DESIGNING A LOCAL E-COMMERCE SYSTEM WHICH ACCEPT MOBILE MONEY PAYMENT

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1.0 Abstract

As the use of internet grow up so does the number of e-commerce systems increases. This increase in number of e-commerce systems stimulates SMEs to engage in online marketing. The online shopping faces many challenges; one among these challenges is the decline of customer's confidence due to insecurity of some e-commerce systems. Many customers are afraid of exposing their information and payment card details on the internet. Hence, this paper propose the use of mobile money payment in local SMEs websites, whereby it will reduce customer's fear of losing their payment card details on the internet as the system does not necessitate disclosure of many information. As a final point, in this paper the book store e-commerce system is going to be designed.

Keywords: e- commerce, mobile money, and e-payment.

1.1 Introduction

Developing countries are up till now experiencing low level of e-commerce technology. This is due to many challenges that are facing the e-commerce technology in these countries. Many studies explain the challenges which face the adoption of e-commerce technology in developing countries.

Salah *et al*. (2010) found that low total factor of productivity, inadequate skills and infrastructure, colonial heritage and its repercussion and geographical isolation are among other factors for the slow adoption of e-commerce technology. Lawrence *et al*. (2010) give explanation that the challenges of e-commerce in developing countries are infrastructure barriers, technology, telecommunication (network), high access cost of internet, transactional trust, socio-cultural barriers etc.

Among the challenges addressed by many researches is customer trust due to insecurity of e-commerce payment systems and accessibility of advance payment methods (credit and debit cards) in developing countries. The usual way for e-commerce system payment is by using credit and debit card information.

In this paper the new way of e-payment will be proposed for local SMEs websites to increase trust to the customers and security of customer's information and also to make it easily accessed by the majority. The payment method using mobile money was introduced and the relevant services are being offered by various mobile operators. For instance services like M-Pesa, Tigo pesa, Easy money and Airtel money are offered by mobile operators in Tanzania. Of significant magnitude, this method demands minimum customer information and payments are made direct to the merchant's mobile, and as well the payment details are sent by the online order form.

1.2 Literature review

1.2.1 M-money

Mobile money allows any mobile subscriber to add credit to his or her mobile account and store it for later use or send it to other mobile subscribers via SMS. The receiver can inexpensively convert this credit back into cash. Mobile money allows users to send cash as quickly as a text message, avoiding inconvenient and costly transfer methods such as physical travel, the mail, or traditional wire transfer services like Western Union. (Ludewig *et al*., 2010 p 28)

In 2007, Safaricom in Kenya introduced a new way of handling bank and money transfer. The System is called M-PESA, where M stands for Mobile and PESA is money in Swahili. The system has become a success and now other mobile operators such as Tigo and Zantel have introduced their own systems for

mobile payments. This method is by far more popular than credit cards, and it is convenient to use in rural areas where it sometimes can be a long distance to the nearest bank office or ATM (Klintibo, 2011).

This mobile money transfer from mobile operators such as Vodacom, Tigo, Zantel and Airtel in

Tanzania can be used by online merchants in receiving online payment; this will facilitate the growth of e-commerce technology. This is the easiest method and it has security hence it will increase customer trust on buying online.

Mobile money platforms and Technologies

There are many platforms and technologies in running mobile money applications. Currently, in Tanzania four mobile operators are running mobile money applications, the table below shows the mobile money applications and the technology used.

Operator	Mobile money platform	Access Channel/Technology
Vodacom Tanzania	M-Pesa	USSD/STK
Airtel Tanzania	Airtel Money	SMS/STK
Tigo Tanzania	Tigo Pesa	USSD
Zantel	Z-Pesa	USSD

Table 1: Mobile money platforms
Source: UNCTAD 2012 report
1.2.2 E-commerce in Tanzania

E-commerce are the business activities involving consumers, manufactures, suppliers, service providers and intermediaries using computer networks such as internet (NICT policy, 2003)

The E-commerce industry in Tanzania is in its early stage as only few local websites recently began offering e-business services, albeit in a limited supply. Yet the services are constrained by the lack of a national payment system for local credit cards and a legislative framework appropriate for e-

business (NICT policy 2003). But there are some areas in which e-commerce is applicable in Tanzania, Oreku et al (2009) found that "e-commerce has been widely acceptable in the tourism industry in the form of online portals and reservation and booking systems".

1.2.3 E-payments

"Online payment is a form of financial exchange that takes place from payer to beneficiary using an electronic means of payment in an online environment (Mandadi, 2006 p 15).

The most popular type of e-payment method is credit card payment. According to this method, after selecting preferred goods from an online store, a customer can make a payment via a supporting credit card payment system provided by the store by simply filling in her credit card number with relevant information such as date of birth or billing addresses, for authentication and payment authorization purpose. Such information is transferred to the customer's credit card company for credit availability. If the request has been approved the goods (in case of electronic goods) and corresponding receipt of payment are transferred to the customer shortly (Kangpisdan, 2005 p 24).

Online payment has challenges in security of customer's information and simplicity of payment.

Panti (2011) found that, not all merchants provide a secure payment environment to their customers and despite having a standard payment policy, adhered to it consequently, this exposes a customer's payment information to risks of being compromised or misused by merchants or stolen by hackers and spammers.

E-payment infrastructure such internet and mobile networks are not widely available in Africa. Furthermore, banks and other financial institutions are not adequately automated to enable e-banking and e-payment. (Kumaga, 2010) Apiah et al., (2007) found that, internet fraud is on ascendancy in Accra, the national capital of Ghana. The youth through dubious means lay hands on credit card number of other people and ultimately using them to make bulk

purchases from online marketing sites like e-bay and others. With credit and debit cards, consumers cannot detect fraud until their statement of accounts arrives but credit card companies and banks do not insure against fraudulent use of their cards.

It can also be extracted from the study that users want more simplified, convenient and secure on-line payment system (Mandadi, 2006 p 7).

2.0 Designing a E-commerce system

2.0.1 Data flow diagrams

Data-flow diagrams (DFDs) are system models that show a functional perspective where each transformation represents a single function or process. DFDs are used to show how data flows through a sequence of processing steps. For example, a processing step could be the filtering of duplicate records in a customer database. The data is transformed at each step before moving on to the next stage. These processing steps or transformations represent software processes or functions where data-flow diagrams are used to document a software design. (Sommerville, 2011).

There are four symbols for drawing data flow diagram,
1. Rectangles representing external entities, which are sources or destinations of data

2. Ellipses representing processes, which take data as input, validate and process it and output it

3. Arrows representing the data flows, which can either, be electronic data or physical items
4. Open-ended rectangles or a Disk symbol representing data stores, including electronic stores such as databases or XML files and physical stores such as filing cabinets or stacks of paper. (Kodali, 2007)
The following is the context level, data flow diagram of the e-commerce system.
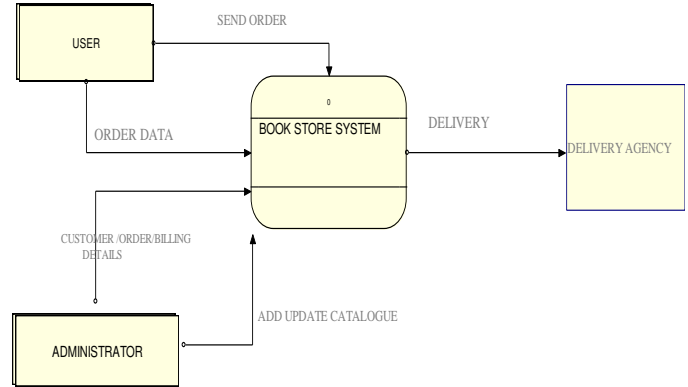

Figure 1: System data flow diagram
Source: Author

2.0.2 Use case diagrams

Use case diagrams shows the interaction of the user in the system, each use case shows the complete list of events initiated by an actor and specifies the interaction that takes place between an actor and the system. In this study three actors shall be identified for this system, customer, administrator, and anonymous person. The following actions identified for each actor.

1. **Customer**
   - Customer can select different book
   - Customer can add books to the shopping cart
   - Customer can submit the shopping cart
   - Customer can search books
   - Customer can open an account
   - Customer can Login in the system
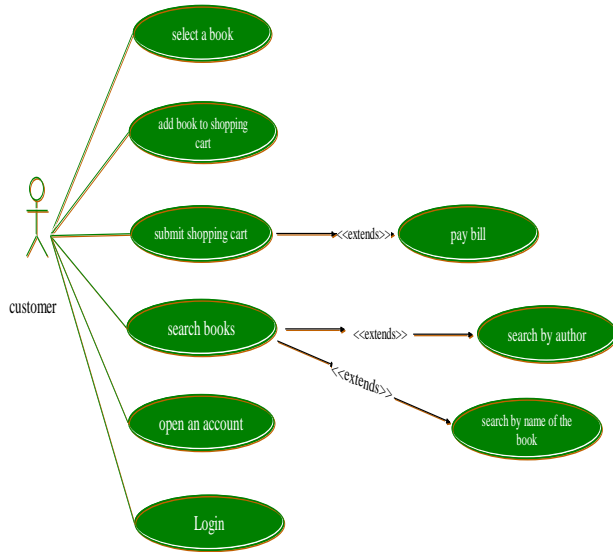
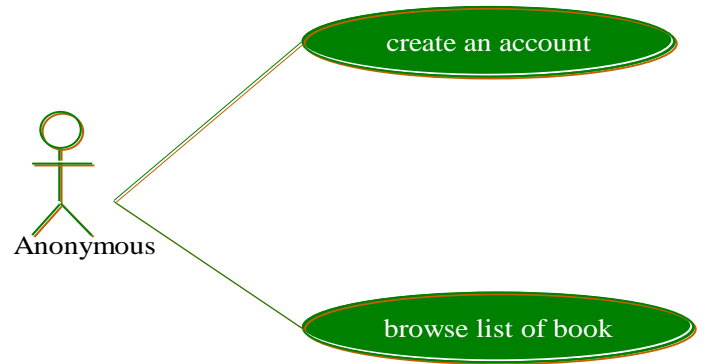**Figure 2: Customer Use case diagram**

2. **Administrator**
- Administrator can add product to the catalogue
- Manage the shopping cart
- Accept orders from the customers
- Administrator can Login to the system
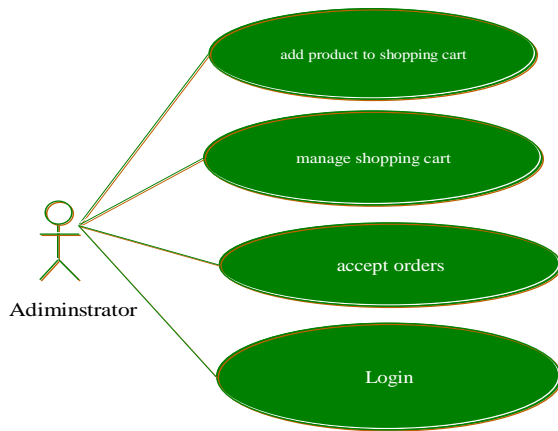
**Figure 3: Administrator Use case diagram**

3. Anonymous
  - create an account
  - browse list of books
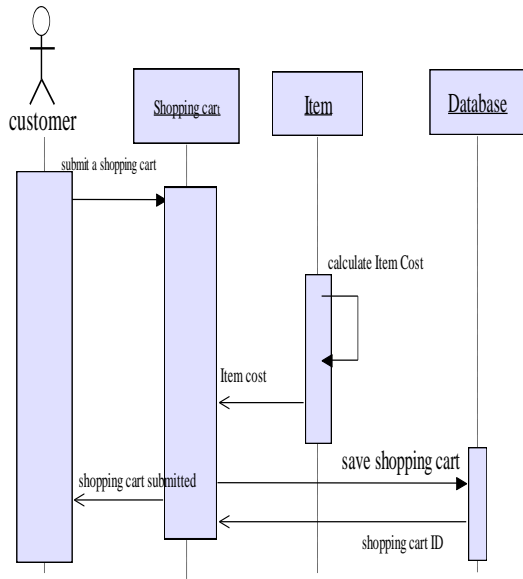

Figure 4: Anonymous Use case diagram
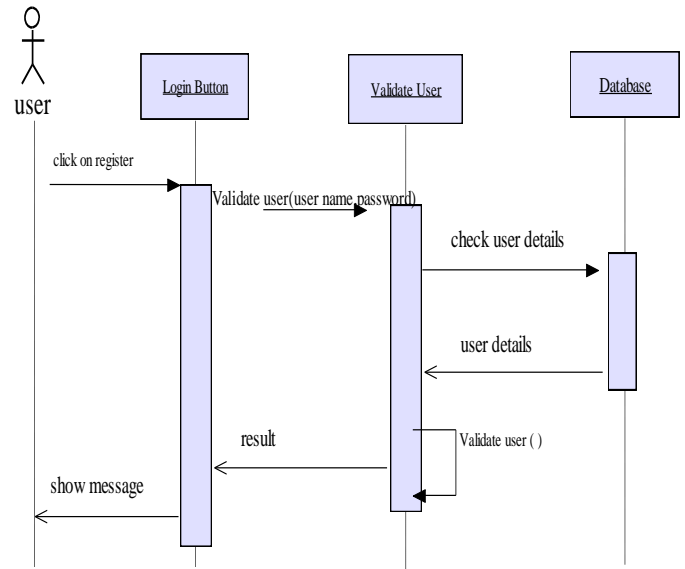
2.0.3 Sequence diagrams

Sequence diagram are the diagrams which shows the workflows for the main use cases, the aim of this diagram is to show how the operations are carried out in the system. The following are different sequence diagrams for various use cases.
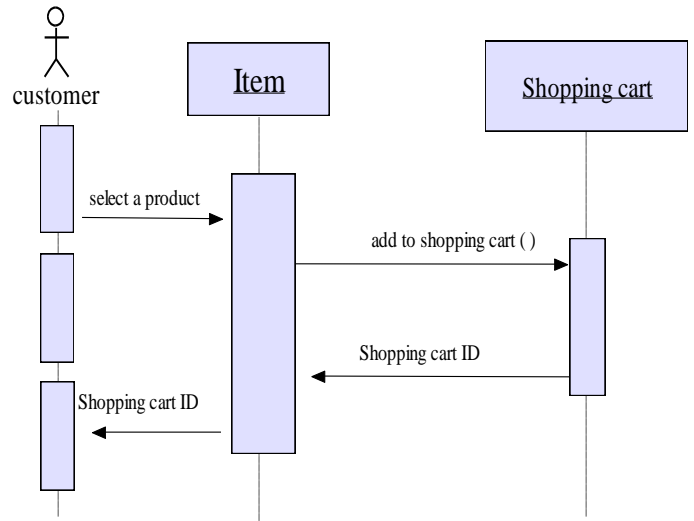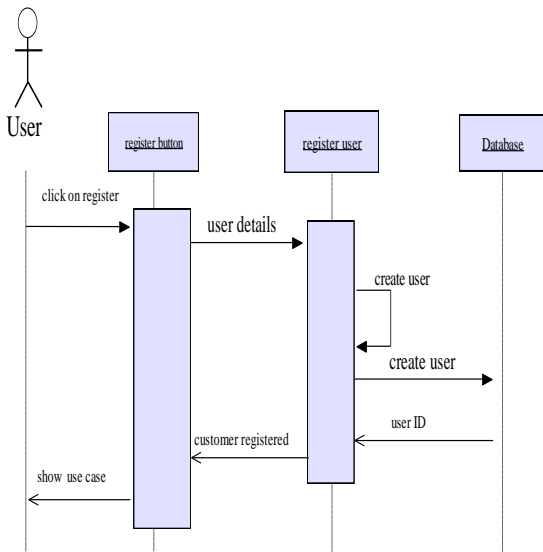

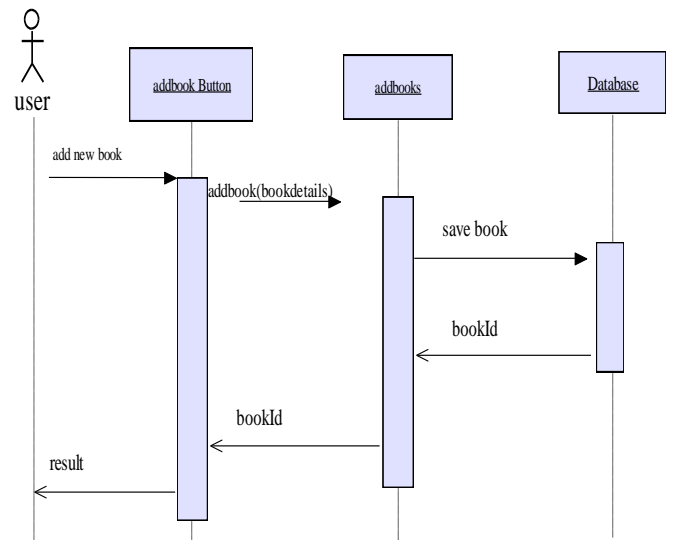**Figure 5: add to shopping cart sequence diagram**

Figure 6: **Submit a shopping cart sequence diagram**

Figure 8: Login a user: sequence diagram

Figure 7: register user sequence diagram

Figure 9: Add book: sequence diagram

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3.0 Conclusion

The use of internet is increasing all over the world. In that regard Tanzania is not an isolated island as the number of internet users increases as days goes on. This increase in number of internet users stimulates the online shopping habit. As the number of online shoppers increases the customer's informational privacy becomes a sensitive issue. The users of the e-commerce systems want to ensure that their payment card information and their transactions are safe and secure. But there are several cases associated with stealing of the payment cards information. This hacking of payment card information reduces confidence on part of some internet shoppers.

The aim of this paper was to design the e-commerce system which uses mobile money payment system for SMEs, thus, the mobile money payment was proposed to local SMEs e-commerce systems. This mobile money payment system is very popular in Tanzania, and it does not require many information when performing different transactions.

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