E-commerce Framework for Micro and Small Enterprises in Ethiopia

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Abstract

Heretofore, there has been a push for Ethiopia to benefit from Information and Communication Technologies (ICTs) as a pathway to economic development. This is especially true amongst Micro and Small Enterprises (MSEs) which play a major economic development role in the country. Today, the government is trying to apply ICT as a tool in economic development. In the context of developed economies, ICT is linked with all aspects of business communication and development.

The purpose of this paper is to develop an e-commerce framework for MSEs in Ethiopia. By adopting design science research method, first the most determinant e-commerce factors for Ethiopian MSEs are identified from related studies which identified the variables through expert panel and reliability measure test. Then the framework has been designed based on the analyzed primary data decision ideas.

The framework features include users, policy and regulations, awareness and supporting industries (telecommunication service providers, transaction services and/or loan suppliers) from the environmental factor side. From organizational factors side, human resource and commitment and from technological factors side, e-commerce technology standard, application infrastructure and security service have been identified. The intended owner, the Federal Democratic Republic of Ethiopia (FDRE) MSE Agency, has since split into two sectors and hence both have been proposed as the owners. MSEs are incorporated as a component since they are sellers of products through the Agency. Delivery service and payment and the payment gateway have been kept separate to incorporate the current transaction system.

The framework is implemented using a sample web application utilizing Word Press for the front end and XAMP for back end. The prototype and the framework were presented to the stakeholders for evaluation.

Keywords: E-commerce Framework; Micro and Small Enterprises (MSEs)

1. Introduction

Information and Communication Technologies (ICTs) are changing the way of human life from time to time. This led to the continuous and growing interest in ICT adoption to be attributed to the exponential growth in the number of Internet users worldwide, with a bigger increase reported from users in developing countries [1].

Particularly the use of Internet to conduct online business is quickly changing the conventional way of doing business among all categories of businesses worldwide. Driven by the perceived potential of the Internet in reducing transaction costs by decreasing the number of intermediary and facilitating linkages to the market, e-commerce contributes to the advancement of businesses [2].

Currently Ethiopia's market is characterized by direct face-to-face interaction with customers at sales locations or shops. Some small enterprises that are established with the help of the government may not even have a separate shop, therefore, depend heavily on government's timely market facilitation. Setting up another shop is not economically viable for many enterprises which makes it very difficult for them to be addressable and competent in the business. In commitment to economic development, the government of Ethiopia is giving greater focus for

the development of MSEs. It started this process by developing the first MSEs development strategy in 1997 E.C. which was integrated into the GTP as the pillar of industrial development. The government provides opportunities to MSEs at designated times and locations to advertise and sell their products. But that is not enough to fulfill the industrial development plan in a consistent manner. As studies show, Ethiopian MSEs are facing market challenges. A study by Munira Sherefa [3] shows among 25 enterprises included in the study in the Gulele Sub city of Addis Ababa, more than 24% show market shortage in their locality hindering their implementation and growth plan.

The other development focus of the government is putting concerted effort to make ICT a tool for industrialization. But enough research hasn't been carried out that coordinates MSE development and ICT for better long term plan achievement. Therefore, this research raises the following questions and explores the potential technology tools that benefit Ethiopian MSEs.

1. What is the current Ethiopian MSEs market practice?
2. How can an e-commerce framework be developed to benefit Ethiopian MSEs?

The general objective of this research is, therefore, to develop an e-commerce framework for micro and small enterprises in Ethiopia that increases accessibility of their market.

E-commerce definition that is employed in this research is the use of ICT in any way that improves enterprises relationships with customers or suppliers. This includes actually transacting business electronically – orders, invoices, shipment documents – as well as using ICT for marketing, market research, customer service, finding potential customers and suppliers, offering entirely new products and services and more [4]. According to [5], e-commerce is classified into eight types from which this research focused on two of them, namely, Business-to-Business (B2B) and Business-to-Consumers (B2C). When businesses make transactions or collaborate electronically, it is called B2B and when sellers are organizations and buyers are individuals it is called B2C.

According to the government of the Federal Democratic Republic of Ethiopia (FDRE), micro and small enterprise development strategy provision framework and methods of implementation document [6], Ethiopia uses the summarized definition as shown in Table 1.

Table 1: Definition of Ethiopian MSEs

	Sector	*Human Power*	*Total Asset in ETB*
Micro Enterprise	Industry	< 5	< 100,000
	Service	< 5	<50,000
Small Enterprise	Industry	6-30	< 1.5 Million
	Service	6-30	< 500,000

Industrial sectors are construction and mining; service sectors are retailer, transport, hotel and tourism, ICT and maintenance services. Previously, manufacturing industry was under industrial sector but now it is administered by the Federal Small and Medium Manufacturing Industry Development Agency separately.

Adopting design science research [7], the study follows the process of problem identification, objectives for a solution, design and development, evaluation, and communication. To build the prototype, Feature-Driven Development (FDD) process was employed [8]. FDD allows taking the framework as a bigger model and decomposing it into small features for the development.

By adopting a qualitative approach, this research gains in-depth understanding of MSEs and the social context they work for greater market accessibility. Within the qualitative framework, three main data collection techniques were employed based on the nature of the available data that is useful for the study. These are questionnaire, interview and

secondary data analysis. Semi-structured interview was done with FDRE Micro and Small Enterprises Agency Marketing and Market Development Directorate to understand MSEs in the Ethiopian context, their market practice and related aspects. Questionnaires were sent out to MSEs with the purpose of understanding the enterprises' group level of education, technology acquaintance, current market practice and willingness to use e-commerce. A sample size of 50 randomly selected firms from five sub-cities of Addis Ababa was used. The sampling considers Addis Ababa due to the technological awareness and availability in the capital city compared to other areas outside of the capital. Operationally, majority of the enterprises in Addis Ababa are considered representative samples for the rest of the country. The collected primary data helps to gain the decision ideas for the framework development. In the framework development, first the theoretical foundations of e-commerce adoption have been collected from literature. The IT adoption and diffusion model concepts in MSEs have been employed in identifying the contexts that would influence e-commerce. Then, determined by the primary collected data decision ideas, the framework design was carried out. Then the framework was implemented on the sample running application and presented to MSEs Agency Marketing and Market Development Directorate and the Agency's information technology team and tried to gather evaluation responses to modify the design.

2. Related Work

The work by Rashid [9] attempts to develop a framework for the adoption of electronic commerce technologies in New Zealand with specific interest to small and medium size enterprises. The researcher adopted the information technology adoption and diffusion models and identified the essential influencing factors and factors leading to the adoption of these technologies. Based on the model the researcher identified contexts which would influence e-commerce as one technology adoption by SMEs. These contexts are technological, organizational, environmental and individual. The researcher identified variables under those contexts through different models with respect to New Zealand's SMEs. The researcher considers that the framework portrays the various factors and their effect on the adoption decision as a first level. Thus, the first level would depict how the potential adopters generally view e-commerce. Then the second level would depict an adoption criterion that is noticeable to each SME and hence would emphasize certain factors more than the others. The study didn't demonstrate the enterprises' technology practice level at the beginning and considers the individual level of e-commerce adoption and also there is no implementation carried out to evaluate the developed framework that validates the study.

The purpose of the work in [10] was to develop an e-readiness framework for Small Tourism Enterprises (STEs) in developing countries. This study focused on the tourism industries but the research approach addresses broad areas. The study was carried out in two phases. In the first phase, the researcher developed a framework based on literature and presented it to an online focus group with a panel of experts. Then the researcher used the experts' comments to refine the work. After making changes to the framework, in the second phase, it was further refined using an investigation of actual STEs in two developing countries (Malaysia and Ecuador) that incorporate a total of 26 tourism operators. To select enterprises in those countries, the researcher considered only those enterprises who used either the Internet in some way or have developed websites to promote their products which is in some way different from the premise this study is based on. However, in the study the final framework has two levels of readiness. The first level is enterprises to assess their internal environment such as organizational resource, managerial readiness and so on. The second level of readiness is the implementation issues once they decide to adopt the framework such as communication, transaction and

the like. Even though the factors this research identified are valuable, the initial supposition of enterprise's technology consideration may not be true for the majority of MSE enterprises in developing countries like Ethiopia.

The work in [11] constructed empirically tested model for e-commerce adoption called Perceived e-Readiness Model (PERM). The authors followed interactionism as the theoretical root of the model and theorized a multi-perspective inspection of the managerial, internal organization, and external contextual issues. They defined perceived e-Readiness as an organization's internal assessment of its managerial, organizational, and external situations in making decisions about adopting e-commerce. They classified PERM as Perceived Organizational e-Readiness (POER) and Perceived External e-Readiness (PEER) for their desired level of explanation. First they identified a number of major preliminary constructs that affect e-commerce adoption and short listed 88 items to capture the essence of the concepts of the instrument. Then a panel of 20 experts reviewed and pre-tested the instrument. The experts were asked to judge the degree of relevance of each of the items in the instrument as measures of the individual variables on a five-point Likert type scale. They were also asked to suggest additional items that were not covered in the instrument. Then the researchers evaluated experts' point of agreement in their assessment of a variable through inter-observer reliability measure using correlation coefficients. Then they distributed the model for refinement and validated in a survey of 150 businesses from South Africa. Finally, they assessed the predictive validity and final reliability of the instrument. The items identification and refinement process used in this study was very comprehensive. Considering the nature of the task at hand, the time constraint and availability of e-commerce experts in Ethiopia, many of the variables used in this study were adopted and localized for Ethiopian MSEs in our study.

3. The Proposed Solution

3.1 Primary Findings

According to the questionnaire analysis, level of education for the majority of the workforce in the enterprises is high school which, to some extent, implies that the barrier to understand technology would be minimized. When we see the enterprises' working capital, from 48 questionnaires, the minimum working capital was Birr 500 and the maximum Birr 2,000,000. The average is Birr 211,420. This shows the enterprises' economic level is not encouraging to propose e-commerce framework at individual level. When we consider Internet access, more than 80% of the enterprises' manpower access the Internet using their mobile phones showing familiarity with technology and Internet use.

During the interview, it was evident that the FDRE MSEs Agency advertises some of the enterprises' goods, especially leather and textile products, on the agency's website. The agency is planning to implement a better technology solution to market these and other products through solutions such as e-commerce. This gives a decision idea to consider the framework at the Agency level.

3.2 Framework Development

The first thing that was done in the framework development was to identify the most relevant determinant variables/factors to e-commerce adoption in Ethiopian MSEs. Those variables are adapted from related literature. This is because, during the course of this research, it was difficult to get e-commerce experts in Ethiopia to make evaluation on individual variables.

Literature on e-commerce adoption foster several determinant perspectives [12, 13, 14, 15, 16] and explained the factors like e-commerce awareness, organization's commitment, policy and regulations and human resource.

The information technology adoption and diffusion model for MSEs by Thong and Yap [17] promotes essential technology adoption contexts

which include organization, environment, technology and individual. Under the environmental context are supporting industries (telecommunication service providers, transaction services and loan providers), users, policy and regulations, and e-commerce awareness (communication). Within the organizational context, human resource and commitment, and under the technological context, application infrastructure, security services and e-commerce technology standard are identified. In the beginning of this study, FDRE MSEs Agency was considered as an implementer based on the enterprises' individual capital analysis. In some research, CEOs' or managers' role (under the individual context) was identified as one of the determinant factors for e-commerce adoption considering the management's influence in the decision making process. Since the framework is not proposed for enterprises at an individual level, the enterprises are included as one component. Delivery service and payment are derived based on the analyzed primary data considering Ethiopia's current cash based payment transaction. During cash on delivery, the deliverer accepts the cash on delivery and settles the payment. Another payment system through a payment gateway (financial institution) is identified as a separate component to explicitly show the process. Figure 1 shows the proposed framework and Table 2 presents the component description of the framework.

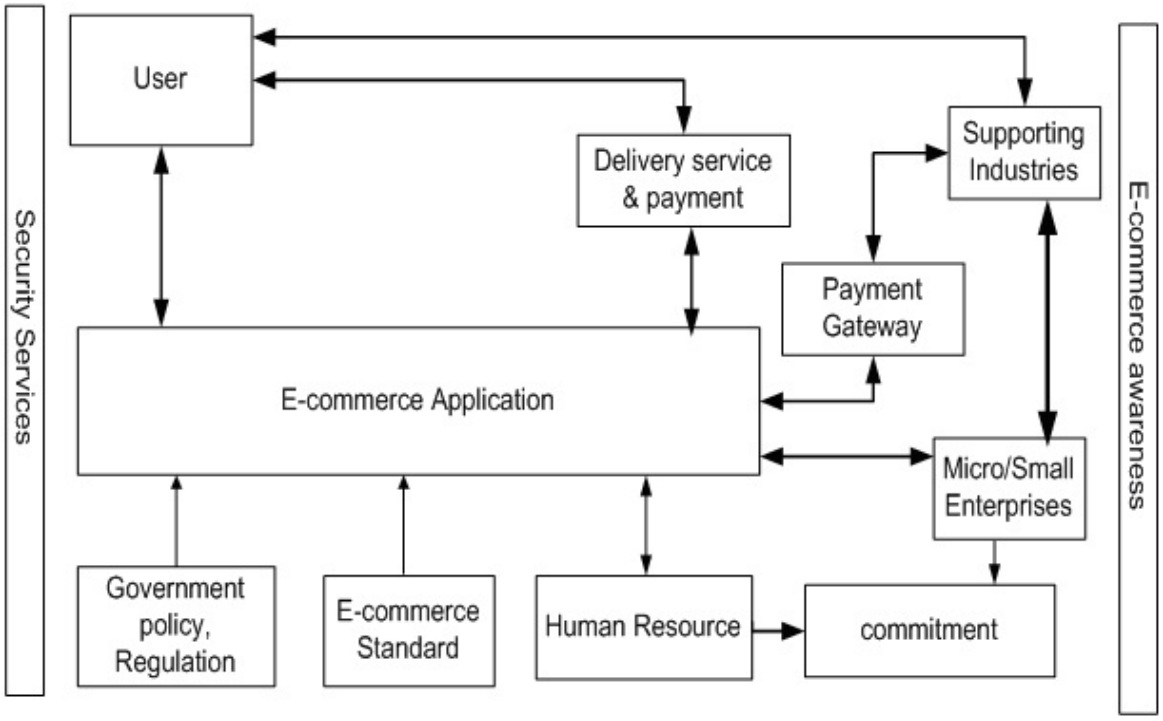

Figure1: E-commerce Framework for MSE's in Ethiopia

Table 2: Description of the Components of the Framework

Component	*Description*
User	A user can be an individual person in case of business to consumers or organization in case of business to business.
Delivery service and payment	It is the order delivery entity considering the current users cash transaction. If the service is given through cash on delivery, the deliverer should settle the payment received from the customer.

Component	*Description*
Payment gateway	It is an e-commerce application service provider that transmits transaction information to participating banks. The payment gateway may be provided by a bank or by a specialized financial service provider.
Supporting Industries	Are e-commerce enablers that include telecom infrastructure, IT services, and financial institutions that allow online payments and also organizations that provide loan for small enterprises.
Human Resource	The available employees with adequate experience and exposure to ICT and other skills (such as marketing, business strategy) that are needed to adequately staff e-commerce initiatives.
Commitment	Reflects enough support for e-commerce from all corners of the organization, the enterprises and from the strategic head. It refers to having a clear-cut e-commerce vision and strategy championed by top management, e-commerce leadership and organization wide support of e-commerce ideas.
Government policy and regulation	It is a government policy regarding cross-border e-commerce retail taxation, shipping and delivery policy, refunds policy, data policy like how to handle customer financial data, and online advertising compliance.
E-commerce standard	This includes foundation technology standard, marketplace standard and commerce services and application standards.
Security Service	This includes physical security, transaction security, network security, system security and database security.
Awareness	For the agency, it is technology and market awareness, for the enterprises it is usability awareness and also for customers it is the availability and means of use.
Application	It is e-commerce enabling interface that is specifically designed to support the creation of an e-commerce system.

3.3 Evaluation

Two ways of evaluation were implemented in this study, i.e., prototyping and survey evaluation. Feature-driven development technique has been employed to develop the prototype. This technique allows taking the entire framework and decomposing it into detailed features. WordPress has been utilized for the front end development which allows to integrate Woo-Commerce e-commerce extension that helps to implement the e-commerce application in standard manner. XAMPP is used for the back end development which stands for Cross-Platform (X), Apache (A), MySQL (M), PHP (P) and Perl (P). After the development of the prototype and the framework, it was presented to the FDRE MSEs Agency Marketing and Market Development Directorate and the Agency's IT department as they are the primary stakeholders. The survey was organized based on Likert scale, in which qualitative opinions were quantified as strongly agree =5, agree =4, neither agree nor disagree =3, somewhat disagree =2, and strongly disagree =1.

The purpose of the survey is to evaluate the proposed framework's completeness with regard to the components and its interaction, usefulness, applicable to the target population and the application of each concept to the developed prototype. The result shows 100% usefulness, 90% completeness, and 80% address the target population. After the evaluation, framework design change hasn't occurred as expected since there was no major component change suggested.

4. Discussion

Based on the observed research gap in Ethiopian micro and small enterprises current commerce exercise and availability of technology based market solution that empowers the county to achieve the industrial development plan, this study raises two research questions and tried to address them.

As micro and small enterprises play a major role in the economic growth of developing countries like Ethiopia, having technology based market solution provides ways for lasting economic development.

The determinant variables of e-commerce implementation are adopted from literature and the framework was developed based on the analyzed primary data decision ideas. Information technology adoption and diffusion contexts are the framing concepts in identifying the influential factors of e-commerce adaptation. In this study, FDRE Micro and Small Enterprise Agency is proposed to be the owner of the framework because during the study we understood that the economical capacity of the individual enterprise is not sufficient to support an e-commerce solution on an individual level. Based on this decision idea, MSEs are incorporated as a component. Most researches [10, 11, 13] that are carried out for MSEs in developing countries have considered the individual level of e-commerce adoption which is mostly impractical for many developing countries like Ethiopia. In most researches, the emphasis during the development of their suggested framework was on theoretical foundations. These studies have not considered the enterprises' economical and infrastructure level to adjust the framework. Our work analyzed MSEs' economical capacity, technology familiarity of their manpower and the like, from the outset, which helps to address the majority of the target audience. Other benefits of choosing the Agency as implementer is because it is empowered to formulate the necessary e-commerce regulations and policies and also eases the integration of bank payment.

5. Conclusion and Future Work

Globalization and the dynamic development of ICT, especially Internet, are some of the drivers of e-commerce. These drivers have impacted the way people do business at all levels of enterprises, which Ethiopian MSEs are not exceptions. The government of Ethiopia identified the development of MSEs as the economic development method to alleviate poverty and IT as one of the industrial development tools. But, enough research hasn't been done to organize these two for better achievement of the plan. Therefore, this study tries to fill this gap by developing e-commerce framework for Ethiopian MSEs.

The framework has been constructed taking into consideration the IT adoption contexts and the identified factor items in different studies. The framework consists of users, policy and regulations, awareness, supporting industries (Internet service providers, transaction services and/or loan suppliers), human resource, commitment, e-commerce technology standard, application infrastructure and security service and MSEs and payment mechanisms.

The next question is how to adjust the framework to be applied to small businesses beyond MSEs that are supported by the agency. This requires further implementation work. As also mentioned previously, the framework components will be evaluated by professional e-commerce experts. As previous researches show, expert survey has great impact to refine the basic components. Customers' evaluation survey is another stakeholders' evaluation to be considered for the better multi-directional response.

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