A TRUST MODEL FOR BUILDING CONFIDENCE IN BUSSINESS-TO-CONSUMER ELECTRONIC COMMERCE TRANSACTIONS

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Declaration

I, Mary Komunte do hereby declare that this Project Report is original and has not been published and /or submitted for any other degree award to any other University before.

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Dedication

To the family of the late Pius Kabukure of Kasharara, Kagongo, Ibanda

Acknowledgement

To the Almighty God be the Glory, Power, Honour and Praises for having enabled me to successfully complete this research project, the energy and sweat of coming up with this project need no less than thanking you my Lord Jesus Christ.

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It is difficult to explain how grateful I am to any person who has been there for me literally since the first day of my birth to the time they departed. My parents the late Mr. and Mrs. Pius Kabukure were incredible. I am extremely thankful to God for everything they did for me. Lastly I thank God for the health and protection He enabled me throughout this research. May His name be glorified.

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Abbreviations

B2B	Business-to-business
B2C	Business-to-Consumer
B2G	Business-to-government
EDI	Electronic Data Interchange
E-Commerce	Electronic Commerce
e-business	Electronic Business
CAs	Certificate Authorities
GUI	Graphical User Interface
MGT	Management
UML	Unified Modelling Language
ICT	Information and Communication Technology
IT	Information Technology
PKI	Public Key Infrastructure

Glossary

ALICE The name traditionally used for the first user of cryptography in a system, Bob's friend

Authentication The action of verfying information such as identity, ownership or authorization. Sender and recipient must prove their identity to each other

BOB the name traditionally used for the second user of cryptography in a system, Alices friend

Certifying Authority Aperson or organisation that creates certificates

Conflict is a disagreement through which business parties perseive a threat to their needs, interests or concerns

Conflict Resolution Resolving conflict effectivelly

Cryptography The art and secience of using mathematics to secure information and create a high degree of trust

Database is a collection of files serving as a data resource for computer-based information systems

Data integrity is the accuracy and accessibility of data

Encryption The transformation of plaintext into an apparently less readable form(called Ciphertext).The cipher text may be read by anyone who has the key that decrypts(undoes the Encryption) the ciphertext

Internet The connection of computer networks from all over the world forming a worldwide network

Integrity Message must not be altered or tampered with

Non-repudiation Proof is needed that the message was indeed received

PKI PKIs are designed to solve the key management problem

Privacy Information must be kept from unauthorized parties

Abstract

In the last years there has been an increasing focus in many countries on the concept of electronic commerce. Countries see it as a central component of efforts to modernize and reinvent business. E-commerce is one of the newest Internet Technology, applications, which promises multiple benefits both for the government and clients.

In the world today, a large number of businessmen and Internet Service Providers have launched business websites, offering online business services. However the implementation and functionality of these digital services seem to be relatively smooth in developed countries, the situation is still young in developing economies.

Lack of consumer trust in E-commerce vendors, technology and legal infrastructure of the E-commerce environment is a major challenge to the adoption of B2C E-commerce. Trust makes business possible, without it few transactions would occur. Trust is a catalyst for Electronic Commerce. Trust is the core of all relationships and it has been suggested that trust will hold people together and give them a feeling of security. Trust is a very fragile thing. It is generally earned and grows at a painfully slow space and can be destroyed in an instant. Therefore it allows people to interact spontaneously and helps the economy to operate smoothly.

The research paper investigates and analyses the determinants of trust in developing economies like Uganda and proposes the appropriate trust model for the successful implementation and development of E-commerce.

Chapter 1

INTRODUCTION

1.1 Background to the study

Web Security is the primary worry of companies that want to do business on the web. According to a 1997 study of 400 information system managers in USA, it was found that, security was a major concern and will continue to be for some time (Garfinkel, 1997) [18]. Building trust is like a key that would open for you to enter into a room and keep away intruders from your room. The strength of the key determines how easy or difficult it can be for an attacker to tamper with it to access your privacy. Therefore just as strong locks, keys, and burglar alarms are to the security of your physical building, the same is trust and confidence to security of users in electronic commerce. Research has proven that the challenge of trust is because of the important personal risk involved in B2C transactions and that consumer trust in online vendors has emerged as an important barrier to transacting online (Egger, 2003) [14].

As business is moving from face to face trading, mail order, telephone order, to electronic

commerce over the Internet, most interactions will occur between strangers, crucial security matters are being raised. Information and communication technologies are creating new opportunities in the delivery and enhancement of basic services in the health, educational, business, finance and government sector. However the benefits of the information society to government, business can only be fully realized if security -trust concerns are addressed and solutions are put in place to deal with cyber crime, enforceable legislation, identity management, data privacy and the protection of critical information systems (Patton, 2004) [34].

The major concern is on how to and whether you even should do business on the web, and this is because of the issue of security and in particular trust management. The opportunities include a wide range of online services from home shopping, networked village to unforeseen network-based ventures. Activities include researching topics, accessing the library books electronically, providing online education, viewing movies, news on demand, purchasing items from electronic catalogues and transacting business electronically. The major challenge for electronic commerce is how to establish a relationship of trust between different parties. It is thus very important for buyers, sellers, and government to estimate each other's trustworthiness and confidence before initiating business transactions, for example before a buyer decides to provide credit card information to a chosen seller, he must trust the seller sufficiently with regard to quality of the products the seller will send, the expected delivery time and the sellers customer service, likewise the seller must trust the buyer enough to realize that the buyer is seriously considering the purchase, will not attempt to cancel his payments and will not try to cheat the seller in any way. With a good developed technology, trust and strategy within a secure environment, electronic commerce has

the potential to revolutionalize the way business is done and improve its competitiveness. Research has proven that hijacking of bank accounts was the most active form of financial fraud in the year ending 2005, according to a survey of 5,000 online consumers who are demographically representative of the USA online adult population. Based on the survey an estimated 3 million online customers were victims of automated teller machine fraud, debt card abuse and 1.9 million were of illegal checking accounts transfers (Gartner, 2005) [19].

In order to conduct secure transactions, a sufficient level of mutual trust must be established. Without trust, development of E-commerce cannot reach its potential. This requires a properlly implemented security model to help in avoiding privacy invasion and economic losses. Therefore E-Commerce success largely depends on gaining and mentaining the trust and confidence of buyers, sellers and vistors (Kaya, 2000) [26].

1.1.1 Electronic Commerce

Electronic commerce is the conduct of business or commerce electronically essentially using the Internet technologies (Ward and Peppard, 2002) [40]. E-commerce is comprised of online banking, online brokerage accounts, Internet shopping, to name a few of the many applications. One can buy a book, clothes, transfer money from one account to another, rent a car, book air tickets, make hotel reservations and many others at one's convinience in the office or home by using a computer. However simply entering a credit card number on the Internet leaves one open to fraud. One solution to this problem is to encrypt the credit card number and other private information like passwords and to secure the entire session. When a computer encrypts this information and sends it out on the Internet, its

incomprehensible to an eavesdropper. The web server (Internet shopping centre) receives the encrypted information, decrypts it, and proceeds with the sale without fear that the credit card number or other clients' information slipped into the wrong hands.

1.1.2 Web Security Problems

Web security problems have many facets as detailed below (Garfinkel, 1997) [18];

(1) Securing the web server and the data that is on it. You need to be sure that the server is not modified without authorization and information is only distributed to those individuals to whom you want it to be distributed.

(2) Securing the information that travels between the web server and the user. To make sure the information the user supplies to the web, that is usernames, passwords, and financial information cannot be read, modified, or destroyed by others.

(3) Securing the user's own computer. You must have a way of assuring users that information, data, and programs, downloaded to their systems will not cause damage, otherwise, they will be reluctant to use the service. There must be a way of ensuring that information downloaded is controlled thereafter, in accordance with the users license agreement or copyright. Along with these issues, there should be requirements to meet the following challenges:

   - Verifying the identity of the user to the server;
   - Verifying the identity of the server to the user;

– Ensuring the message gets passed between client and the server in a timely fashion reliably and without replay. This involves logging and auditing information for purposes of billing, conflict resolution, non repudiation, and investigation of misuse.

1.1.3 Dimensions of Trust

Trust is a catalyst for human cooperation (Patton, 2004) [34] and is the core of all relationships. It has been suggested that trust will hold people together and give them a feeling of security, but is a very fragile thing. It is generally earned and grows at a painfully slow space and can be destroyed in an instant. This is because it allows people to interact spontaneously and helps the economy to operate smoothly. Lack of trust in electronic commerce is like acid poured on a human being, it makes us waste time and resources on protecting ourselves against harm and thereby clogs up the economy (Patton, 2004) [34]. In today's information technology economy there is increasing growth of mistrust in electronic commerce by the users.

A number of scholars have defined trust differently and in different contexts, for instance Brook(2004) [5] believes trust is a complex concept, it is dimensional, multi-layered and exists in almost every economic event. Even in the simplest of relationships, the dynamics of trust can be complex. Trust has been described by scholars as the emotional glue of all institutions (Betal, 1995) [3]. This prompts the thought that in using glue one cannot avoid potentially sticky situations, because trust involves personal risk and by taking these risks, we move to a deeper level of trust. There are basically five key dimensions that underlie

the concept of trust in an electronic organization and these are: *Integrity, Consistency, Competence, Loyalty and Openness* (Robbins, 2003) [36].

Integrity

This is being honest and trustful. It will be virtually impossible to build trust if we lack integrity in our organizations. If we favor one seller over the others, or if we lack fairness in our handling of business transactions within the organization, how are decision taken?, Do participants believe that they are taken fairly, without prejudice, or do some people feel excluded from the decision making process? Transaction Integrity requires methods that prevent transactions from being modified in anyway while in transit to or from the customer. For example error checking codes are an exampale of such methods.

Consistency

This relates to the individual's reliability, predictability and good judgment in handling business transactions. Inconcistencies between two parties in terms of words, action and transactions decrease trust. Good managers will hold their clients confident of their products.

Competence

This covers the individual's technical and interpersonal knowledge and skills. Qualities of competence include influence, impact, ability, expertise, knowledge and the ability to do what is needed. Trustworthiness is part, to the extent to which trust referents are perceived as being competent. Researchers have described competence as "that group of skills,

competencies and characteristics that allow a party to have influence within some domain". (Mayer, 1999) [29]. Therefore different competencies would be appropriate depending on the trust referents.

Loyalty

It is the willingness to protect and save face for another person. Business organisations with good customer care and well-designed websites have increased trust among their clients such that new customers can depend on them to purhase their products. Technologies should aim at customer satisfaction, reliable service, timeliness and cost-effective solutions. Developing customer loyalty requires an enduring commitment over time. If managed correctly customers loyalty can deliver substancial rewards. Loyalty can be developed in three unique ways, which are: Knowing your customers, Understanding what customers want from you and Managing customers' experience.

Openness

This is the ability to rely on another for full truth. Smart managers do not underestimate the resourcefulness and goodwill of their employees because they probably know as much, if not more, about the state of the business. Managers should therefore be able to tell the truth to their clients. In organisations, mistrust comes as much from what people do not know as from what they do know. Managers should keep customers informed of the price changes, decisions taken, and explain the rationale for the clear decisions made, solve problems of customers and disclose relevant information to clients at the appropriate time.

1.2 Statement of the Problem

There is an increase in mistrust between different parties engaged in web transactions. Consumers' lack of trust has been cited as a major barrier to the adoption of E-commerce (Egger, 2000) [13]. This could be due to the behaviour of marketers during the last century and the begining of the new one, who were so irresponsible and thus eroded all the trust people had of companies operating on the Internet (Clarle, 2001) [7]. It is likely that 70 percent of transactions do not take place because of reluctance to purchase by potential customers because of fear of risk (Baker, 2005) [2]. A number of security breaches have been documented, examples being the Zimwe- Kasagga scandal (Uganda) where he defrauded the Standard Charted Bank of billions of money through Bank transfers ("The East African", 2006) [11], and the multimillion dollar fraud caused by Khuram Lftikhar in United States (Micci-Barreca, 2006) [31]. Despite increasing web fraud, various approaches have been applied to build trust in E-commerce. These are: Reputation systems, payment intermediaries, trust mark seals, cryptography, digital certificates, MoTEc trust model, Mathematical trust model, credit bureau sevices, E-commerce insurance, enscrow services and others (Egger, 2000 [13]; Saymour, 2002 [38]; IDA, 2001 [23]; Wang, 2003 [41]). However there are still acknowleged deficiencies in these approaches and little information on trust is known about E-commerce in Less Developed Countries. The only way of staying a head of these challenges is by using technology to bar the fraudsters. An E-commerce Trust Model that can build trust and generate confidence in customers will go a long way in revamping and generating new business.

1.3 Aims and Objectives

The main aim of this project was to develop an E-commerce trust model for improving commitment and trust as well as confidence in E-Commerce.

1.3.1 Specific Objectives

(i) To investigate off and online factors that are likely to affect customers trust in E-commerce, that influence users trust in a web site and E-Commerce and developing an understanding of strategies that can be used to communicate trustworthiness.

(ii) To specify system requirements necessary for redesigning the E-commerce trust model.

(iii) To design a model that captures online transactions processes to address the problem of mistrust, and make recommendations showing how trust in E-commerce can be reinforced.

(iv) To implement and validate the model.

1.4 Scope of the Study

Scope of the study involved geographical and content. The research project was carried out among the business community in Kampala district. The study used a sample of research tools, different companies were visited and results were generalized for Uganda. Information Communications Technology is significantly developed in Kampala and access to the internet is extremely limited to individuals who have the resources.

Content scope was limited to trust building in E-commerce, while building on lessons learned in Information Technology Management. Other types of E-commerce like B2B, B2G were not consindered in the research but their importance was noticed. From customer's perception, E-commerce is still young in the minds of people in less developing countries. The project report largely covers determinants of trust building in E-Commerce.

1.5 Significance

The loss of business due to lack of trust constitutes an important problem for all stakeholders (Baker, 2005) [2]. In many organisations, investment in E-Commerce represents a large proportion of capital outlay. Thus we can conclude that IT assets (in terms of computer hardware, software, telecommunications facilities and human knowledge, capital) are very significant and therefore entitled to careful investigation and management to attain their value and contribution and return to the organisation (Willcocks, 1994) [42]. Once a new trust model that is more efficient has been developed, law enforcement officers and security personnel may adopt it to improve the accuracy of results in Electonic environment, and it will contribute the following benefits to organisations:

- Provide good level of security. Stakeholders will ensure transaction security through authentication, confidentiality, integrity, availability and non-repudiation. Parties engaged will make sure that information is transferred to those for whom its intended, access information and instruments that ensure verification of parties to transaction are available. It will help organizations, companies, and government to ensure that

data is transferred, processed and stored at the highest security level standards.

- Stakeholders will gain a general understanding of the trust issues in E-commerce; these principles can be adapted later to different industries and business models.

- Relationship management. This will help in the development of trust among parties involved at the very begining of their business contact and how trust between a buyer and a seller can maintained over time.

- Consumer protection. Trust management will lead to dependence, reliance and confidence of a product on the online world. Increased trust make Stakeholders build robust models that increase consumer voice and consumer protection.

- Effective trust model. It is hoped that the findings of the research project will help Stakeholders in the electronic world to have a deeper insight into what constitutes an effective trust model to improve performance. This will allow efficient, rapid transaction, collection and analysis of important information as an economic resource for clients.

- Reduces costs and risks. The model will help in facilitating the purchase and sales of every thing from a matchstick to mansions and transferring trillions of dollars each day. The electronic world will be poised to unite Technological enabled processes to reap the benefits of E-Commerce. The encryption model will influence organizations of the future by allowing them to reduce processing experiences through streamlining administration of transaction policies. New competitive products will be produced by incorporating the speed, flexibility and interactive capabilities.

- Provide powerful competitive advantage. Trust in E- commerce will lead to increased online sales, streamlined applications and processes for products such as insurance mortgages, credit cards, cash in transit, entry of new customers, cost effective delivery, streamlined enrollment and better marketing through better customer knowledge.

- Easier decision making especially for managers at the strategic level and transaction level of the organization. Trust in E-Commerce will bring greater benefits like simplified administration, better services, customer care, reduction in costs and fraud, web technologies will enable more frequent and interactive public participation in the policy making process.

- The research project shall also contribute to the knowledge concerning the development of E-commerce model for future researchers and academicians.

It is therefore entirely pleasurable that the end product of this project will be of great help to the business community and government at large. It will bring hope and trust to online marketers to build a path to attain economic sustainability through trust management.

Chapter 2

LITERATURE REVIEW

2.1 General Overview

In many Countries E-commerce is still at an infancy stage of development. A lot is still required to be implemented to make stakeholders gain competitive advantage in this information age that is advancing day and night. Therefore the Internet is redefining the mode of E-commerce to one that supports the complete seller to buyer relationship. The model includes promoting and communicating company and product information to a global user business, accepting orders, payments for goods and services online, developing software and information products online, providing on going online collaboration for new product development. As the control of E-Commerce shifts from the campany to the customer, new Models are needed for customer relationship and trust building in E-Commerce enviroments.

2.1.1 Types of Trust

There are basically four kinds of trust in an organizational relationship. The first three are emphasized by (Robbins, 2003) [36]. These include *deterrence based trust, knowledge based*

trust, identification based trust and role-based trust.

Deterrence Based Trust

Trust is based on fear of reprisal if the trust is violated (Robbins, 2003) [36]. This form of trust will only work to a degree and that punishment is possible, consequences are clear and the punishment is imposed if trust is violated. He further notes that most relationships begin on a base of deterrence. For instance trusting a new buyer to the company and yet there is little experience to base trust on him. Thus deterrence-based trust is where partners do what they say they will do because of fear of punishment. The fear of punishment is seen as a negative factor between parties (Pauline, 2004) [35].

Knowledge Based Trust

Trust is based on behavioral predictability that comes from a history of interaction (Robbins, 2003) [36]. Trust only exists when you have adequate information about someone to understand them well enough to be able to accurately predict behavior (Good, 1988) [21]. This kind of trust relies on information. In other words the more you know somebody (seller, buyer), the more accurately you can predict the behavior of that person in the organization. This kind of trust therefore develops as time goes on. Its advantage is that, deviant behavior in an organization might not be able to break this kind of trust since the more knowledge you have of a client in the organization, the more likely you are able to understand the weaknesses and strengths of the clients.

Identification Based Trust

This is said to be the highest form of trust that can be developed among businessmen in E-commerce. This is because the parties understand each other's wants and desires. This mutual understanding is developed to the point where one can act for the other. Robbins (2003) [36] notes that at this level, controls are minimal and goes ahead to give an example of a married couple over years. He explains that in marriage, a husband comes to learn what is important to his wife and anticipates those actions. She in turn trusts that he will anticipate what is important to her without having to ask. In E-commerce today, this is possible with businessmen who have transacted business over a period of time.

Role-Based Trust

Other scholars have added role-based trust. Team members often deal with each other as roles than as individuals. This means that, trust manifests itself in impersonal form and trust bases on categorical assumptions. Expectations are more stable and defined in terms of professions. We trust engineers because we trust engineering and believe that engineers are trained to apply valid principles of engineering (Pekka, 2003) [33]. Inconsitent role behaviour leads to a slower build of trust.

2.1.2 Ways of Building Trust in E-commerce

The ability to build a trusting and a trustworthy E-commerce environment in many Countries is one of the most important characteristics of IT administrators who seek to build strong

IT organizations. It is important to note that, new IT security managers encouraging trust have achieved some of the successful turn-arounds of failing organizations examples include Western Union, eBay, Amazon.com. The increasing rate at which information technology is growing in organizations today makes it quite important for information security managers to develop measures that will ensure trust is built not only among buyers and sellers but also with top management. Trust cannot be managed, hence agents should certainly act in a trust sensitive way when building and sustaining networks. Some Researchers agree that trust cannot be managed but built (Brook, 2004) [5].

Robbins, (2003) [36] identified the following factors to trust building in any organization. *Practice openness, Fairness, Fulfill the promise, Maintain confidence, Tell the Truth, Competence, consistency.*

Practice Openness

It is important that participants in E-commerce are informed about the changes that are taking place in the company, decisions that are being made and for what reasons have to be published on the web site, however, it should be noted that some information security administrators are so reserved that they let their behaviors and nature take control. There are managers who prefer locking themselves up in their offices and just come up with abrupt changes without letting the clients know what is taking place. This is dangerous for trust building in E-commerce, as it will only instill fear and developing of informal groups that might aim at the downfall of the business.

Fairness

Fairness in an organization is a broad concept as this depends on receipt or the client towards which the action is directed. It is therefore difficult to completely agree as to what is fair. However there is consensus that when it comes to decisions to be taken in the organization, it is only fair to consider the perception of clients in the organization, it is also fair to give credit where it is due and reward those who excel in the organization. This faith in fairness is similar to the "boomerang belief", that what you throw out to others will come back to you enventually in life (James, 2006) [24]. So if business parties are fair, honest or nurturing they will eventually receive similar behaviour aimed back at them. Having faith helps parties to be open to each other and reduce the risk of being vulnerable in business.

Fulfill the Promises

Many business managers today behave like politicians who continuously promise their voters heaven and earth but on winning the elections forget about their promises. However, for IT managers today, it could be understandable that their promises during promotions on the websites go unmet. This is largely because top management is usually skeptical about budgets that the IT departments submit to the organizations. It is therefore important that managers only promise what they are able to deliver since trust requires that people believe you are dependable.

Maintain Confidence

This is one of the most important aspects of trust building in organizations. The main component of trust relationship is the ability of the other person to meet our expectations, to do the job we are asking them to perform, for example when we take a flight, we are placing our trust in the pilot's license he proved his competence. Similarly a web site administrator is trusted by the confidence that we put in him given his skills and qualifications. People trust those who are discreet and upon whom they can rely. Therefore if people make themselves vulnerable by telling you something in confidence, they need to feel assured that you will not discuss it with others or betray that confidence (Robbins, 2003) [36].

Tell the Truth

Sometimes continuous making of empty promises can be regarded as lies. It is therefore very risky for managers to keep making promises that they can not keep. (Robbins, 2003) [36] observes that people are generally more tolerant of learning something they do not want to hear" than finding out that their manager lied to them. Therefore the manager must be seen as someone who tells the truth not lies.

Demonstrate Competence

The competence component directly refers to capability process. Whereby one party assesses the other party's ability to fulfil its promises (Doney, 1997) [10]. In E-commerce enviroment, this can be acheived by assessing and comparing information and the company's profile and

the services it offers. It is important that managers win the confidence of their clients by showing to them that they are competent and professionally qualified for the position they hold. This will win them the admiration of staff members. However, it is also important for managers to learn from members of staff who have technical expertise in their respective fields. This will only win the trust of clients. A manager that feels he knows everything is most likely to be left to perform more thus destroying the trust that employees would have otherwise put in him.

Show Consistency

Clients need consistency and predictability on the part of the organization. They will only trust their managers /websites if they can depend on them, if they do what they say, they will do in a stated time period.

It is important to note that, to maintain trust in an organization, there is need to reliably meet the expectations of the workers in that working relationship, rather than the things they believe management is committed to do. Clarifying these expectations can be important if management is to avoid misunderstanding and a reduction in the trust level. Even simple things like failing to return phone calls, replying e-mails can create a perception of unreliability and mistrust.

However what Robbins (2003) suggests above alone, cannot build trust in electronic commerce. They need to be supported by other factors like development of strong electronic commerce trust Model that operates in a secure environment.

2.2 Principles of Trust

From traditional marketing literature, consumers trust is seen to be more easily developed when the consumer has a positive trusting stance in general, has had prior interactions with the merchant, interacts with knowlegeable sales person with similar or familiar background to the consumer and when protected by strong social and legal structures (Geyskens, 1998) [20]. Micheal (2002) [28] emphasized trust as the mainstays of E-commerce and explains the nature of trust by identifying principles underpinning the concept of trust and the online mechanisms that promote it. These are: *Identity, Information, function of the perception of risk, Depeens over time and with increased reciprocity, A matter of degree, Culture, Third-party ratings, and Second-party opinions.*

2.2.1 Trust Depends on Identity

Trust accrues over time between individuals and companies that build a shared history of positive interactions. In this way trust depends on identity, the condition of being distinguished from others and therefore without clear identity there is no way to group together separate interactions into a history.

2.2.2 Trust is Based on Information

To trust someone or some organization one must first get to know them. In a business setting information required to trust another party must capture knowledge about behaviors surrounding issues such as privacy, reliability and past performance. It has been found

out that many features enhance trust in B2C [business to consumer] E-commerce sites like navigation, usability, reliability (Urban, 2002) [39].

2.2.3 Trust is a Function of the Perception of Risk

Trust is a belief or expectation that the promise by the merchant can be relied upon and the seller will not take advantage of the consumers ignorance. Trust and risk are closely interrelated according to Mayer, (1995) [29]. Risk is a core of trust in that trust is the degree to which a trustier holds a positive attitude towards the trustees good will and reliability in a risky exchange situation.

2.2.4 Trust Deepens Over Time and with Increased Reciprocity

Most researchers agree that trust is intimately associated with risk and when a trustee realizes that a truster has taken considerable risk in trusting them, they tend to be motivated to behave in a trust worthy manner, such reciprocity has been found to be a key element in trust building.

2.2.5 Trust is a Matter of Degree

Trust can be defined as the degree to which the truster holds a positive attitude towards the trustee goodwill and reliability in a risky exchange situation at hand. It has been found that buyers need for information or advice varies with product type. If the purchase decision involves certain attributes such as high price, complexity, learning rapid changes or risk, then information is needed in order to build trust. Hence, there is need for the ability to

customize the degree to which a truster places importance on different aspects of trust with their individual risk tolerances and the situation at hand.

2.2.6 Culture Affects Trust

As the globalization of markets by the Internet makes it necessary to establish trust in disparate foreign markets, jurisdictions and cultures. It is important to understand the impact of national culture on the trust building process. Cultural attitudes influence trust (Fukuyama, 1995) [16], for example the Moslems do not eat pork and pork products can not be consumed in a Moslem Country, Cheskin study concludes that cultural differences result in different responses to risk. They found out that the US and Brazilian consumers are more concerned about the ability of governments and web sites to control identity and other forms of risk than Spanish speaking Latin Americans and that both Latin Americans and Brazilians gained more trust from the presence of credit card symbols on sites than the US.

2.2.7 Third Party ratings are important in Developing Trust

Trust is affected not only via first hand interaction, but also by opinions of other parties. In the offline works such parties include organizations.

2.2.8 Second Party opinions are important in Developing Trust

Trust can also be affected by opinions of the second parties that have had experience in conducting similar transactions with a business, in the offline world such parties might

include friends and acquitances that lender personal opinions based on experience, in the online world, which is better able to facilitate communication among strangers, such parties may be just about any one who has conducted transactions with the same business.

2.3 Electronic Commerce Trust Models

Researchers have proposed various trust models to build trust and confindence in online transactions. These have beeen applied in developed countries where E-commerce is in the transitional stage of development. Web security can not be attained effectivelly, therefore it is an interesting area of research. In this section we consider trust models that include *Consumer Trust model, Online B2C Perceived Trust Model, The MoTEc Model of Trust for Electronic Commerce.*

2.3.1 Consumer Trust Model

This model identifies characteristics of the trustees (E-commerce vendors) as, r̂eputation, size, multi-channel integration, system assurance and *characteristics of the trustors (consumer propensity to trust)* (Teo and Liu, 2005) [37]. This model emphasizes that buyer's perceptions of seller's reputation and sizes are factors of trustworthiness'. This is due to the fact that reputation and size provide assurances of the vendor's ability, competence, integrity and willingness to buy.

- Reputation is defined as the extent to which buyers believe a seller is professionally competent or honest and benevolent (Doney and Cannon, 1997) [10]. Therefore re-

searchers have recognized that a firm's reputation is a valuable intangible asset that requires a long-term investment of resources, efforts and attention to customer relationship. Reputation is valuable because it is harder to form a reputation than to lose it (Yaniv, 2000) [43]. It is noted that perceived reputation of an E-commerce vendor is positively related to the level of consumer trust in the vendor.

- Perceived size is defined as the overall size of the organization and the market position it serves. This suggests that the firm consistently delivers on its promises to its consumers and many consumers tend to trust it. Large organizations are likely to have expertise and necessary support systems that encourage trust and loyalty and the vendor is able to assume the risk of product failure or transit losses and to compensate buyers accordingly (Jarvenpaa, 2000) [25]. Hence perceived size of an E-commerce vendor is positively related to the level of consumers trust in the vendor.

- Multi channel Integration: is a process of having multiple interaction channels with consumers and increasing the level of integration among all the communication channels examples telephone, fax, e-mail, internet, websites and so on. It is becoming a very important source of competitive advantage as consumers demand more and more flexible access to products and services. These channels should provide reliable, accurate, portable and timely information. This increases consumer confidence in the vendor. Thus the level of multi-channel integration of E-commerce vendor is positively related to the level of consumers trust in the vendor.

- System Assurance: is the level of dependability and security of vendors online transactions system, which enables transactions through the Internet to be secure and suc-

cessful. Previous research has demonstrated that insufficient trust in the security and reliability of the transactions over the Internet is commonly expressed concern of consumers.

- Propensity to trust: is a characteristic of consumers, Which is the overall willingness to trust other people and a measure of an individual's tendency to trust or distrust. It is influenced by cultural background, personality and previous experiences (Lee,1999) [27]. Therefore propensity to trust is positively related to consumer trust in the E-commerce vendor.

- Attitude and beliefs: Trust is significantly related to a person's attitude that is affected by beliefs. Hence consumer trust toward an E-commerce vendor is positively related to favorable attitudes toward purchasing from the vendor. Favorable attitudes toward an E-commerce vendor are positively related to consumer's willingness to purchase from the vendor.

- Risk perceptions: trust can reduce the fear of consumer perception of risk associated with behaviors by the seller. Hence it follows that, Consumer trust toward an E-commerce vendor is negatively related to perceived risks involved in purchasing from the vendor.

Consumer Trust Model

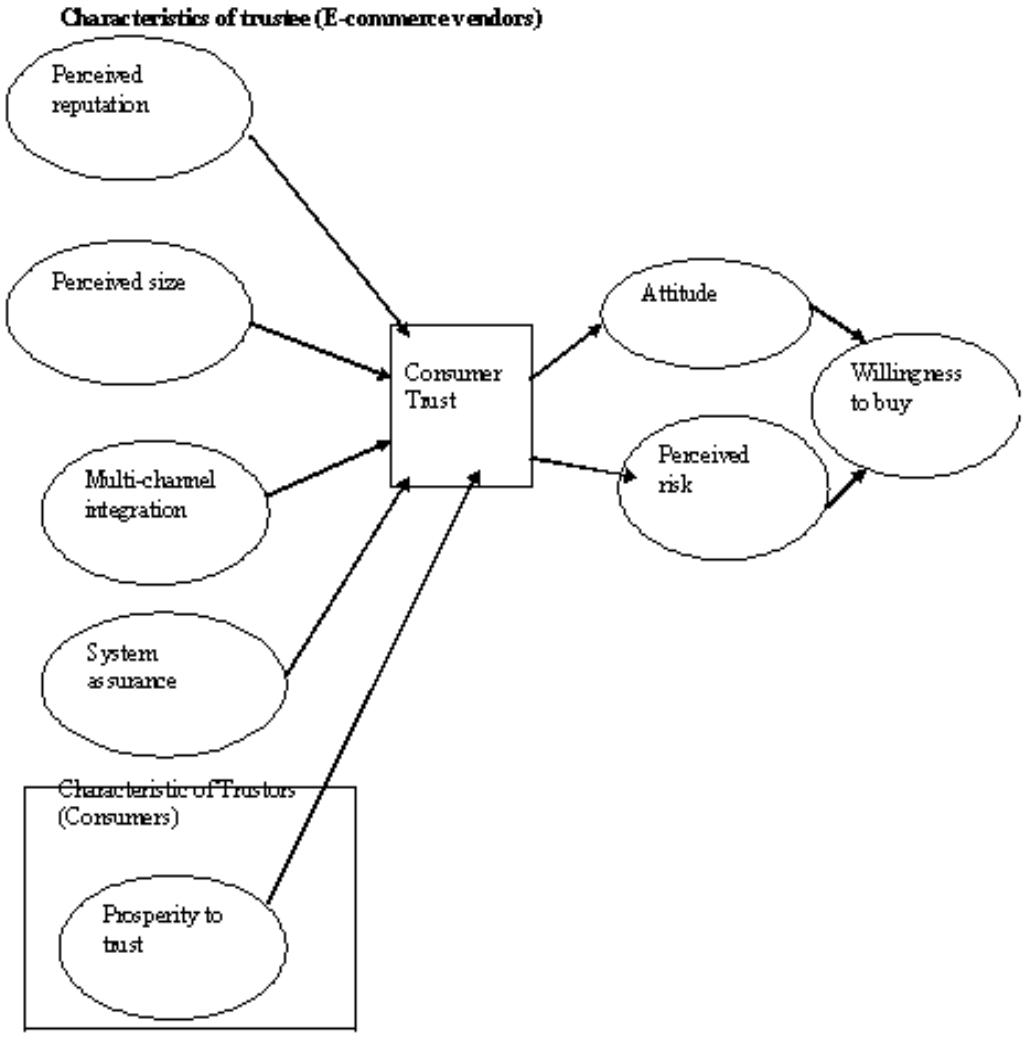

Figure 2.1: Consumer Trust Model [**Adopted from Teo and Liu, 2005**]

Online B2C Perceived Trust Model

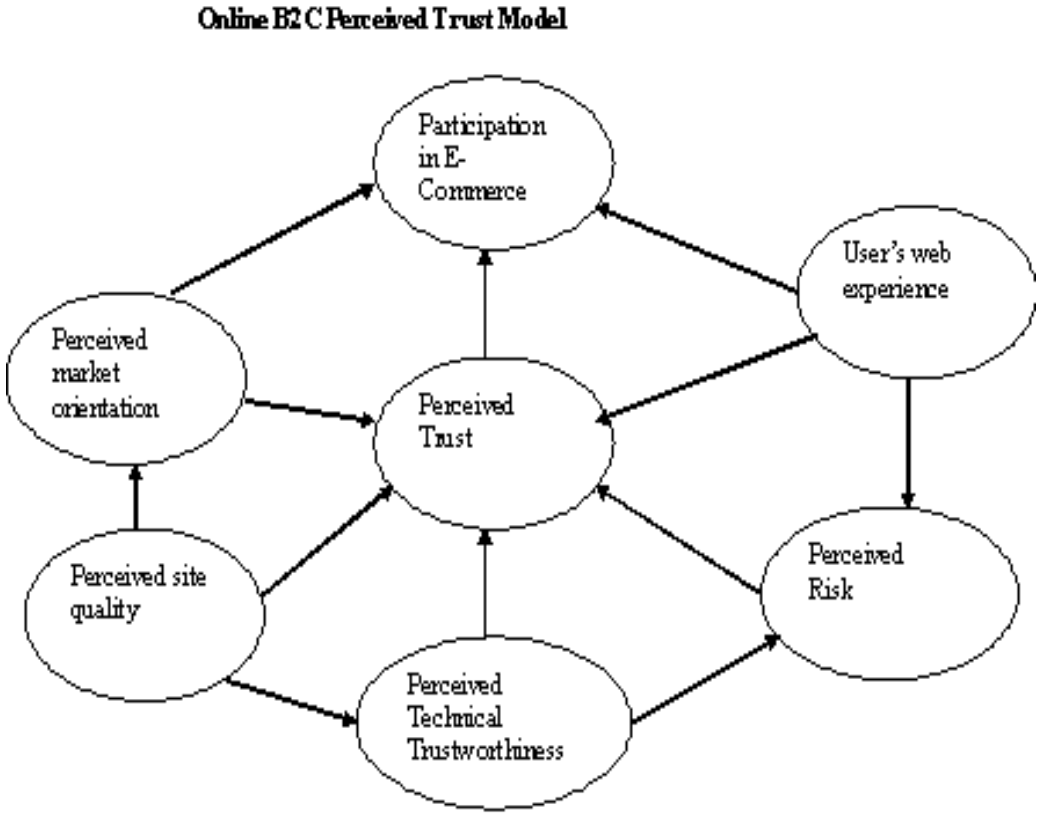

Figure 2.2: Online B2C persceived Trust Model [**Adopted from Brian and Han Yi, 2003**]

The model was developed by (Brian and Han Yi,2003) [4], they identified the following factors to trust building in any organization; *Market orienation, Trustworthiness of Technology, web experience, customers attitudes, and website quality.*

- Market Orientation is likely to increase the level of trust since the E-Commerce web sites will. It encourages collection of customer information dynamically to follow customers preference from time to time, which information can be used to customize

products /services to cater to the individual customers taste on a one-to one basis rather than mass marketing (Jarvenpaa, 2000) [25]. This helps the organization to maintain close contact with customers and respond to customer's problems immediately. It allows customers to contribute to site development (Ganesan, 1994) [17]. Hence open communication and willingness to participate are necessary conditions for market orientation. Hence perceived market orientation is positively related to the level of customers trust perceptions; and to the level of customer's E-commerce participation.

- Trust worthiness of technology is a critical factor in supporting E-commerce transaction. The more efficient and effective the technology, the more customers are willing to use it to carry out business. Perceived technology trust worthiness' is negatively related to the level of perceived risk and positively related to the level of perceived trust.

- Web experience in our everyday life, the more experience a person has in a certain activity the more he is willing to increase the likelihood to engage in it. Similarly web experience will encourage customers to shop online. User's web experience is positively related to E-commerce participation and the degree of perceived trust. At the same time web experience is negatively related to the degree of perceived risk.

- Website quality is a critical tool for attracting customers to gain competitive advantage over other websites. The organizations image, reflected by its site, increases customer's perceived trust. The quality of a website is associated to risk perception. Thus perceived site quality is positively related to trust, marketing orientation, and

technological trustworthiness.

- Customers attitudes, trust intentions to purchase online is influenced by customer's attitudes. Active trust will influence participation in online shopping. Therefore trust is positively related with E- commerce participation.

2.3.2 The MoTEc Model of Trust for Electronic Commerce

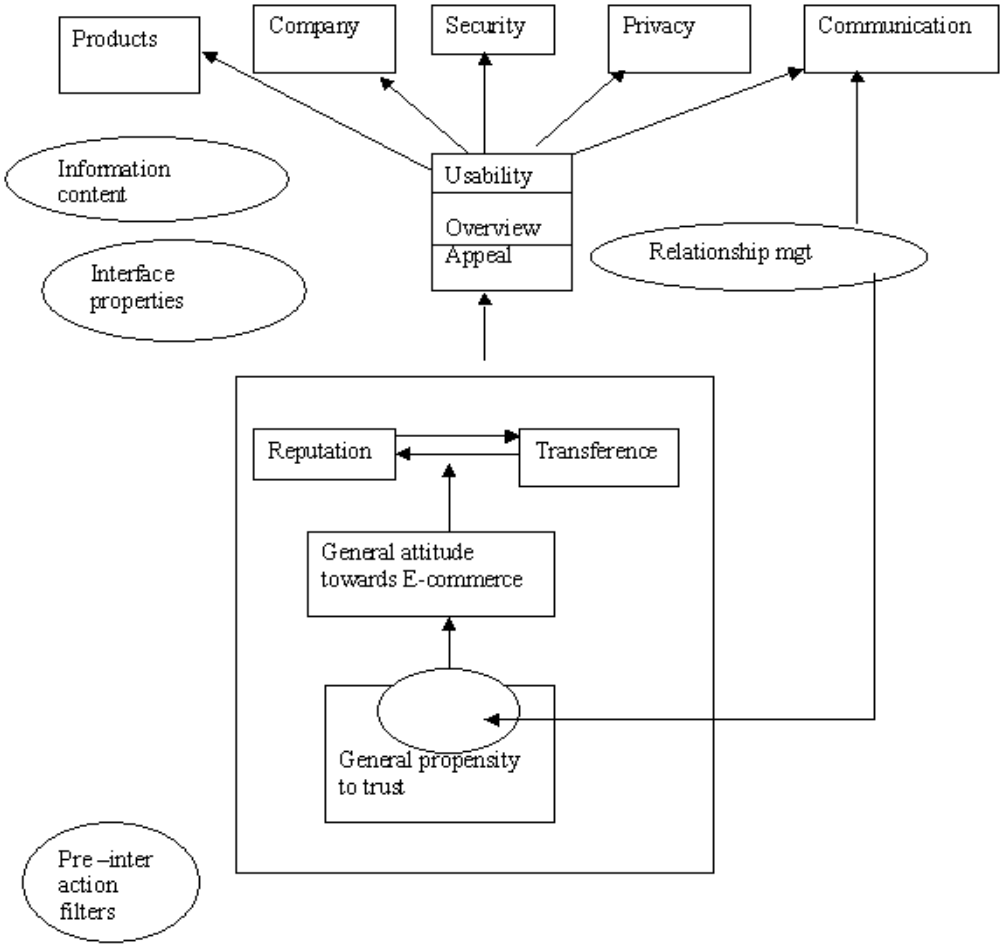

Figure 2.3: The MoTEc Model [**Adopted from Egger, 2003**]

The model as illustrated in figure2.3 page 30 above was developed by (Egger, 1998, 2000, 2003) [12], and identifies the factors that are likely to influence the development and maintenance of trust in the domain of business-to consumer E-commerce, and the factors were integrated as components of MoTec analytical. The Motec components are defined as follows;

- Pre-interaction filters, where individuals differ to general propensity to trust. It emphasizes the peoples knowledge and expectations towards a company's product, reputation and the strength of the company's brand name.
- Interface properties, where the development of trust is strongly affected by ones impression of a commercial system.
- Appeal -graphic design and layout of the web site, how it attracts customers.
- Overview- refers to the extent to which the sites commercial drawings and resources are made explicit by organizing its content in a manner relevant to the end user.
- The usability component refers to the system reliability, ease -of- use and familiarity in terms of domain model, classification schemes and terminology.
- Information content, information about products and services should be completly relevant.
- Security refers to the completeness and the understanding of information about the financial risk and guarantees.
- Privacy describes the vendor openness with respect to its privacy policy.

- Relationship management is the first type of trust to take place in conversion trust where users gain enough trust to engage in commercial relationship with an online merchant.

Critique

Overview Of Reviewed Trust Models

Study	**Context**	**System Trust**	**Trusting Concepts**	**Other Variables**
Egger (2003)	MoTEc Trust Model	From Interactions to Transactions Designing	-Security, -Privacy -Communication -Interface Properties -Propensity to trust -Attitude	-Usability -Relationship mgt -Overview -Inf.content -Appeal
Brian and Han Yi (2003)	online B2C Perceived Trust Model	Trust and E-Commerce A study of Consumer persception	- willing ness to buy -Technical trust -Market Orientation -site quality -User web Experience	- Trust - perceived risk -Attitudes
Teo and Lui (2005)	Consumer Trust Model	Consumer Trust in E-Commerce	-reputation, -Size -Multichannel Integration -System Assurance	-Attitudes -Risk & trust -Willingness to buy -Propesity to trust

2.4 Conclusion

In conclusion therefore, the E-Commerce trust model can actually benefit law enforcement and government agencies. Electronic crime today has significant costs for governments businesses and private individual. Encryption can help reduce these costs by preventing piracy of intellectual property and the interception of sensitive information such as credit card, PIN numbers, co-operate secrets, medical records and personal communications. As the job of law enforcements and national security standards is ultimately to prevent crime, electronic or otherwise, in this respect, at least their interests converge with those of private individuals and business in favor of the free use and availability of strong trust models with encryption as a tool.

Chapter 3

METHODOLOGY

This chapter presents the way the study was carried out. It gives the description of the steps and procedures that were taken to accomplish the research project. It futher shows the data collection methods and analysis which involves the design and development of the system model. The research project was implemented through the following phases;

- Initial preparations.
- Review of literature relevant to trust building in E-Commerce.
- Requirements elicitation.
- Design of the model.
- Software system development.
- System validation and verification.

- Validation of the model.

3.1 General Overview

The purpose of this study was to address how companies can build trust and compete favorably for competitive advantage on the web while ensuring integrity, authentication, confidentiality, and availability. The rationale was to create a factual representation of web security problem that facilitate distrust in E-commerce, to explore how Ugandans have been building trust among the users of the internet, to read literature about the strategies and factors for building trust in E-commerce, and finally to suggest an improved technology Model with a secure environment that builds trust and confidence in E-commerce. This is a theoretical study that considered many different technologies. A great deal of research was required to understand and be able to suggest solutions.

3.1.1 Initial Preparations

With the informal and scanty statistics about Internet trust building in Uganda, the research investigated whether there is mistrust in E-commerce, where it is reported, and explored steps the web security managers, users, and the Government can follow to build confidence. Various research tools were used to collect secondary and primary data among the businees community in Kampala and Uganda chamber of commerce.

3.1.2 Review of Literature

This included reading documentation such as E-commerce strategies in Uganda, policies and the way forward for Uganda. This further included reading textbooks, manuals, newspapers manuscripts, circulars and Internet materials, Journals, articles, working papers technical reports, conference proceedings, Master's and PhD theses, textbooks, and other relevant literature was read. This gave a background to the design of a questionnaire and other tools that were used to gather information.

Literature

Overview of Reviewed Methodology

Study	**Context**	**Samples**	**Methodology**	**Analytical techniques**
Jarvenpaa et aL (1999, 2000)	Exploring trust in Internet store (Across-Cultural Investigations)	-184 students Austria -198 students Isreal -115 students Finlad	Experimental survey	-Modelling & simulation -Equation modelling
Egger (2003)	From interactions to transactions		Questionnaires	Hypothesis testing
Brian and Han Yi (2003)	Trust& E- commerce a study of consumer perceptions	new zealand	self administered survey approach, survey questionaire	-Modelling -Correlation tests were used
Thampson (2005)	Consumer trust in E-Commerce in United States, China, Singapore	544 USA 1381 singapore 988 China	Online survey questionaire	-Modelling
Joseph (2006)	E-business differentiation through value based trust	297 under graduate business students	survey questionaire	-Hypothetical website
Giffen (2000)	exploring e-commerce vendor -using an e-book store	217 students USA	Experimental survey approach	-Modelling

3.2 Requirement Elicitation

The heart of any research project is a thorough understanding of business requirements. The first step was to explore the current system operations in Uganda and to develop a good working knowledge of trust building and propose new components of E-commerce trust model.

3.2.1 Instruments and Data Collection

The instruments used during the study included, telephone interviews, e-mail statements, face-to-face interviews and questionnaires. The researcher collected data on the existing trust building strategies in Uganda and factors that lead to distrust. After identifying these factors, data was analysed and grouped into appropriate forms to build a model of trust in E-Commerce. Hence collected data helped the researcher to investigate the factors that influence clients to trust one website more than another as well as strategies used to communicate trustworthiness.

3.2.2 System Investigation

System investigation helped to produce a good system requirements specification, which was used to build a trust model in E-commerce. This involved visiting different business

organizations by carrying out interviews, distributing questionnaires and critical observations in order to ascertain the requirements. These requirements were then analyzed in order to produce a document containing the specifications for the proposed E-commerce trust model.

In order to achieve the objectives of the project, both primary and secondary data were sought to discover the system requirements. Primary data was got from the field using the various research methods.

- Record review: this was used during the time of data collection. This method helped in gathering data regarding input and out put of the system.
- Interviews: The interview is an important data gathering technique involving verbal communication between the researcher and the subject. Interviews are commonly used in survey designs and in exploratory and descriptive studies. The interview was aimed at studying the existing factors that affect trust in E-commerce transactions as well as existing online transaction processes. This helped confirm from the users how transactions are carried out as well as the problems they face during online transactions.
- The questionnaire is a research tool that consists of a series of questions defined by the researcher. Therefore it is a data gathering device that elicits answers or reactions from respondents to pre-arranged questions presented in a specific order. It is a good way of collecting large amounts of quantitative data. Questionnaires are flexible and

adaptable to a variety of research designs, populations and purposes. Questionnaires were distributed to businessmen and workers in business organizations to collect data that was used in the analysis stage.

- Observations: Observing the current websites in Uganda and the trust methods in use when transacting business. To achieve objective (ii), the researcher visited Internet cafes and businesses that offer online services. Post office cafe, jolis.com, Edge Soft Solutions Limited were visited. The researcher observed the existing e-business processes before finally designing the trust model. This involved how customers register with the company, how they are given user names, passwords and how they contact the country where they import goods from, proposal forms filled by the customer/consumer, filing and archiving of the proposal and delivery documents were seriously observed.

3.2.3 Analysis of Data

SPSS software was used to analyze data collected by the researcher. The analyis process began with elicitation and description of the system requirements of the domain to be modeled. These requirements were systematically and progressively refined under the research project. In this process, a prototype of the model was proposed and developed.

3.3 Designing a New Model

After using the Ugandan experience coupled with ideas gained from international experience and reading existing literature, the researcher designed an improved E-commerce trust model that can be used to build trust and confidence in E-commerce. A set of notations were used to complete the design of the model. UMLwas used.

3.3.1 UML Models

UML models were used to illustrate trust management in E-commerce. A combination of notations was used to complete the design of the project study. The UML that supports object-oriented design was used to model the current state of E-commerce. The UML can be successfully used as a formal modeling tool without the notational complexities that are commonly found in textual specification techniques (Andy *et al*, 1997) [1]

3.3.2 Tools and E-commerce Environment

Use case diagrams were used. They show the functionality of the new system. Use case diagrams displays the relationship among the actors and use cases. Use case diagrams show the actors while class and object diagrams define the objects and their behavior. UML uses collaboration diagrams to model design patterns and provide ways of instantiating

pattern description through the binding stereotypes. Links were used to define dependencies between terms and the values of these terms. A requirement is the specification of what a customer wishes to buy. It stores attributes about the customer and details of his E-commerce requirements.

A product is then defined as an encapsulation of an attribute about the customer and the details of E-commerce requirements. Given customers details and requirements the vendor finds a match with list of products proposed by the customer.

In this model both products and requirements have attributes and constraints and preferences. Thus the customer will have specific requirement constraints and preferences to this ideal commodity or product.

3.3.3 System Software Development

A standard message format with meaningful structures and semantics is used for both parties to understand each other. There are many languages (XML, HTML, PHP), which are fast becoming the standard of electronic data interchange on the web (Nogueria, 2002) [32]. For this project research, system model development, involved creating user interface, interfaces of web technologies and database creation.

Web pages were created to input and review formatted text. A combination of method-

ologies was used since none has all the elements required to complete the design of the project.

The programming environment consisted of the following languages and systems.

- Hypertext mark up language (HTML)) is a markup language designed for the creation of web pages with hypertext and other information to be displayed in a web browser. It separates presentation from structure, has Improved accessibility features, internationalization features and document rendering.
- Structured Query language (SQL)
- Java servelets: Java Servlet technology provides Web developers with a simple, consistent mechanism for extending the functionality of a Web server and for accessing existing business systems. A servlet can almost be thought of as an applet that runs on the server side-without a face. Java servlets make many Web applications possible.
- PHP is open sources server-side scripting language that supports databases like Mysql. It has Superior technology and therefore it is a general purpose scripting language much superior to Perl, ASP, and JSP. It is quick to develop and therefore saves time. PHP has an easily learned syntax which has broad database connectivity. The fact that PHP was designed specifically for web development gives it an edge as a development tool for Internet design. It also have massive library of contributed extensions and supports

all major platforms examples of which are, Unix, Linux and even main frames

- Mysql is a popular robust open source database product that supports key subsets of sql and both Linux and Unix system. A database was implemented using Mysql, this included a relational database management system that can support many applications.

3.3.4 System validation and verification.

Automated unit tests were created during the system development. Phase tests, and defect reports were corrected and programming errors corrected. In order to confirm the practicability of the system it was used in an E-commerce environment, where MIT students of Makerere acted as online consumers transacting business with the researcher as the vendor. Futher testing was done with the business community in Kampala. The system validation was mainly to

- Determine if the system was user friendly, easy to navigate and worth being developed.
- Whether it was fulfilling the goals of the web security that is confidentiality, authentication, integrity,access control availability and nonrepudiation.
- If it captured all the system requirements.
- Indentify the system weaknesses and any improvements required for the next iteration.

3.4 Validation of the Model

The final validation was carried out in relation to MIT students of Makerere University as the case to study for indepth analysis. Case studies are particularly useful in depicting a holistic portrayal of clients experiences and results regarding a program. The business community/ government can then adopt this globally. An interview guide was designed and used to test the model. This largely included finding the establishment of E-commerce, factors facilitating trust, experiences and challenges and overall benefits so far.

3.4.1 Publication

The publication will serve as a basis for my Project Report.

3.4.2 Research Questions

1. What are the factors that cause lack of trust in E-Commerce?
2. What factors influence users trust in websites and what strategies can be used to communicate trustiworthiness?
3. What tools are being used to implement trust management?
4. What are the building blocks for designing and implementing an E- Commerce Trust Model?

Chapter 4

DATA ANALYSIS, DESIGN AND IMPLEMENTATION

The research Project extends previous models designed in developed countries to less developing countries. It examines the factors that facilitate online trust in the context of E-Commerce. This chapter looks at the knowledge gathered from the field with emphasis on the existing determinants of trust in E-Commerce. The analysis took the business community in Kampala, 200 questionnaires were designed and distributed, and 20 Executives were interviewed. It further shows the steps that were taken during implementation, the details of the trust model were designed and the various web pages to improve people's attitudes towards E-Commerce. The analysis and design followed an object oriented approach that manupulates objects and UML was used to model the state of E-commerce transactions.

Makerere University MIT students were interviewed for the validation of the project. The

following results emerged from the project study;

4.1 Data Analysis

- Demographic profile: The profile of respondents is shown in appendix B on gender and age graphs, page vi. The gender of the respondents was almost evenly mixed with, 51% males and 47% females. In addition most of the respondents were above 34years with 27% and above 42 years 27%, the young had 25%, followed by the middle with 21%.

- E-commerce: Majority of respondents knew what E-commerce is about and Internet with 80% and 70% respectively. Most of the respondents use the Internet for business 44% as the leading activity, followed by e-mails 33.6%, surfing 5.2%, entertainment and word processing 1.7% each as indicated on graphs on page viii.

- The gender and age distribution findings indicate that most of the people who engage in E-commerce are within the range of 34 years and above. Majority of respondents were computer literate ranging from certificate, to hands on experience, 13% did not know what a computer is as illustrated on page vi.

- Respondents agreed that product performance affects consumer trust with 75%. The results of the research shows that relationship management is the first stage of trust building as majority responded positively.

- Trust respondents supported the following determinants of trust, that is government 8.6%, confidence 6.9%, technology5.2%, privacy 4.3%, security with4.3%, web experience2.6%, truth with 1.7%. the findings are in line with earlier research findings discussed in chapter two. This is indicated on graph 2.2on page ix.

- Risk perception: Results indicate that it affects trust both positively and negatively with 63% and negatively among those interviewed. Risks involved in using information technology are a significant factor that influences the adoption of E-Commerce. Risks such as exposure of submitted data, violation of privacy and exposure to online fraund play a role in a customers decision making to engage in E-commerce.

- Motivation: 66% of respondents reveal that motivation is a major factor of trust building among online customers and vendors. Results revealed that without motivation E-commerce couldnot develop as indicated in figure 2.9, page x.

- Technical failures were found out to be the inhibitors of E-Commerce. 68% of respondents accepted that with technical failures like load shedding or power failures, lack of robust systems, poor infrastructure and others, causes mistrust in E-commerce. Therefore a good technological trustworthy system builds trust faster.

- Organizational culture; 65% proved that culture is an important factor of trust building.

- Government; Results reveal that in developing countries government should take a

leading role in trust building in E-commerce. 75% approved that government policy builds confidence and trust in online transaction

After analysis of data, it was revealed that the investigated variables were positively related with trust. Perceived risk was negatively and positively related to customers attitude, trust and willingness to participate in E-Commerce.

4.2 The Proposed E-Commerce Trust Model

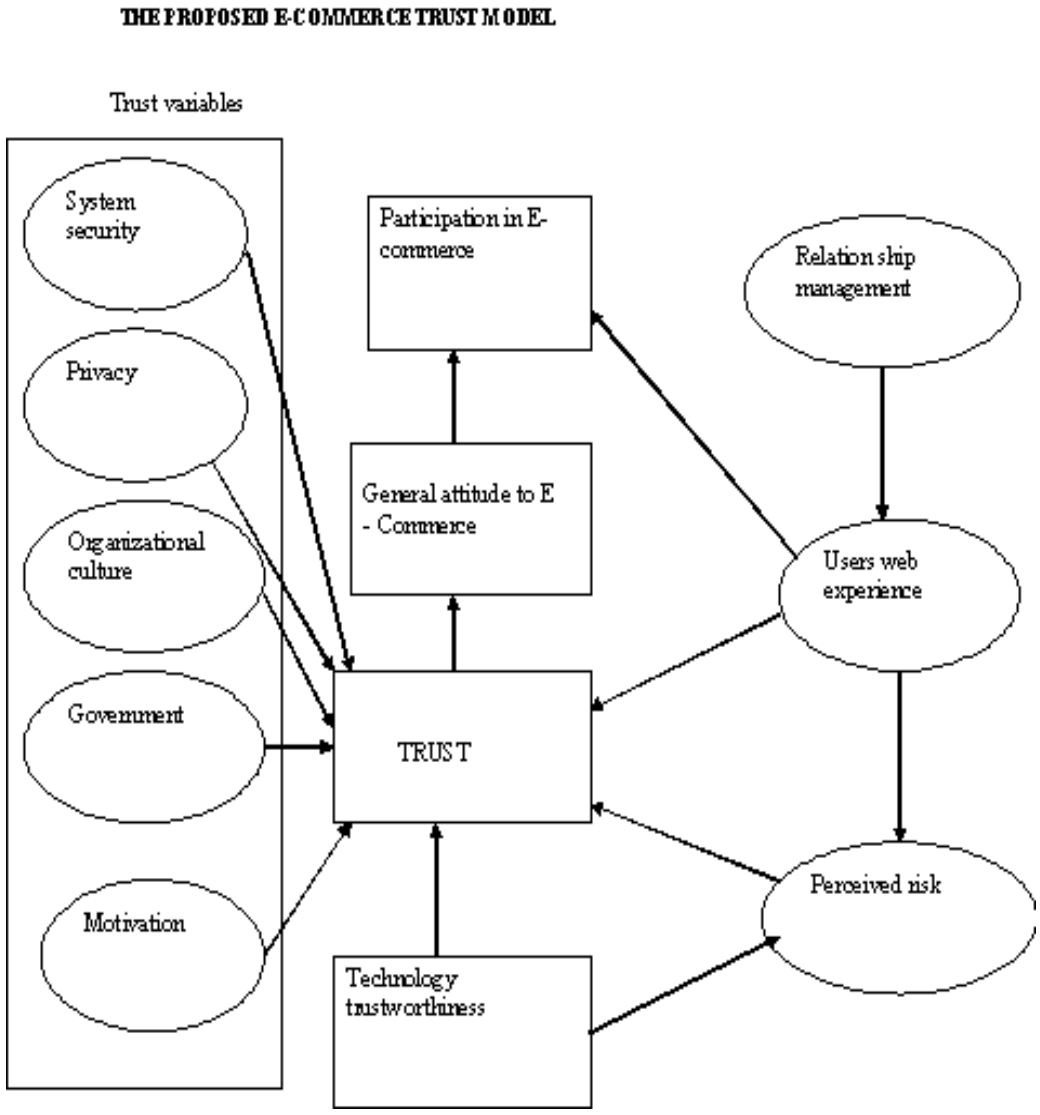

Figure 4.1: The Proposed E-commerce Trust Model

Relationship Management

Is the initial stage of trust building in E-Commerce, Trust takes place where users start exchanging information by visiting commercial websites. The way vendors welcome and respond to consumers requests makes them gain enough trust to engage in online transactions. Good customer service builds trust immediately and reputation of the organization. This is acheived through Customer care chatroom were parties are assured security of their transactions through various methods they use.

Providing the buyer with timely information as to the progress of the transaction, Handling customer requirements, resolving any mistakes, disputes, or complaints concerning product quality, delivery, or payment (this includes managing returns and refunds, further exchanges, and/or repairs), and Providing expert advice and assistance in the use of the products and services. Constant communication removes the fear of dealing with the unknown and gives both parties involved a feeling of confidence in E-commerce like those in the physical market.

Users Web Experience

There are various factors that influence a users web experience in building trust and these are: *Presentation, Ease of use and Brand.*

- The presentation: The design of the website makes agood first impression to customers

and they stick to it. When impressed they convice others to use the same organisation. Hence the design of the site must present professionalism and quality, it should be reliable, relevant, and attractive, customers centered, detailed and help to convey a professional image to the public. The mentioned factors will attract customers to remain royal to the organisation. Therefore customers will have enough trust before placing an order.

- Ease of use: the website should be user friendlly, that is easy to navigate the site,and finding what you want. The availablity of information should be reliable 24/7days a week to increase users perception that a website will meet their demands. Ease of use could be perceived as a sign that the company understands, cares for and respects its customers. This will win many consumers to transact online as it is easy to find the information one is looking for and saves time.

- Brand: The credibility of the online company based on reputation, the promise to deliver certain criteria and a person previous experience dealing with the company. Elements of branding include prominent information, name of the business, what it does and what it distinguishes it from its competitors. Branding refer to what (Dix *et al*, 1993) call system likeability and acceptability. Successful brands establish good will that is independent upon the trust that customers have in their products. For example IBM, Kodak, and Dell. The brand is really the trust bulding mechanism in

E-commerce. In most cases brands that are known world wide, parties have confidence in transacting with them. The more parties are committed to each other brands the more connected they are to the brand and organisation and more interactions they have with the organisation. Parties have a belief that they are legitimate and normally their clients are protected from fraud, hackers and others.

Risk Perceptions

Unlike in the physical market where consumers deal with physical vendors, on the Internet, the two parties never meet, and the goods / services cannot be touched or felt. Online consumers fear to transact business using websites since it is difficult to tell which one is legitimate or a crook website. This increases risks of privacy, hacking, and security risks as inhibitors of E-commerce. This increases fear among parties involved to participate in E-commerce. Thus risks are negatively related to trust building.

There is no business in real world that can operate with out risks. Through chartroom communication, parties are encouraged and educated on how to reduce risks through registration with the Government, use of National ID, credit card numbers, Pine codes and the use of encryption and passwords to keep their information private. This removes bad image that clients have in purchasing online and brings hope and confidence in E-commerce. Hence risk is positively related to trust and participation in E-commerce.

Technological Trustworthiness

Parties in physical market in LDCs have a general deslike of compute-aided commerce compared to the traditional based shopping. This is because of accessibility, availabilty,consistency and other technological limitations. This discourages clients to participate in E-commerce. The online technological system should provide services to clients 24/7 days a week. It should be stable with standby generators and power savers for customers to rely on the system. This encourages parties to remain Loyal and transact online.Increased member loyalty leads to increased number of hours online . This in turn creates commitment among the parties that lead to trust and collaboration with other parties involved. Technology futher covers the system security in E-commerce.

System Security

Security refers to techniques for ensuring that data stored in a computer cannot be read or compromised by any individual with out authorization. Security is a critical component of any electronic commerce application and must be addressed in designing any electronic commerce service infrastructure. A secure transaction of information means that the the two parties involved have been clearly authenticated and the information exchage vai the internet remains unaltered. Therefore vendors cannot be able to accept payments by increasing sophisticated encryption technologies. Electronic commerce system security should provide

the following types of guarantees to the user:

- Availability: The system should prevent denial of service to authorized users, for example, if a third party ties up the network either inadvertently or intentionally.Availability of information impress and encourage customers to participate in E-commerce.

- Integrity: The system should ensure that information is delivered in whole, complete, and in good order; and that, where applicable, the information is the same as agreed upon by all parties. Date/time-stamping along with digital signatures is one mechanism for ensuring trust building.

- Confidentiality: The system should ensure that information communicated and stored is kept private and can be revealed only to people on an approved access list. To achieve confidentiality, integrity, availability, the trust model should provide Identification, authentication, access control, auditing and assurance. This gives customers a feeling of security for their information, products and money exchanged through the Internet.

There fore clients and vendors should be encouraged to choose passwords that are not obvious, require employees to change passwords every 90 days, make sure the virus protection subscription is current, educate clients and vendors about the security risks of e-mail attachments, effective use of encryption software, assess your security posture regularly, update your web server software regularly and finally do not run any unnecessary network services

Privacy

Keeping private documents private using encryption, passwords and access controls. Thus Privacy is the right to be left alone and the right to be free of unreasonable personal intrusions. This help to safeguard corporations and clients financially from hackers who could steal credit card numbers and bank account information or penetrate their databases. Hence enable organizations to lead in this competitive edge. Therefore privacy explains the vendor openness with respect to its privacy guidelines and procedures.

Organisational Culture

Charity begins at home, building trust should begin within tthe organisations since threats and fraud in most cases are caused by internal factors rather than extenal. Organizational culture is historical and reflects the beliefs of the owners of organisations and it is the glue that binds individuals together. Team work coupled with common purpose and knowlegde sharing help in trust building.

Strong organisational culture motivates staff, vendors,and consumers to ensure coherent behavior. This helps in uniting consumers with vendors in disparate locations to act in a similar manner. Hence enhences brand consistency and increases the level of trust parties have in E-commerce. Culture is pervasive throughout an organization and colors the meaning that individuals ascribe to all organizational acts. It acts as stabilizing influence in the

organization, and once in place, employees and customers will be flexible to IT and management changes. This will enable the parties involved to adopt to changes in businesses. Culture is to do with groups of people collectively (not individuals alone), who through their experiences together, day by day in the work environment, will build a picture of what the organization is all about and how it undertakes its purpose, and that this picture is built through learning how to behave for survival and progression in E-commerce enviroment. Therefore organizational culture and trust are interrelated.

Government

Government is a very important determinant of trust building in E-Commerce. It provides public confidence in using the Internet. It provides clear and comprehensive internet legislation, legislative measurers for data protection and data transfer, the punishment on online frauds, the law of electronic commerce and the introduction of electronic clearing system for inter-banking payments and fund transfers. The Government should create online agency to which consumers can login complaints on E-commerce. As mentioned before some of the biggest fears in using the web are security and legal issues. Government has the ability and the authority to address these issues.

- Law enforcement: Government should set up legal regulations and e-security laws. Government must first of all ensure that all legal, regulatory and e-security aspects are

addressed to the point where the populace has confidence in the system to facilitate E-commerce. Without this, the digital economy will fall into disrepute and may never fully recover in appropriate enough time frame to ensure that the country is a global and potential trading partner.

- Government as a consumer of electronic commerce. Majority of consumers and vendors would like to see Government as the major consumer of electronic products, in the expectation that demand spills over into the private sector. All Government ministries should purchase requirements for organizations online. This will build trust very fast in E-commerce.

- Free access of E-commerce services and Education awareness: Government should provides free Internet services, infrastructures, and education awareness to the population when E-commerce is still in the infacy or informational stage. This will motivate customers to engage in E-commerce since Government is the major consumer of online products. Government should lead by example, by conducting its business online including procurement, acceptance of electronic filing and electronic payments such that the public can follow its foot steps.

Motivation

It is rarely considered in most businessboardrooms. Motivation helps the business vendor to know the amount of money paid by employees and the more they respond to recognition than cash payments. Customers need to be given tangible recognition, which could include merchandise, travel, debit cards, gift certificates, and invitations to special events, trophies or jewelry. This provides a way not to thank customers but to build trust throughout the business community and reputation of the company will be greatly valued. The researcher suggests five steps to better motivation in E-Commerce.

- Encourage alignment: Online customers and vendors should be provided with clear goals and objectives to motivate the purchase of goods.
- Empower: Give customers enough training and power to perform their responsibilities. They should know the risks involved in online transactions.
- Involve: Get mobile super markets to help remove obstacles to performance and improvement and find new methods to do business better.
- Reward: Provide meaningful recognition that is clearly distinguished from cash compensation.
- Understand the role of tangible rewards: Examples merchandise, travel tickets to special events, and provide powerful publicity that supports corporate values.

Trust

Trust is the social glue of organisational life. Organisations that have high trust tend to out- perform those that are not. Trust is the basis of personal and organisational effectiveness. Developing personal potential, securing commitment and engagement, and maximising learning are all products of trust. Trust is defined as as an expectancy held by a client or group that the word, promise, verbal, or written statement of another client or group can be relied on.

Therefore trust is the expectation that the other party will perform a particular action important to the trustier, irrespective of the ability of the trustier to monitor or control the actions of the other party (Mayer, Davis and Schoolman, 1995). We argue that if the recipient of knowledge is not convinced that the source is competent and trustworthy, it is unlikely knowledge from that particular individual will be accepted.

Trust has major sub-elements: security, integrity, and assurance of performance. Security describes a system's ability to ensure adequate protection, accessibility, and integrity of information. Integrity includes such concepts as graceful degradation of performance in the event of failure, recovery after failure, and fault tolerance. For example, one component of trust is to protect a system from unauthorized access; every system should have the degree of such protection that is appropriate for its purposes.

It is the core of E-Commerce. It comprise of many determinants and characteristics of vendors. When the E-commerce vendor is trustworthy, that is, if he treats customers fairly, genuine, kind, keeps promises and commitments. This increases consumer trust to participate in online transactions.

Futhermore the vendor should keep the interests of his customers through customer care interactions to meet their needs. Customers are best source of business information-whether it is to improve an existing product or service or whether you are planning to launch something new. There is no substitution for "getting it from the horse's mouth." When you open up the lines of communication, you are able to align your resources to best advantage, and you often can make changes or launch products more quickly. By talking to customers through the chartroom, you increase your odds for achieving success; you "mistake-proof" your decisions and work on what really matters. When you routinely ask your customers for feedback and involve them in your business, they, in turn, become committed to the success of your business. Hence trust increases the overall general attitude to E-commerce.

Attitude to E-Commerce

The intention to purchase a product Online is determined by customers attitude. Customers attitudes are determined by beliefs of an individual. System investigations have revealed that trust is significantly related to attitude and attitudes positively result into customers

intentions to purchase .

Participation in E-Commerce

When the business community have realised the need and advantages of E-commerce, their attitudes will change, which will increase participation in E-Commedrce.

Conculusion

Despite the perceived risks of potential security breaches, E-Commerce can be one of the safest means by which to conduct business. The web has undoubtedly become the largest public data network, enabling and facilitating both personal and communication worldwide.

4.3 The Requirements and Design Rationale in the UML

The analysis and design of the trust model followed an object -oriented approach that manipulates objects. The components based methodology conceptualizes applications as sets of interacting components and rational database that stores the data. The UML that supports object-oriented design was used to model proposed state of online transactions.

The unified modeling language is a standard language for specifying visualizing, constructing and documenting the artifacts of software systems, as well as for business modeling and other

non software systems. The researcher used UML because it provides users with ready to-use, expressive usual modeling language so they can develop and exchange meaningful models, provide extensibility and specialization mechanisms to extend the core concepts of trust building in E-commerce.

4.3.1 Use Case1

The use case describes the proposed functionality of the new trust model. It represents a discrete unit of interaction between a customer and the system in the model. Therefore a use case has the description that describes the functionality that will be built in the proposed system.

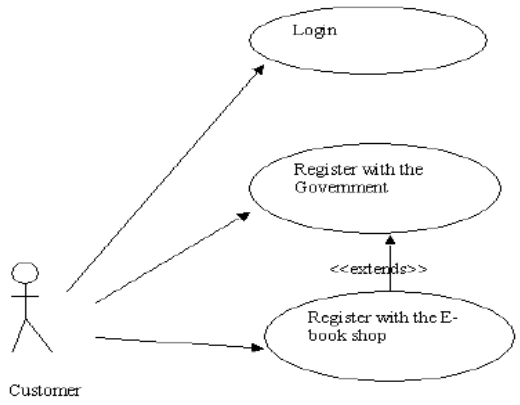

Figure 4.2: Use Case Diagram 1

Use case displays the relationship among actors and use cases. Business use cases enable the sharing of data and business processes among online users. The interactions between an electric utility and a customer include requests for new service, change of billing address, and others. The use case diagrams are used in capturing the system requirements. The actors are the roles humans play when interacting with the system. For example login to the system, register with the system, and create the order are all use cases. Customer relationship with the Internet builds a deeper relationship with user in order to develop appropriate products and services to satisfy customer needs. It futher shows the requiremnts needed to build trust among the two parties.

Use case2

A customer placing an order with the online vendor has to follow these steps. The customer is the actor because is using the request system. The request system helps in capturing all the requirements that the system will need to autheticate and verify clients information to build confidence and increase trust in E-commerce.The diagram as illustrated in Figure 4.3 on page 64 .

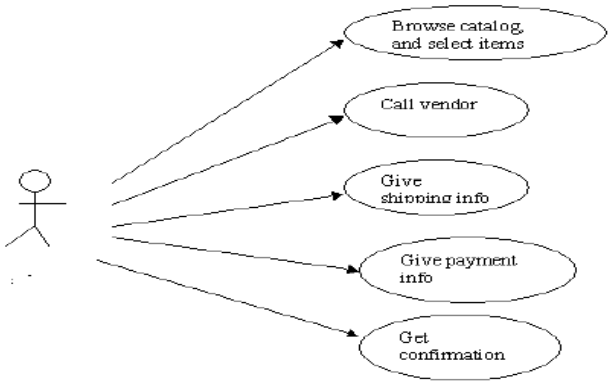

Figure 4.3: Use case diagram 2

4.3.2 Sequence diagram

The sequence diagram describes the behavior of use case by diagramming the classes and the messages exchanged in chronological order. The sequence diagram show the flow of messages from one object to another, and as such correspond to the methods and events supported by a class.

This is the trust model lifeline. Time is assumed to pass as clients transact business from top to bottom of the diagram. The message flow from the lifeline of the sender to the receiver validating each stage to track culprits of online transaction. Hence it gives ability to represent the passage of time graphically which helps the vendor to trace back in case of any problem. This encourages clients to have confidence in the organisation as every stage of transaction is noted with exact time it happened, which can be used as a concrete envidence to decision makers. The diagram as illustrated in Figure 4.4 on page 65.

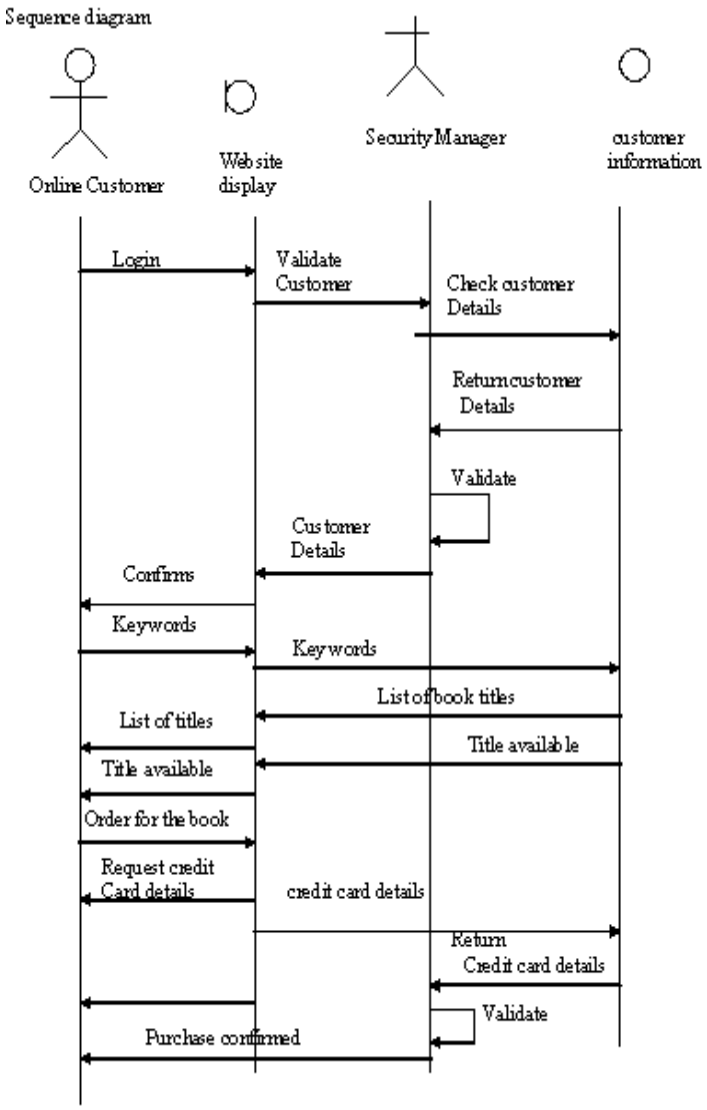

Figure 4.4: Sequence diagram

4.3.3 Activity diagram

The diagram as illustrated below, describes how activities are co-ordinated in the trust model.

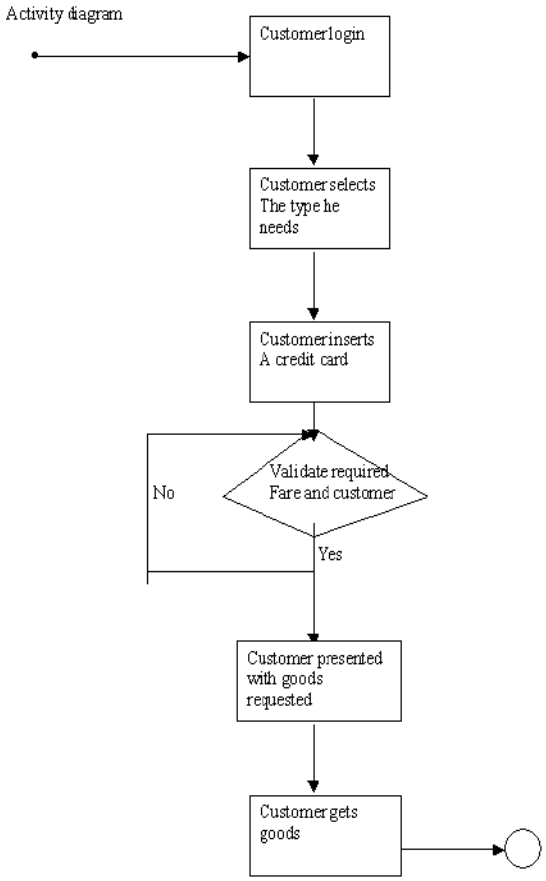

Figure 4.5: Activity Diagram

It shows how operations in the model were implemented, it further shows business decisions and flows by recording the dependencies between activities, such as which things can happen in parallel and what must be finished before something else can start. Therefore if un authorised client attempt to use the model with out authority, he wil be detected and access denied. This will impress the vistor to stick to the website and transact business.

4.3.4 Curent State of E-Commerce

Trust makes businesses possible, without it, limited transactions can take place. In Less Developed Countries where E-commerce is in the informational stage of development, consumers must trust and be confident with the seller/ vendor to deliver goods /services as agreed. Trust is still based on the well-known four Ps that is Product, Price, Promotion and place. In the physical world, place is an important determinant of trust building. They use IT technologies in trust building. The current system has a range of technology activities that are shared in different sectors that include;

The registration process: Where a client goes to either to the Internet cafe, send an e-mail message or fax the message to the vendor. After getting a feedback from the vendor, confirming his request, sends money /payments through E-banking in Backlays Bank or Standard chart Bank or any other bank that offer the services. The vendor delivers the goods to the customer. There are very few clients who use E- commerce to transact business. It was found out that clients have mistrust in it. Due to the factors discussed in chapter 2, poor

quality goods being supplied and delivered to customers. Identification of the right person is also difficult.

System data Capture: The system capture all information about a particular customer that pertains to proposal like Names , Address, Telephone number E-mail, country of origin Id number, Photograph, Payment details, Credit card number, and other additional information to be viewed by customers, like different types of goods or products, their prices, quality, and so on.

However, online transactions need a new model of trust to succeed as place has become an irrelevant factor in this IT arena.

4.4 Implementation of the Model

Object programing languages were used to develop a prototype and this improved with subsequent iterations. this included web-technologies, database design, user interface design and web pages were created to input and receive formated text. The programming environment consisted of the following languages;

- structured query language (SQL)
- hypertext markup language
- PHP

- Mysql
- Java servelets and applets.

4.4.1 The User Interfaces

The GUI was designed, with HTML because it provides ease of development, extensibility and is user friendly. Customer user interface provides the customer a platform for registering and authentication.

Figure 4.6: User Interface

Figure 4.6 above shows a sreen shot of the interface that enables consumers to register with the Government first since its a requirenment, then with the e-bookshop. Registered

consumers can then follow up the purchase guide to request for orders. The welcome screen has a menu with buttons that are user friendly and can enable the customer to navigate the system easily. This builds confidence of the user as it saves time for him to get the requested information and increases the integrity of the campany or organisation.

Register with the Government

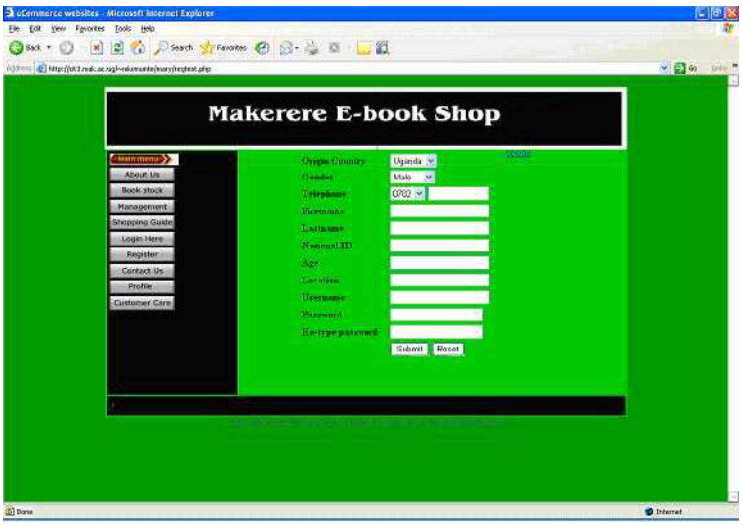

Figure 4.7: Registration

To register with the website, the customer needs first to register with his country of origin. After registration he is given an identity number which allows the customer to register with the website before Online transactions begin. This proves citizenship of the customer and removes the fear of dealing with the unknown. In most cases it is very difficult to trace back

the culprit in a public utility like the Internet, Customers and vendors fear to be betrayed if a stranger gave wrong intials and directions on purpose of frauding and dealing with websites of crooks. The National ID help to trace the culprit from his country of origin and it will be the government to avail different trust websites to users. This will provide concrete envidence to consumers hence increasing their beliefs towards E-commerce as a sign of faith leading to trust building.

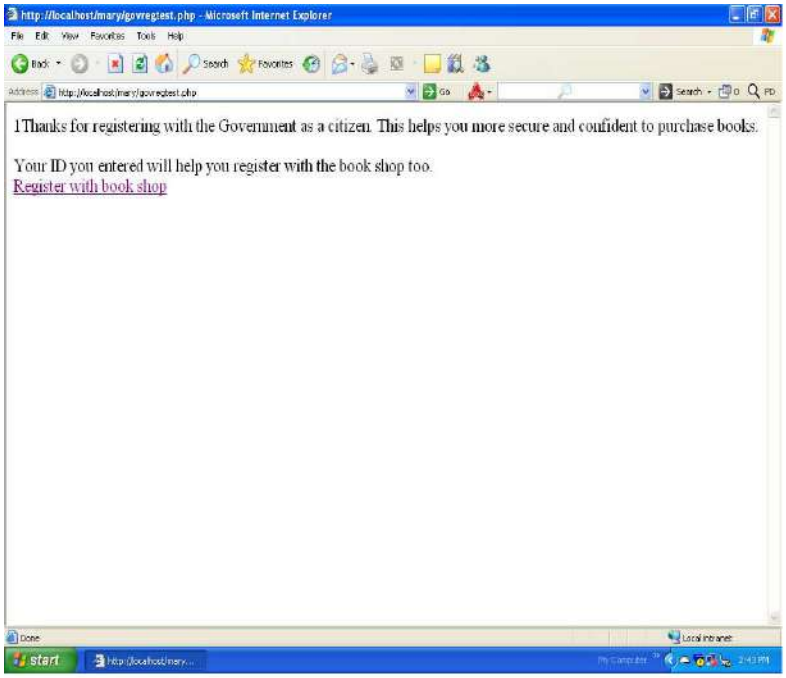

Figure 4.8: Registration

After registering with the Government, the online customer can proceed and register with the Makerere E-bookshop. Customers are confident with the National ID and list of websites displayed by the Government with all the data and information to support the envidence. Therefore the belief here will be confidence in the website hence trust building in E-commerce.

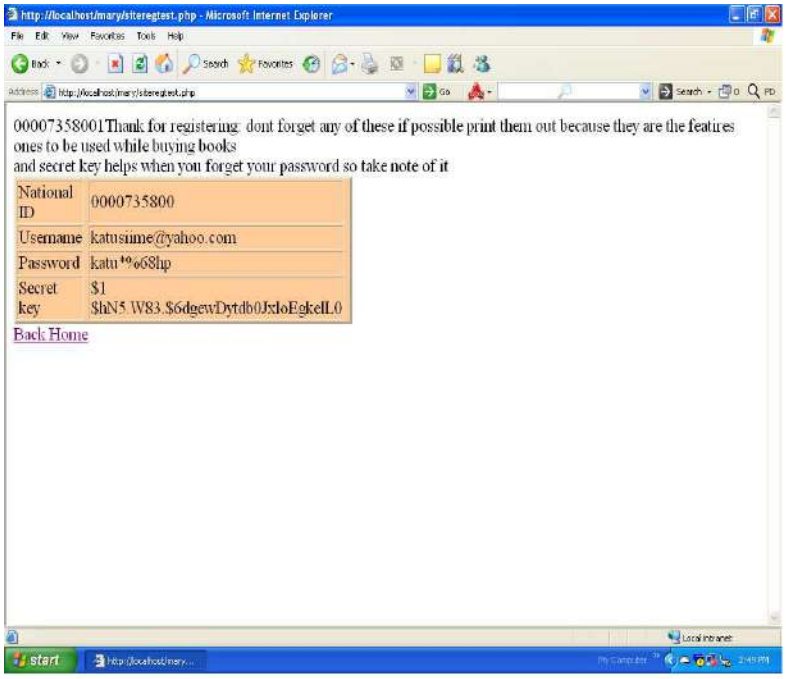

Figure 4.9: Receipt of Registration

After registering with the Makerere E-bookshop, a receipt of regisration will be displayed as seen above and the user can print it to study and understand it. This acts as a proof

of registration and removes the fear of dealing with the unknown, Both online vendors and consumers will have enough trust in the website before placing an order. The user can go back to the home menu to start transacting business as illustrated in figure 4.9.

Online consumers can click book stock menu to purchase the books they need. The user is free to transact business any time 24/7 days a week. This builds consumer trust in E-bookshop website as they can buy what they need at their own convience either at home or in office using a computer. The most important information is encrypted such yhat it becames hard to steal users information easily.Encryption helps to safegourd users privacy thus increasing hope and faith in E-commerce. It futher saves time and money to be incured on transportation costs as shown in figure 4.10 on page 74.

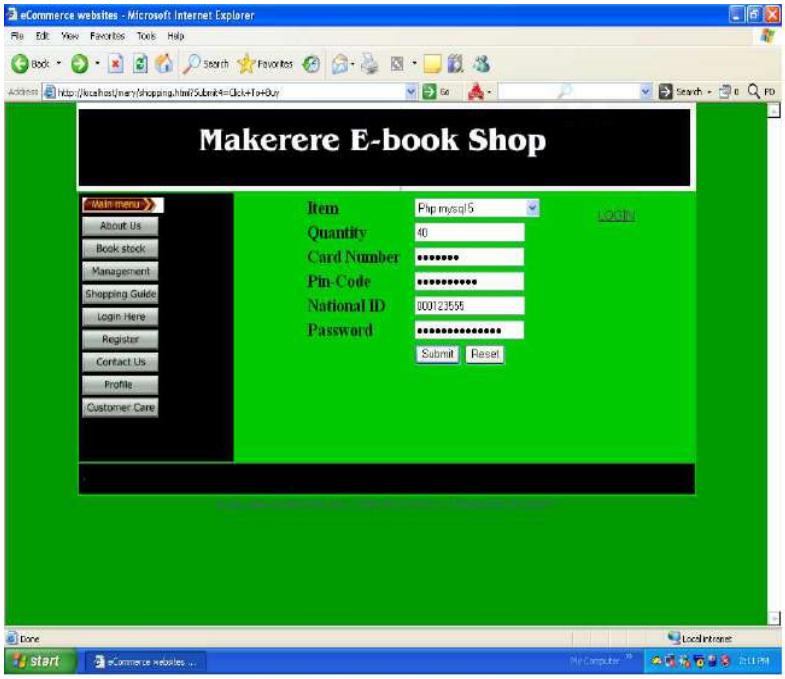

Figure 4.10: Online Purchasing

The system also enables quick retriaval of information in form of reports on both customers and administrators side and these can be referenced in future in case of any defects in the system operations. The receipt below acts as an evendince in case there is a delay in delivery of goods, theft, and poor quality goods. Users are able to use it and claim their money in any country with bidding E-commerce laws. This removes the fear of dealing with illegitimate companies. The examples are shown on the next page.

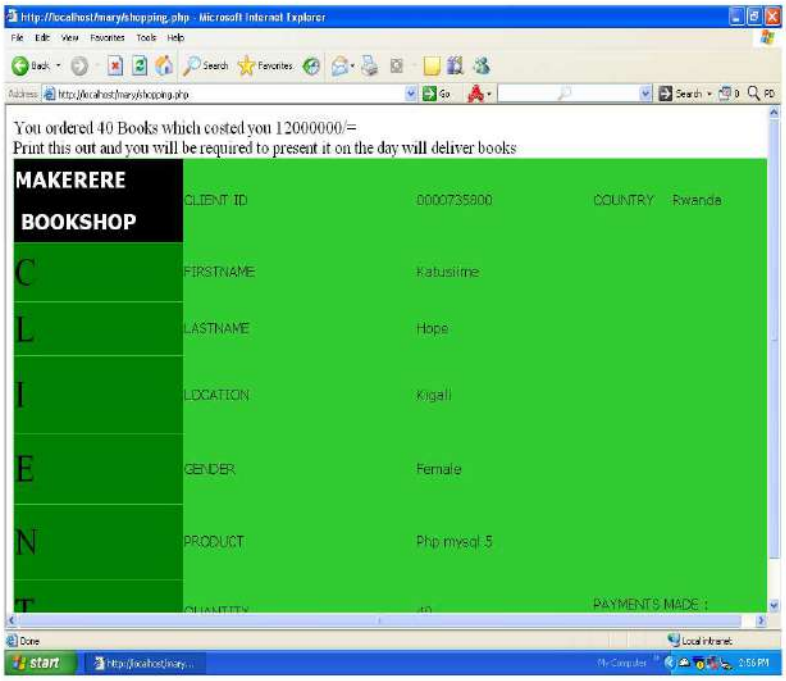

Figure 4.11: Details of clients

System Management

The welcome screen has the icon for system management. only previlaged vendors (web Administrators) can be able to access and manage customers purchases. When the web administrator tool is started from administrators desktop, the user will be presented witha window that requires authentication and the password is encrypted. The screen shot is fuctionally presented on the next;

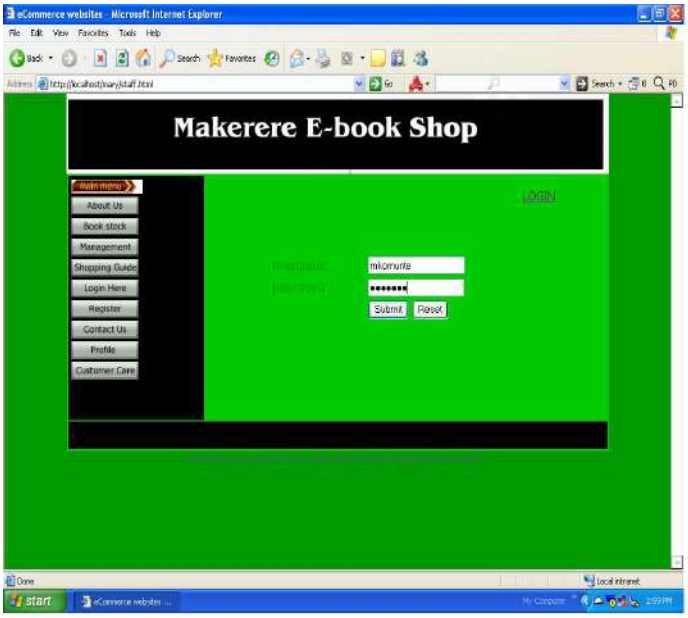

Figure 4.12: Management interface view with authentication

The administrator management tool is used to provide administrators with an application to view and enter or make modifications to the content of stored clients. This allows updates to be made to the E-commerce database while maintaining data integrity, privacy,and consistency. This is illustrated in figure 4.10 on page 74. The web administrator is the one who can do what the user requires to manage the system and it is only the administrator with trusted roles that can invoke them. This improves security management of the system.

Figure 4.13: The web administrator menu bar

On the clients side, the system has a simple and user friendly interface designed to enhance the ease of use and flexibility that suits all categories of customers during the proposal aplication phase.

Customer Care Chatroom

The chatroom is open and inviting and content is available on every page. This caters for relationship management. Through online interactions, the vendor learns more about his clients profile, user web experience, companies that he has been transacting with, services that were provided and others. This help to build a certain amount of trust with the audience before they feel okay about submiting personal and private information. This enables the vendor to get back to any customer requests within 24 hours, provide an easy customer feedback and others. As in the online world , the product is never felt, constant feedback to frequentlly asked questions in the chart room will remove this fear and bring trust to consumers. Overall achievements will be improved services through motivation and putting up a competitive strategy to out-compete his rivals in the online market.

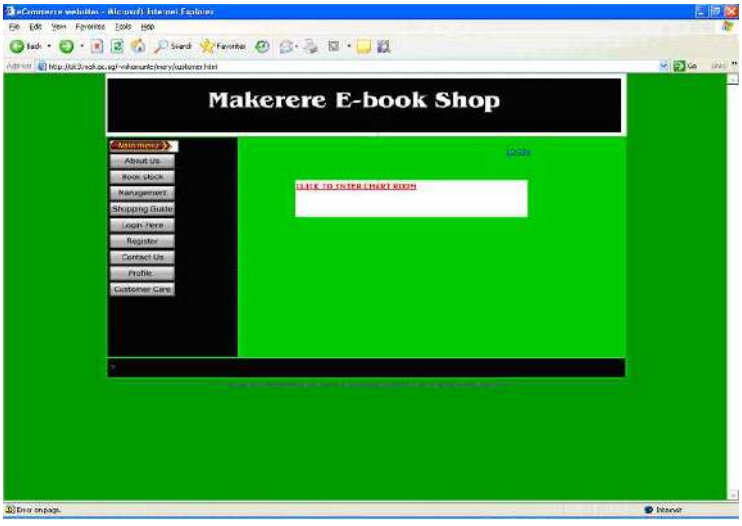

Figure 4.14: Customer care chartroom

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4.4.2 System Validation and Verification

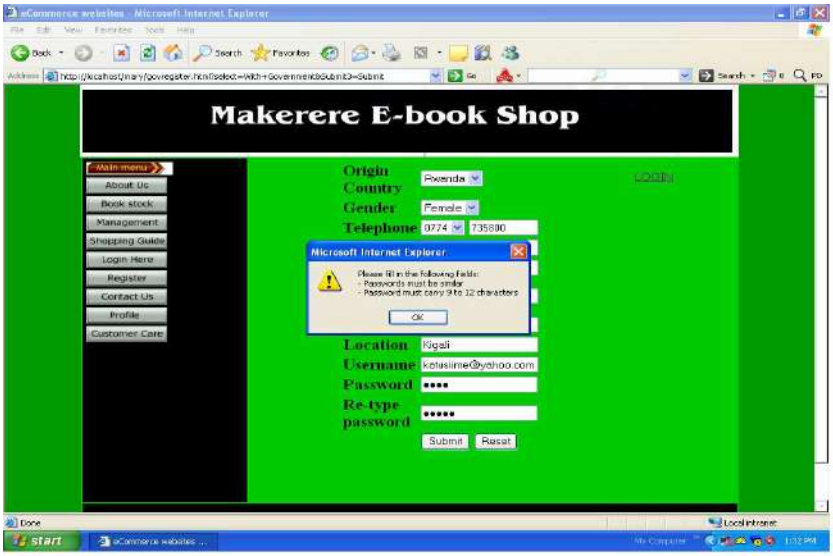

Figure 4.15: System Verification

Software verification and validation is the process of ensuring that the software being developed or changed will satisfy functional and other requirements. Testing is a process of validating and checking the software meets the expectations of the users. Security testing

is testing the system to restrict access to the system, attempts to obtain data, wrong user password and wrong client indentification. The password must be between 9-12 characters with features of a good password. To some extent it helps to have secure transactions, as hackers will need a lot of time to penetrate the system. The functionality of the system is shown on page79

Security testing

The system was tested to restrict access like were unthorized parties attempt to operate or use the application or parts of it, this also include attempts to obtain access to the data, or harm the application installation or even the system software itself. As with all types of security it is recongised that someone sufficentlly determined will be able to obtain unauthorizad access and the best than can be achieved is to make this process as difficult as possible. Error messages are indicated or even when the user is denied access as shown in figure below;

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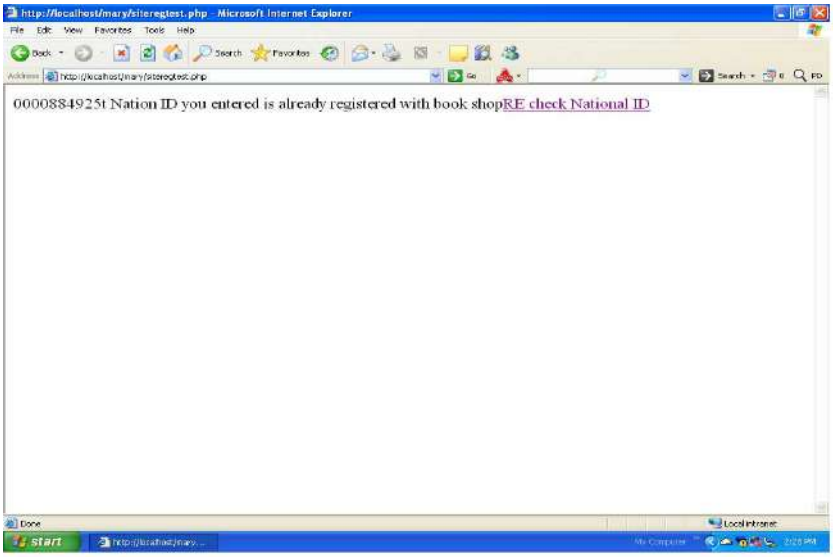

Figure 4.16: security testing

Usability testing

Usability testing was done where by the researcher made the E-commerce prototype website available on line for the business community and Makerere University MIT students to register and start transacting business. A system prototype was made available to few of the businessmen and MIT students, Customers were able to access an electronic commerce website located on link http://cit3.mak.ac.ug/ mkomunte/mary/customer.html. Results obtained were in consistency with other E-Commerce websites in existance.

Privacy

The web administrator can be able to determine the real identity of customers hiding behind a pseudoname. The system ensures high level of privacy by protecting the user data that is provided when the clients are filling in the request form. Passwords are encrypted. This is a sreen shot of the interface that enables an authorized user to be authenticated by means of password, national ID, Pincode numer and credit card number before access can be allowed.

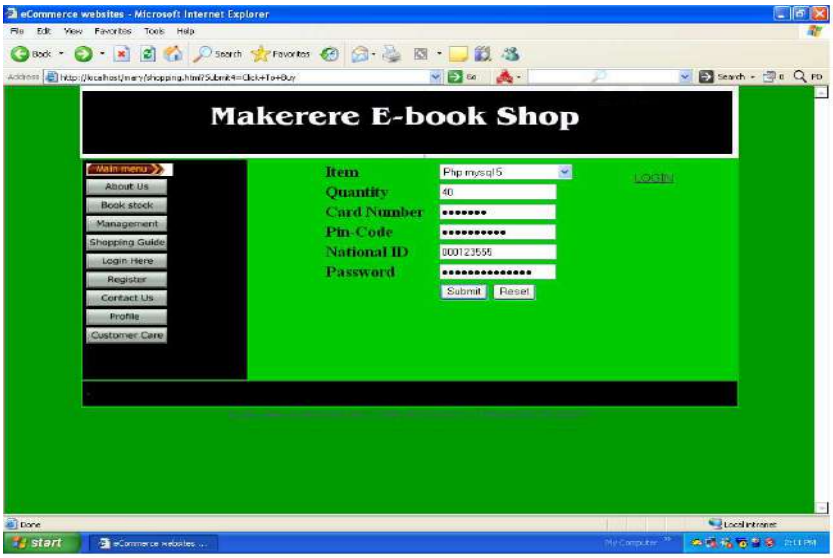

Figure 4.17: Encrypted user interface

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4.5 Validation of the Model

Validation is the process of checking if something satisfies acertain creterion. That is checking if a statement is true or false. In this case an E-commerce Trust Model was tested to check if it is fit to be used in E-commerce environment for trust building.

Procedure

The final validation of the Model was carried out in relation to MIT students of Makerere University and the business community in Kampala as the case to study for in-depth analysis. The study consisted asking MIT students and few of the businnessmen in Kampala as participants to evaluate the E-commerce trust model. Participants were not given any guidance to factors that affect trust. An interview guide was designed and used to test the model. Participants were interviewed and results critically analyzed. The business community/ Government can then adopt this globally. This largely included finding the establishment of E-commerce, factors facilitating trust, experiences and challenges and overall benefits so far.

The main aim of the study was to indentify components of the E-commerce trust model that are likely to affect users trust either positivelly or negativelly. Evaluations were based on the knowledge and experience gained in class and their interactions with different websites.

Secondary interviews were conducted to establish not only the ease of use of the system but also the ability of the system to be used for the intendend purpose. The interview questions were designed to test the determinants of trust building like user friendliness of the GUI and the suitabilityof the system for tracking and lodging customers transactions. .

Data Analysis

The researcher noted each answer on paper along with students registration number. Answers to questions from participants were arranged according to major, minor and not a trust problem. The results were critically analysed and information noted. The interviewees reported satisfaction with the model in the category of trust building. The interview guide which was used is attached as appedixA(II)

Results of the Validation Study

Usually when testing a prototype, usability problems increase with the number of user participation up to acertain stage when the redesign is done accordingly. It was found out that as soon as one collects data from a single test user, insights increases and one learns more of all there is to know about the usability design. As observed problems increase as the sytem is tested with one or more users although as it is tested with more users there is not much to add so the percentage remains constant onwards.

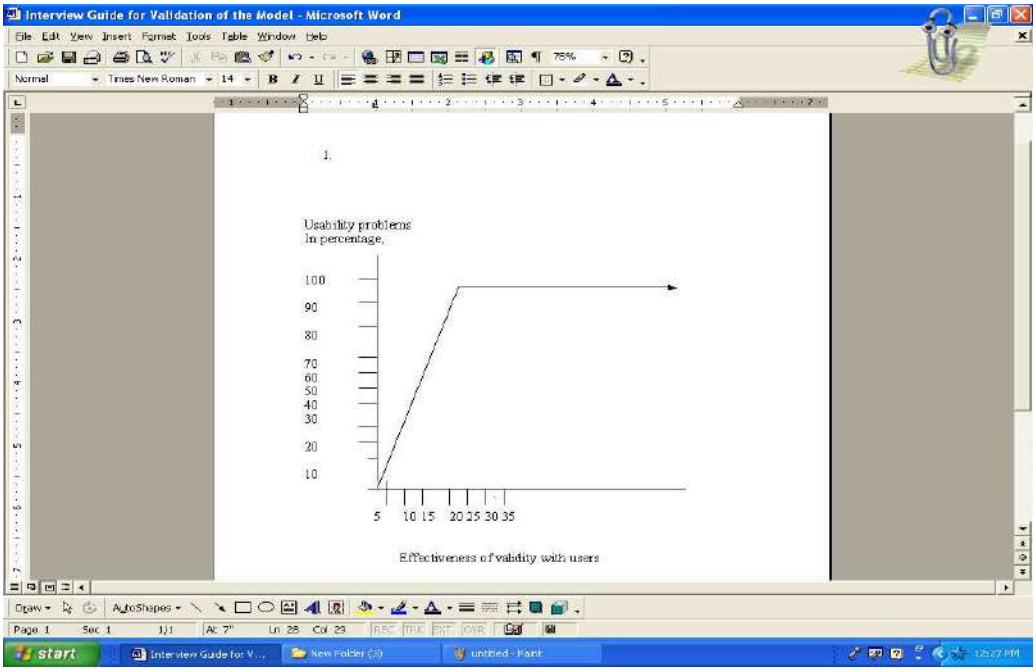

Figure 4.18: Usability Problems Found

The x-axis demostrates the number of test users while the y-axis shows the usability problem in percentage as illustrated abave.

The interviewees reported satisfaction with the model in the category of trust building. The results show overall reliablity of the model in E- commerce. Validation findings suggest that all the components of the new trust model are important tools for E-commerce development in LDCs. This is illustrated on the next page.

Table 4.1: Results of the validation Exercise

Model Component	Numerical Rating in Percentage
System security	70
Privacy	65
Organisational Culture	95
Government	93
Motivation	78
Relationship Managenet	88
Users Web Experince	57
Persceived Risk	65
Technological Trust Worthiness	72
Trust	90

Chapter 5

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Under this chapter, the research project centered on developing an E- commerce trust model. This model can be used to build confidence and improve online business transactions.

5.1.1 E-Commerce Trust Model

E-commerce continues to hold tremendous profit potential for many organizations. It still offers faster responses to customer needs, reduced operating costs, increases cooperation's among customers and trading partners once done right. Trust is a major factor in every day life; therefore before we go very far, we have to build trust first for E-commerce to generate results. This is because capital, resources, time plus information are scarce today and very

expensive.

From the designed prototype the customer is able to approach the vendor in open space environment without any fear. Customers can request for products online, make payments and receive what they demand for. The web is used as a gate to all customers. It consists of a variety of products they can request online depending on the vendor company.

5.2 Discussion

Overall, the results provide support for the proposed trust model of B2C E-commerce. The results of the study are consistent with results of previous studies discussed in chapter 2 which reveal that most variables like relationship management, privacy, security, perceived risk and user web experience are positively related to consumer trust.

Risk perception may have different effects on attitude and participation in E- commerce. Results indicate that it can positivelly or negativelly influence consumer trust in the online World. Negatively customers fear to transact business with the unknown using the Internet. It is noted that high level of consumer's trust in E-commerce transaction decreases as consumer perception of risks associated with online purchasing increases.

Results indicate that Government and organizational culture have the strongest influence on consumer trust among all the other factors as illustrated in figure 8b,8c and 9 on page xi.

Therefore they are strong factors in influencing and maintaining consumer trust in online transaction. The results in appendix A and B shows factors of B2Consumer trust in online transaction. They also show factors of building trust in B2C transactions supported by data collected, system security, privacy, organizational culture, government and motivation plus technology are important determinants of trust in developing countries.

Relationship management is the first factor that persuades the online consumer to engage in E-commerce. Therefore the way the website is designed, organized, and content management are very important. This leads to overall attitude to participate in E-commerce.

5.3 Conclusion

The research findings suggest that Government is an important tool for E-commerce to develop in developing countries. The E-commerce trust model is an enhanced version of other trust models discussed in chapter two. The study extends prior research in trust by including government, motivation, and organizational culture and exploring the formation of trust in a new context. It is important to note that E- commerce gives companies improved efficiency, reliability of businesses processes through transaction automation over the Internet. The commerce industry will be poised to technology enabled tools and trust determinants to reap the benefits of E-commerce. The web-enabled model will influence the E-commerce sector by allowing business organizations, and non-profit organizations to reduce processing

expenses, transportation, by streamling the administration of E-commerce.

5.4 Recommendations and Further Studies

- **Unique Identification of Internet Users**

  Tracing back for the culprit is usually very difficult if the premise under investigation is a public utility like Internet cafe. The government should make it a policy for system users to always log onto system resources using the unique identifiers as I proposed National identity cards and passport numbers, as user name will simplify to trace the offender and should be punished by the authorities. This will help to identify suspects easily hence building trust among users.

- **Enforcement of E-commerce Laws**

  Countries that have not yet drafted and implemented the laws to govern E-commerce should urgently incorporate them into laws of the land. The ministry of ICT in Uganda should try to implement laws quickly for E-commerce to benefit the nation. Harsh punishment s should be given to hackers and offenders so that people can fear to commit Internet crimes.

- **Education Awareness**

  The public need a lot of sensitization and training on what trust in E-commerce is., how to build it and the procedures they can take to implement E-commerce. The

public is still illiterate in IT skills. The government should endeavor to build trust and confidence in the population by using the media.

- **International Co-operation**

  Countries and in particular developing countries should actively participate in the international ICT policy -making activities which will culminate in the formation trust building in E-commerce. The ministry of ICT should encourage active participation in case any endeavors to enact global E-commerce laws arise.

- **Improve ICT Infrastructure**

  There is a huge difference in quality and quantity of the information communication infrastructure between the developed and the developing world. The developing world lacks the infrastructure which limits its participation in the electronic world. This calls for different set of solutions to enable it to securely interact with the rest of the world. Particularly the security goal of availability of information is threatened. The government should give a hand to propose better mechanisms that can match existing infrastructure for the internet users in developing countries

Recent approaches to E-commerce trust models stress the distinction between business model and process models, which also need to be deeply studied. Further research can focus on exploring the relationship between the trustee and risk perception in E-commerce. The role of integrity and trust in online transactions requires future research.

Further research could be done in perception of integrity, competence and trust in senior management as determinants of organizational change.

Although the project study discussed, based itself on consumer trust in E-commerce, online trust is relevant to other stake holders like employees, suppliers, distributions and in online alliances. (Shankar *et al.*, 2002). Varying the consumer or vendor may result in different sets of determinants and results of online trust giving additional interesting topics for future research.

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Appendices

AppendixA I: Interview Guide

Questions for the Business Community in Uganda. This study aims at finding out whether the business community can do business on the web without any worry. You have been chosen to participate in this study to help solve the problem of trust in E- Commerce/ business.

1. In your own opinion what is electronic commerce.

2. The Internet is a Network of Net works. Do you think this is true?

3. How often do you use the Internet for business purposes?

4. According to your own understanding, what causes mistrust in E-Commerce?

5. With the experience you have in business, what strategies should be put in place to increase hope and confidence in Electronic commerce in Uganda?

AppendixA II: Interview Guide for Validation

Interview guide for validation of the electronic commerce trust Model.

1. In your own opinion are the variables explained in the model good enough to build trust in electronic commerce.

2. With the experience you have, is the system prototype, user friendly, ease to navigate and well designed.

3. Does the prototype capture all the requirements of customers

4. Are the error prevention messages adequate enough.

5. Do you feel you need assistance when using the system.

Appendix B:Questionaire

The answers given will not in any way be used for either commercial or any other purposes. The purpose of collecting this data is purely academic. The researcher Mary Komunte is a Masters student at the Faculty of Computing and Information Technology, Makerere University. Thank you.

Demographic data

- Gender and age
- Education background
- Computer literacy

Electronic Commerce questions

Electronic commerce is the process of buying and selling or exchanging products, services and information via computer networks including the Internet.

1. The Internet is a network of networks.
2. What do you mainly use the Internet for [Specify]
3. On a scale from 1 to 5 indicate your usage of the Internet (1 lowest, 5 highest).

4. The Internet is used to transact business

5. What do you think causes mistrust in E-commerce?

Trust

Trust is the willingness to rely on an exchange partner in which one has confidence.

i. Product performance affects consumer trust.

ii. In your own opinion what factors influence the level of trust in the Internet or online transaction?

iii. In your own opinion, how does trust influence participation in E-commerce?

IV. A customer can trust a companys website if it treats him fairly.

V. Customers trust website of organizations if they deliver on what it promises.

VI. I would trust an organization website if it has the integrity to defend its products.

VII. I would trust an organization products and services if its open to its customers [tell the truth]

VIII. I would trust a companys website if clients have confidence in it.

Ix. In your own opinion does customer motivation affect trust of online transactions?

Relationship Management

Availing information about the products and services.

a. Relationship management focuses on identifying customers and satisfying their needs

b. Relationship management aims at identifying customers profile on the Internet.

Risk Perception

-In your own opinion does Risk perception affect customers trust of online transactions?

System Security

According to your own experience do you think Web Customers should devote attention on the following; *Products warrant policy, Return and refund policy, Privacy policy, Credit card loss assurance policy, and Security policy.*

Technology

a. I would trust an organization web site if it has the necessary technological skills to carry out Electronic commerce.

b. How often do you experience technical failures when transacting business?

Experience

Online customers can always predict performance of E-commerce from past experience and fellow customers.

Culture

A. Culture affects trust

B. Resistance to change by high level management and customers affects trust.

C. Lack of willingness to reengineer business processes in organization.

Government

Government policy affects trust of online transactions.

Thanks .

Appendix B: Results

The figures below as labelled illustrate the gender distribution , age distribution, education background of respondents, and computer literacy levels.

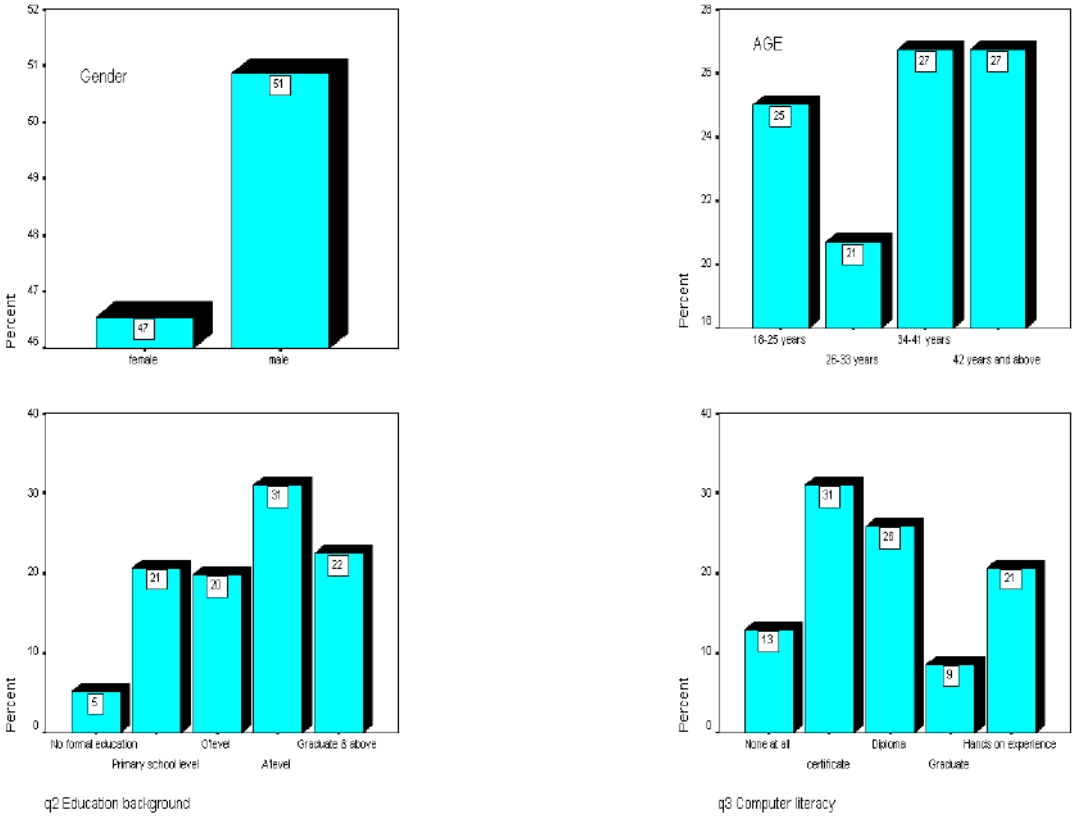
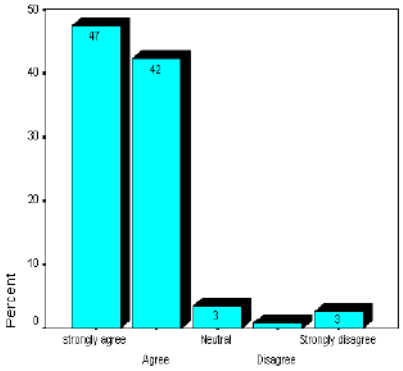


Figure 5.1: Demographic profile

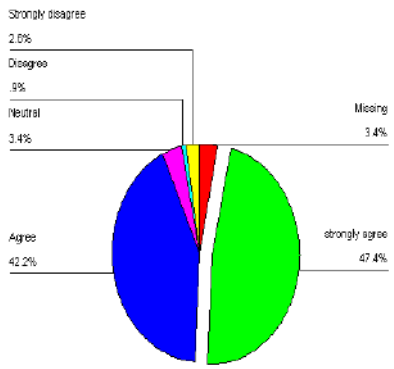
Results Contd

Figures below as labelled demonstrate the percentage of respondents who were coversant with Internet and average usage of the Internet.



Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
1a Electronic commerce is the process of	112	1	5	1.64	.83
Valid N (listwise)	112				



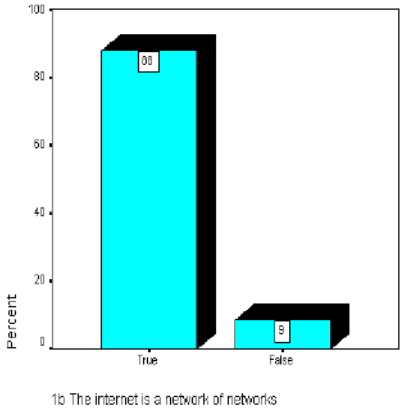


Figure 5.2: Electronic Commerce

Results Contd

Figures below illustrate the main usage of the Internet.

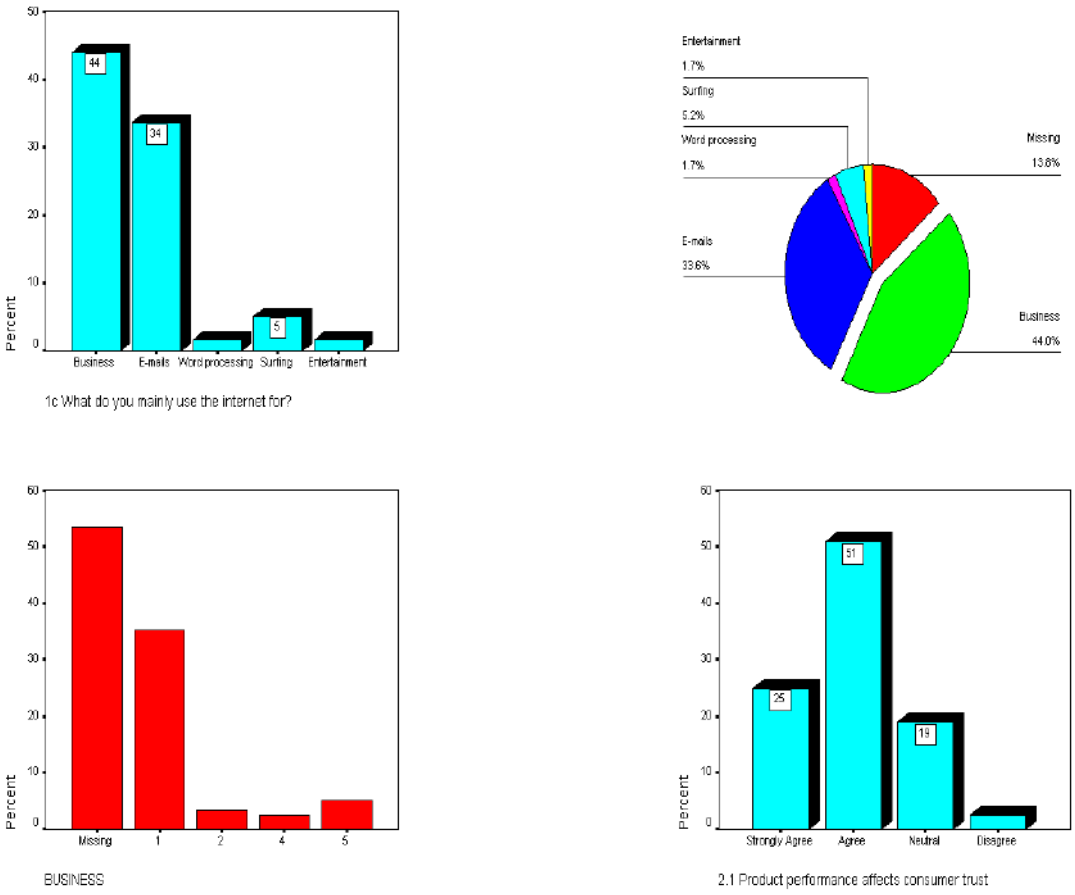
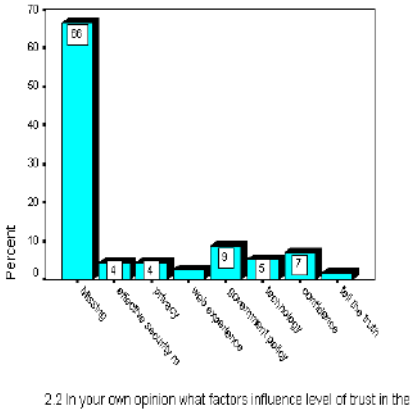
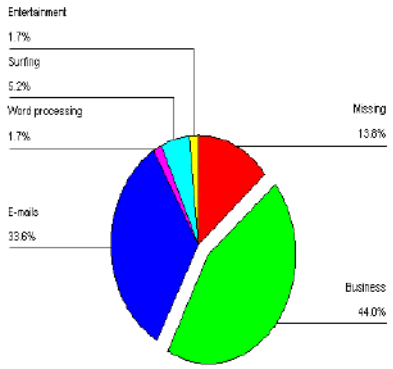


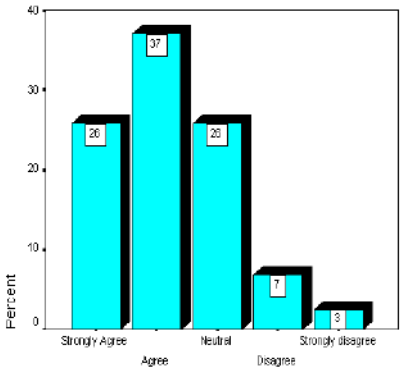
Figure 5.3: Internet findings

Results Contd: Figures below illustate the percentage contribution of factors of trust building in E-commerce. Figure 2.2 illustrates factors that influence the level of trust, 2.6 Integrity of website, 2.7 Openness to customers.

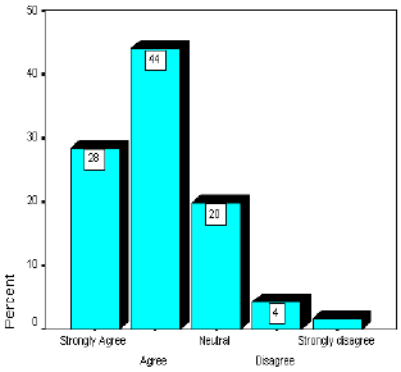


2.2 In your own opinion what factors influence level of trust in the





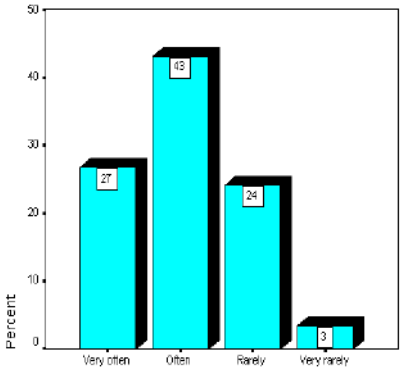
2.6 organisation website if it has the integrity



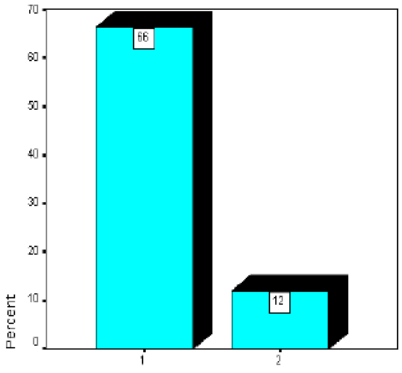
2.7 Open to customers

Figure 5.4: Determinants of Trust

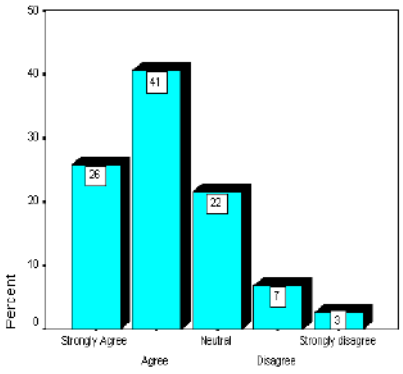
Results Contd: Figures below show the percentage contribution of factors of trust building in E-commerce. Figure 2.8 illustrates customers' confidence in website, 2.9 Customer motivation, 3a identifying customer and satisfying their needs, 3b identifying customers profile on the Internet



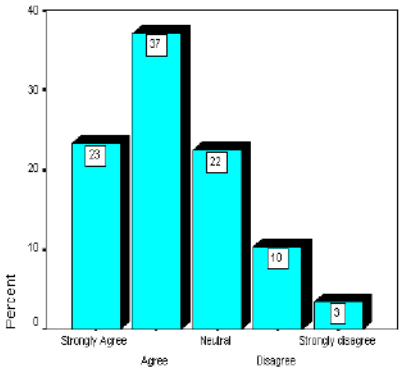
2.8 If clients have confidence in it



2.9 In your opinion does customer motivation affect trust



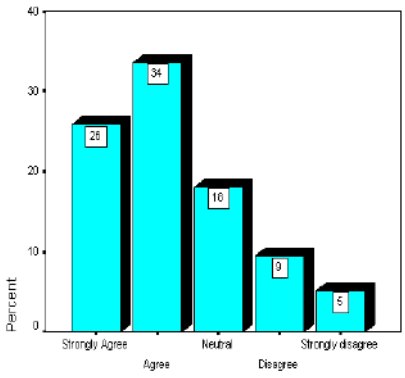
3a focuses on identifying customers and satisfying their needs



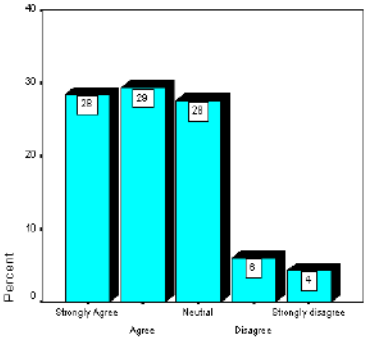
3b aims at identifying customers profile on the internet

Figure 5.5: Determinants of trust

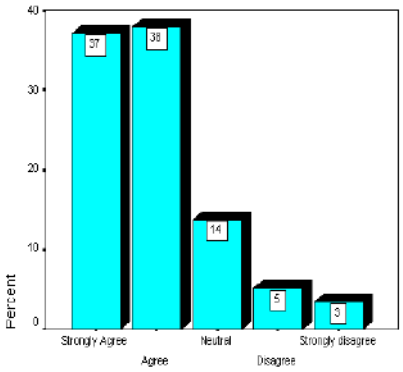
Results Contd: Figure 8a and 8b illustrate culture as a determinant of trust with two variables resistance to change and lack of willingness to re-engineer. Figure 9 Government as a major determinant of trust in E-commerce.



8b Resistance to change by high level management and custome



8c Lack of willingness to reengineer business processes in orgar



9 government policy affects trust of online transactions

Figure 5.6: Determinants of trust

AppendixC

Selected Codes of the System

```
\noindent Begining of the system code\\
// starting part of php programming

<?php
if(($_POST['pass']!=$_POST['pass2']))  //testing if both passwords
confirm to each other
{
$fname= $_POST['fname'];  //assigning variable to capture first name value entered
  $lname= $_POST['lname'];
  $id = $_POST['id'];
 $age = $_POST['age'];
  $loc = $_POST['loc'];
 $user= $_POST['user'];
 $pass = $_POST['pass'];
 $country = $_POST['country'];
  $gender = $_POST['gender'];
  ///echo $id;

$conn= mysql_connect("localhost","mkomunte","komunte");  //connecting to the database
mysql_select_db("mkomunte",$conn);   //select database to use
$query = "SELECT id  FROM government where id='$id'";   //querying database
$result = mysql_query("SELECT id,password,username  FROM government where id =
'$id'")or die(mysql_error());
$row = mysql_fetch_array($result);  //handling retrieved data from database
  if( $row['id']==$id)/
    {
      echo "That Nation ID you entered is already registered <a href=\"govregister.html\
Enter Another National ID</a>";

    }
else //verifying  if country ids match
    {

$query="insert into government (fname, lname, id, age, loc, username, password,country,
 gender)values(' $fname','$lname','$id',' $age','  $loc',' $user','$pass',' $country','$
 echo mysql_query($query);
```

```
echo "Thanks for registering with the Government as a citizen.
This helps you more secure and confident book purchase. </br>
Your ID you entered will help you register with the book shop too. </br>
 <a href=\"siteregister.html\">Register with book shop</a> ";

    }

 mysql_free_result($result);

    }

 //echo mysql_query("insert into government (fname, lname, id, age, loc,
username, password,country, gender)values(' $fname','$lname',' $id',' $age','
$loc',' $user','$pass',' $country','$gender')");
 ///echo "Success registration continue ";

?>


//verifying if passwords match during admin login
<?php
 $user= $_POST['user'];
 $pass = $_POST['pass'];

//echo $user;

mysql_connect("localhost","mkomunte","komunte");
mysql_select_db("mkomunte");
$result = mysql_query("SELECT password,username FROM staff where password ='$pass'")
or die(mysql_error());
$row = mysql_fetch_array($result);
//echo $row['username'];

if ($row['username']==$user &&$row['password']==$pass&&$user!=""&&$pass!="" )
{

  //include("admin.html");

echo "Succes<a href=\"admin.html\">Proceed</a> To exit <a href=\"exit.php\">Exit</a>" ;
 mysql_free_result($result);
```

```
}


else
{
echo $row['username'];
echo "invalid Login details<a href=\"staff.html\">Relogin</a> To exit <a href=\"exit.ph
 mysql_free_result($result);
 }

///data validation

<Script Language="JavaScript">

function checkEntry()
{

      else //verifying  if country ids match

var numb="100";

CLASS1="S1";CLASS2="S2";CLASS3="S3";CLASS4="S4";CLASS5="S5";CLASS6="S6";

s1="s1";s2="s2";s3="s3";s4="s4";s5="s5";s6="s6";

var error_message = "";

if (document.frmSample.lname.value =="") error_message += "- last name   \n";
if (document.frmSample.fname.value =="") error_message += "- first name   \n";
if (document.frmSample.nationalid.value =="") error_message += "- nationa id  \n";
if (document.frmSample.loc.value =="") error_message += "- location  \n";

if (document.frmSample.pass.value =="") error_message += "- password   \n";
if (document.frmSample.pass2.value =="") error_message += "- second password   \n";
if (document.frmSample.phone.value =="" ||document.frmSample.phone.value.length<6 || doc

if (document.frmSample.pass2.value  !=document.frmSample.pass.value ) error_message
+= "- Passwords must be similar  \n";

if (document.frmSample.pass2.value.length<9 || document.frmSample.pass2.value.
length>12 ) error_message += "- Password must carry 9 to 12 characters  \n";
```

```
if(error_message) {
      alert("Please fill in the following fields:\n" + error_message);
      return false; }
   return true;

}//closes function

    </Script>

<SCRIPT language=JavaScript>
function validate2(fname) {
var valid = "abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ ";
var ok = "yes";
var temp;
for (var i=0; i<fname.value.length; i++) {
temp = "" + fname.value.substring(i, i+1);
if (valid.indexOf(temp) == "-1") ok = "no";
}
if (ok == "no") {
alert("Invalid first name");
fname.focus();
fname.select();
   }
}
</SCRIPT>

<SCRIPT language=JavaScript>
function validate3(lname) {
var valid = "abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ ";
var ok = "yes";
var temp;
for (var i=0; i<lname.value.length; i++) {
temp = "" + lname.value.substring(i, i+1);
if (valid.indexOf(temp) == "-1") ok = "no";
}
if (ok == "no") {
alert("Invalid last name.");
lname.focus();
lname.select();
   }
}
```

```
</SCRIPT>

<SCRIPT language=JavaScript>
function validate4(phone) {
var valid = "+0123456789";
var ok = "yes";
var temp;
for (var i=0; i<phone.value.length; i++) {
temp = "" + phone.value.substring(i, i+1);
if (valid.indexOf(temp) == "-1") ok = "no";
}
if (ok == "no") {
alert("Ivan Coding center \n \n \n Please enter numbers only for phone.");
phone.focus();
phone.select();
   }
}
</SCRIPT>

<SCRIPT language=JavaScript>
function validate5(id) {
var valid = "+0123456789";
var ok = "yes";
var temp;
for (var i=0; i<id.value.length; i++) {
temp = "" + id.value.substring(i, i+1);
if (valid.indexOf(temp) == "-1") ok = "no";
}
if (ok == "no") {
alert("Invalid National ID");
id.focus();
id.select();
   }
}
</SCRIPT>

<SCRIPT language=JavaScript>
function validate6(age) {
var valid = "+0123456789";
var ok = "yes";
var temp;
```

```
for (var i=0; i<age.value.length; i++) {
temp = "" + age.value.substring(i, i+1);
if (valid.indexOf(temp) == "-1") ok = "no";
}
if (ok == "no" || document.frmSample.age.value>100 |
|document.frmSample.age.value<10 ) {
alert("Invalid age value");
age.focus();
age.select();
   }
}
</SCRIPT>

<SCRIPT language=JavaScript>
function validate7(loc) {
var valid = "abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ ";
var ok = "yes";
var temp;
for (var i=0; i<loc.value.length; i++) {
temp = "" + loc.value.substring(i, i+1);
if (valid.indexOf(temp) == "-1") ok = "no";
}
if (ok == "no") {
alert("Invalid location value");
loc.focus();
loc.select();
   }
}
</SCRIPsT>

//storing the commodity details after purchasing
<?

$item = $_POST['item'];
//echo $item;
$qua  = $_POST['quantity'];
$card  = $_POST['card'];
$pin  = $_POST['pin'];

$id  = $_POST['id'];
//$user  = $_POST['user'];
```

```
$pass = $_POST['pass'];

if($item ="Network +" )
{
  $price = 100000;
}
if($item ="Complete E-commerce" )
{
  $price = 200000;
}
if($item ="Php mysql 5" )
{
  $price = 300000;
}

//$total = $price*$qua;
?>

<?php

//$user= $_POST['user'];
// $pass = $_POST['pass'];
//$id = $_POST['id'];
//echo $user;

mysql_connect("localhost","mkomunte","komunte");
mysql_select_db("mkomunte");
$result = mysql_query("SELECT id,password,username FROM site where id ='$id'")
or die(mysql_error());

$row = mysql_fetch_array($result);

if ($row['id']!=$id)
{
echo "That national id is invalid <ahref=\"shopping.html\">reshop</a>
 To exit <a href=\"exit.php\">Exit</a>" ;
}

else
{
mysql_connect("localhost","mkomunte","komunte");
```

```
mysql_select_db("mkomunte");
$result = mysql_query("SELECT id,password,username FROM site where id ='$id'")
or die(mysql_error());

$row = mysql_fetch_array($result);


if ($row['password']!=$pass)
{

echo "invalid password <a href=\"shopping.html\">reshop</a> To exit
<a href=\"exit.php\">Exit</a>" ;
}
 else
   {
$totalcost =  $price*$qua;

mysql_connect("localhost","mkomunte","komunte");
mysql_select_db("mkomunte");
$result = mysql_query("insert into goods (id,item,quantity,card,cost)
values('$id','$item','$qua','$card','$totalcost')")
or die(mysql_error());

//echo $result;

echo "You ordered ".$qua." ".$item. "Books which costed you ".$totalcost."/=<br>";
echo "Print this out and you will be required to present it on the day will deliver bool

mysql_connect("localhost","mkomunte","komunte");
mysql_select_db("mkomunte");
$result = mysql_query("select * from site inner join goods where site.id = goods.id")
or die(mysql_error());

$row = mysql_fetch_array($result);

?>

<table border="0" cellspacing="1" width="1000" height="558" bgcolor="#33CC33">
  <tr>
    <td width="137" height="76" bgcolor="#000000"><b><font color="#FFFFFF"
face="Verdana" size="4">MAKERERE</font></b>
```

```
      <p><b><font color="#FFFFFF" face="Verdana" size="4"> BOOKSHOP</font></b></td
    <td width="220" height="76"><font face="Verdana" size="1">CLIENT ID</font></td>
    <td width="167" height="76"><font face="Verdana" size="1"><? echo $row['id']; ?></fo
    <td width="170" height="76"><font face="Verdana" size="1">COUNTRY   
      <? echo $row['country']; ?></font></td>
  </tr>

  <tr>
    <td width="137" height="56" bgcolor="#008000"><font size="6">C</font></td>
    <td width="220" height="56"><font face="Verdana" size="1">FIRSTNAME</font></td>
    <td width="167" height="56"><font face="Verdana" size="1"><? echo $row
['fname']; ?></font></td>
    <td width="170" height="56"> </td>
  </tr>
  <tr>
    <td width="137" height="51" bgcolor="#008000"><font size="6">L</font></td>
    <td width="220" height="51"><font face="Verdana" size="1">LASTNAME</font></td>
    <td width="167" height="51"><font face="Verdana" size="1"><? echo $row['lname'];
?></font></td><td width="170" height="51"> </td>
  </tr>
  <tr>
    <td width="137" height="74" bgcolor="#008000"><font size="6">I</font></td>
    <td width="220" height="74"><font face="Verdana" size="1">LOCATION</font></td>
    <td width="167" height="74"><font face="Verdana" size="1"><? echo $row['loc'];
?></font></td><td width="170" height="74"> </td>
  </tr>
  <tr>
    <td width="137" height="67" bgcolor="#008000"><font size="6">E</font></td>
    <td width="220" height="67"><font face="Verdana" size="1">GENDER</font></td>
    <td width="167" height="67"><font face="Verdana" size="1"><? echo $row['gender'];
 ?></font></td>
    <td width="170" height="67"> </td>
  </tr>
  <tr>
    <td width="137" height="71" bgcolor="#008000"><font size="6">N</font></td>
    <td width="220" height="71"><font face="Verdana" size="1">PRODUCT</font></td>
    <td width="167" height="71"><font face="Verdana" size="1"><? echo $row['item'];
?></font></td>
    <td width="170" height="71"> </td>
  </tr>
  <tr>
```

```
    <td width="137" height="62" bgcolor="#008000"><font size="6">T</font></td>
    <td width="220" height="62"><font face="Verdana" size="1">QUANTITY</font></td>
    <td width="167" height="62"><font face="Verdana" size="1"><? echo $row['quantity'];
?></font></td>
    <td width="170" height="62"><font face="Verdana" size="1">PAYMENTS MADE :<br> <?
 echo $totalcost."Shs"; ?></td>
  </tr>

</table>

?>
```