

Wireless Technologies & Inventory Control System: *The Bridge for Rural SMEs Development*

Lethamaga Tladi, and Ray Kekwaletswe

Abstract— In this research study, a wireless web-based inventory control system framework is suggested as a possible solution to leverage the rural SMEs challenges. The study had three objectives: 1) Analyse how rural SMEs conduct business using manual inventory control system, 2) Explore challenges and issues affecting the process of conducting business, and lastly 3) Determine how wireless inventory control system could be used appropriately to improve rural SMEs. Subsequently, the goal of this research study was aimed at conceptualizing wireless web-based inventory control system framework for rural SMEs leading to sustenance and competitiveness. Diffusion of Innovation (DoI) theory underpinned the study and interpretive paradigm was followed using qualitative methods with open-ended questionnaires, semi-structured interviews as data collection methods.

As the proposed information system was not yet developed or available to be tested, the DoI adoption attributes were used to analyse the empirical evidence collected from rural SMEs using pre-determined set of themes which were derived from research objectives. Ultimately, this research study concluded that the web-based inventory control system and wireless technologies could assist leverage the challenges of rural SMEs in Ga-Mphahlele, Polokwane.

Keywords—Diffusion of Innovation Theory, ICT, Inventory Control System, SMEs, and Wireless Technologies.

I. INTRODUCTION

THIS research paper aims at leveraging rural SMEs challenges which hinder them to be at competitive edge amongst their counterparts in urban areas. Five rural SME entrepreneurs were interviewed and other different five rural SMEs both from Ga-Mphahlele, Polokwane were requested to complete research questionnaires voluntarily. The rationale behind deploying those qualitative data collection methods was to: 1) analyse how rural SMEs conduct business, 2) explore ICT technologies that SMEs are currently using to enable the business, and 3) lastly to explore how wireless technologies and inventory control system could be used appropriately to improve rural SMEs. As the Diffusion of Innovation (DoI) theory underpinned this research study, its adoption attribute were used to analyse the data collected

using the predefined theme which were derived from the objectives.

II. RURAL SMEs

Rural areas are those parts of the residential area that were underprivileged due to the process of urbanization, and are therefore more associated with much more low economies of scale, and physical remoteness [1]. And one major factor of concern is their distance from markets, political centres, and of their access to services which yield high transportation costs. The SMEs in these areas are tiny businesses with fewer than ten employees – often just one [2]. According to Gopaul [3], the South African rural societies appear neglected, experience great poverty, deprivation and remain some of the most impoverished societies in the world. Ga-Mphahlele is a rural settlement named after chieftaincy of the Mphahlele's and is located 50 km south of provincial capital, Polokwane and falls under Lepelle-Nkumpi Local Municipality. According to the Economic Development Plan [4], the municipality has unemployment rate of 61% out of estimated population of 241 414 and 28.7% of households have no income.

Unlike most people residing in well resourced- urban areas like Sandton, Johannesburg in the Republic of South Africa or developed economies like United States of America and Europe just to mention a few; access to goods and services can be obtained within immediate vicinity and residents do not have to travel far to access their retail outlets. Sadly, the residents in this village, Ga-Mphahlele do not have privileges to access well established retail outlets in their vicinity and they have to rely on local mini-shops called “spaza-shops”.

SMEs entrepreneurs in this area, still have to travel at great expense to provincial capital, Polokwane to stock products to their shops and some have to hire a bakkie in that regard which results in residents paying up to 20% to 40% more for the goods [5]. Based on above statistics, nurturing the SMEs in this area can bring bread and butter to many households and reducing the unemployment rate as part of policy objective on SMEs to alleviate poverty, job creation, and the enhancement of national economic growth as part of post-apartheid reconstruction [6],[7], and [8].

According to [9], in rural areas, many SMEs have constraints of capital and resources, cost-based competition, high transportation costs are some of the factors that hinder

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them to be their competitive edge amongst their urban counterparts and despite the challenges that these rural SMEs are experiencing, the wireless technologies and inventory control system seems to be the promising solution to address aforementioned challenges that hinder this SMEs to be at their competitive edge with their counterparts are urban areas.

III. CHALLENGES

The rationale behind this research case study is to address common challenges that SMEs in rural areas of Ga-Mphahlele are experiencing. To mention the common few challenges which hinder these entrepreneurs to be at the competitive edge amongst other well established businesses are as follows:

- a) Access to mainstream supply chains and markets due to long distances,
- b) High transportation costs,
- c) Low economies of scale,
- d) Physical remoteness,
- e) Low economic activity densities and etcetera.

According to [10], other limitations of rural areas points out as having rough and difficult terrain, adverse weather condition, scattered population distributions and low-return-benefits which in turn, hinder rural areas from being explored and developed.

In relation to telecommunication mediums available in rural areas, He further described rural areas as, are for various reasons the last to be connected with any form of a communication network. Even when connected, they usually have to use outdated technologies and inherit equipment from urban areas.

Diagrams in figure 1 and 2 below, depicts the difference between the traditional stock ordering process which is currently used by rural SMEs and the new proposed process with wireless technologies and Inventory Control System.

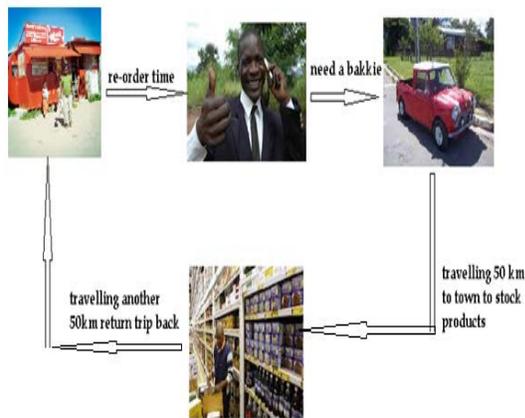


Fig. 1 Realistic stock ordering process

In figure 1 above, traditional stock ordering process depicts the series of steps followed by rural SME entrepreneurs in Ga-Mphahlele each time they wishes to order stock products to their businesses.

This process is time consuming and not cost effective in a sense that the SMEs has to find a bakkie owner who can assist in stocking products at a lower cost. After he gets hold of the ‘bakkie’ (pick-up/van), has to appoint someone to look after the shop on his behalf whilst he went to stock. And the sad part is; they will travel 100Km return trip; meaning the cost of transportation is approximately the profit he expected.

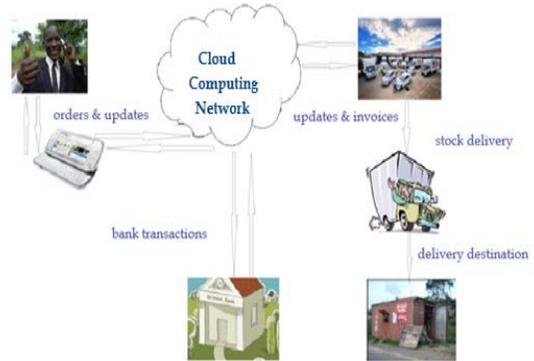


Fig 2 Idealistic stock ordering process

In figure 2 above, depicts the new proposed process with ICS and wireless technologies. This process is cost effective, secure, hassle free, and profitable as compared to the traditional stock ordering process which is time consuming and has high transportation costs.

With this process, rural SMEs have powers in their hands by using their smart phones; hence the research findings depicted that most rural SMEs are using cell phones to conduct business. With the aid of the proposed information system, they can pay their suppliers, order stock products, get updates on how their businesses performs, and could as well know how their customers need to be serviced online.

IV. CONCEPTUALIZED WEB-BASED INVENTORY CONTROL SYSTEM AND WIRELESS TECHNOLOGIES PROCESS FOR RURAL SMEs

This section illustrates and discusses the conceptualized process informed by the empirical evidence from rural SMEs and interpretation of findings thereof.

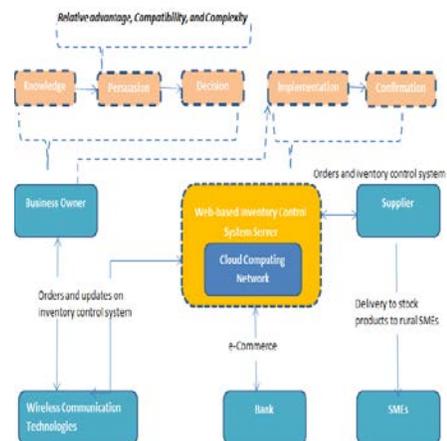


Fig. 3 A conceptualized framework for stock ordering process for rural SMEs

V. OPERATIONAL SCENARIO

The proposed information system will be hosted by a chosen distributor and rural SMEs will access the services wirelessly through cloud computing network. This network will serve as a central point for all transactions. There will be an affiliation fee to be paid by SMEs to the supplier. This fee includes the web-based inventory control system software, bar-code scanner, bar-code label, and recording of SMEs stock products into the database.

After the affiliation, each rural SME should have a smart phone that will be able to run the system and their stock products being captured electronically into their supplier's database; thus means that every single stock item a customer buys, it will be scanned-out of the inventory database and rural SMEs will get the updates on their business inventories on real-time bases.

Furthermore, SMEs will have to set a minimum inventory level on each stock product; should happen that particular product falls below minimum inventory level, the supplier will get a signal about that particular product and will act appropriately to make a product available without rural SMEs having to travel to the supplier.

Similar process will be followed when rural SMEs wishes to add new stock products to their businesses, they will make use of their wireless technologies to make orders and delivery will be made of those stock products. Lastly, the SMEs have a benefit of viewing their weekly/monthly financial statements as to how their businesses performed and what amount of money has to be paid to the supplier.

VI. DISCUSSION OF FINDINGS

The empirical evidence derived from data collected using qualitative data collection methods from rural SMEs in Gampahlele depicts that there are some challenges which needs to be addressed before these rural SMEs could realise their potential contribution towards economic growth. Physical remoteness, less economic activities, limited access to markets, high transportation costs are some of the challenges which hinder rural SMEs this area to be at their competitive edge amongst other SMEs in urban areas.

In some instances whereby SMEs have their own transport, high petrol prices and long distances to get to the markets are still challenges. In the context of this research paper, the wireless technologies and inventory control system is proposed as a solution which will leverage SMEs challenges which in turn could improve rural SMEs, leading to sustenance and competitiveness. Even though some aged SMEs entrepreneurs foresee the adoption of this concept time consuming and needs some training to be able to operate it. As the proposed information system is not available to be tested, the researcher is just providing an operational scenario and trust that the real system will be user friendly.

VII. CONCLUSION

This research study has highlighted and discussed issues and challenges which fueled this research study to be undertaken considering the importance of SMEs in national economies. Furthermore, this research study has provided an understanding as to how a web-based inventory control system and wireless technologies could be utilised to improve rural SMEs, leading to sustenance and competitiveness through addressing those issues and challenges.

Logistics of stock products between a supplier and rural SMEs remain an obstacle for their growth due to being physically remoteness as a result; they incur high transportation costs. The study suggested suppliers should deliver stock products at SMEs business door step, building strong supplier-and-SMEs relationship, managing their businesses electronically using their cell phones which run a web-based inventory control system.

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