

A Web-enabled Decision Support System for peasant farmers and small scale entrepreneur Case of Morogoro-Tanzania

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Abstract: In today's global economies, Geographic Information System (GIS) assisted by Information and Communication Technologies (ICTs) have emerged to be agents of changes in the way people conduct their business and organizations have continued to re-engineering their business to accommodate these vital technologies. This wind of change ought to permeate every business sector if these technologies are to help alleviate poverty in emerging economies. Consequently, through productive, the entrepreneurs do not get good value of who needs what they produce. They tend to be unaware of who needs what they produce (i.e. their key market), when their produce is mostly needed and how much they can sell their produce at, who can render services to their business at affordable prices, etc. even when they are aware of the key markets. These tend to be far flung cities when the cost of distribution becomes a bottleneck.

This paper, is part of an on-going public services in Morogoro as pilot Region. We propose the use of web based GIS portal to help ease the conduct of business by small scale entrepreneurs in Tanzania. We contend that these entrepreneurs could get good value of their goods and services if they could share marketing information using cost effective means that cut the cost of distribution and help them only pay for services that they can afford.

Keywords: Geographic Information System, Information and Communication Technology, Web-enabled System, database, Portal, decision support system.

I. INTRODUCTION

Tanzania has an estimated 43 million hectares suitable for farming, however, only 71 percent of this land is cultivate. Small –scale farmers constitute 96 percent of all farmers [1], this has resulted into rampant rural poverty. One of the greatest challenges to poverty alleviation in underdeveloped economies is how to ensure that small scale entrepreneurs, peasant farmers or individual entrepreneurs get good value for their goods and services. The trends in underdeveloped economies such as Tanzania tends to favour large enterprises or multi-national conglomerates that have the capacity to advertise their products and services using print and electronic media. They also have the ability to distribute their goods and services in order to service a business contract. In this way, they have access to a wide range of market in which they can dictate pricing in order to get good value for their goods and services. The cost of their goods and services are usually beyond the reach of small scale entrepreneurs, peasant farmers, individual entrepreneurs and the poor majority who are usually exploited. Thus there is no room for small-entrepreneurs, peasant farmers or individual entrepreneurs to gain competitive advantages due to lack of information.

In Tanzania for example, the cost of distribution stands out as major bottleneck to the conduct of business by the poor majority. The poor railway network and underdeveloped telecommunication infrastructure means there is a heavy over-reliance on road transportation, which itself lacks a proper road network, for distributing goods and services. Distribution costs and access to market are the major hindrance to the effective conduct of business by peasant farmers, small-scale entrepreneurs and the vast majority of small enterprises. These categories of entrepreneur usual travel hundreds of miles carrying their goods in search of market at high cost. They are unaware of who needs what they have or how much they would get for their goods if a buyer was found. Whether they find a buyer or not, they still have to pay for transportation.

In some situations, they are forced to surrender their goods to the transport service provider if they cannot find a buyer or are unable to pay the full cost of transportation. For the foregoing categories of enterprise and many other entrepreneurs operating in similar circumstances, the business picture is very gloomy. The major problem is that such enterprises or individual entrepreneurs do not have any means of finding out who are interested in their goods and services, in the first place even in their local communities or who can provide affordable services required to ease their conduct of business. Even after they have found out who needs their goods and services, the cost of distribution or delivering services to far flung market wipes out their meagre profit margin.

Consumers in this category also have problem. They do not have any means of knowing who can provide goods and services at prices they can afford. In this way, small scale enterprises have no means of improving their conduct of business in order to contribute meaningfully to economic development as they cannot afford good value for their goods and services. In the global world we live in today, lack of information about competitive markets and how to access them means small scale enterprises or individual entrepreneurs cannot be effective earners even if they are productive.

In this paper, we report on our on-going work on the development of a Web- Based GIS Portal. We use an example case study of small scale entrepreneurial in Morogoro and show how such a system could help solve the problem highlighted earlier.

II. RESEARCH MOTIVATION

The growth of global information and Communication networks over the past decade, the burst of creativity in technologies, applications and business processes driven by these networks and advances in computing, and a broader social impact of these new technologies led to widespread enthusiasm over the potential of information and communication technologies to combat poverty and promote economic and social development in developing countries[2]. With recent advancement in Information and Communication Technologies (ICTs), small scale enterprises could improve the conduct of their business if they could use these technologies to access information on available markets. There are several studies on the use of ICT which include [1, 3, 4] to mention but a few. This information is essential in planning what to sell, when, and where and at what prices. Similarly, when small scale entrepreneurs require goods or services, they could have a way of getting information about which goods and services are on offer, when, where and at what cost. This information could prove to be of crucial importance in planning whether to sell or buy available goods and services. In business terms, such information could prove to be the difference between success and failure. This scenario is shown in figure 1. Thus such information is vital for conducting business competitively in the modern era. Proper use of ICTs could greatly enhance the small scale entrepreneurs' decision making process thereby making their business gain competitive advantage.

The aim of this study herein referred herein as "The Small Scale Enterprises –Business Portal (SSE-BP)" is to explore the use of ICTs in order to create an enabling environment to ease the conduct of business by small scale enterprises. Peasant farmers or individual entrepreneurs in undeveloped economies. We propose the use of web- enabled database system to help maintain registers of small scale enterprises, peasant farmers and individual entrepreneurs together with their goods and services. The idea being that such a system would serve as a source of information about available goods and services in market within Tanzania and the world at large.

Some sceptics, including such notables as Bill Gates, have argued in the past that the poor do not need ICT and that ICTs are a luxury that people living on less than a dollar a day cannot afford [5]. Strictly speaking nobody needs ICTs on their own per se. what the poor like anybody else need is any suitable intervention that can provide an economic opportunity to deliver education, health care and other components of a rewarding and sustainable livelihood. It is a fact that most small scale enterprises, peasant farmers or individual entrepreneurs do not have access to the internet and therefore may not be able to make use of such a business portal. However, we mitigate this shortcoming by proposing the use of public access centres for ICT herein referred to as "Local SSE-BPs Access Centres (LSSE-BP-AC)" within strategic business locations which acts as one stop shopping places for business information by local entrepreneurs. These are internet café springing all over in Tanzania and these could be used as access points for business portal. The only requirement being that each centre must be equipped with computers accessing the SSE-BP in order to allow local entrepreneurs, peasant farmers and consumers access to business information about markets, goods and services via the web. As businesses evolve and private entrepreneurs get better returns on their investments, extra functionality would be added on SSE-BP to allow web access through mobile devices.

**Communication gap between local
Business and consumers**

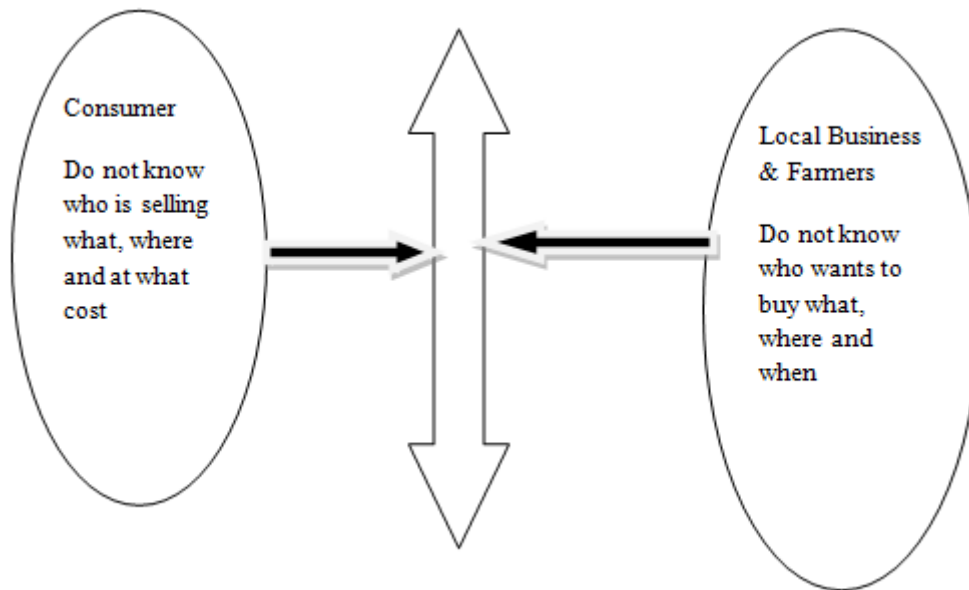


Figure 1: The current problem in the scenario

III. THE ROLE OF THE LSSE-BP-AC

The LSSE-BP-ACs would be the principle contact point for small entrepreneurs with the SSE-BP and through these centres. Local entrepreneurs only need to register at any of these centres and from time to time, they would come to register whatever products or services they have to offer or require, when and in what quantities. This information would be available on the SSE-BP for global access worldwide. If someone is interested in a specific product or service they have to contact the LSSE-SSE-BP. Once this information become available, either the seller or buyer would contact the other party to arrange a transaction, thus bridging the communication gap between the service provider and their clients. Where communication between the two parties is not possible due to lack of access to ICTs, the LSSE-BP-AC could be contacted to facilitate the transaction. In this way, no one would have to pay for distribution before firm agreement is reached on sale. It is proposed that such an ICT-driven solution should ideally have a training plan alongside. This has always been the case in most ICT projects. Our proposed solution is not any different. While a long term education and training plan is being worked out, the LSS-BP-AC would have staff to assist those cannot use business portal unaided. Thus, in short, an SSE-BP assistant would be on hand at each LSSE-BP-AC to help those who are unable to use computers to enter their business information in the database. However, in the long term, the idea is to train all registered peasants farmers, local entrepreneurs and small scale enterprises staff in the use of SSE-BP. Thus in addition to guiding them on how to use the business portal , small scale entrepreneurs would also have an opportunity to access broad based training programs.in the use of ICTs and possible development of simple ICT-driven solutions required in their day to day lives.

IV. BENEFICIARIES

There would be many stakeholders to such a system in Tanzania. Initially, it appears as though only the peasant farmers, small scale enterprises and individual entrepreneurs would benefit. However, in the long term the list of beneficiaries expands to include major financial institutions, local and global businesses, local and central government revenue collectors and other service providers. Thus, the government, market, civil society, and community are all needed to work together to and help to create conditions that will enable the poor to overcome their poverty, build their physical, economic and social assets, improve their capability, safe guard their security and reduce their risks and vulnerability to external shock.[5]. For example, information about transaction available on the business portal could be used by lending institution to evaluate the capacity and viability of small scale enterprises to ascertain whether they could be exposed to

financing. Similarly, the revenue collectors in local or central government could use this information to assess who should be taxed thereby widening the tax base. For the community, training of entrepreneurs in the use of such technologies would offer employment opportunities for new graduates with ICT skills.

Furthermore, for distributors who offer logistical support to small scale enterprises, access to such information would be invaluable in the efficient use of their vehicles. They could for example, know what goods ought to be moved from one area to another, and on their return, they would know what goods ought to be moved in reverse direction. This would help them maximize on the utilization of their fleet of vehicles thereby enhancing service provision.

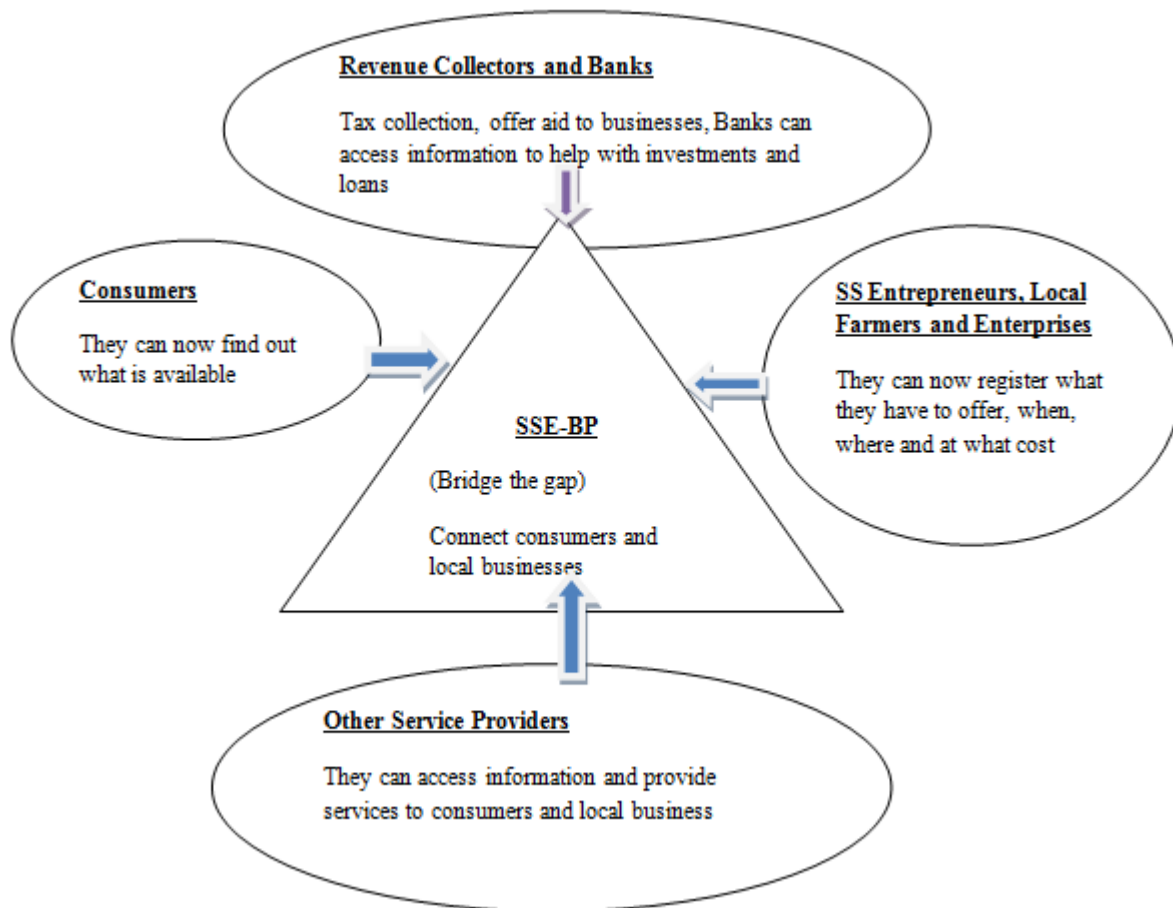


Figure 2: The SSE-BP bridges the gap between stakeholders

Thus, through the development of proper ICT-driven system, these technologies could play a major role in all aspects of national life: in politics, in economic life, as well as in social and cultural development. Figure 2 show a complete list of potential beneficiaries from the envisaged system.

V. SSE-BP AS A DECISION SUPPORT TOOL

In the long term, information would be collected over a period of time in order to help future investors or emerging entrepreneurs to assess services that could be on demand, where and in what form, thereby helping improve the quality and diversity of services available to the local communities. It is such services that would induce development thereby helping improve the quality of lives among communities. There are available tools and techniques, in the subject of data mining and knowledge discovery in databases that would be used to ease the use interfaces for the entrepreneurs to make decision at the touch of a button. For example, a typical farmer may be interested in the market information of sesason crops or product that sell most in a given season. Figure 2 summarises a range of such functionality according to the requirements of the different stakeholders

VI. CONCLUSION

Successful innovation in developing countries including Tanzania are disparate and fragmented. Therefore, it is expected that this public services project using Local SSE-BPs Access Centers will revolutionize agriculture in many ways. It is expected that entrepreneurs will no longer travel hundreds of miles carrying their goods in search of market at high cost as they will be aware of who needs what they have or how much they would get for their goods if a buyer was found. In the long term, such information would be collected over a period of time in order to help future investors or emerging entrepreneurs to assess services that could be on demand, where and what form, thereby helping improve the quality and diversity of services. We believe that the universal access to all ICTs including the internet access for rural poor should be an objective for the government of Tanzania. As we live in a global world, an information society that cannot leave out anybody from universal ICT access, these technologies have now become a strong and important motivating force for nearly all facets.

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