

Using inexpensive mobile technologies to empower rural farmers

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Abstract—In this research the influence of mobile technologies on rural agricultural businesses is explored. The intention is to build a system, based on basic inexpensive mobile phone technology, to enable farmers to easily and at very low cost, source market information and advertise their commodities. Work related to these aims, the methods planned to achieve these goals, initial work and prototype will be described. It is hoped that rural farmers will embrace this mobile technology to increase their income.

Index Terms— Unstructured Supplementary Services Data (USSD), m-agriculture, Short Message Services (SMS), Global System for Mobile Communications (GSM), Marketing, Farmers.

I. INTRODUCTION

In Sub-Saharan Africa, rural households produce most of their own food. In recent studies however it was shown that there is a substantial increase in the dependence on market purchase on the part of both urban and rural households and as a result food expenditures reached 60-80% of the total income of low-income households [1]. Regardless of the abovementioned change, rural inhabitants of Africa value farming activities and subsistence farming remain a major component of their livelihoods. However, if these farmers could have access to market related information, it is felt that it could provide them with opportunities to sell their produce as well as make informed decisions about their business practices and in so doing reduce the cycle of poverty that have plagued rural areas for centuries.

According to the World Bank, the mobile phone is a strategic tool, which can reduce poverty and facilitate economic development of remote rural areas [2]. In line with this, Nokia proposed a project called “*Nokia Economic growth Venture Challenge*” with the objective to encourage mobile phone developers to create programs useful for emerging economies, and to create the application or tools that helps to perpetuate and sustain a thriving local business, and improve the standard of living and quality of life in area where the people are poor [3]. Bhavnani, found that mobile phone technology is the most popular and affordable telecommunication technology available in rural areas of developing countries [4]. This is also true of South Africa where already [5] in 2007 the cell phone network coverage was approximately 90% (that is the Global System for Mobile Communications (GSM) cellular network operators MTN and Vodacom combined) and 83% of the population owned cell phones in 2008 [6]. Although cell phone prices have decreased consistently over the years while their

functionality have increased, people in developing communities do not often get the opportunity to make use of their cell phones for purposes other than social communication [7]. In rural Eastern Cape, farmers often sell their commodities at a much lower price than normal because of the relationship that exists between the buyer and the seller. However if farmers have access to a bigger range of clients as well as to market related information, it would enable them to sell their produce at more competitive prices [8].

The question is: will inexpensive access to market information improve the viability of rural farmers’ businesses? This gives rise to the following research questions: How can inexpensive mobile technologies be harnessed to provide market related information to rural farmers? Will farmers be empowered if they are able to advertise their produce and be put into contact with potential clients? How can the uptake of this technology be promoted?

A system, which uses Unstructured Supplementary Service Data (USSD) and Short Message Service (SMS), could reduce the cost of acquiring market related information, considerably for rural farmers. Why USSD and SMS? Because both these technologies are less expensive than voice calls and are available on even the cheapest model of cell phone. Most of time, USSD menus are subsidized by the system provider which makes it a free service to the end-user [9]

The proposed m-agriculture system is a mobile phone based information system consisting of:

- A computer based system: enabling transfer and retrieval of data. It will be comprised of interfaces and a database that will store the information.
- A USSD interface: consisting of menus and request commands. It will be designed to enable mobile phone communication.

Figure 1 depicts the functionality as well as the operations of the proposed system.

In the first operation (see Figure 1) a farmer can request information with regard to a specific commodity on the market using USSD, the request is sent to the server then the server returns feedback by SMS. The farmer receives a list of current sellers as feedback by means of SMS/USSD. This list contains seller name, their contact details as well as the commodity they are selling.

The second operation is where the farmer or the buyer

checks the price of the commodities using a menu; he/she will open the menu of different commodities and then choose one to check the price on the market.

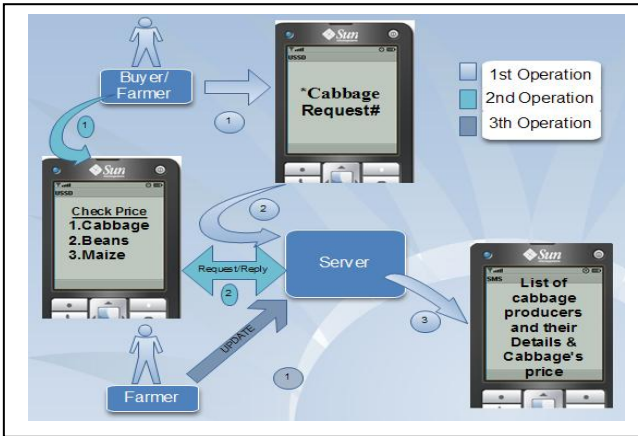


Figure 1: Schematic representation of the proposed system.

The third operation allows the farmer/seller to update their commodities information to the server.

II. RESEARCH APPROACH

Epistemology is the theory of knowledge thus it is “*how we know what we know*”. In our research objectivism is the epistemological stance assumed. It is a philosophy that respects science, and emphasizes reason and clarity.

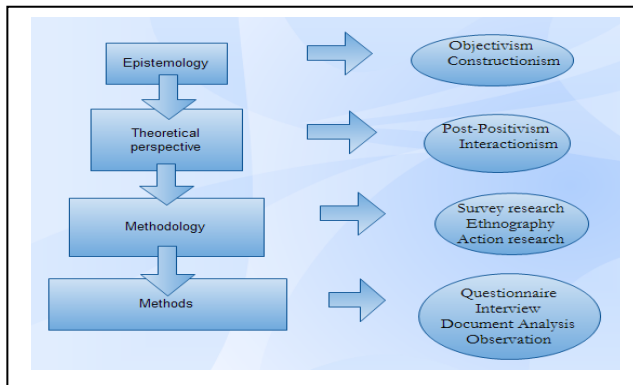


Figure 2: Schematic representation of the research approach.

The theoretical perspective from which this research is approached is post-positivism. It is an amended form of positivism that recognizes human conjectures but retains the idea of objective truth. Methodology is the strategies used to collect data, which in our case include survey research and ethnography. The methods are the actual tools for collecting the data, such as: interviews, questionnaires document analysis etc [10].

Case studies of the agricultural activities in the Eastern Cape and the farmers’ exposure to mobile technologies have been started in three districts of the Eastern Cape Province. A colleague will conduct a survey and collect data using the Cell-Life EMIT System [11], a mobile-based data monitoring and evaluation system. The data will be analysed and will feed into the design of a cost effective and efficient mobile phone system prototype. The prototype will be tested with stakeholders and redesigned until it is robust enough to serve as a strategic tool for agricultural businesses in rural areas. Open source applications such as PHP, MySQL,

MyAdmin, JavaScript and Apache will be used to design and implement the prototype.

III. PROGRESS

The project was started in February 2010 and should be completed in November 2011. So far document analysis has been done and some information has been obtained about the area; as well as on Information Communication Technology (ICT) based projects that were conducted in similar environments. This will be followed by data collection from farmers by means of interviews and questionnaires as well as observation. This information will be used to guide the prototype design. The design of the prototype will be an iterative process consisting of a series of tests with the users, modification according to users’ feedback, until the final product is obtained.

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