Graduate School of Development Studies

**ICT in Development:**
**The Search for Hidden eSoko among Rural Small Scale**
**Farmers of Rwanda**

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# List of Acronyms

| | |
|---|---|
| 3G | Third Generations |
| ADSL | Asymmetric Digital Subscriber Line |
| BNR | National Bank of Rwanda |
| BPL | Below Poverty line |
| CPI | Consumer Price Index |
| EAC | East African Community |
| EAGC | East Africa Grain Council |
| EDPRS | Economic Development and Poverty Reduction Strategy |
| FRW | Rwandese Francs |
| GDP | Gross Domestic Product |
| GNI | Gross National Income |
| GPRS | General Packet Radio Service |
| GSM | Global System for Mobile Communications |
| HH | Households |
| ICT | Information and Communication Technology |
| ICT4D | Information and Communication Technology For Development |
| ISPA | Internet Service Provider in Africa |
| ISPs | Internet Service Providers |
| IVR | Integrated Voice Response |
| Me2U | Me to You |
| MINAGRI | Ministry Of Agriculture and Animal Husbandry |
| MINICOM | Ministry of Commerce and Trade |
| MNCs | Multinational Companies |
| MTN | Mobile and Telecommunications Network |
| MVK | Kigali City Council |
| NICI | National Information Communication Infrastructure |
| NISR | National Institute of Statistics of Rwanda |
| RATIN | Agriculture Trade Network |
| RDB | Rwanda Development Board |
| RDB/ICT | Rwanda Development Board/ICT Department |
| RITA | Rwanda Information Technology Authority |
| RRA | Rwanda Revenue Authority |
| RURA | Rwanda Utilities Regulatory Agency |
| SMS | Short Message Service |
| USD | United States Dollar |

# Dedication

To my dearly mother Bazibagira Justine and my late father James Gatete

Once more to Dr. Dalton Ssegawa and family for their support and love I received during my A' Level and undergraduate studies, it is because of such a foundation that I have made it to this level.

# Acknowledgment

# Abstract

This paper, employs a qualitative research method to examine the reasons behind the design and implementation of eSoko in its current form, by who and with what interests, despite the obvious disconnections between the project and the factual reality experienced by the poor rural farmers of Rwamagana, Ruhango and Musanze Districts in Rwanda. The findings indicate that eSoko is less known to majority rural poor farmers, due to structural issues such as the low levels of literacy, inadequate ICT infrastructure, high costs of acquiring and maintaining the technology and social structures such as gender, that limit the poor farmers from accessing ICT opportunities. Such opportunities include but not limited to market information that could empower them to raise their yields, incomes and compete equally for better markets in order to improve their wellbeing. These findings indicate eSoko to be of a limited significance to farmers because it meets more of the elites' interests and that of MNCs such as those of MTN and Voxiva, as these monopolise the functioning of eSoko system which puts the poor farmers under the risk of being exploited, yet they have no enough means and capacity to meet the costs of the services provided as compared to the political and economic elites. This might turn the project from a tool of emancipation to a tool of exploitation because from the field research, it is noticed that the whole infrastructure is owned by foreign companies, with limited consideration of domestic context where internet and mobile phone ownership is limited.

# Keywords

# Chapter 1: Introduction

"The digital divide can further widen if a large section of the population remains unable to participate in the ICT sector" (Meera, 2004:8).

## Background

The Rwanda government through the defunct Rwanda Information Technology Authority (RITA) and now the Rwanda Development Board/ICT, via its previous e-Rwanda project funded by the World Bank decided to integrate ICT in the agricultural sector to help rural farmers, access market information. This was done by the introduction of an ICT project known as eSoko. This term originates from a Swahili word "Soko", meaning market (Magada, 2009:1; Mulupi, 2010:1). E-Soko is an ICT electronic market information project that was launched in 2009 to, empower farmers with market information that would contribute to their wellbeing through increased productivity and incomes as a poverty intervention ICT project. Through eSoko, traders, consumers, projects and policy makers are supposed to text (send) and receive messages rapidly. Individuals, businesses, and projects are also expected to search for market information in a quick and inexpensive way by the use of SMS and the World Wide Web.

However, ICTs have been rarely heard of among rural small scale farmers and the majority, if not all, still remain poor in the rural farming Global South, including Rwanda. Despite the fact that ICTs of late have been considered as a transformational tool that would empower farmers to overcome poverty. The problem is that there seem to be no connection between eSoko concept and the factual reality of farmers' behaviour towards the usage of such an ICT application. This mismatch originated from the design, implementation, intrinsic nature of the technology or structural issues such as literacy and infrastructure experienced by the rural poor farmers. This is because the majority of these disadvantaged communities are still using the traditional methods of acquiring market information which consumes a lot of their time due to ignorance on where to find markets for their agricultural produces, and most small scale farmers still depend on middlemen as the source of information, who in most cases are (dis)trusted about the information they pass to them.

This paper demonstrates a qualitative case study of small scale farmers living in the Districts of Rwamagana, Ruhango and Musanze in Rwanda who cultivate land hard to earn a living and face market information challenges due to structural weaknesses such as poor levels of literacy and infrastructure. The conditions experienced by most of these farmers reveal a disconnection between eSoko and the reality of the functioning of these rural poor farmers.

Many studies have been conducted about the role of ICT in development but these have been mainly carried out in developed countries and less has been done in the Global South and most specifically on eSoko project, as an agricultural price market information system accessed via the website using

internet or through a mobile phone by sending an SMS. Consequently, the findings of this study will add to the existing body of literature on the role of ICT in rural development, more specifically focusing on Rwanda and the Sub-Saharan Africa.

Moreover, this study will inform policy makers and development partners' decisions while designing similar ICT projects for small scale rural poor farmers who can hardly read or write a SMS. This is worth considering because the latter barely participate in the design of the projects intended to benefit them and are mainly faced by various structural challenges, that limit them (farmers) from the use of eSoko application which makes one raise a question as to why eSoko project was designed and implemented the way it was, by who and in whose interests, despite such obvious disconnects?

Presumably then, the project could be driven by the interests of the elites who decide on what is good for the poor, and foreign interests rather than the needs of the rural poor farmers. This can be explained from the point of view that, the technology used in the design of project is more foreign than domestic and controlled by foreign firm (Voxiva). This encourages the Rwandan government to spend on the system maintenance as a result of limited capacity, hence promoting dependency as well being another form of exploitation. On the other hand, internet as well as eSoko SMS are monopolised by another multinational company (MTN) as it will be explained in the paper.

## Methods

This research employed qualitative methods of social research which consisted of primary and secondary data. Primary data was obtained in the form of interviews from three districts of Rwanda and Kigali city. Then secondary data consisted of data from eSoko website, reports and publications as well as related literature on eSoko and ICT in rural development from journals and articles. Multiple tools were used to collect data and these included face to face interviews, telephone interviews, observation and in depth interviews with key informants.

Primary data was gathered purposefully and by snow-balling by carrying out in-depth interviews with individuals involved in the implementation of the project such as; the Ministry of Agriculture and Animal Husbandry (MINAGRI) officers (2); one responsible for eSoko and another in charge of Agriculture Market Information System (AMIS). Other partners were also interviewed such as the Rwanda Development Board/ICT department (2), eSoko market agent in Kigali City (1), a Voxiva project manager (1), farmers (10 from each district) and traders (4). These interviewed were done orally except one trader who was interviewed by phone. Observation was done through field visits to check on the eSoko usage and ICT adaptation by the small scale farmers since the system uses internet and a mobile phone as an instrument for exchanging information by checking eSoko website updates and/or using emails and SMS.

In total 40 respondents were interviewed both from Kigali city and the districts of Rwamagana, Ruhango and Musanze. The city was sampled because this is where the project main architectural ground is located and both policy

makers and project technicians. The other three districts were selected because most of the rural small scale farmers are considered poor since the majority hardly own more than half an acre of land and are illiterate. Others for instance in the district of Rwamagana, engaged in rice growing using government owned swamps due to the former's lack of land for cultivation, despite these districts being considered to be the 'baking pot' for the main staple food crops consumed by majority Rwandans. In all these rural areas visited, MTN network is available, which could be a strong point for access and usage of eSoko.

### Area and population

Rwamagana district is one of seven districts that make up the Eastern Province of Rwanda, covering an area of 691.6Km², consisting of 14 sectors, 82 cells and 753 villages. The main city of the district is about 50km away from the Capital of Kigali and the district population is approximately 47,203 as of 2002 (Rwamagana district, n.d.). It is renowned for rice production and many farmers have formed cooperatives to cultivate government swamps because of limited land. This district was selected because of its proximity to Kigali City and the fact that rice growing cooperatives are said to be familiar with and use eSoko.

Ruhango is one of the 8 Southern Province districts comprising the previous districts of Kabagali, Ntenyo, Ntongwe and Ruhango now centres. The district is made up of 9 sectors, 59 cells and 533 villages and it is neighbouring some districts; in the North there is Muhanga, in the South Nyanza and Nyamagabe; in the West Karongi and Kamony, and Bugesera in the East. It is 73Km drive from Kigali to Huye district, and the area coverage of the district is 626.8Km². The population of the district is about 271807 with 60809 households (128761 men and 143046 women). Farming and Livestock are the key economic activities practiced: cassava, maize, coffee, and rice are the main crops grown. Ruhango district where most cassava is grown is far away from the capital (Ruhango district, n.d.; NISR, n.d.). The area was of interest because it is deeply rural and it is cultivated by poor farmers each of whom have a half an acre of land and have no knowledge of eSoko or ICT.

Finally, Musanze district lies in the Northern Province of the country, comprises of 15 sectors, 68 cells and 432 villages. In the North, the district is neighboured by Uganda and the Democratic Republic of Congo, in the South there is Gakenke; Burera in the East, and Nyabihu in the West. The population of the district is estimated at 314,242 in habitants (Musanze district, n.d.). This district was selected because the MINAGRI respondent informed me that farmers there could be aware of and were using eSoko, since the majority were engaged in selling potatoes to traders, as the district is well known for growing potatoes.

### Strength and limitations

I knew the language and most of the policy implementers of the project and so these were an added advantage to my research. However, interviewing individual farmers took more time. Some of the traders avoided me thinking that, I was a Rwanda Revenue Authority officer. Additionally, I went with the view

that the project was being put to use by farmers in accessing commodity price and market information in general but only found out that, they hardly used the project and this limited my interviews.

Being ill-prepared for the cold and drizzly weather in Kabagorizi village, in the Musanze district, almost forced me to postpone the interviews with farmers. I could not even write properly in the cold. It was only when one of the respondents provided me with a jacket that I was able to resume my work.

The other practical limitation of the study is that the sample of the population is small for one to draw general conclusions on eSoko application and ICT usage as well as its adaptation in Rwanda, since it is in its early phases of implementation.

## Structure of the Paper

The paper starts by discussing the debates by different scholars on ICT in development, specifically ICT application usage in rural development- much attention is put on rural small scale farmers in chapter two. Then chapter three elaborates the Rwandan context of the research such as Rwanda at a glance, the country's ICT strategies, current ICT status and the integration of ICT through the eSoko project, in helping rural small scale farmers to access market information. The fourth chapter indicates and analyses the findings of the research. Finally, the fifth chapter concludes the paper.

# Chapter 2: Literature Review

## Introduction

ICT development in rural communities is a greatly contested issue with the proponents on one hand arguing that ICT plays a great role in the development of the rural areas. Their perception is that this development will subsequently contribute to poverty reduction (Chapman et al. 2004; Hellström, 2008; Annor-Frempong, et al.2006; Cecchini and Scott, 2003). On the other hand, the opponents (Bhavnani et al.2008, Prakash and De, 2007; Saith et al., 2008a; Koutsouris, 2010) take a pessimistic view that this hardly considers socio-economic inequalities, human development and social structures that exist among the rural communities which could limit the adaptation and use of ICTs among the rural poor.

## ICT in Rural Development

ICT gives a big boost in advancing information by just a click of the computer. The majority in the rural areas are greatly delinked from the outside global vicinity, due to shortage of equipment in ICT-even when this information technology (IT) could enhance an optimistic future for the rural Global South (Patel et al., 2010:1). Subsequently, various countries have made ventures in ICT with a notion that it leads to industrialization and contributes to development (Sein and Harindranath, 2004:7). The term ICT has been defined by several scholars (Heeks, 1999:5; Fors and Moreno, 2002:2 ; Warren, 2002:1; Cecchini and Scott, 2003:1) as "an electronic means of capturing, processing, storing and communicating information" (ibid.). Fors and Moreno (2002:2) postulate that, information and communication technology has different components ranging from mobile phones, internet, Radio and Television (TV), Telecentres, software and hardware. However, with such a presumed complete description, it hardly refers to the practical part of the three words which comprise ICT and in contrast, this can be seen as a gain. It is prevented from remaining inert and locked in the time when it was formulated, as latest technology is developed and old technologies become out of use (ibid:2). In this case, ICT is regarded as a composition of different devices that transmit information even though how they are used to transmit information, to whom and with what interests, is hardly mentioned in this definition.

ICT has been considered as a model possible for development and has been rendered as another agenda for poverty reduction, with most of it being adapted by many countries in the world including those in Africa (Marker et al., 2002:7). Similarly, ICT is presented as a means to growth by being a vessel for accessing information and skills, and without it then a "digital divide" is experienced which is a term used to illustrate the unequal accessibility of ICT between the Global North and South societies or countries(Vrasidas et al. 2009). The proponents also claim the extension of ICT applications to rural

areas to have a great impact on livelihoods of the rural people, for instance Chapman (2004:11) claims that short text messages are less expensive than a phone call, thus increasingly it's being adapted as a way of acquiring information which in the due course would improve people's wellbeing (ibid.:11). In some cases, according to Kirkman et al. (2002: 84) reveal that ICTs are able to assist farmers through either enhancing their power to bargain by removing the obstacle of middlemen and directly making sales to buyers. Even though, for this case the existence of middlemen hardly symbolises lack of market information (ibid.:84).Also, on one hand scholars such as (Annor-Frempong, et al.2006:4) argue that these technologies enhance farmers yields. On the other hand, Saith et al. (2008a:15) raise doubts on the ways through which ICTs can alleviate poverty since it is more of top down than bottom up as compared to other poverty interventions such, as micro finances that are directly injected from the bottom of the pyramid. Hence claiming that it is important distinguishing among the indirect impact that are fostered via the effect of ICT on the general economy and that which comes directly through ICT use by the disadvantaged (ibid.:115). This reveals that ICT rarely has a direct impact to poor but rather an indirect one which hardly translates to the improvement on ones wellbeing since it is channelled through top down than bottom which doesn't work for the poor as compared to bottom up.

Conversely, the present socio economic, cultural and political obstacles between the centre elites and periphery poor hinder the disadvantaged members from making their knowledge and information circulated and identified, barring the marginalized from participating in the prevailing economical and political structure of the society ( Gigler, 2004:4). In this regard, even when the proponents claim ICT to be the source of information that empowers the farmers to bargain for better prices the counter argument is that information is rarely put to use due to structures that are power centred within the society, and hence some times these structures could be a barrier to information access or might even distort the information originating from these ICTs which could have negative effect on the farmers productivity.

The mainstream has been pro-ICT with a view that it is a problem solver through its contribution to development and poverty reduction (Heeks 1999: 7). However, this has been contested by some scholars, (N. 2001:2)[1] arguing that the composition of the structures in societies have been left out yet these play a great role in deciding accessibility of these ICTs; for instance the imbalance distribution of these technologies evidenced between Punjab, Haryana and west up in relation to that of Bihar, West Bengal and east Up was strongly in relationship with the existence of first region land lords and second region tenant, these indicate how accessibility and impact could be influenced by structures in society (ibid.:2). Nevertheless, ensuring that these ICTs are not elite dominated needs a targeting program for both the poor and women with a notion of changing the structures, for the women and landless to gain from the ICT community programs, with availability of resources delivered from the government as to ensure poverty reduction among these groups (Ibid.). Slater and Tacchi (2004: 43) studies indicate that women were found to be immobile

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[1] Author's name identified as "N.D" only.

and would not talk publically without giving sound reasons (ibid: 43). From this perspective, Fors and Moreno (2002:4) suggest that such structures that bring inequalities can be dealt with by the use of ICTs through accessibility to information regarding market prices, job opportunities and governmental programs which are a representation of enhancing empowerment through the use of ICTs, and thus these ICTs posses the potential of changing individuals' incapacities to improved participation, despite the structural inequality existences in the sharing of customary resources like land, finance and education ( ibid.:4). Interestingly, both views seem to suggest the existence of social structures in society as the cause of a "digital divide" with the proponents arguing that availing information through ICTs would be the remedy, but how these technologies will be accessed is unmentioned in their argument. Yet, the breaking of social structures goes beyond information access by the use of ICT since in some cases it calls for agency for the disadvantaged to empower themselves before being empowered by ICT.

Saith et al. (2008a: 122) oppose the idea that there are benefits generated by these ICTs in most probably to be appropriate in generating related benefits evenly for all people, insisting that there exists differences among the rewards for the wealthy metropolitan, intelligentsias and the disadvantaged un included remote societies of the populace (ibid.:122). Consequently, scholars such as Fors and Moreno (2002:7) reveal that there are reasonably high levels of uneducated women with less levels of engagement in the prescribed economy-culminating to inequalities in gender in terms of accessibility and usage of ICTs. For instance in rural places the enormous predominant women labour force await confined to rural places, mainly participating in the subsistence farming, yet their male counterparts have a tendency of dominating the service and industrial-based vacancies , hence expected to get accessibility to and making usage of ICT (ibid.:7). On the other hand, authors such as N ( 2001:1) suggest that connecting women through accessibility of microfinance could be a considerable means of empowering women to introduce ICT in rural places, and as a result they may be linked to the rest of the world by the microfinance as well as setting up of "knowledge centres" managed by women in the rural areas would empower them (ibid.: 4). In all cases, the scholars seem to suggest that ICTs hardly generate equal benefits to all due to the heterogeneity among users both in use and in their benefits, because of the existing power structures. Thus, giving examples such as those of women that have been marginalised in terms of accessibility of ICTs and of which  breaking this requires empowering them through education and accessibility of incomes which possibly illustrates that there is a relationship between ICT accessibility, usage and education.

Authors such as Prakash and De (2007:1) suggest that, using technologies depend on the individual agency and the determining force surrounding the situation in which the usage happens-with a view that the usage itself reflects the structural differences in the societal situations. Thus, claiming that the designers of ICTs have to be keen in considering such differences if ICT is to achieve its development objectives (Ibid: 1). In the same case, they demonstrate their idea by an example of computerized land records project in the districts of India (Mandya and Koppal) showing how the usage of technologies was embedded. The provision of the meanings of the technologies and its us-

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age was assumed to be via the several structures in society. They additionally illustrate a relationship between the usage of technology and social structure set by the users which are determined by the wider social setting in the technology usages (Ibid).Nonetheless, power relationships need to be first addressed for an ICT enabling environment to prevail; bridge the gap culturally, socially, political divide between the elites and the poor (Gigler, 2004: 23). On the other hand, Slater and Tacchi (2004:30) postulate that information access through the use of ICT in rural areas requires other innovations involving traditional knowledge (ibid: 23). Taking this into consideration, there could be other issues affecting ICT usage and adaptation in rural farming areas rather than the structural differences within society. For instance, checking whether these ICTs are in harmony with the culture of the intended users would be important before looking at structural differences that exist among users.

Equally, Berg (1998) discusses the importance of engaging the end user of the information technology and their interests during the design, consider their implicit skills which empowers them rather than involving them as a "political strategy". This claim is based on breaking of differentiation existing between the users and the designers of the technology as both hardly know each other's needs, which make the design to be dominated by the management interests, controlling workers' skills, thereby demonstrating class struggles. Thus a need for the new technology that breaks these capitalistic social structures dominated by the management and worker relations which could be reflected in the outcome of the technology and its usage by the end users (ibid). Additionally, Islam and Grönlund (2010:6) assert that most of these technologies meet the interests of the decision makers , research officers, development bureaus than the intended users or beneficiaries such as farmers, since most of these are donor funded projects, and whose (donor) interests are usually met than those of the users (ibid.:6). On the other hand, Fors and Moreno (2002:3) proclaim that ICTs represent more of Western interests because this is where they mostly originated from, with a limited anxiety for the end users interests or needs that exists externally to the economic and cultural context. More so, ICTs policies integrated and setup in development projects are mainly of top down approaches (ibid: 3). Indeed, these arguments illustrate ICT as an exploitation tool designed with Western interests to enhance dependency without considering the interests of the users.

Nevertheless, Fors and Moreno (2002:3) postulate that the significance of these ICTs is to be primarily for providing and disseminating knowledge and information which indicates a well-built connection amid bottom-up approach and the ICTs which makes the users empowered as well as making ICT policies relevant and central for the end user based development (ibid.). Gigler (2004:20) argues that in rural circumstances, ICT seemingly enables accessibility of markets and knowledge on practices of agriculture, thus enabling local people to acquire new opportunities; linking them to better incomes, people and the community hence, ICT usage is hard to separate its impact from other social and economical impacts (ibid.:20). For instance, mobile telephones have been highlighted in various studies ( N, 2001:2; Magada, 2009:2; Aker, 2010: 3) to have been able to provide market information to farmers with price gaps between the rural and urban places evidenced, take an example of the village pay phone bought by poor rural women using the borrowed money from the

Grameen Banks which they later repay through charging the village users for each minute call (N, 2001: 2). However, ICT usage could be highly constrained because the choice of their utilization is determined at the same time by education since it is a crucial determinant in new technology use and this could widen alternatives and full utilization of the technology by individuals.(Ibid: 3). Abbot and Yarbrough (1992:1) suggested the examination of the type of farmers that adopt the recent technologies and to understand how these farmers use the communication technologies that they adopt, because of the shortage of adopting technologies universally and the considerable variance in the productivity usage of these ICTs (ibid.:1). For instance, Aker (2010:5) claims that farmers require information on various themes at different phases before adoption of a latest technology and that the information needed vary among different farmers (ibid: 5). In addition, Brewer et al. (2005:12) reveal that incorporation of the needs of users' voices in establishing and deploying of the technology innovations is important for the protection of their interests as new technologies upsets important, mechanisms of change. Whereas, the optimistic authors claim ICT users to be homogeneous and enabling the users' revivification through access to information and eventually incomes. On the contrary dissenting scholars take users to be heterogeneous with the claim that it is vital to identify the differences that exist amid the users before the deployment of these ICTs.

In a related notional move, Kirkman et al. (2002:80) state that the majority rural disadvantaged areas face inadequate necessary infrastructure for communication, thus accessibility to highly developed forms of ICTs are usually lacking and, several of these poor people in rural areas become isolated from the stream of information needed for making markets function (Kirkman et al., 2002: 80; Parikh, 2006:8 ). Likewise, Bhavnani et al. (2008:4) pronounce that implementation challenges experienced by institutions as a result of unfriendly regulatory environment and policies constrain the enhancement of private sector participation in providing ICT infrastructures and servicing to the rural areas (ibid:4). In the same case, scholars argue that the lack of appropriate local content that is simply understood by the local communities, plus skilled personnel for the application development and serving for the last users, limit the diffusion of ICTs in rural communities, thus advocating for a user friendly, affordable, flexible and accessible ICT instruments such as cellular phones (ibid:5). On contrary, Slater and Tacchi (2004:35) in their study found out that maintenance and consistency were considered to be pertinent issues by participants and staff when engaging with ICT with challenges of connectivity, electricity power cuts, soft and hardware hurdles and undependable mobile networks were other interruption with ICT usage (ibid:35).In this case, the literatures shows a correlation between ICT adaptation and structural conditions such as infrastructure rather than the power relations that may exist among users.

According to Alemna and Sam (2006:3), rural communities such as those in Ghana still lag behind in terms of development even with the introduction of ICTs despite the fact that it has enhanced the social-economic development, through storing, disseminating, information accessibility. However, Kimura et.(2011:11) illustrate the use of ICT through the eSoko project which uses cellular phones to foster output benefits for farmers in Africa and busi-

nessmen by providing them faster and improved market information accessibility. The project is said to have started in Ghana in 2007 with merely $90,000 and functioning in the red by up to $21,000, in the fourth and fifth year eSoko had revenues of $1.4 million and about $540,000 in gains. Around 2010 eSoko had been rolled out to Madagascar, Benin, Cameroon, Burkina Faso, Mali, Togo and Côte d'Ivoire and leading full-time 40 workers and users totalling to about 9,000. Unfortunately, Islam and Grönlund (2010) argue that the expenses involved by the poor people in the rural farmers is a vital concern for sustaining such a project, thus the perception of the user is to reduce the costs since the farmers are usually hesitant to make payments for the services, as they hardly visualize the worthiness of their venture (ibid.:6). In this case, the latter claims that the usage of ICTs in rural areas is usually affected by their costs as farmers would always weigh the technology worth compared to other needs, where as the former identifies ICTs as an instrument that has been adapted and embraced by various countries in Africa due to its significance ensuring market efficiency, although they all ignore the local and political context at which these ICTs are adapted for easy assimilation.

Furthermore, Brewer et al (2005:8) assert that information and communication technologies in rural places are rarely pragmatic since over 70% of the expenses are in the accessibility of the network rather than in the backbone which comprises of a central constraint for the development of rural areas, as density usage and the capacity of the user to pay are small. Therefore, the development of mobile operators is an experience of the urban, despite most of the global population inhabiting the rural place, for instance, 74% of the Indian population in the majority rural place remain hardly technologically networked ( ibid.: 8). This is again re-emphasised by Molony (2007) stating that, it is only the minority farmers able to acquire these cellular phones or even purchase a generator and that it is hard for the small scale farmers to access mobile telephony even through a telephone kiosk and always hard for them to use it regularly due to the costs involved (ibid). In remote areas of the Global South occupied by these small scale farmers, there is hardly any source of reliable market information and other information related to production and the reason being limited access to basic infrastructure for communication or even advanced forms of ICT (Kirkman et al., 2002). Further to this, the traders avoid these places because of being far from the road for fear of the exorbitant transport expenses (Molony, 2007).These arguments seem to suggest an urban-rural digital divide that is due to poverty, thus indicating a relationship between inequality, poverty, adaptability and that each is likely to affect the other.

In the same case, Kimura (2011) presumes that eSoko has led to 6.4 percentage decrease in cereal price market distribution and a 3.5 percentage decrease in mean prices. Costs in transaction for traders and farmers are said to have declined by $2-$ 150 for each dealing by considerably decreasing the middlemen role or removing them holistically. E-Soko has again changed cellular phones into bulletin market rising their usage beyond text and voice. Its success is attributed primarily to the use of open source software that enables scaling up, telephony that is affordable and adaptable businesses service to the needs of the locals offering unpaid service listing that allows one to send and receive text messages in various languages, providing real-time product prices, and providing direct accessibility to markets (ibid.). Nevertheless, Alemna and

Sam (2006:3) dissents this notion by stating that rural areas hardly posses a straight accessibility to these ICTs and the places where they could be accessible, the affordability to the rural community is a problem. Clearly, below a USD1.00 a day is survived on by these rural people which is a challenge for the payment of USD.030 a minute for calling using a phone from a communication kiosk (Ibid:3). On the other hand, Moshapo and Hanranhan (2003:1) suggest that whilst cheaply accessible services of ICT delivered to the poor communities in the rural areas get considered to be essential, this is not enough to ensure the required development of the societies both socially and economically and thus, the difficulties hardly get over with cheap accessibility; the ICT delivered need to be appropriate to the development desires of the community both socially and economically (ibid.:1). In their view, Larsen et al (2010:10) propose development professionals and researchers digging deep into the history and context of the local challenges addressed for potentiality of these ICTs to reduce poverty (ibid:10). In this sense, the opponents oppose ICT being directly transparent with reasons that it doesn't give a direct access to markets as claimed by the proponents since it doesn't address the development needs of the rural and, hence there could be other factors for the markets to work efficiently and for ICT to be directly accessible.

In the same theoretical view, Mulupi (2010:1) proclaims that farmers are able to use mobile phones in Ghana to acquire commodity price information on several markets with the help of eSoko application, through an SMS received or typed via a code text for a product and then a market code is sent to a definite number. Despite this initiative, the study done by Akkermans (2010:7) in Ghana illustrates that there was hardly any respondent among farmers that had ever heard of the eSoko or even used it. He strongly confirms that not even the individuals doing work on the developing of rural areas knew eSoko, apart from the developers of only some software within Accra that had known the presence of the application, as result of knowing the eSoko developer, Mark Davis. According to Akkermans, this could be due to the fact that using the application seem complicated for users due to the various codes one uses and that currently, MTN was the only service provider (Akkermans, 2010:7). Fascinatingly, Islam and Grönlund (2010:5) argue that although there exists several information market services, many of the key partners for instance, traders and farmers normally get the market price information via their own traditional means, for example by speaking to fellow farmers, neighbourhood, schools in the locality, market price boards, organisations, civil society or community leadership plus other networks, even though the perception farmers have from these sources are hardly dependable and trusted (Ibid:5). Probably, this illustrates how such applications are uncommon among rural farmers rather among the technicians and designers themselves. This is either because farmers consider them as complicated or because the system being monopolised by one operator hindering subscribers from other networks. It could be also that there is unawareness of the system by the users, and hence preferring the use of the traditional methods of accessing information.

More so, Gigler (2004:12) stresses that the relevance of these technologies even when desired by the disadvantaged for gaining in its pure usage, it is rarely had even when it is accessible for instance the internet which could be defined as means for the West and elite requires to be appropriate with the

South and the poor societies prior to delivering its pure worth as it often rarely reflects the rural society realities for example the internet language frequently indicates unreasonable obstacle for the societies when using the information since a lot of the content is written mostly in academics or business oriented language hence being indirectly irrelevant at rural levels (Ballantyn, 2002 cited in Gigler, 2004:12). Also, content variety is limited by restriction and protection from pessimistic alienated influence (Lor and Britz 2007:9). Likewise, Saith et al. (2008a:125) argue that the usage of internet hardly embraces the needs of the poor in the rural Global South economies thus interests of the poor appear to be overlooked as their accessibility to content is liable to experiencing severe barriers and he again questions how such content that is non material could be usable in transforming factual materialistic situations of survival by the poor since this weightless un definable notion has got to change into a substance or touchable impact for it to have an effect on the poor (ibid.:125). Possibly, these debates indicate how irritant some of these ICTs are to the rural poor since they are designed out of context of the realities experienced by the poor by the mere fact that they represent the designers' hegemony and interest rather than the users' interests and needs.

Finally, Bhavnani et al. (2008:4) claim that the poor levels of literacy functionality, computer illiteracy, limited awareness, less disposable incomes, struggles for survival, lack of good health conditions, low population density characteristics of the most rural areas hardly attract ICT assimilation (ibid:.4). Taking this into consideration, Larsen et al.(2010:11) suggest that mapping activities for purposes of discovering ways of reaching the very poor of the population, instead of presuming the presence of a 'trickle down' impact in the ICTs deployment, putting into consideration exploration of alternatives such as universal access for availability means of availing paybacks to all is important (ibid.:11). This seems to suggest that both authors compliment each other in that the first scholar indicates a general overview of rural structural constraints to ICT access, where as the latter takes a comprehensive approach of addressing such hurdles for ICTs to benefit all rather than taking it as "blue print" that ICT would eventually reach the poor and lead to a general social-economic development.

Summing up this chapter, the proponents argued that ICT leads to the end users' development through ICT meeting needs and enabling efficient functioning of rural poor communities, where as the opponent side suggest that these ICT hardly translates into rural development due to structural issues (literacy, infrastructure) and also power issues (who owns, controls, which interests etc) which compromise the intended users' needs.

# Chapter 3: Rwandan Context

## Introduction

This chapter illustrates the country context such as Rwanda at a glance, an insight of ICT policies in Rwanda and their current trends, focussing on the mobile subscription and internet usage that influence the adaptation of eSoko project and the paradigm success in helping rural farmers; showing the aspects and functioning of eSoko System and the guidance on how the system works.

### *Rwanda at a glance*

Rwanda is a small country with a population of about ten million people having a GNI per capita of 490 (US $) and an annual average growth rate of 2.3% (World Bank, 2011a:1). The country's GDP increased from 2.2% in 2003 to 7.2% in 2010, and in 2008, it registered 11.5% highest growth, and in general 7% was its average rate of growth (RDB, 2011b:10). The current figures as per the World Bank indicate that 57% of the population are below the poverty line. The life expectancy at birth is 50years with infant mortality rate (per 1,000 live births), being indentified at 70, as well as literacy levels (% of population age 15+) indicated to be 70 (World Bank , 2011a :1). This reveals that, the country is registering positive trend in terms of growth even though it is still poor with the majority still living below the poverty line and 30% still illiterate.

According to the World Bank report, the country's GDP (US Billions) improved from 4.7 (2008) to 5.2 (2009) with a GDP per capita of 4.1.There was a positive shift in the agriculture sector, contributing towards the GDP growth from 32.5%  in 2008 to 34.2% (2009), while the industrial sector contribution decreased from 14.9% (2008) to 14.5% in 2009 and an increase was manifested in the manufacturing sector from 6.2% (2008) to 6.4% (2009), in relation to service sector which reduced from 52.6% (2008) to 51.3% (2009), respectively  (ibid:1). Rwanda's industrial sector contribution still remains low as well as the manufacturing sector, while a slight decrease in the service sector is revealed, even though there was a positive trend registered by the Agricultural sector.

Nevertheless, according to the World Bank Doing Business Survey 2010, Rwanda was rated among the top ten worldwide reformers, in that out of 183 countries, it was ranked the second global reformer; and the World Economic Forum global competiveness report indicated that as regards to starting a business, Rwanda was 9th most easy place to begin a business globally and the 6th best competitive economy within the African Sub-Sahara as indicated by the (World Bank, 2011b: 5; RDB, 2011b:10). The 51% large share contributed to the GDP by the service sector as compared to other sectors reflects these achievements.

The realization of these gains could have been due to the country's Vision 2020 and the national development plan (EDPRS). Both plans postulate Rwanda moving from poverty ravaged country to medium income nation and

with ICT being ventured in, as a cross-cutting issue by the government of Rwanda as of 2000, with an aim of enabling the country to achieve her vision objectives (adopted 2000). The long term plan was adopted to accelerate development both socially and economically (RDB, 2011b:10). Rwanda's information and communication sector continues to grow with the backing of the political will of H.E Paul Kagame who considers the sector as a way for the country's economic development (Mwangi, 2006: 6; Kashorda et al., 2007:9; Kimanuka, 2009:88). Indeed, the country wants to transform itself from an agricultural dominated economy to an industrial oriented one (RDB, 2011b:13). Consequently, Rwanda has incorporating ICT into the country's policy documents such as the Vision 2020 as well as the medium term strategic plan-the Economic Development and Poverty Reduction Strategy (EDPRS) regarded as a catalyst for this cause.

## The Country's ICT strategies

As of 1998, the National Unity and Reconciliation government of Rwanda fostered an ICT for development course designed to execute plans and policies that could deal with the hurdles of the country's development, thus taking ICT as a means to accelerating the social and economic development process. And with regard to this, the ICT4D policy, normally branded as NICI, was adopted by the government, as of 2000 and later the development and implementation of NICI 1 (NICI 2005 plan), which was the beginning of the five year systematic strategies. (RDB, 2011b:14; Kimanuka, 2008:90). The importance of this policy was positioned on enhancing a better environment for the introduction of institutional framework for ICTs, establishing the required legal and regulatory system, liberalizing the telecommunication market; by reducing entry barriers to the telecommunication markets and efficient coordination and implementation of the systems.

The first National Information and Communication Infrastructure plan (NICI 1) started in 2001. It had objectives to transform Rwanda into an IT-literate nation; to promote and encourage the deployment and utilization of ICTs within the society; improve the civil and public service efficiency; develop the information and communications infrastructure of Rwanda; make Rwanda a regional ICT hub; transform the educational system using ICTs with the aim of improving accessibility; quality and relevance to the developmental needs of Rwanda; empower Rwandans by developing a human resource base that adapts to changing demands of the economy; develop the legal, institutional and regulatory framework, a structure required to support the deployment and utilization of ICT (RDB, 2011b:12; ITU, 2011:1).This was met by setting up institutional structures that provided a strong foundation for the functioning of these ICTs; importantly the plan revolved more on human capacity building.

The second National Information and Communication Infrastructure plan (NICI-2) that was recently completed looked at setting up a world-outstanding communication infrastructure, as a backbone for the recent and the next communication requirement. Various projects such as national data centre, increased nationwide coverage of telecommunication networks, centralized monitoring and operations centre versatile and high capacity national optic fibre backbone have been part of the completed projects (ibid.). This plan

fostered infrastructure development to enhance the growth of telecommunication for better network coverage which would ease communication systems and setup of better ICT infrastructures such as the national optic fibre that would tackle the internet connectivity problems.

A third plan (NICI 111 ) which will be followed by a fourth one, has of recently been developed and is in its early stages of implementation, with the aim of emphasising service delivery through the five focussed areas that are considered to energize continuity and growth. The plan is taken to be flexible, compared to the earlier NICI plans for the allurement of the rising technologies easy adaptation as well as sector change. The projects in this plan will be executed yearly and biannually as compared to the earlier plans where the projects were having a five year roll out, this is ensuring the easy adapting to the rising technologies and change in the country priorities (RDB, 2011b:12). In this case, the plan will look at enhancing service delivery through the use of ICTs, and these plans have been developed in such a logical way that will enable the transformation of Rwanda from an agrarian nation to a knowledge based country.

**Figure 1: NICI process to date**
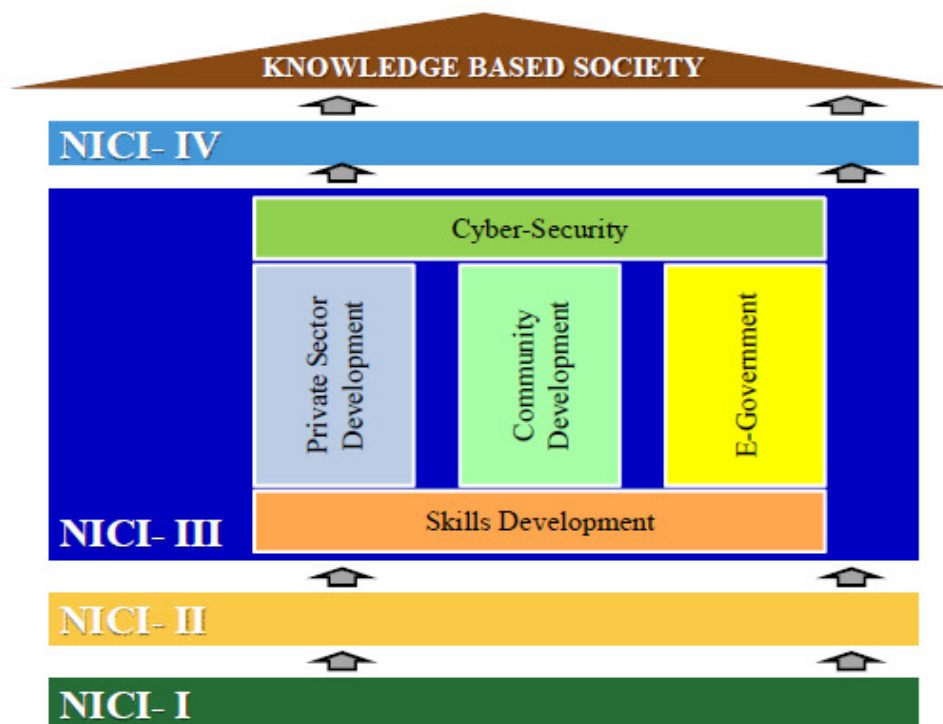


Source: Adopted from RDB (2011b)

Figure 1 illustrates NICI framework, beginning with NICI one (2005) which was laying ICT institutional structures as the fountain for the establishment of ICTs, then NICI 11(2010) which was much to do with the deployment of the communication infrastructure, followed by the current NICI 111 (2015) which is aimed at service delivery development through skills enhancement focusing on the private sector, community and E-government develop-

ment as well giving priority to cyber security concerns and lastly the fourth NICI plan (ibid); and thus all these will guide Rwanda to becoming a knowledge based society. In a nut shell this framework summarises the process of Rwanda National Information and Communication Infrastructure (NICI) development plan phases.

## Current ICT status in Rwanda

People's life styles have been transformed by the use of ICT; for instance internet has provided employment to many, and increased people's standard of living thus leading to economic growth as well as poverty reduction. Also, liberalised telecommunication network attracted mobile telephony players such as MTN Rwanda cell, Rwandatel, and TIGO, ensuring the seeing of broadband internet connectivity almost suitably within people's means, via ADSL (Rwandatel) and 3G technologies (RDB, 2011a:10). The country's common figure of individuals for each fixed phone is constant at 0.3 per 100 people as compared to the cellular phone density likely to attain 40 per 100 people by December which implies that there are more mobile phones than fixed.

In figure 2 mobile phone subscription continues to grow at a constant rate for years 2002 to 2006. And, then a sharp increase is realised for the consecutive years which could be an indication of an increase in mobile penetration (ibid). As for figure 3, it illustrates internet usage rate, growing at a still rate which is followed by a sharp increase and later increasing steadily. Comparing the two graphs, the mobile subscribers seem to be increasing faster than the internet users, which could be a reflection in growth of mobile telecommunication sector attracting many phone users than internet users.

**Figure 2 : Mobile subscribers   and  Figure 3: internet users per 100 inhabitants**
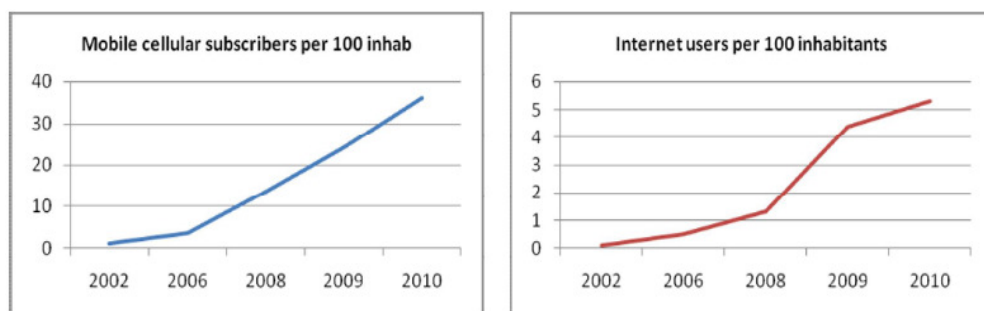


Source: Adopted from RDB (2011a)

In September of 2010, cellular mobile telephone subscribers were about 3.615,467 for all operators and the internet service coverage has been extended so far to most of the main towns of the country via GPRS and 3G technologies which has been provided by similar providers (RDB, 2011a:12). In addition, the sum of local websites improved as of 2000; above 38.9% public institutions possess their existence on the website as compared to 34.5% of the private institutions. Clearly, this is expected to solve internet connectivity problems as well as ensure quality service delivery within different administrative levels of the country.

Likewise, around 300 internet cafés were operational by 2008 and 65% were identified to be located in Kigali city plus, other 35% in other parts of the country. And, providers of inventory terminal equipment were evidenced in Kigali, with 79 end-user sellers and providers on terminal equipment realised to be 93% in the District of Nyarugenge (RDB, 2011b: 10; RURA, 2010:57). As evidenced, the majority internet cafés are located in Kigali city, implying that it has more internet users than the rest of the country that shares only 35% of the internet cafés, and this maybe a reflection of an urban-rural digital divide.

## *Major Telecommunication operators*

MTN Rwanda started its operations in 1998 and continually expands it coverage by providing inventive products and services through maintaining the current progress in telecommunication. This firm has currently been implicated in most network infrastructure ventures for instance updates of GSM network, expansion of fibre optic backbone around Kigali capital and other main towns in the peripheral districts. It has again established hotspots in the capital of Kigali for fast accessibility of internet (GPRS and 3G services) (RDB, 2011a: 10). The second is TIGO which has of recent been launched and this firm operates in about 13 countries with 7 in Africa including Rwanda, 3 in South America and 3 in Central America. The other operator is Rwandatel providing ADSL internet connectivity and internet broadband connections to its users (ibid:10). In this case the internet and telephony can be used for different things including SMS access.

**Figure 4: Repartition of mobile phone subscribers by providers in 2010**
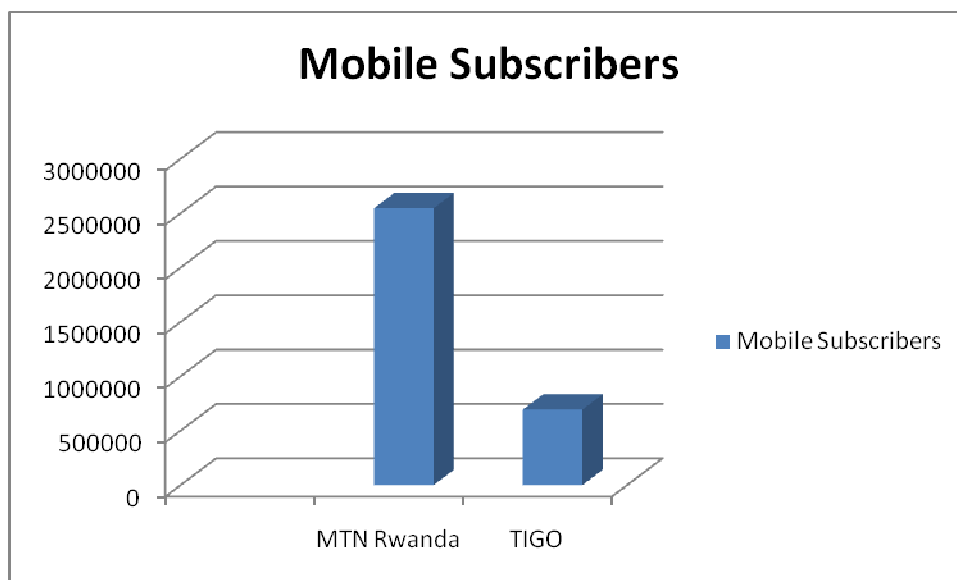


Authors Illustrations from RDB (2011a)

In figure 4 it is evidenced that MTN has over 2,000,000 subscribers compared to about 695,072 mobile subscribers of TIGO (ibid.:10).Comparing the figures, the former triples the latter, which indicates how the mobile telecommunication is almost monopolised by MTN, thus having the big mobile market share.

As it is indicated in Figure 5, MTN is the leading internet service provider with above 70% market share followed by Rwandatel having about 15 % and other ISPs such as NEW ARTEL, ALTECH stream, ISPA and, Value data Rwanda hardly exist (RURA, 2010). This is probably an indication that MTN has a greater penetration rate with more internet users which could be a reflection that it again almost monopolises the internet market.

**Figure 5: Internet Service Providers versus the market share**
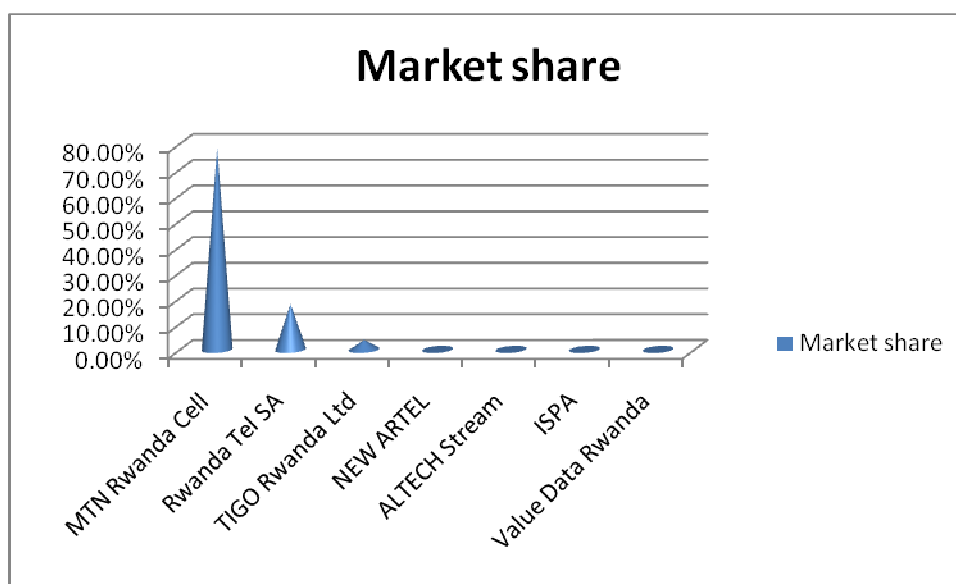


Authors illustrations from Rwanda Utility and Regulatory Agency (2010)

**Table1: ICT Household indicators related to telephone accessibility, computer and Internet**

| Indicators | Population Census 2002 (%) | Scan 2006 (%) | RURA 2009 (%) | RDB 2010 (%) |
|---|---|---|---|---|
| Proportion of HHs with a fixed line telephone | 0.2 | 0.2 | 0.3 | 0.3 |
| Proportion of HHs with a mobile cellular telephone | - | 11.4 | 28.4 | 29.5 |
| Proportion of HHs with a computer | - | 0.2 | 1.6 | 2.3 |
| Proportional of HHs who used a computer (from any location in the last three months) | - | - | - | 3.9 |
| Proportion of HHs with internet access at home | - | - | 1.1 | 1.8 |

Source: Adoption from RDB (2011a)

As it is indicated in Table 1, there was a continuous percentage increase in the number of HHs with accessibility to cellular telephones from 2002 to 2010 shifting from 11.4% as of 2006 to 30% in 2010 (RDB, 2011a:13). The households owning computers shifted from 1.6% to 2.3% by 2010. The constant fall of computer and cellular phone prices, could have raised the level to

purchase the technology devices, hence the increase in the ICT diffusion (ibid.). Additionally, the affordability of these devices could be a reflection of the slight increase in accessibility of internet by households at home as of 2009 (1.1%) to (1.8).

As revealed in Figure 6 below, Kigali city possesses the uppermost percentage of HHs (46%) that use cellular phones in texting SMS. The second is the Western province, having 26%, followed by 11% HHs of the Eastern province (ibid:88) and Southern as well as the Northern still lag behind. Generally, the percentage of SMS sending is still low in other provinces as compared to Kigali city, which probably is either because of a low mobile penetration rate in the rural provinces, illiteracy that could be limiting SMS usage or could be that mobile phones are used for other purposes; for instance there are individuals who may be comfortable calling rather than SMS texting.

**Figure 6: Repartition of HHs that have sent SMS using mobile phones**
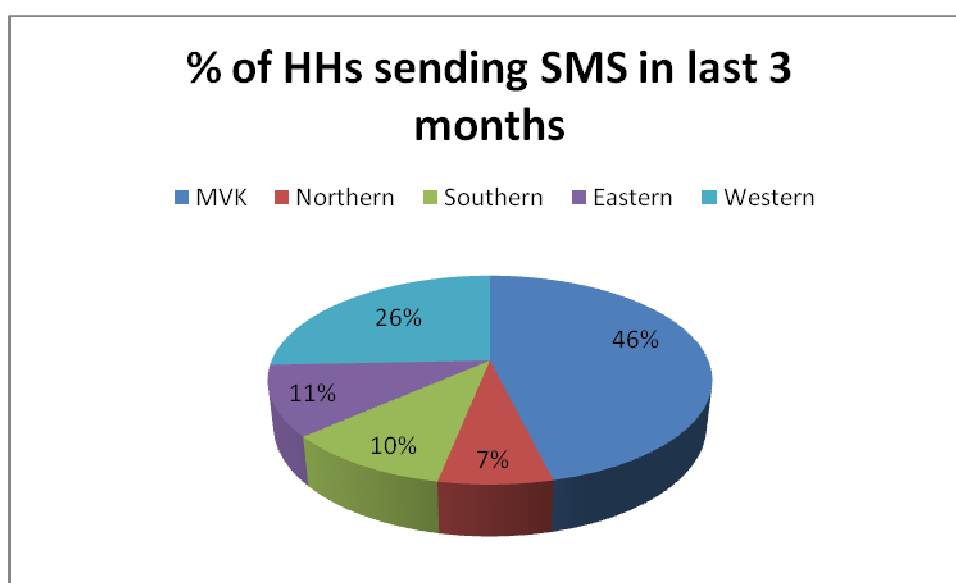


Source: Authors own illustrations from RDB (2011a)

In table 2, according to the 2010 Rwanda ICT baseline survey, there is hardly any recording of radios, computers and TV sets (imported) to Rwanda. Nonetheless, the 2002 Rwanda population and Housing Census indicated that 61.4% of urban inhabitants (HHs) owned radio and indeed by 2010 the accessibility rate in urban places was 95% (RDB, 2011a:13).Whilst, in the rural places it was about 40% in 2006 and by 2010 it had increased to approximately 74%. The share of TV, sets is strong in the main Kigali capital, having 7% of HHs that confirmed owning a TV of which, the majority may be able to meet the costs of the devices as well as able to access the electricity power. Comparing, the urban and rural figures in accessing information using different ICT equipments reveals that rural areas still lag behind which signifies an urban rural digital divide in ICT application accessibility and usage.

**Table 2: Illustrates ICT Household Indicators (Radio and TV sets)**

| Indicators | EDS 1992 | POP 2002 | SCAN 2006 | RURA 2009 | RDB 2010 |
|---|---|---|---|---|---|
| Radio sets per 100 inhabitants (Urban) | 52 | 61.4 | - | 71.6 | 95 |
| Radio sets per 100 inhabitants (Rural) | 30.5 | - | 39.8 | 45.8 | 74.3 |
| Television sets per 100 inhabitants (Urban) | - | 0.9 | - | 5.7 | 6.9 |
| Television sets per 100 inhabitants (Rural) | - | 0.01 | - | 0.8 | 0.9 |

Source: Adoption from RDB (2011a)

RDB (2011a) illustrates that 4 households acknowledged that ICT had improved their wellbeing by raising their incomes in the case of those that were in the correlated business. As it is shown in table 3, the proportion of households that declared ICT to have improved their quality of life is greater in Kigali city with 91.3% followed by the Northern Province (86.3%), Western (82.7%), Eastern (80.5%) and lastly, the Southern Province (63.3%). This is also reflected with in districts in that HHs in Kicukiro of Kigali tops the rest with 97.5% declaring ICT to having improved their quality of life as compared to the lowest districts such as Gisagara of Southern Province with the lowest percentage of HHs declaring ICTs to having improved their livelihood (ibid). This shows that it is actually only those people who are dealing in ICT or in related business that are directly benefiting and not people who are using these ICTs.

**Table 3: Proportion of households who declared that ICTs have improved their quality of life**

| Provinces | % of HH | Topping Districts | % of HH | Lowest Districts | % |
|---|---|---|---|---|---|
| MVK | 91.3 | Kicukiro | 97.5 | Nyarugenge | 81.3 |
| Northern province | 86.3 | Rulindo | 90.0 | Gakenke | 82.5 |
| Southern Province | 63.3 | Ruhango | 76.0 | Gisagara | 35.0 |
| Western Province | 82.7 | Ngororero | 97.5 | Rutsiro | 67.5 |
| Eastern Province | 80.5 | Nyagatare | 90.0 | Bugesera | 71.3 |
| National | 80.8 | | | | |

Source: Adoption from RDB (2011a)

## *How ICTs have been integrated to help rural small scale farmers*

The agriculture sector in Rwanda, tops in providing employment and is a source of incomes for the predominant poor. Therefore poverty alleviation relies on increasing the production in the sector by the help of technology and enhanced market accessibility (Nyamurinda et al., 2010:2). Having this in mind, previously the department of planning and Statistics in the Ministry of Agriculture and Animal Husbandry applied a paper based system of price search in which textual coding system for products was done manually, with information collection done in a fortnight basis, and information from the 37 markets found in the country, was gathered on paper forms and faxed for processing, analyzing and validation through the Ministry, then transmitted on print media and internet (Musonera, 2011). There after a provincial, district market tabulation was produced and disseminated to various users through messenger or an electronic mail or even wall postings market centers. In addition, this system was met with various challenges like distribution of outdated information-the collecting, aggregating, analysis of the data for distribution was a tiresome process and, the system was expensive in terms of distribution and transmission as well as limited accessibility to data by the main target group (ibid.). Subsequently, MINAGRI and RDB through the former e-Rwanda project, funded by the World Bank, joined efforts to apply technology in providing a solution by increasing accessibility to help in updating agricultural product market price information through the development eSoko.

As earlier stated, eSoko is an ICT project initiated to empower farmers by enabling them, make more informed market pricing decisions and ultimately more successful farming through speculating what crops to grow and what prices to charge at harvest (MINAGRI, 2009). The initiative leads to elimination of exploitation by middlemen, and enables their (farmers) interactions with the Ministry of Agriculture, since the majority of Rwandan population earn their living, directly or indirectly, from agriculture and mostly through subsistence farming.

Map1-demonstrates 37 markets that were first piloted in the country before the operation of eSoko which is accessed through the mobile phone instrument for SMS as well as internet and via the web for those with computers. Farmers are said to have participated in eSoko design as said by the project system administrator, "farmers were engaged in this eSoko exercise". The Pilot study was done to find out markets where it would function before extending it to other areas and to check on whether farmers would use it as well as the entire public, thus this was a way of mapping out places where eSoko would function to its best before enrolling it other markets.

**Map1 Demonstrating open markets piloted before eSoko operation**



Adopted from e-Rwanda project (2009) unpublished

According to MINAGRI, there are now 50 markets (i.e. 11 in the Western Province, Northern Province 8, Eastern Province 11, in Southern Province 14 and 6 in Kigali) so far that have been covered by eSoko. A total of 15 market agents were hired by the MINAGRI to enable the daily collection of commodity information using smart phones. Indeed, most of these open markets as figures indicate are situated in four provinces of Rwanda and only 6 are found in Kigali capital (Musonera, 2011). Markets operate on different days except for Kigali City markets that happen daily and, thus this affects the quality of data collected for dissemination since the accessibility of daily information is un reliable due to the time lapse of the market operation in the rural areas.

## The aspects and functioning of eSoko System

Alerts and reminders that are considerably automated get back to the market agents and officials of the Ministry of agriculture in a systematic and timely way (Musonera, 2011). Thus, enabling farmers and the public to access the recent agricultural product price information of the commodities registered in all main open markets. Farmers/traders access current agricultural commodity prices information of registered commodities in all major open markets in Rwanda through SMS, IVR & Web. Also, real time trends for product price

information is accessible by the MINAGRI through indicating and reporting for standard analysis and access to data mapping and major reporting or commodity charts-markets are accessibly web viewed.

Figure 7 illustrates a Voxiva platform used for various functions like multi-channel access, interactive communication, data collection, real time data analysis and decision support, flexible configurable platform, supporting many usage case, hosting managed service, web service integration, plus other systems which are controlled by the same multinational firm (Voxiva) via phones and computers in accessing SMS and internet through the web (ibid.). There is hardly domestic technology used in this case but rather a representation of foreign technology controlled by a foreign company providing services to a domestic institution in this case MINAGRI.

**Figure 7: Illustrates the eSoko Technological Overview**



## Technology Overview

- Multi-channel access.
- Interactive communication.
- Data collection.
- Real-time data analysis & decision support.

- Flexible, configurable platform.
- Supports many use cases.
- Hosted, managed service.
- Web services integration with other systems.
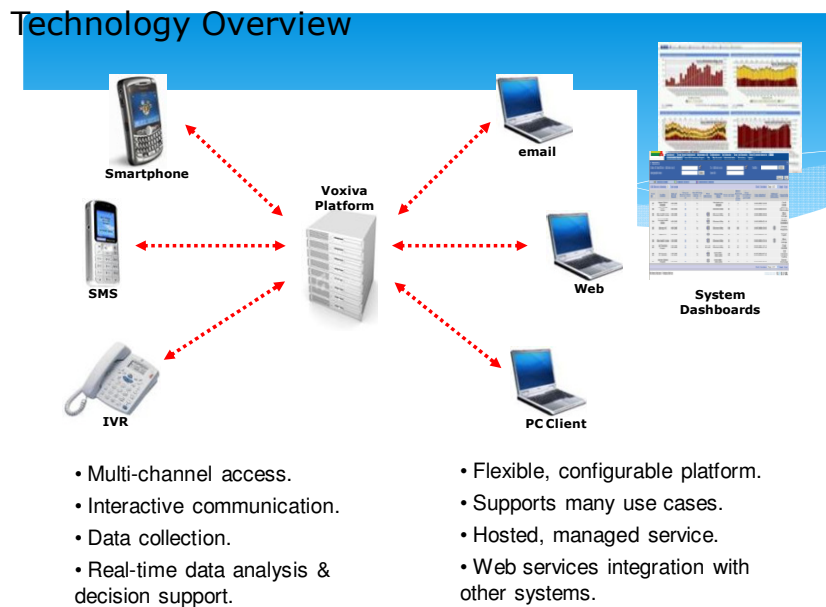
Adopted from Musonera (2011)

Information from MINAGRI project office indicates that eSoko market agents collect commodity price information from all the markets, then uploaded on the computer systems and smart phones through Voxiva support and users are able to access the information by web internet based subscription and through texting an SMS. A total of 78 main agriculture products are covered, through agents collecting and submitting the market price data each week.

### *Guidelines to eSoko accessibility*

The system, functions via a mobile phone as an instrument for texting and receiving a message (SMS). And for accessibility, you type "price (space) market name (space) Commodity name" then you send the text to 7656 which is the short code number of market information access (Musonera, 2011). There after, a farmer/public trader would be able to have immediate automated feed back with the current price for each unit of the product. It is again accessed using the web of which you can access through URL www.esoko.gov.rw link, for the product prices that are of recent. Available commodity reports are weekly and monthly.

In concluding the chapter, ICT infrastructure development is an important determinant for the functioning of ICT applications such as eSoko, since its accessibility depends on the internet and SMS through mobile telephone. This has been set up by the government of Rwanda through its ICT4D plan and through operators such as MTN and Voxiva firm coming as players, despite the fact that these MNCs monopolize and control the technology used for eSoko operation.

# Chapter 4: Findings and Analysis

## Introduction

This chapter first explains government players such as MINAGRI and RDB, then multinational companies like MTN and Voxiva and talks about their roles in the design of eSoko. Secondary, it reveals structural issues such as literacy, communication infrastructure, as the main disconnects between the design of the project, and the reality functioning of farmers. Interviewees were drawn from Kigali key respondents and, the districts of Rwamagana, Ruhango and Musanze, whose community is characterised by subsistence peasantry life, illiteracy, and isolation for they are far away from the main towns. They struggle hard for survival; have no electricity, no internet, some roads are hardly passable by public transport due to being stony and hilly. Most of these farmers have an open mind towards the use of ICTs, even when the mainstream community hardly get into contact with technology. Lastly, a conclusion of the findings is made.

## Actors and their roles

The public institutions such as MINAGRI, RDB and private firms like MTN and Voxiva have been the key players in the design of eSoko. In this case each institution tries to pursue its own interests. For instance the government has a role of acting as an enabler for the business environment as well as ensuring that farmers are empowered with market information. On the other hand, the multinational companies aim at expanding their business through companies like MTN increasing their profit margin by increasing the number of subscribers as well as SMS senders, of which the same applies to Voxiva as a private firm.

The government role through its institutions such as MINAGRI and RDB has been fostered as to empower farmers with information through initiating the design of eSoko as well as ensuring its sustainability through meeting costs for its maintenance as Wilson said, "the government has been investing a lot in the eSoko through MINAGRI to ensure the system maintenance and support from Voxiva[2] as well as through employing eSoko market agents, since the project is no longer funded by the World bank, as previously before the phasing out of eRwanda project". From the respondents' comments, this is an indication that the project was initiated to help farmers increase productivity as well as their incomes through information access and providing employment to its citizens. On contrary, the government plays a role of providing an ena-

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[2] This is the firm that was also involved in the design of TRACnet Rwanda http://www.voxiva.com/content/case_studies/Rwanda%20Ministry%20of%20Health.pdf, accessed 27 October 2011

bling environment for firms like Voxiva even though it spends a lot in hiring its service which could be an indication of the government lacking capacity to maintain the system.

A part from that, the government reports indicated that other government institutions that have been involved were the Ministry of Commerce/Directorate of Trade responsible for setting up a trade Information System whose objective was to ensure that the systems interoperable for sharing information to prevent the replica of data collection. The other stakeholder is the National Bank of Rwanda (BNR) whose responsibility is to publish the consumer index, which is calculated from agricultural and other types of products, and the National Institute of Statistics of Rwanda (NISR) whose mandate is to conduct various actions in the agriculture sector such as surveys and collaborate with BNR in developing the CPI. In addition, the Regional Agriculture Trade Network (RATIN), East Africa Grain Council (EAGC), and the National Institute of Statistics/ GDP and household living conditions Survey depend on eSoko application data. Thus, this probably illustrates that the project was designed to meet governments' interests such as enabling it to collect data, monitoring and analyzing of markets, which works as a guideline in taking policy decisions, rather than those of presumed intended users, who in this case are the farmers.

Nevertheless, the government reports indicated that eSoko registered some achievements since 2009 when the system was launched. For instance, there were 40437 users of SMS and 6268 web users had been recorded. The number of markets covered in the country increased from 37 to 50 and the listing of commodities increased from 47 to 78 products, which presumably accounted for the increase in the number of SMS sent.

**Figure 8: eSoko SMS recorded between the years of June 2009 to April 2011**
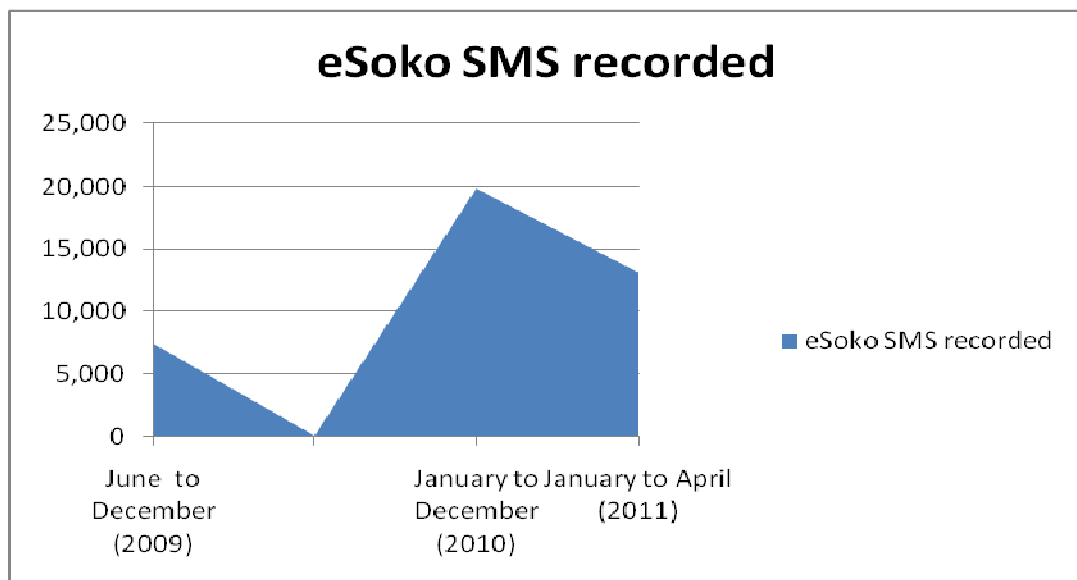


Authors own illustrations from Musonera (2011)

Figure 8 illustrates an increase in the number of SMS sent since the launch of the application with about 7,431 SMS sent from June to December (2009), which increased to about 19,862 in 2010 and 13,144 as of January to April (2011)-all totalling to 40,437 SMS accounted to have been sent by both farmers and the public. This might be an indication that the application is continuously becoming common among users.

The other actor is MTN[3], which is a multinational national company owned by South African firm in partnership with the government of Rwanda[4]. The firm's mandate is to provide an SMS and internet service for eSoko access to its clients. There is need to note that it is the same service provider for eSoko in Ghana, at the same time it is a telecom partner with Voxiva as illustrated on the Voxiva website link[5]. This company as the earlier chapter indicated, has the largest internet market share and the highest mobile penetration rate in the country; thus having the majority subscribers, as Wilson explains, "MTN has been the main beneficiary of eSoko because it has got many customers who subscribe to the system and it is the only service provider for eSoko accessibility". This probably indicates how eSoko has addressed more of the MNCs' interests than the interests of the intended poor farmers and the public. This could possibly be another form of exploitation by the MNCs to the users such as the rural poor farmers, because they get charged for sending an SMS or using internet. On the government side, it could be benefiting in terms of taxes paid by these MNCs which probably leads to growth and development of the country. On the other hand, it illustrates how MTN monopolises the market as a sole provider since other subscribers using other networks such as TIGO can hardly access eSoko as it is reported by Wilson, Jules, and the Voxiva project manager, "Presently the users of the application are MTN customers, of which other mobile telecommunication network customers are unable to access it because Voxiva supports only one carrier and there isn't an aggregator to allow other eSoko providers". Arguably, this could also lead to poor service delivery for instance network failure.

Another private firm involved as earlier indicated is Voxiva. This is an American company that was charged with the architecture of eSoko and it is their consultancy services that were hired to carry out a needs assessment as described by Wilson's comment, "A Voxiva consultant was hired to carry out a needs assessment with farmers before the design of the project, apart from that, MINAGRI is still seeking its support in the maintenance of the system". Voxiva played a role in the design and maintaining[6] of eSoko, which implies

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[3] MTN is the same sole service provider of eSoko in Ghana (see in Akkermans, 2010: 7)

[4] In the words of H.E Paul Kagame the president of Rwanda, "This company, which is a joint venture between Rwandans and a South African firm, has become the largest taxpayer in our country. And the ICT sector in general has surpassed all other fields to become the leading wealth creator in our country" ( Kagame , 2008: 3)

[5] http://www.voxiva.com/company/partners/partners.html, accessed 25 October 2011

[6] http://www.voxiva.com/services/serviceSupport.html , accessed 22 October 2011

that the government through MINAGRI has not yet been equipped with the capacity to maintain the project which could consequently lead to a continuous dependency on Voxiva services because of the complex foreign technology used rather than the indigenous. As illustrated in the earlier chapter, this may lead to a problem of exploitation as well as sustainability challenges, since the government continuously spends on Voxiva to maintain the system rather than building the capacity of its staff to maintain the application. At the same time, it fosters the MNCs interests more than the intended users' interests.

### Challenges in the implementation of eSoko

According to one of the policy maker informants interviewed, ownership of the system has been a challenge as its adaptation was not as fast as possible. The sensitization, mobilization of its use has been slow among the rural communities even though it is claimed that there has been awareness and sensitization campaigns using telecentres, publicity on TV, radios and ONATRACOM buses that head to rural areas as Grace explains "We have faced a challenge of ownership that has been slow than expected due to lack of enough sensitization and mobilization campaigns. However, the project is now in the hands of MINAGRI which has the capacity for the implementation of the project; as a Ministry that deals directly with the rural farmers, and sensitization campaigns are being done through radios, TVs and ONATRACOM buses going to rural areas". Nevertheless, the information received from RDB/ICT respondent indicates that there is anticipation that MINAGRI as the current owner of the project has the capacity to sensitize the system usage for the rural farmers benefit. On the other hand, one should not ignore the fact that ownership challenge could be a problem of not involving the users during the designing of the project. Also, the mere stickers on buses moving to rural places doesn't imply that everyone is able to read the message, for example a rural farmer without knowledge of how to read and write could think that these are just usual advertisements.

## Literacy and Text Messages

During my field work, I found out that most of these rural farmers from Rwamagana, Ruhango and Musanze hardly used or knew what eSoko is. For instance, Niyibizi and other farmers' comments were as such, "How can I know of eSoko when I have never seen anyone teaching us about it, how it is applied and used?" This is an expression of surprise by small scale farmers interviewed during my fieldwork after going to their area as I inquired about their awareness on the eSoko ICT project delivered by MINAGRI. According to them, they had never seen anyone going to their areas telling or asking them about ICT or even eSoko. The reason for not having known about the application is that, they have never got any opportunity of being taught about eSoko or even sensitized about the application and how to use it. They noted that the discussions which dominated their rural farming community were on land consolidation, use of fertilizers, security and healthcare insurance and so on. This is in contradiction with the earlier statements from the technicians and policy makers who claimed that farmers were aware through the eSoko advertisement.

This illustrates that probably, the approach of intervention was not the best or not all farmers were able to understand the information passed to them. Subsequently, this demonstrates how such poor farmers consider themselves as digitally isolated as well as valuing being knowledgeable first as a key factor that would lead to their adaptation of the ICT application, because in most cases even the educated get to be trained before the adaptation of such complicated systems. Debatably, this could also point out a mismatch between farmers' expectations with those of eSoko project designers.

On the other hand, a few of them had heard of eSoko via the radio advertisement. Even though, hearing of information and using it are totally two different things because they could be unable to use it, as they had never received any training on how to use, interpret and translate information received as to take the products for sale. Such small scale farmers regard eSoko to be for those capable farmers with means to transport and sell commodities to a far distant place at better prices, thus the notion as Amina demonstrates "we hear it on radio advertisement but I have not yet used it because we have never received any awareness on how it is used and my commodities are "petit". So I usually sell them in the near by markets because I have no means of taking them to distant markets for better prices and sometimes, I leave them for home consumption". This reveals that, Amina and other poor farmers interviewed, transporting commodities to the main markets could be more of a pressing issue than knowledge of market prices accessed through eSoko. In this case, this questions the capability of how ICT can empower poor farmers to come out of poverty since the usage of such application differs among people. For instance the way the poor rural small scale farmer would benefit and use eSoko is different from a policy maker, large scale farmer or trader that is able to afford transport costs for his/her commodities and the way information is interpreted, received and put to use differs in time as well as scope. This probably, sets up a contradiction with the earlier claims made by intelligentsias within the government institutions that the project was empowering and being put to use by rural farmers. Nevertheless, there could be other vital needs to be met by the poor than the use of the application, which in the due course could make farmers lag behind in terms of ICT usage due to limited means. There is still lack of ICT skills arising from lack of information and training in preparation for the adaptation of the new ICTs which could be a barrier for these ICTs.

For those that had heard about eSoko on the radio and the majority that hardly knew or even heard of it, reading and writing a message was a problem as many of them were graduates below primary six level[7] and thus the illiteracy could have limited eSoko usage, as it requires one to read the received automated messages or, write when sending it. For example, most respondents attributed the lack of awareness to their illiteracy as one Nireganya explains, "I don't know eSoko and I have never used my phone for the message sending, but only calling and receiving calls; I think it is because, I have never gone to school or even received training on ICT because even when I want to read a

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[7] Rwanda's literacy levels are (% of population age 15+) highlighted to be 70 (World Bank, 2011a: 1).

message on my phone I have to first get a friend to do it for me even when it is a secret". Possibly, this could be limiting opportunities to these rural small scale farmers. Nonetheless, this counter opposes the administrative reports that indicated the project achievements of 40437 SMS, as registered since eSoko launch in April 2011; as earlier shown in the chapter, one would ask the source of these SMS. There was no specific mentioning of the senders or receivers and statistics indicating the category of eSoko SMS users, could not indicate whether they were from farmers, policy makers, traders or any other person which is a question to be posed. Data consistency and reliability provided by the application leaves doubts on the importance of the system to the intended users. The majority of rural farmers like Nireganya hardly use the system due to illiteracy and lack of information about the project, which assumingly makes them excluded from the benefits of ICT projects. Consequently, this might limit the diffusion of ICT projects in rural areas since most of these districts visited, the community telecentres which could have been considered to be helpful in educating these farmers, appeared to be located in distant townships of the districts and are speculated to be used by a few elites and the youth during school vacation. This postulates to us the importance of educating the rural community most especially the users of the project before its implementation, otherwise eSoko is mostly likely to benefit only those who can read or write and these in most cases are urban dwellers.

The system involves a lot of coding specifically for the web page, it involves the commodity code, market code and requires for those with mobile phone, to be able to type, for instance to type in price (space), market name (space) product name before sending an SMS and then send to a short SMS code 7656 and an immediate reply would be received showing the product average unit cost and the specific market is indicated in ones' cellular mobile phone as explained by one of the eSoko market agents Denyse, "each market has its own code and its own day of operation and so when you type the message you get the price of two days back because that is the day I work on that market and within that period some times the prices are same and hardly change after the two days".The steps involved in accessing this market information using eSoko for a small scale illiterate farmer may be more complicated to use. However, even those who are able to use it can barely get prices of that particular day. They instead access prices of the day after the previous two days, which could be affecting the reliability of the application usage and confidence of its users. Prices for some crops keep on changing and apart from that, not all commodity prices are accessible, only 78 products have been registered in the system. On the other side, this doesn't imply that when a farmer takes his/her commodities for sale in the market he/she would immediately get buyers as a result of the constant prices.

**Figure 9:**
**A photo illustrating directives in the local language on how eSoko SMS is accessed**



Authors illustrations from field work (2011)

## Technology and affordability

Most of the small scale farmers interviewed barely accessed electricity[8] used for charging their phones, and this made them walk long distances to access electricity. For instance, farmers from the three districts such as in Nyamiyanga village of Ninda cell of Musanze and those in Rubona cell of Ruhango district, explained that they could walk and spend 100frw to have their phones to be recharged. In addition, not all farmers had the means or were able to afford the cost of maintaining a phone. Another example is that the fee charged every time the phone had low buttery, was unaffordable. More so, the majority could barely meet the costs of buying top up cards for loading on their phones or even buying a phone. The majority were too poor to afford phone expenses which made most of them to use "call backs", locally known to be the free message sent when one is financially constrained with no credits to call and needs to be called by a friend. Others, could buy "me2U" units of 100frw or be given units by a friend, as charges to top up their cellular mobile phones appeared "exorbitant". Yet, a kilo of cassava was at the cost between 50 to 100frw as told by the farmers interviewed during my study; Mupenda said, "I buy a me2U worth 100frw or sometimes use call backs. When power is off I go to Kiningi centre and pay 100frw for charging the phone, and it takes 2 days for the phone to be put on the charger as it depends on the number of phones one finds at the charging place. This is costly and inconvenient for all my programs of the day because I need to communicate to my friends and continue working in my garden as well as being accessible online". These are survival mechanisms of getting connected to the rest of the country experienced by the majority small scale farmers; they are unable to keep up with the costs of technology and are unable to have electricity in their homes. Therefore, eSoko being accessed through mobile phone could either be a link or de-link experienced by rural farmers in accessing market information due to the fact that it even consumes more than what the majority small scale farmers earn from their products as detailed in table 4. Also probably, such applications could be enriching MNCs like MTN rather than the intended users as previously illuminated.

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[8] RDB (2011a:21) illustrates the percentage of HHs with accessibility to electricity power to be 11.8%

**Table 4: Shows the approximate costs incurred by a farmer in owning a phone**

| ITEM | COSTS | COMMENTS |
|---|---|---|
| Mobile phone for using to SMS | 10000Frw (Minimum price) or renting it at 100Frw | For SMS access a farmer is required to buy a phone |
| Electricity for Charging phone | 100Frw (Minimum) | To SMS a farmer needs a electricity to charge his phone |
| Airtime Card | 500 (Minimum) | A Farmer also needs Air time loaded for sending SMS |
| Me2U | 100Frw (Minimum) | The majority of farmers buy Me2U as a survival means to reach friends because airtime cards are too expensive for many |

Authors illustrations from field findings (2011)

In some cases, farmers resorted to the sell of their mobile phones because of lack of income after realising that it was costly maintaining the hand set, for instance one of the farmers, Michael who is a village leader in charge of social affairs and he had spent one year owning a phone but decided to sell it because he had other priority needs to meet such as using the money for "mutual health insurance" as he explains, "I first came to know mobile phones through others, then I bought it and owned it for one year because of its usefulness; but I decided to sell it since I became poor and needed to address other needs, (...). Even though, I have ended up making long journeys to the market and the trading centre looking for traders to buy my cassava, yet I could have called using a mobile phone for the traders to find me here (home)". Others reported that it was worth using the money to buy scholastic materials that mattered more, despite the phone being credited for its importance in rural places; For example they use phones to call fellow farmers, friends and traders which most likely improved their social interaction. Others have to sell their phones due to limited financial means and lack of options for ICT instruments. Farmers who are considered to be leaders would end up missing important information for transmitting to the rest of the community due to the costs involved in phone maintenance. This most likely reduces their self esteem and brakes the intermediary means for the majority of the rural who usually consider their leaders as the source of dependable information.

### Internet, Content and language disconnect

Infrastructure, for internet connectivity is hardly evidenced in the villages visited due to electricity power problems as experienced by many farmers. Majority barely can tell what internet means or personal computers. For instance, Jacqueline aged 50, is farmer who has been to "Duterimbere" micro finance Bank in Gitarama and assumes that it is places like micro finances where one can find internet. She saw the officials in the bank with computers, which she considers to be the internet, as her comment highlights "I don't know internet, but when I went to Gitarama in a Bank, I saw a lady serving me trying to press a machine, then later she gave me my money so, I don't know whether that is

the internet". On contrary, eSoko project reports indicates web page users to be 6268, ignoring the fact that most of the farmers are unaware or are hardly able to access internet and even though they were to access it on their phones there still remains a challenge of illiteracy. There is lack of phones and even not all phones owned by most of these rural farmers in the three districts are able to access internet; plus the heavy cost of accessing it, since even the elites themselves would find it heard to use mobile telephone internet because in most cases the expenses are even much higher than the SMS. In most cases, internet is even more intricate to understand by the educated people and so this raises doubts on how this can be user friendly to rural illiterate society. This shows how complicated it can be for a poor farmer to use internet while accessing eSoko. And apart from that the system involves entering codes before one receives a feed back message regarding the market and price of the commodity. This could be a complication of its own for an illiterate farmer, which could probably end into a "digital divide" leading to inequality between the elite, educated and the poor rural farmers as the content in most cases barely suits even their local needs but rather foreign and elite desires.

To add on, the content in most of these ICT communication instruments are either irrelevant or written in English or French languages which alienates farmers from using such ICTs; since many of them (rural farmers) speak the local language. One of the respondent I interviewed, Habimana noted, "Some of us cannot read the language used in these mobile phones, some times they are in English or French and for un educated people like us it is always difficult to read what is being communicated. So even when there may be Internet message about eSoko, it could be hard for us to use it". He additionally, requested me to assist him by showing what internet was on his phone but, when I tried to check on it the content was in French and we were both limited to access the message due to language barrier because, he knew only Kinyarwanda and I knew both Kinyarwanda and English. None of us knew French. So, he asked me how a poor illiterate farmer leaving in deep rural villages could know such foreign languages used in the technology equipments, yet even the educated were limited in using them. Presumably, this illustrates how biased internet access is, especially to the rural illiterate farmers who are unable to read in foreign language, hence limiting eSoko access. This also sends a message that this approach is apparently more used by the elites or it was designed to suit foreign interests rather than local desires because how a local illiterate poor farmer translates the content and the foreign language used in such an ICT application in order to increase his/her yield, incomes and alleviate poverty for a better wellbeing is still questionable.

## Tradition and Culture

New innovations are considered to be easily adapted by the majority rural as evidenced by one of the key informant officer in charge of the Agricultural Market Information System, speculating that unawareness of eSoko by most of the farmers could be either because of the ignorance or sticking on their tradition and culture as Angelic explains; "Many of our people have a tradition of being resistant to change and so when a system is new its adaptation is usually slow and gradually diffuses as a process". This could possibly portray her own

urban educated elite bias towards rural farmers rather than the reality on the ground, since the earlier expressions by the majority rural small scale farmers as interviewed, highlighted the problem as not being cultural or traditional resistance but rather that of more structural problems like costs, literacy, infrastructure that are beyond their capability for ICT application usage.

## Gender and ICT

It was observed that some male farmers interviewed mainly in Musanze district walk with IT equipment owned at home, hereby having more access to information than their spouses. For instance in figure 10 "Leonard" moves with his radio and mobile phone both when in the garden or elsewhere, leaving the wife at home without any ICT gadget for receiving or passing on information. This domination renders women to be reliable to "information poverty" which could lead to their poverty as compared to their male counterparts. As a result of being less aware of what happens within their location or country except when informed by their husband or friends. Clearly, eSoko in this case would be benefiting men than the women, yet it is always women that get involved in the farming. But, bargaining with traders or even taking these commodities to market is always done by men. For example this study reveals that it is mostly men that were interviewed within the farming communities of Ruhango and Musanze except for Rwamagana, since these farmers operate under cooperatives. These women from the two districts were observed to be shying away from being interviewed and referred me to their husbands saying that it is their husbands who got engaged in price bargaining with traders. This implies that eSoko is likely to empower men than women which leaves women "digitally poor " and excluded from acquiring information which most likely confines them in only their locality without knowing what happens elsewhere.

**Figure 10: Photo of a farmer in possession of a radio and mobile phone**



Authors illustrations from field work (2011)

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## Participation

Some of the farmers in the three districts were concerned for not being consulted in the design of some projects such as eSoko. For instance Veneranda's problem was that of low cost of her produce after going through several hardships as well as the changes in prices as she explains, "I cant tell what eSoko is because it is my first time hearing about it and I have never seen any one coming to involve us during its setup. Otherwise, I would have loved them to first consult us before such new projects are initiated in order for us to know their (projects) importance and how they contribute to our development. For example we hear most of these programs on radio, but we have never seen any farmer being asked for any input. Yet, as a cassava farmer we go through too much hard work and only to be paid 100frw. This could have been one of our concerns, plus the continuous price changes that make us incur a loss". Indeed, such farmers have no alternatives but rather to sell their products cheaply to the traders since they are unable to even transport their products to the markets by themselves. Additionally, the system in place to indicate market price information is different from the capacity to translate the information to finding the market as well as having the ability to transport the commodities to the place and reaching on time that the client is ready to buy them at the expected price. There is also an issue of bargaining power since there are possibilities that farmers can take their products at the market and come back without selling them. Not every day traders or buyers have money to buy these commodities. However, this contradicts with the information from the project technicians who informed me that the farmers were consulted and involved during the project design. There is thus a possibility that this consultation was more of top down than bottom-up, with expectation that its usage will trickle down in the long run which compromise most of the rural poor farmers interests, compromised by the urban elites who assume what is good for the poor as well as the needs of the multinational companies like MTN that seem to be met at the expense of the users needs. This makes us ask a question whether the project is addressing its cause, at the same time illustrates to us that the project designers' interests were different from the expectations, and the needs of the intended end-users.

During the study, according to one of the key respondents, eSoko was common among the elites of Kigali city than the rural small scale farmers. Most of urban habitants used eSoko to access prices for commodities before sending their house helpers to buy them from the market. Before the introduction of eSoko, many of them-used to be cheated due to the fact that they barely went to markets for they sent house workers as explained by one of the eSoko market agents "eSoko is useful to farmers but common among the elites in Kigali because they never go to markets to buy commodities. So they consult the application to know the price of domestic commodities so that they are not cheated by their maids. They were cheated before its introduction and now they are able to minimise that through its use. It also helps policy makers in knowing why products prices are increasing, whether it is because of farmers, fuel prices or taxes since the price hype affects the livelihoods of

everyone". The application is also used by those Rwandans abroad who for instance check the costs of cattle, and send money to relatives worth the cost without being cheated due to over pricing or incurring transport costs to travel to Rwanda". It is also emphasised that the system was more useful to the policy makers in findings out why there was price fluctuations; judging whether it was as a result of taxes, fuel price increase or farmers. This was confirmed by the fact that the National Bank of Rwanda use the application during its calculations of the CPI as described in the earlier paragraphs. This seem to suggest that eSoko benefits more of the political and economic elites than the primary intended end user (farmers)

Ultimately, this chapter has provided us with evidence that rural small scale farmers are yet to assimilate the eSoko ICT application due to the several disconnects ranging majorly from poor literacy levels and infrastructure. The chapter has argued that this could be due to a top down rather than bottom up approach used during the design, presumed to be originating from different interest ranging from government, elites and foreign interest rather than the intended users (rural farmers) interests and, thus the project seems to be serving more of elite and foreign interest than the rural poor farmers.

# Chapter 5: Conclusion

This paper applied a qualitative research method to examine the reasons behind the design and implementation of eSoko the way it was, by whom and with what interests, despite obvious disconnects between the project and the factual reality experienced by the poor rural farmers of Rwamagana, Ruhango and Musanze Districts in Rwanda. The paper then found out that the different disconnects were due to different interests from the government, MNCs such as MTN and Voxiva that never put into consideration the interests of the intended end users (rural farmers) but rather those of MNCs and secondary beneficiaries such as the elites, thus making it difficult for eSoko to be diffused among rural poor farmers.

The emerging findings indicated that the government, MTN and Voxiva were the main players in the design and implementation of eSoko without involvement of the farmers. Although the project recorded some achievements such as increase in the SMS since the launch of the system, it was not clear who made them and what information was relayed on the SMSs sent. There was also a problem of ownership of the project as the beneficiaries were not largely aware of it and hardly used by the most rural small scale farmers. Generally, the project has limited significance to the rural poor farmers. As the application of the system involves writing and reading of SMS which requires one to be literate, the illiterate farmers investigated were not able to use the project.

It was noticed that some of the farmers barely have phones and those with phones hardly can maintain it due to the fact that air time (top up) itself was costly for them. This leads to the majority adopting survival strategies of using cheap means such as Me2U for 100frw and call backs normally regarded to be applied by people considered to be under financial constraints. In addition these farmers lack electricity for charging their hand sets which forces them to move to distant places to charge butteries making them spend 100frw on charging their phones, for those that have them. The ICT applications among the rural poor communities, with no electricity and affordable technology limit the achievement of intended goals, unless government comes in to subsidize the systems. The project did not take into account the inadequate internet connectivity access, electricity, computers, content and languages problems in accessing the eSoko web page by mainstream farmers.

The findings also indicate that men dominated the ICT tools such as radios and mobile phones which can easily promote information asymmetry among the different types of gender. It further reveals that most of the problems for not adapting to eSoko usage were more of structural than the rigidity of farmers to change and so addressing these issues in such rural places was vital than thinking in terms of the cultural rigidity of these rural small scale farmers since this could have been just an elite bias towards rural poor farmers.

Again the project designers considered policy makers, traders, farmers and the general public to be a homogenous entity when using eSoko. This supports the argument that the project was more of top down than participatory because such differences could have been highlighted during the consultations with the intended users. This limited the opportunities of the small scale farm-

ers in accessing market information because their means is limited and they have no capacity as compared to other advantaged groups such as traders or the urban elites. Therefore, eSoko could be benefiting multinational companies like MTN and Voxiva as a well as the elites that use the system more than the rural poor.

Another challenge was the monopoly of MTN in the market with many subscribers, yet farmers find it hard to maintain their phones because of costs involved and for those using internet and the mobile phone to access SMSs, the same company compels user to their code (7656) in accessing eSoko. Thus the project seems to be meeting the interest of this MNC than those of the rural poor.

E-Soko technology is more foreign owned than domestic, thus, representing foreign interests. For instance most of the technology designed by Voxiva encourages dependency and exploitation of the country and hardly does it encourage the building of indigenous knowledge. In such a case Voxiva would have first built the capacity of MINAGRI staff as a way of ensuring the project sustainability and analysed the wider social context of the technology usage in addressing the local needs and in meeting the interests of the poor. Otherwise, the project empowering rural small scale farmers to access market information for poverty alleviation in this case seems problematic because it continues to empower more of MNCs interests than domestic interests.

Finally, more research needs to be carried out because more structural issues are likely to turn the project from a tool of emancipation to a tool of exploitation. This brings a question of whether this project could lead to the positive impacts on the beneficiaries, calls for further investigation because of the trajectory of the program. May be, the project does not have positive as well as negative impact on the intended beneficiaries. There is need to consider whether eSoko is the best intervention for poverty reduction.

All in all, even if eSoko design was rotated in the circles of the government institutions, elites and the multinational companies rather than those of the rural small scale farmers, one can barely predict eSoko as a failure since it is still in its early stages of implementation, for the project to be adapted by all and for it to have an impact on the rural poor farmers, which was beyond the scope of this study.

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