Augmenting an e-Commerce service for Marginalized Communities: A Rewards Based Marketing Approach

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Abstract—Information and Communication technologies (ICTs) have been widely deployed in developmental programmes and this has lead to the creation of a new field – ICT for development (ICT4D). Many e-Commerce platforms now exist in many rural areas in developing countries. ICT4D allows Small, Medium and Micro Enterprises (SMMEs) in rural areas to increase sales and gain the market share on the global market. However, many of these ICT4D projects in marginalized areas fail as a result of lacking the required resources to support ICTs.

SMMEs in rural areas face problems in marketing their products on the global market. Therefore, ensuring sustainability of such systems in marginalized areas is important. This paper explains an e-Marketing strategy through a reward based negotiation application, aimed at improving the existing e-Commerce platform. The e-Commerce platform has been deployed for the Dwesa community. Dwesa is a rural area in the Eastern Cape province of South Africa.

Keywords — rewarding system, e-Commerce platform, intelligent negotiation, e-Marketing

I. INTRODUCTION

According to Bikky Khosla, (2008), “Small, Medium and Micro Enterprises (SMMEs) cannot do conventional marketing because of the limitations of resources” [1]. In most cases SMMEs need to gain a greater market share on the global market, but they lack enough resources. “SMMEs need to search for alternative marketing approaches such as personal contact networks, social networks, e-Commerce tools, B2B portals, business networks and industry and marketing networks”, [1]. There is great art and craft done in Dwesa which is the field site of this research. The people in the area design a lot of products that are sold online at www.dwesa.com [2]. The name of the existing mall is buy at Dwesa. The paper focuses on how to implement an e-Marketing strategy to attract customers and create customer loyalty. This is achieved through a rewarding application referred to in this paper as Dwesa Reward Program. Customers will get points for registration, referring friends and for buying online. The accrued points are used to negotiate with the system for a reward. The system emulates the shop owner that interacts with the customer, giving instant feedback on the number points earned, rewards available and the necessary feedback to the customer.

Also considering the fact that it is, “with the help of international organizations and donors that many African countries have embarked upon national processes and projects to formulate and implement ICT policies and strategies, specifically with regard to e-Commerce”, [3]. This has been considered, as the area under study is also a beneficiary community from donors as noted by [4]. The whole idea is to encourage all those people who are willing to assist the rural communities by purchasing their products. Dwesa Rewarding Program (DRP) is developed bearing in mind the fact that, the implementation of the application should make a contribution to rural development and should also be a poverty alleviation application in the area as noted by [5]. The application contains an intelligent negotiation module used when points are redeemed.

II. SMMEs IMPLEMENTING e-MARKETING STRATEGIES

SMMEs have emerged in rural communities as a means to ensure sustainability of ICTs in rural areas. e-Commerce applications are being developed to allow sustainability of ICTs in rural community and to benefit the people in these areas [6]. The growth of e-Commerce in rural communities has led to development of many ways of selling products. e-Marketing is now the popular strategy. Highposition.net (2008) defines Internet marketing, also referred to as online marketing, e-Marketing and web marketing, as essentially the practice of communicating products and services to consumers over the internet [7]. “There are a multitude of different methods used in internet marketing from direct email and website construction to search engine optimization and the collation and analysis of digital consumer data from previous transactions, social networking sites” [7].

However, developed countries and large organizations stand a greater advantage on web marketing. For example, Highposition.net (2008) noted that, “there are 41.8 million internet users in the United Kingdom which equates to 68.6% of the UK's population”. This is a 171.5% rise in the period 2000-2008 which is continuing to rise. Highposition.net (2008), continues, “globally there are 1.464 billion internet
users which equates to 21.9% of the world's population. With such vast numbers of consumers, e-Marketing is creeping up on television as the most popular and effective marketing medium. For rural communities in developing countries to be able to penetrate the global markets selling products effectively is proposed. “New rural community leadership models are urgently needed for rapid identification of the unprecedented new opportunities, which are offered by the Internet as new global markets, e-Commerce and unlimited online learning resources for alert citizens” [8].

People in rural areas need to be equipped with the knowledge of new ICTs and technologies. Helen Aitkin (2002), says that “Women are often the primary drivers of ICT development in their communities and, in many cases, make up the majority of the sellers of ICT services” [9]. It is, therefore, critical to ensure that women have full opportunity to gain equal access to ICTs, to learn how to use them effectively, and to share in the social and economic rewards ICTs can generate. Chhaya Mudgal (2002) said, “Despite the comfort that ICTs and e-Commerce has brought with itself, humans are still involved in most of the important process of business, for example, in making decisions in all phases of buying and selling” [10].

Negotiation is one of the key factors in commerce systems, which involves a lot of decision-making and tradeoffs between various factors. Chhaya Mudgal, (2002) continues saying, most business transactions in e-Commerce involve negotiation to settle on the most suitable price for both parties. The authors of this paper appreciate that a lot of marketing strategies exist, but can not discuss all of them, so this paper focuses on the reward-based and negotiation application.

A rewarding application is a way of creating customer loyalty. This application involves several processes and factors before it is implemented. It requires proper planning and decision-making. Considering the amount of effort that goes into launching a rewarding application in many companies, it is essential to get the rewards right [11]. Rural communities are selling or promoting their products online. Various technologies associated with these rewards and selling products online have been explained [12, 13, 14]. Customers get points for buying online and points will be allocated for each of the activities done by customers shopping online [15, 16]. These are not discussed in detail in this paper as it focuses on rewarding application with an automatic negotiation or an intelligent expert negotiation module.

III. SIYAKHULA LIVING LAB PROJECTS
The deployment and testing of this system is done within the context of the Siyakhula Living Lab (SLL) undertaken in Dwesa [2]. The name Siyakhula, means that we are “growing together”. The University of Fort Hare (UFH) and Rhodes University (RU) run it jointly, both Universities are located in the Eastern Cape Province of South Africa. The mission of the Siyakhula Living Lab is to develop and field-test the prototype of a multi-functional, distributed community communication platform for deployment in marginalized and semi-marginalized communities in South Africa [2]. SLL aims to develop the marginalized community by equipping people in the area with the necessary technological skills to be able to support projects deployed. It shows how marginalized communities that are very difficult to reach, may in future be joined with the greater South African and African communities to the economic, social and cultural benefit of all [17].

IV. e-MARKETING CHALLENGES FOR RURAL COMMUNITIES

The infrastructure in rural areas is very poor and as a result communication in these areas is very difficult. Network problems and inaccessibility of internet in rural areas is part of the other problems [4, 5]. Most of the businesses in rural areas are too small and lack enough capital to offer rewards. These areas rely on donations and funding, so may find it difficult to have extra products to offer as rewards [4]. Internet infrastructure alone, has proven to be inadequate to sustain rural communities. Effective use of infrastructure is needed to create a meaningful info-structure built on concrete content and effective collaborative practices. “Social engineering strategies engaging citizens in ongoing self-directed online learning are needed to enable rural citizens to determine their own destinies and together build a sustainable future” [8].

Many of South Africa’s rural areas live below subsistence levels and remain impoverished because they have no access to basic infrastructure essential for economic growth and development [6]. Consequently, the youth are leaving their rural homes in pursuit of employment opportunity in the cities [18]. Rural communities nationally are losing 3-5 percent of their population annually and the out-migration of youth is decimating their future sustainability [8]. SMMEs face problems when selling products to the entire world due to shortage of resources, skills and innovative ideas to expand their markets [4, 19]. The majority of rural people are poor without enough capital and resources to fully and effectively market their products [4, 5]. In some cases, people in rural areas lack knowledge on the advantages of introducing new ideas. Technological illiteracy means that there is no support or maintenance readily available for ICTs. For example, only 2.3% of rural households own or have access to a computer in rural South Africa, and only 5.4% own or have access to a landline [20]. Thus, most organizations, which are implementing ICT projects in marginalized community also conducts training on the usage of the ICTs. There is need for frequent training on ICTs and e-Commerce projects to ensure awareness. It also allows people in these areas to understand
the benefits of the projects. Sustainability is also another problem in rural areas. The main challenges, as a way to maintain sustainability of ICTs and e-Commerce platforms are:

- High implementation costs.
- Limited usage – not enough to sustain
- Need to encourage private sector participation
- Need for effective management
- Need for strong community support
- Need for ICT training – wide coverage
- Technology moves fast

Of course, there is a current online shopping mall, which sells the products, however not enough to maintain sales [21]. Due to the emergence of various online shopping malls, it is difficult to maintain customers because of stiff competition. Customers have many shops to get products from and many of the customers prefer where rewards are given. The authors are aware of the discussed problems in rural areas. However, most of the problems were solved and some are still been looked at for the rural area under study. Therefore, for the development of the Dwesa Reward Program such problems were considered and the application aims to be the solution to the identified problems.

V. e-MARKETING AND REWARDING APPLICATION DEVELOPMENT

There are four main modules, which have been developed in this application. DRP consists of the allocation of points module, the negotiation module, the points redemption module and the rewarding module. The diagram shows the interaction between the customers and the system.

The application was developed using open source software based on the LAMP, (Linux-Apache-MySQL-PHP) architecture. This is so because the existing ecommerce platform deployed at Dwesa is currently running on the same platform [21]. So to maintain uniformity and integrity open source software was also chosen for this application. The other technologies, which were used for DRP development, are:

- JavaScript
- AJAX , (Asynchronous JavaScript and XML)
- GNU get text tools, version 0.17
- CSS (Cascading Style Sheet)

The combination of AJAX and JavaScript is mostly used when the user is viewing the uploaded items or viewing the customer orders. This combination allows the user to edit the details of individually without having to refresh the whole page and saves creating an extra page for editing the details [22].

Similar to the current system the rewarding application has the front-end and the back-end [21, 22]. The back-end consists of the shop-owner interface. The front-end interface is accessible to any user who accesses the shopping mall, these users include system administrator, shop owner and customers. The shop-owners interface is accessible only to the system administrator and shop-owners. The shop-owner interfaces are accessed with the aid of a login panel via the front-end interface. The system administrator is responsible for managing all the modules and provides the shop-owners credentials for login from the front-end. Shop-owners are allowed to perform certain actions including allocating of points to products, identifying the products to offer as rewards, negotiating with customers, editing and viewing of the details about the items being sold, deleting of items, uploading new items to their shops, and viewing the item orders made by customers.

A. The allocation of points

The diagram below shows the items available in one of the shops and the different points assigned to the products. There are different points, which are allocated to the items in the shops and the customers are able to see the available points to each of the items.
The products are assigned points. These points can be edited by the shop owner and the administrator. All points assigned to the products are dynamic as they can be changed at any time. However, there are some fixed points like for registration and referring friends. Points for these activities may be fixed for a long period though again can be editable at anytime.

B. Negotiation Module

Negotiation allows customers to redeem their points. Customers will be communicating directly to the system. Instant feedback is available. Through negotiating, thus where customers can get rewards. Those who are good at negotiation will get better offers. The decision is made by the system. The general negotiation principle will be incorporated in this module, for instance, buyers will always prefer to win when negotiating and pay less, at the same time sellers need to sell at a higher price [10]. This module allows the system to make a decision on the rewards to offer.

The application will consider the customer transaction history, the number of points available, the number of customers referred and the availability of the rewards. A decision will be made and communicated to the customer based on the above factors. The module is responsible for the decision making when points are redeemed. The negotiation module contains the communication layer, knowledge base, reasoning base and the control module. The diagram shows the features of the negotiation module.

![Diagram of Negotiation Module](image)

Figure 3 Intelligent Negotiation platform: Adapted from Elsevier ScienceB.V. (2002): [www.elsevier.com/locate/ecra](http://www.elsevier.com/locate/ecra)

C. Viewing of points

All the main entities in the application are able to view the available points. Customers using the front end, the shop owners using both the back-end and front-end are also able to view points.

When browsing through the shops all the items available with the points can be viewed. The points are also visible to the customers when adding products to cart and before the final order is made. The shop owner is also able to view the points at any particular moment. Allowing this functionality of viewing the available points enhances the customers’ decision making. The customers know how many points to redeem and negotiate. At the same time the shop owner knows how much to offer as the rewards to different customers depending on the points available.

D. Redemption of points

Customers redeem the points through negotiation and get rewards in form of any items from the shops. There is a minimum number of points required before a customer can redeem the points and at the same time there is a maximum number of points which cannot be exceeded before points redemption.

An example of how to allocate points, the redemption process and the final rewarding process: Assuming that:

- The conversion rate is 250 Points = € 1 (Euro).
- Allocating points: for every €1 spend customers get 10 Dwesa Rewards Points
- Referral points and registration points are fixed at 10 and 30 points respectively.

An example of how Dwesa Rewards can be calculated considering the conversion rate given above is as follows:

\[
\begin{align*}
\text{Amount spent} & = \€ 38 \\
\text{Points earned} & = 345 \\
\text{Conversion formula} & = \frac{345}{250} \\
\text{Redeemable Value} & = \€ 1.38
\end{align*}
\]

The system has to check on the items from the shops and make a decision on which item to issue as a reward. The item will be equivalent to € 1.38 as from the example above. However, it is important to note that in this application, a reward can only be given to customers who have negotiated for it using points. The rewards will only be in form of items from any of the shop.

VI. IMPROVEMENTS FOR THE REWARDING APPLICATION

As part of improvements to the rewarding application explained in this paper, there is need for improving the modules explained. These are intelligent modules and changes in technology certainly affect the overall output, thus there is need for continuous improvements on all the modules. Since the application is to be part of the SLL, which consists of several projects, project integration has to be done.

This will integrate all the projects undertaken in Dwesa with the explained application. Furthermore, continuous training of the people in Dwesa is proposed. This will equip the people...

1 The current e-Commerce platform makes use of the European currency, thus the reason for using it as a currency
with technological skills so that they can be able to support projects deployed for their area development. There is also need to consider audio-based interfaces. These interfaces will benefit many users and customers who cannot read or understand the language used to implement the rewarding application.

The rewarding program should have a variety of products to offer, not only the products from the shops. In addition, the customers should be able to transfer the points that they have to other customers. Customers should be given unique membership cards with unique numbers to be able to use when purchasing online from Dwesa. Meanwhile, customers only use usernames and password as unique features.

VII. CONCLUSION

The development of an intelligent rewarding application for a rural community is the main idea brought in this paper. Rewarding customers for buying online is a strategy to be able to survive in the current market, which has a lot of competition. This paper has discussed how points are allocated to products, how customers get the points and how the points are used. Rewarding customers enables customer loyalty and attracts more people who are willing to support rural communities by purchasing products from buy at Dwesa.

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