning resource capacity to participate to knowledge creation and to overcome high illiteracy rate particularly in ICT sector. DRC government must strengthen the training sector to

increase knowledge and expertise in order to find out technological solutions specific to Congolese environment.

## **CONCLUSION**

South Africa has a commitment to improve education, health, agriculture and universal access through ICTs. It is clear that the comparative study demonstrates DRC is still lacking behind in ICT4D to connect local to the global. South Africa has a commitment to improve education, health, agriculture and universal access through ICTs. All South African ICT initiatives participate to the improvement of quality of life and socio-development of people. SA has to invest further in broadband technology in rural areas and eliminate dualism in e-Agriculture. The case study reveals many challenges to overcome in the health sector in DRC, namely lack of electricity, Internet availability, lack of IT training, outdated ICT system and architecture. The result of this situation is a delay in detection of epidemic phenomena with a consequence in quality of health service given to the people of DRC. The educational sector also suffers mostly with same symptoms namely human and technical ICT deficiency. This slows down universal access to ICTs by the people.

We recommend solutions such as: real commitment of DRC government to provide ICT infrastructure and resource, reduce the cost of ICT and support ICT training programs. Increased rate of access of the population to the electricity grid and investing in ICT broadband infrastructure will solve universal access to information in DRC to some extent. DRC government must strength the training sector to increase knowledge, expertise in order to find out technological solutions specific to DRC's environment and to fight the illiteracy crisis in ICT particularly. DRC has to consider collaboration with ICT based international organization and private sector through efficient partnership. These commendable initiatives can be used as guidelines for creating new opportunities for people to achieving MDGs through ICTs in DRC.

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