KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY,

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COLLEGE OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

THE IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY ON THE OPERATION AND PERFORMANCE OF SMALL AND MEDIUM SCALE ENTERPRISES
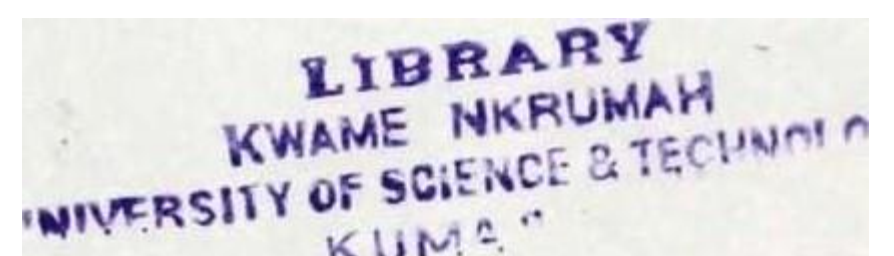
By

UCHEGBU FAV OUR CHINAZA

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PHILOSOPHY IN INFORMATION TECHNOLOGY

MAY, 2014
DECLARATION

I hereby declare that this thesis:" The Impact of Information and Communication Technology (ICT) on the Operations and Performance of Small and Medium Scale Enterprises (SMEs)" consists wholly of my own work produced from research undertaken under supervision and that no part of it has been published or presented for another degree elsewhere except for the permissible excerpts/references from other sources, which has been duly acknowledged.

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ABSTRACT

The purpose of this thesis work is to investigate on the impact of ICT on the operations and performance of some selected SMEs in Kumasi and to examine the impact, the factors that affect or prevent SMEs from adopting ICTs in their business.

This paper further presents the assessment of different types of ICT used in SMEs in Kumasi and comes up with an integrated ICT system that will emerge the applications used by SMEs in Kumasi.

To achieve this purpose, an overview of the current sale transaction was reviewed through academic paper, journals, related research work, the internet, articles, and books which were analyzed and interpreted.

An extensive review of the available literature provided the foundations of the writing of this thesis. The study used primary data collected through questionnaires which were administered to 45 respondents (due to the limited time of the study) to assess the impact of1CT on SMEs in Kumasi.

It is universally accepted that ICT has greatly transformed the way and manner in which companies conduct their business.

The impact derived from the integrated application cannot be over emphasized as it can be hosted and assessed anywhere on the browser and even PDAs. The manager does not need to come to the company to see what goes on there or to take stock for new orders. But rather, all the manger need to do is to sit in his/her comfort zone and check the transactions made in the company without coming to the company. That is, distance does not create any barrier with the integrated system.

The emerged system has the potential to eliminate the problems been faced by SMEs with their current system in the area of transactions, stock, accounts and point of sale. The study revealed that SMEs are ready to embrace their ICTs been emerged and more advanced ICTs into their business.

DEDICATION

I dedicate this thesis to the Almighty God who granted me the grace and mercy to embark upon and complete this MSc programme. I also dedicate this work to my Beloved parents and my lovely siblings.

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LIST OF ABBREVIATIONS

ASMS	Aditon Shop Management
BERR	Business Enterprise and Regulatory
CS	Case Study
CRM	Customer Relationship Management
DB	Drawback
ERP	Enterprise Resource Planning
	European Union
	Factor
GDP	Gross Domestic Product
GUI	Graphical User Interface
	Impact
IDE	Integrated Development Tool
ICT	Information and Communication Technology
IBM	International Business Machine
JSF	Java server faces
MO	Motivator
OECD	Organization of Economic Co-operation and Development
RDBMS	Relational Database Management System
SCM	Supply Chain Management
SME	Small and Medium Scale Enterprises
TCP	Transmission Control Protocol
	United Nation
	United Kingdom
USA	United State of America

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1.0 Introduction

Chapter one describes the background to the study, motivation of study, research objectives and research questions. The chapter concludes with Organization of the thesis and the summary. In undertaking any research, it is important to establish the rationale behind such a study as this acts as a reference point against which the research outcomes can be evaluated.

1.1   Background of the Study

The role of SMEs in the economy is very essential because of its impact in generating more employment and enhancement of the social-economy for the local community (Barba-Sanchez, 2007).SME development does not only bring changes in developed countries like the UK, other European Countries, and the USA, it also brings changes to developing countries such as China (Tan, et al., 2007). ICT is important to SMEs because it helps develop the productivity of the organization. Schubert and Leimstoll (2007) conducted a quantitative study regarding the co-relationship between ICT usage and SMEs business objectives and the result was positive. His study shows that " 1) SMEs in Sweden are extensively using ICT in their daily business, especially in field like financial and accounting, human resource management; 2) there is a high degree of inter-organizational ICT usage; 3) ICT is strongly rooted in management, that is high involvement and skills of managers; and 4) ICT successfully supports competitive strategies."
Although all fast growing companies are not essentially extreme ICT users. There are some interesting findings in recent studies about how ICT made a difference in business

performance, for instance, firms using e-mail for customer communication grew 3.4% faster in terms of sales than those that did not use e-mail (Qiang, Clarke & Halewood, 2006). In recent years, significant numbers of SMEs were engaged with computers or other direct data access equipment for individual task development purposes. But now. more and more computers are being connected to each other. This has brought gradual change in communication and it has helped them become more effective. It lowered the cost of communication and coordination between and within business entities. It also affected market sales volume positively (Barba-Sanchez, 2007).

Increase in the use of Information and Communication Technology (ICT) in organizations have considerably changed the way in which organizations communicate and operate. ICT plays an important role in the present-day knowledge based economy and is applied in a wide range of areas in some organizations.

Several organizations tend to rely deeply on ICT solutions in order to improve and gross their businesses. The rotations in the use of ICT have thoughtful consequences for economic and social development and have saturated every aspect of human life (Shanker, 2008). Spanos •al. (20Dì-pestuhtes that ICT has the capacity to enhance, organize and control the operations of many organizations and can as well increase the use of management systems such as Customer Relationship Management (CRM) in the midst of others. For that reason, ICT is regarded as a vital tool for the economical administration 01 any organization and in the deliverance of services to its clients.

Ashrafi, and Murtaza (2008) posit that organizations around the world are now utilizing ICT not just for improving competence and cutting costs, but also for providing improved customer service. In the same way Buhalis (2003) postulates that businesses can now act together more efficiently with the use of ICT. Sharing information is a key role played by ICT which in addition assists in increasing the supply of information within organizations. Spanos et al. (2002), postulates that buyers and sellers are able to share informati01) ami move goods across national borders with the use of ICT, which helps to raise entrance to global supply chains. This brings about sincerity and clarity in organizations (Kollberg and Dreyer, 2006; Shanker, 2008).

Jiménez-Zarco et al. (2006) added that ICT plays a vital role in the aspect of acquiring, creating and managing experience as it enables the transmission of organizational data that can be necessary for useful decision making and control at all levels. Similarly, ICT helps in organizational planning and getting better organizational elasticity.

There is an increasing awareness of the impact of Small and Medium Enterprises (SMEs) in economic development, as their operation is very vital to all countries (Olutunla and Obamuyi, 2008). SMEs impact significantl to the social and economic development of several economies (Abor and Quartey, 2010) as they participate greatly in the employment generation, income generation and also support in speeding up developments in urban and rural areas.

In some of the recent industrialized nations, more than 98% of all industrial enterprises belong to the SMEs sector and account for the bulk of the labor force (Sanusi- 2003) In

Africa, SMEs play a crucial role in encouraging growth due to their economic influence (Abor and Quartey, 2010).

It has been widely realized that small and medium enterprises (SMEs) do not only play an important role in the economy of a country, but are crucial to the country's economic stability. In New Zealand, SMEs make up more than 99% of all businesses and account for about 60% of employment. In the USA more than half of all the employment comes from firms with fewer than 500 employees (Baldwin et al 2001). In the UK, SMEs employ 67 % of the workforce (Lange et al 2000). In most of the European Union (ELI) member states. SMEs make up over 99% of enterprises, 67% of jobs and 59% of GDP. In most countries SMEs generate a substantial share of the gross domestic product (GDP) and a key source of new jobs as well as a breeding ground for entrepreneurship and new business ideas. The United States of America, UK, Japan, Australia, New Zealand, Canada and other developed, as well as developing countries are making policies to facilitate the growth of SMEs.

Realizing the importance of ICT, New Zealand spend about 10% of her GDP on ICT, making it the top ranking country in the world (Clarke 2004). Estimates from the World Bank indicate that SMEs have contributed over 55% per cent of GDP in the Organization for Economic Co-operation and Development (OECD) countries and between 60 to 71) per cent of GDP in middle-income and low income countries generating 60 to 70 per cent employment (Oman Economic Review 2007). The above facts show that SMEs play a very important role in the growth of economy of a country.

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The relative importance of SMEs in developed as well as developing countries have led and will continue to lead to a reconsideration of the role of these enterprises in the economy of nations (Ayanda and Laraba, 2011).

SMEs are currently utilizing ICT around the globe, not merely for cutting costs and improving productivity, but also for providing an improved customer service. ICT is considered as the backbone of all new age technologies, without which other technologies may fail to be adopted (Mugodi and Flemming, 2003). Moreover, Ashrafi and Mutarza (2008) confirm that governments around the world are adopting ICT, to enable them to provide better services to their citizens.

1.2 The Impact of ICT

Presently, the extensive use of ICT is changing the way people or companies work. Researchers refer to ICT as a very important tool for innovation in this present era. The benefits of ICT for a firm includes saving of inputs, general cost reductions, higher flexibility and improvement in product quality (Mouelhi, 2009; Majumdar et al., 2010). Bloom et al. (2009) ascertain that ICTs play a major role in networking and communication as firms use these technologies to facilitate communication among employees and reduce co-ordination costs.

According to Hanna (2003), ICT enhances the production process in organizations as monitoring technologies could be used to reduce the number of supervisors required in the process. Arvanitis and Loukis (2009) also advocate that the use of ICT has direct

implications for firms. ICT helps in areas such as information gathering and dissemination, inventory control and quality control.

Olugbenga (2006) argues that ICTs are being used for strategic management. communication and collaboration, customers' access, managerial decision making, data management and knowledge management since it helps to provide an effective means of organizational productivity and service delivery. According to Brynjolfsson and Hitt (2003) there is a substantial long-term productivity gain with the use of ICT in organizations. Buhalis (2003) also notes that the application of ICT in businesses causes fundamental changes that can provide powerful strategic and tactical tools for organizations if properly applied and used. This could have great impact in promoting and strengthening organizational competitiveness.

Krishnaveni and Meenakumari (2010) assert that ICT has played a major role in reducing operational inefficiency and improving decision-making in many areas of governance. Furthermore, Hengst and Sol (2001) affirm that ICT enables organizations to decrease costs, increase organizþnaLcapabilities and also assist to shape inter-organizational coordination. Therefore, the use of ICT can help to lower coordination cost and increase outsourcing in organizations. Similarly, Ramsey et al. (2003) in their report mentioned what organizations generally stand to gain from ICT in areas such as reduced transaction costs. In order words, the use of ICT could assist both individuals and companies to access large markets at low cost. In addition, Irvine and Anderson (2008) comment that the use of ICT

does not only offer practical benefits for general management, but also enables companies to overcome the disadvantages of place and space.

Alam and Noor (2009) argue that ICT offers enterprises avenues to compete on a global scale with improved efficiency and closer customer and supplier relationships. Therefore, ICT should be regarded by businesses as an important strategy to stay competitive. Similarly, Melville et al. (2004), highlight that the use of ICT brings about customer satisfaction by improving service quality thereby offering new opportunities tor companies. Apulu and Latham (2010), claim that ICT enables customers to receive immediate feedbacks that allow companies to react fast to customers' demands and recognize new market niches. This entails that organizations that are able to exploit the potentials offered by ICT can handle various types of innovative processes in their businesses since ICT influences the performance of an organization in multifaceted ways. Thus, ICT can bring about change in organizations and make them more competitive, innovative and assist to increase organizational growth (Obijiofor et al., 2005). For these reasons, Kapurubandara and Lawson (2006) recommend that organizations need to adopt ICT in order to remain competitive in the present competitive global economy.

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1.3 Definition of Terms

The key terms in this research are defined in sections 1.3.1 and I .3.2.

1.3.1 ICT

ICT is defined as any technology that facilitates communication and assists in capturing, processing and transmitting information electronically (Apulu and Latham, 2009c). Mugodi and Flemming (2003) define ICT as "the goods and services that support the electronic display, processing, storage and transmission of information". Kawalek and Ramani (2007) refer to ICT as a broad term that is used to describe any technology from simple acquisition of hardware to the full implementation of the system. ICTs are regarded as tools used for changing world values and making society a knowledge based

environment where things are processed electronically (Hassan and Willie, 2006), and have a revolutionary impact on the manner in which organizations conduct businesses.
how people see the world and how people live (Dabesaki, 2005).

Gyampoh-Vidogah et al. (2007) describe ICT as the overall management and control of an organization's investment in information including identifying and sharing management information and ensuring that standardization, control, security and integrity of data are stored in a way that benefits a particular organization. The World Bank (2004) further defines ICT as consisting of the hardware, software, networks and media for the collection, storage, processing, transmission and presentation of information in the form of voice, data, text and images.

This research adopts Beckinsale and Ram's (2006) as well as Mpofu et al.'s (2009) definitions of ICT which state that "ICT is any technology used to support information gathering, processing, distribution and use."

In this research, ICT is also regarded as the application of software used to serve malor business functions (Laudon and Laudon, 2004) including accounting and human resources software, customer relationship management (CRM) and supply chain management (SCM), internal IT usage such as internet and email as well as enterprise resource planning (ERP) that integrates all business functions into a single computer system.

1.3.2 SMEs

The importance of Small and Medium Sized Enterprises (SMEs) cannot be overlooked in the economic development of any country since SMEs play a critical role in every country's economic development. The concept of SMEs is relative and dynamic. There is no universal definition of SMEs that is widely accepted as the definition is dynamic and depends largely on a country's level of development (Aruwa and Gugong. 2007: Mutula and Brakel, 2007). The definition of SMEs differs from one country to another but is often based on employment, assets or a combination of both. Jutla et al. (2002) state that SMEs have been defined against various criteria such as the value of assets employed and the use of energy. Rahman (2001) ascertains that SMEs are defined by a number of factors and criteria, such as location, size, age, structure, organization, number of employees, sales volume, worth of assets, ownership, through innovation and technology. Storey (1994) added that the

number of employees is considered to be an appropriate measure of SMEs because of the differences in organizational structure that occur with size. Aruwa and Gugong (2007) affirm that each country tends to derive its own definition based on the role SMEs are expected to play in that particular economy.

Varying definitions amongst countries may arise from differences in organizations at different levels of economic development. For example, the Department of Business, Enterprise and Regulatory Reform (BERR) (2009) uses the following definitions: Micro firm: 0-9 employees; Small firm: 0-49 employees; Medium firm: 50-249 employees: and Large firm: over 250 employees. The European Union Commission (2003) also defines SMEs, using the same number of employees as used by BERR, but includes annual turnover. Micro enterprises are those having fewer than 10 employees and having an annual turnover not exceeding €2 million or an annual balance sheet total not exceeding €2 million. Small enterprises employ fewer than 50 people and have either an annual turnover not exceeding €10 million or an annual balance sheet total not exceeding €10 million. Medium Sized Enterprises are those with fewer than 250 employees and have either an annual turnover not exceeding €43 million.

1.4 Research Scope

The scope of this research focuses on some selected SMEs in Kumasi. The research determines ghe impact of ICT on the selected SMEs' organizational performance and the research also investigates factors that motivate and inhibit the adoption of ICT in some of —the-SMEs selected and further determines the extent to which some of these SMEs that have successfully adopted ICT effectively utilize sophisticated ICT applications/systems.

This research concentrates on SMEs since they play a vital role in every economy and significantly contribute to the country's industrial development.

1.5 Motivation of Study

Presently, the act of using ICT to raise productivity is one of the problems being confronted by SMEs due to the lack of knowledge on the value of ICT in their businesses.

They still use the traditional tools to stay competitive. In view of this, SMEs can identify the current economic possibilities and values in adopting ICT. For that reason, the focus of this research is to review how ICT can enhance the operations and performance of small and medium scale enterprises (SMEs) in Kumasi.

1.6 Research Objectives

In general, the objective of this study is to examine the impact of ICT on SMEs' operations and performance.

To reach at the above aim, the following objectives were proposed:

- To determine the impact of ICT on SMEs' organizational performance.

- To identify motivators for and inhibitors to ICT adoption in the selected SMEs. ■ To propose an integrated ICT applications that will enable SMEs enhance and be competitive in their businesses.

1.7 Research Questions

The development of a research question is a process of looking at an issue that might be a problem and formulating a question about it. Sweet and Grace-Martin (2003) stated that the research question emphasizes a lack or absence of understanding about an issue. It refers to the gap that the researcher intends to address. To achieve the research aim stated in Section

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1.6, the following research questions have been formulated which are comprised of the main research question as well as sub-research question. The main research question for this study is:

How does the use of ICT impact on the organizational performance of the selected SMEs?

1.7.1 Sub-Research Questions

1. What are the motivators for and inhibitors to ICT adoption in SMEs?

2. What is the current level of ICT utilization amongst the selected SMEs?

3. To what extent does SMEs utilize sophisticated ICT systems?

1.8 Organization of the thesis

The study is organized into six chapters as follows:

Chapter one deals with the introduction which highlights among others the research fields and subject of study, Research Scope, Motivation of study, Research objectives, and Research que'tions, and the Organization of thesis. Chapter two focuses on the literature review relating to the study. Chapter three discusses the research methodology and evaluates the selection of the research method adopted which includes the research design. research instruments, mode of data collection, and method of data analysis. limitations and problems that is encountered4n the study. Chapter four will be Research implementation. Chapter five will be for the Analysis and Findings. And chapter six will focus on the conclusions drawn from the findings of the study as well as recommendations.

1.9 Summary

Chapter one covers background of the study and has presented the motivation of stud\, research objectives, and the research aim which is aligned with the research topic. The chapter has also put forward the research questions and has reviewed literature that provides a background to the research. Definitions of key terms for the research were presented in this chapter. Thesis structure was outlined which provided an overview of the entire research and a description of the content contained in the other chapters. It is hoped that the outcome of this research will assist in increasing the level of ICT deployment by

SME in Kumasi.
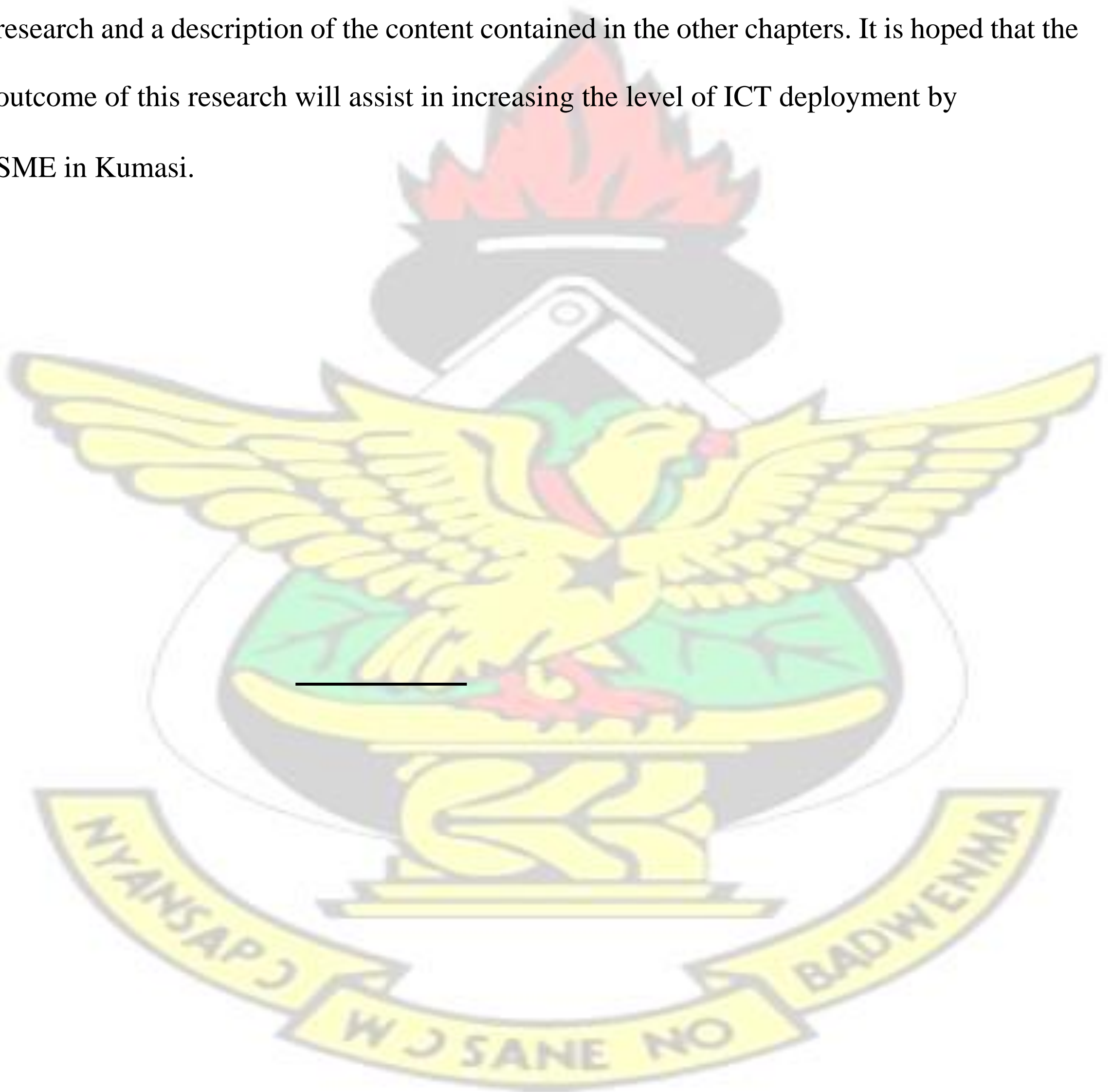
CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents a literature review of existing works, views, knowledge and information relevant to the scope of the study but more importantly to the objectives and research questions set for the study. This literature review would help put the research methodology into a better conceptual framework.

2.1 General overview of SMEs

There is growing recognition of the importance of Small and Medium Enterprises (SMEs) in economic development, as their performance is of interest to all countries (Olutunla and Obamuyi, 2008). SMEs contribute greatly to the social and economic development of many economies (Abor and Quartey, 2010), as they contribute significantly in employment generation, income generation and also assist in speeding up developments in urban and rural areas. In many of the newly industrialized nations, more than 98% of all industrial enterprises belong to the SMEs sector and account for the bulk of the labour force (Sanusi. 2003). In Africa, SMEs play a crucial role in stimulating growth due to their economic influence (Abor and Quartey, 2010). The relative importance of SMEs in developed as well as developing countries has led and will continue to lead to a reconsideration of the role of thexe_enterprisesD-tbe-eeonomy of nations (Ayanda and Laraba, 2011). Likewise, SMEs are currently utilizing ICT around the globe, not merely for cutting costs and improving efficiency, but also for providing better customer service. ICT is regarded as the backbone of all new age technologies, without which other technologies may fail to be adopted

(Mugodi and Flemming, 2003). Moreover, Ashrafi and Mutarza (2008) confirm that governments around the world are adopting ICT, to enable them to provide better services to their citizens.

SMEs in Ghana can be categorized into urban and rural enterprises. The former can be subdivided into 'organized' and 'unorganized' enterprises. Organized ones tend to have employees with a registered office and are mostly solely owned by an individual whereas the unorganized ones are mainly made up of artisans who work in open spaces, temporary wooden structures or at home and employ little or in some case no salaried workers. They rely mostly on family members or apprentices. Rural enterprises are largely made up ot family groups, individual artisans, women engaged in food production from local crops. The major activities within this sector include: soap and detergents, fabrics, clothing and tailoring, textile and leather, village blacksmiths, timber and mining, bricks and cement, beverages, food processing, wood furniture, electronic assembly, agro processing, chemical based products and mechanics (Liedholm & Mead, 1987; Osei et al., 1993) as cited by (Kayanula & Quartey, 2000).

SMEs in Ghana are heterogeneous group- ranging from small workshops making furniture, metal parts and clothing to medium-sized manufactures of machinery as well as service providers such as restaurants, consulting and computer software firms. Some are traditional 'livelihood' enterprises that are satisfied to remain small; others are growth-oriented and innovative.

2.2 Characteristics of SMEs

Hudson et al. (2001) argue that SMEs have very distinct characteristics. On the positive side they are able to adapt quickly in the way they work. In SMEs, decisions can be acted upon quickly and they have a close proximity to their market and significant customer loyalty (Costello and Reece, 2005). Cragg and King (1993) further state that SMEs have specific attributes that distinguish them from large enterprises in the way they develop their corporate strategies and their technology policies. Large companies typically have well-defined processes for developing and implementing strategies through a corporate planning process, while SMEs often use less structured approaches, strategies and policies that may not be formulated but may emerge from a set of actions and experiments (Mason, 1997). According to Hudson et al. (2001), SMEs may be differentiated from larger companies by a number of key characteristics such as personalized management with little devolution of authority, severe resource limitations in terms of management and manpower, as well as finance, reliance on a small number of customers, limited markets operations, flat and flexible structures, high innovatory potential, reactive, fire-fighting mentality and informal dynamic strategies.

A major characteristic attributed to SMEs is flexibility (Levy and Powell, 2005). Storey and Cressy (1995), state that SMEs are more flexible than large firms hence they bring about innovation—in terÞ.gLtheir—goods and service. SMEs usually operate on a flat management structure and are associated with small management teams and in most cases

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SME managers work closely together on a day-to-day basis (Onugu, 2005). According to

Levy and Powell (2005), SMEs' survival is often ascribed to their adaptability and speed of response to environmental change.

2.3 ICT Adoption in SMEs

According to Evans and Wurster (1997), ICT increases richness and reach. This refers to the way companies communicate, collaborate and conduct transactions with their customers, suppliers and distributors and the ability for local SMEs to participate in the digital economy (Golding et al., 2008). Moreover, Ashrafi and Murtaza (2010) identified that ICT helps SMEs to enter new markets, supply new products and services, increase their added value, change business processes, increase performance and productivity of the organization.

According to Frempong (2007), the impact of ICT to business development have been pervasive, hence it is becoming increasingly difficult for companies to compete effectively in the world market without adequate ICT infrastructures and this applies to SMEs as well. In addition, the impact of ICT enables SMEs to partake in the knowledge economy and offers enormous opportunities to narrow the social and economic inequalities that will assist SMEs in achieving broader development goals (United Nations, 2007).

The use of ICTs can provide several significant benefits to SMEs, as identified by the United Nations (2007) wþgb—iæk£increasing productivity in the production process, enhancing and increasing the efficiency of internal business operations, improving inventory management systems, decreasing wastage in production processes, improving

communication between different departments within a firm, improving accounting and budgeting practices etc.

Furthermore, Love et al. (2004) ascertain that the use of ICT provides many benefits to SMEs at different levels (operational, tactical and strategic). Consequently, for SMEs to grow and become successful, they must have the ability to compete and dynamically respond to rapidly changing markets. This means that SMEs would need to adopt ICT.

2.4 ICT and SMEs Performance

Gaol P.H.L (2011) found out in his research that despite the internet illiteracy and low financial capitals, most of the SMEs in the kampung have integrated ICT into their business. As a result, most of them are able to increase their business performance. Several SMEs even succeed to achieve exceptional improvement. However, some differences are also recognized in which the respondents with more extensive ICT intervention have less performance improvement than other respondents with less extensive ICT. It indicates that the performance of the SMEs doesn't automatically improve after having ICT interventions.

Further enquiries showed that the performance improvement relates to the Absorptive Capacity of_the SMEs. TLg_SMEs-that manage to significantly improve their performance are able to combine the new innovation with their old knowledge. It enables them to put ICT into the context of their existing work system and properly merge the new innovation into their work mechanism. In his conclusion, he stated that SMEs can properly utilize ICT

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to improve their business performance by having adequate and proportional dimensions 01 .'Absorptive Capacity.

In view of this, John M. Mutua and Wilson S. K. Wasike (2009) reviewed a literature on ICT adoption and its impacts on firms in both developing and developed countries, the determinants of ICT adoption and their impact on firm's performance. Their findings show that the main determinants of adoption of ICT are the size of the firm as indicated by firm employment, formal registration, and the level of education/training the manager has. Registration or formalization of firms is also correlated with higher probability of adopting ICT. As predicted, the study finds that ICT tends to increase both capital and labor in raising productivity of firms.

Shyamal K. Chowdhury and Susanne Wolf (2003), in their research on the Use of ICTs and the Economic Performance of SMEs in East Africa, they assess the use of information and communication technologies (ICT) and their impact on the economic performance of small- and medium-scale enterprises (SMEs) of three East African countries: Kenya, Tanzania and Uganda. Their Findings suggest that the diffusion of ICT among East African SMEs is both industry and country specific. The empirical findings suggest that investment in ICT has a negative impact on labor productivity and a positive impact on general market expansion.

SMEs use ICT both as input in the production process, and in the transaction process éelling their products or acquiring inputs. ICTs can enhance enterprise performance through indirect cost savings such as labor costs and increased labor productivity, and direct cost reduction of firm's input such as information costs. On top of these short-run impacts of ICT adoption in the production process, the use of ICTs in the transaction process can foster input and output market

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expansion. However, in the long run. ICA may have an even bigger impact as it can completely restructure the production process and transaction methods, increase flexibility and improve outputs.

Covin and Slevin (1991) posit that SME performance is a fundamental feature for SME survival and sustainability where performance factors have been found to spur business expansion, technological progress, and wealth creation in both start-up and existing firms hence being a key aspect of management of the organization. In the business strategy literature there are two major streams of thought on the determinants of firm performance. One is based on factors that exist in the firm's external environment, and the other is based on internal organizational factors. However, most research has highlighted the necessity of concentrating on strengthening internal organizational factors to improve organizational performance, rather than concentrating on external factors, which are often beyond the organization's control. Performance can be determined in various ways. It might stand for financial performance, market performance, customer performance or overall performance.

2.5 General Constraints t»e-Growth of SMEs

Despite the potential roles of SMEs to a faster growth and job creation in developing countries, a number of bottlenecks affect their ability to realize their full potential. SME development is hampered by a number of factors, including finance. lack of managerial skills, equipment and technology, regulatory issues, and access to international markets (Gockel and Akoena, 2002).

The lack of managerial know-how places significant constraints on SMEs development. Even though SMEs tend to attract motivated managers, they can hardly compete with larger

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firms. The scarcity of management talent, prevalent in most countries in the region, has a magnified impact on SMEs.

The lack of support services or their relatively higher unit cost can hamper SMEs• eitorts to improve their management, because consulting firms are often not equipped VS1th appropriate cost-effective management solutions for SMEs.

Despite the numerous institutions providing training and advisory services, there is still a skill's gap in the SME sector as a whole (Kayanula and Quartey, 2000). This is because entrepreneurs cannot afford the high cost of training and advisory services while others do not see the need to upgrade their skills due to self-satisfaction.

In most cases, SMEs utilize foreign technology with a scarce percentage of shared ownership or leasing. They usually acquire foreign licenses, because local patents are

difficult to obtain.

Regulatory constraints also pose serious challenges to SME development and although wide ranging structural reforms have led to some improvements.

The high start-up costs for firms including licensing and registration requirements can impose excessive and unnecessary burdens on SMEs. The high cost of settling legal claims and excessive delays in court proceedings adversely affect SME operations.

In the case of Ghana, the cumbersome procedure for registering and commencing business are key issues often cited. The World Bank Doing Business Report (2006) indicated that i l takes 127 days to deal with licensing issues and there are 16 procedures involved in licensing a business in Ghana.

The absence of antitrust legislation favors larger firms, while the lack of protection for property rights limits SMEs' access to foreign technologies (Kayanula and Quartey, 2000).

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The limited international marketing experience, poor quality control and product standardization, and little access to international partners, continue to impede SMEs expansion into international markets (Aryeetey et al., 1994).

Cook and Nixson (2000) observe that notwithstanding the recognition of the role of SMFs in the development process in many developing countries, SMEs development is alvvavs constrained by the limited availability of financial resources to meet a variety of operational and investment needs.

2.6 Constraints to ICT Adoption among SMEs

The acceptance and implementation of ICT in businesses have not had the same outcome for all businesses. Not all small to medium business owners or micro-businesses have taken up ICT nor do they intend on doing so in the near future (Ramsey, Ibbotson, Bell, &

Gray, 2003D_SMEs face >exeus-barriers and obstacles that complicate the adoption of ICT. Successful ICT adoption and implementation rely on both socio-economic and technological issues; these issues can be based on internal and external factors (Arendt.

2008; Modimogale, 2008; MacGregor, Vrazalic, Carlsson, Bunker, & Magnusson, 2002). Walchzuch et al (2000) and Chitura et al (2008) categorized the barriers to ICT use into four broad categories. These include, Firm awareness and access to infrastructure, confidence in the security framework, ICT use among business partners and adaptation of business processes. The "Manager-Owner factors" category is a recent addition to the list coming about as organizational and manager-owner factors are recognized as influencing ICT usage in small businesses (Wagner, Fillis, & Johansson, 2003).

2.7 Why Few SMEs Adopt ICT

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Given the benefits that ICT can bring to SMEs, SMEs in most developing countries in the Asia-Pacific region still have been slow to adopt it. For example, 90 per cent of Thai SMEs still use basic communication technology such as fixed phone line and fax, and only 1 per cent use CRM software.

Meanwhile, their counterparts in developed countries are using advanced ICTs. One cause of limited adoption is the lack of dynamism between ICT firms and SMEs outside ot- the ICT sector. ICT firms have not provided goods and services tailored to SMEs in the past because demand from SMEs has been low.

However, their demand is low in part because ICT products available on the market are too complex and expensive. The result is a vicious cycle of limited supply and limited demand that ultimately excludes §NEs-from-the benefits of ICT. Other factors also contribute to the limited supply and demand of ICT for SMEs:

2.7.1 Supply Side

Poor communications infrastructure results in limited access and higher costs.

Many developing countries still have poor communications infrastructure. Out-dated equipment and state-owned monopolies often result in expensive charges and limited coverage, especially in rural areas. This discourages SMEs from adopting even the basic ICT of fixed lines or mobile phones.

Most advanced ICT products are designed for larger firms and not SMEs.

ICT firms target large enterprises because they have larger budget and are willing to pay for more complex ICT services. Their products are often too expensive and too complex for SME users. However, competition in this market is making firms — both large and small — turn their attention towards the untapped SME market.

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2.7.2 Demand Side

1. Limited ICT literacy of SME owners hinder their ability to choose the appropriate technology and understand the concrete benefits it can bring to their business. Many SME owners are unfamiliar with operating a computer, and they have the stereotype that ICT is only for larger companies.

   Even if they have the will and financial resources to integrate ICT into their core business, -SME owners are often at a loss when needing to choose the most appropriate and cost-efficient product.

2. Limited ICT literacy of employees in SMEs hinders ICT adoption. Even if SME owners have a strategic understanding of why they should adopt ICT, their staff is often untrained. Training costs both time and money — resources that SMEs usualÁ lack.

3. Adopting ICT is an adaptive challenge, not a technical challenge. Adopting ICT is a difficult task for companies of all sizes, whether they are in developed or developing countries. In fact, a lot of management literature focuses on the organizational changes that firms must go through in order to effectively adopt ICT because they change the way firms do business.

While the changes may be beneficial in the long run, they often hurt one department and strengthen another. Thus, SME owners are often reluctant to bring their firm through a learning curve that may be difficult and costly. In the end, the definite costs of identifying the right goods /or service, finding staff to manage it, taking the company up the learning curve, and obtaining financial resources are not perceived to justify benefits.

2.8 Barriers to ICT Implementation in SMEs

Large organizations have enough resources to adopt ICT while on the other hand SMEs have limited financial and human resources to adopt ICT. (Duan et al 2002) identified lack of ICT skills and knowledge in SMEs as one of the major challenges faced by all European countries, particularly in the UK, Poland and Portugal in their study. (Houghton and Winklhofer 2004) have reported a slow response of SMEs relating to adoption of ICT. (Shiels et a 2003) found that characteristics of the firm and industry sector are contributory factors to the adoption and exploitation of ICTs by SMEs. (Kapurubandara e: al 2006) have categorized internal and external barriers that impede adoption of ICT by SMEs in a developing country. The internal barriers include owner manager characteristics, firm characteristics, cost and return on investment, and external barriers include: infrastructure, social, cultural, political, legal and regulatory.

Unfortunately, there are a number of factors that hinder SMEs from adopting ICT in developing countries. According to Golding et al. (2008), there is a digital divide h shows that ICT adoptions vary between developed and developing countries with developing countries adopting ICT at a slower rate. Ihua (2009) states that there exists a wide technological gap between developed and developing countries, using the United Kingdom and Nigeria as example. Developing countries are far less advanced than developed countries in the areas of technological environment and infrastructure, probably because the technology is produced in developed nations, while the developing nations import it (Ihua, 2009). Beekhuyzen, von Hellens and Siedle (2005) state that in developing countries, access to ICT continues to be a major problem. Countries are digitally divided due to lack of access and availability of ICT.

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The following table presents a summary of key factors identified affecting the impact of

ICT on performance and operations of SMEs in general.

Table 2.1 Factors affecting the adoption of ICT in SMEs

Factors	Related Literature	Nature of Research Studies
Cultural barrier	Adenikinju (2005)	Adenikinju (2005) — Survey of 300 manufacturing enterprises
Lack of infrastructural facilities	Adenikinju (2005); Apulu et al. (2011); Achimugu et al (2009); Chibundu (2006); lhua (2009); Lai (2007); Mambula (2004)	Adenikinju (2005) — Survey of 300 manufacturing enterprises Apulu et al. (2011) — Case studies of 25 SMEs Achimugu et al (2009) — Literature review Chibundu (2006) _ Literature review lhua (2009) - Survev of 45 SMI in the United Kingdom and Nigeria respectively and Semistructured interviews of 4 firms (2 in the UK and 2 in Nigeria) Lai (2007) - survey of 67 SMEs Mambula (2004) — Case studies
Corruption	Obayelu (2007); Ayobolu (2006); Dike (2005); Ochulor and Bassey (2010); Ojukwu (2006)	Obayelu (2007) Literature review Ayobolu (2006) Literature review Dike (2005) — Literature review Ochulor and Bassey (2010) Literature review Ojukwu (2006) Structured interviews
Low level of education	Olatokun (2006); Apulu et al. (201 1)	Olatokun (2006) Literature review Apulu et al. (201 1) - Case studies of 25 SMEs

Table 2.1 Continuation

Lack of skills and training; technological background	Mambula (2004); Apulu and Latham (2009c)	Mambula (2004) —Case studies 2009c) Apulu and Latham Literature review Cost of implementation Folorunsho et al. (2006).
Lack of capital	Abor and Quartey (2010)	Abor and Quartey (2010) Literature review

Electricity constraint	Agyeman (2007); AkpanObong (2007); Olatokun (2006)	Agyeman (2007) Literature review Akpan-Obong (2007) Literature — review Olatokun (2006) Literature review
Lack of support from the government; Lack of regulatory policies; institutional framework	Apulu and lge (2011); Apulu et al. (2011); Baro (2011); Adeyeye and lweha (2005)	Apulu and lge (2011) — Survey of 250 questionnaires were distributed and 180 copies were returned. Apulu et al. (2011) - Case studies of 25 SMEs Baro (2011) — Literature review Adeyeye and lweha (2005) Literature review

Insights from the review of the literature suggest that SMEs play a significant role in the economy. The literature review also confirms that a large percentage of organizations in developed and developing countries are SMEs or belong to the SME sector. Likewise, it has been noted that ICT is a driver of change in many organizations. The benefits of ICT cut across all sectors and its role in SMEs is crucial. Thus the impact of ICT should be considered by SMEs since ICT can help in the advancement of their businesses. Moreover, SMEs are known to be the driving force behind every country's economic development. ICT is regarded as a competitive tool for every organization in this present era of globalization. But, the literature review indicates that SMEs are quite slow in participating in ICT advancements due to some Factors such as the lack of electricity, lack of resources amongst others as possible factors affecting the impact of ICT applications by SMEs which is the focus of this research.

2.9 Summary

This chapter has presented a review of the literature in relation to the impact of ICT on SMEs thereby defining the scope of the research. ICT is said to be an integral part of the development process to the operations in SMEs. This chapter has also described the characteristics of SMEs, which differentiate them from large organizations. The impact of ICT is said to be vital for SMEs' survival since it provides them with the opportunity to compete with larger organizations and operate on an international scale. This chapter has also identified some benefits of ICT adoption in SMEs which confirms that the effective use of ICT can assist SMEs to experience some strategic advantages. ICT is said to be influenced by annmber of characteristics such as the role of the owner/manager, the level

of government commitment and so on.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter discusses the procedure by which the research was conducted with a Choice of Method. It addresses the research methods adopted for capturing the data required to achieve the research aim. The qualitative research method was used in this study to identify strategies that would assist in increasing the adoption and effective utilization of Information and Communication Technology (ICT) in Small and Medium Sized Enterprises (SMEs) in Kumasi Ghana. Based on the discussions in the previous chapters, the interpretivist philosophical paradigm within a qualitative methodology was selected as the most appropriate for this study. Klein and Myers (1999) noted that interpretive research can help Information Systems (IS) researchers to understand human thought and action in social and organizational contexts. Furthermore, the research is exploratory and descriptive in nature and will assist in understanding emerging issues that are related to the subject.

3.1 Research Methods

Research methodologies are pivotal consideration in most research works. Quantitative and Qualitative research are the main ones and in the most perspectives are seen as the classical framework for classifying methodologies and methods (Wild, 2006). The third is mixed research, an integration of qualitative and quantitative researches. These research types conform to accepted standard tools of research and are separate fields with different viewpoint to the way research should be carried out (Osua, 2001: Holiday, 2002 cited in Furaha, 2009). No single method of research is better than the other, each is a field of enquiry on their own right (Denzin and Lincoln, 2000: Silverman, 2005).

Qualitative research seeks to build a holistic, largely narrative, description to inform the researcher's understanding of a social or cultural phenomenon. Virtually all qualitative research takes place in natural settings employing a combination of observations, interviews, and document reviews.

Quantitative research on the other hand involves the collection and analysis of numerical data. Scientific methods are adopted and focus placed on gathering measurable evidence and coming to general conclusions. This is based on the idea that something is meaningful only if it can be observed and counted. Its key characteristics are numerical data that permits a range of statistical analysis.

There has been an important and growing interest in the combination of qualitative and quantitative research. Mixed method research is the result. It is a research type where qualitative and quantitative research techniques, methods and approaches are mixed or combined in a single study. It bridges the gap between qualitative and quantitative research (Onwuegbuzie and Leech, 2004 cited in Johnson and Onwuegbuzie, 2004).

The choice of a research type is majorly directed by its appropriateness to the research problem at handa——

———————

We opt for a qualitative method approach in this research. Reasons being the types of data captured during the time studies.

3.2 Choice of a Method

Methods that typically sit well with collecting qualitative data on a case include structured and unstructured interviews, observation, questionnaire and document analysis. Observation offered us a favorable course and was purposely chosen to know the impact of ICT on the operations of SMEs. Zikmund and Babin, (2006) establishes that "Observation is a systematic process of recording behavioral patterns of people, objects and occurrences as they happen". The kind of observation employed in this research is direct, structured and non-participatory. Direct and non-participatory entails the passive participation of the researcher, making no attempt to control or manipulate a situation but instead merely recording occurrences of interest. The observer strategically positions himself or herself in such a way that vividly observation can occur without needless obstruction. An observation form helped keep the observations consistent and ensured that record of all relevant information was taken.

Generally, interview and questionnaire are both more suited to cases in which the prime objective is to seek the opinion of the administrator and sales personnel on issues such as how they feel having their software separate or their views on it being integrated. In this respect a questionnaire was used to get the needed data from them on issues related to the impact of ICT in small firms.

3.3 Justification for Choice of Methods

The research uses qualitative research methods for implementation and analysis of data and the rational for choice of method are as follows: ✓ Nature of research — Interpretive Case Study

✓ Types of data — Textual / Narrative data.

3.4 Method of Data Collection

3.4.1 Data Types

The first step of structuring collected data for analysis is how that data would be captured in the first place (Kantner et al., 2005). In this study, two types of data were collected and used. These are primary data and secondary data. Primary data was obtained through the use of self-administered questionnaires to respondents of the population. On the other hand, secondary data was obtained through the company's records, other research works and both published and unpublished articles.

In this research, data collection was carried out through a wide variety of techniques including documentation, observations, semi-structured interviews and questionnaires, in order to identify and allow a detailed understanding of the research topic. Denscombe (2007) identifies that questionnaires can be used to provide information on a particular point of interest in a case study research. Mintzberg (1979) describes the use of both types Of data (quantitative and qualitative) as synergistic because quantitative data are used to esúblish the relationships and qualitative data are used to "uncover relationships" achieved from quantitative data.

3.4.2 Other methods of Data Collection

Two other forms of data collection methods were used for this research, i.e. other than questionnaires and interviews. They include the use of documents and observation, to support and confirm the interview data. According to Denscombe (2007), a strength of the case study approach is that it not only allows the researcher to use a variety of sources, a variety of types of data and a variety of research methods as part of the investigation, but also observation of events within the case study setting can be combined with the collection of documents from official meetings and informal interviews with the people involved.

3.4.3 Documents

The researcher made use of the documents of some of the companies that were interviewed. Documentation was used to form the basis for understanding the background of the case study companies, the roles of the senior personnel and the workflows within the company. Furthermore, information on some of the documents was used to confirm, and as an add-on to, the evidence gathered from other sources.

Documents read during the researcher's stay in the companies typically included memoranda, agendas, minutes of meetings, progress reports, administrative documents, newspaper articleS and so _____ on. This assisted in providing further evidence to other data collected via interviews and surveys, although Yin (1994) states that researchers must not regard documents and records as a pure account of facts that have happened. However,

Myer (2001) states that the use of documents is important because they can be used as

inputs to the interview guide and used to identify statements made by key people in an organization.

3.4.4 Observation

Observation is a methodology consisting of watching what people do, listening to what they say and sometimes asking them to clarify certain issues. Stake (1995) and Gillham (2000) identify the benefits of engaging in observation which include looking at what people actually do, rather than what they say they are doing, or why and how they should be doing it. Data were captured by carefully observing the activities in the various companies and keeping field notes bearing in mind the aim of the research. The field notes were then written up and further compared with the information provided by the participants during the interviews.

This method of data collection gave the researcher some added advantage in terms of observing the manner in which the owners/managers especially, deal with clients, suppliers and employees, while they tried to complete the questionnaires.

3.5 The Research Design

There are a number of research designs that are considered to generate reliable data and to meet research objectives irrespective of whether the research is qualitative or quantitative in nature. These are experimental design, longitudinal design, cross-sectional design and case study designrRobson (1993) divides these designs into fixed and flexible research

designs. Others have referred to this distinction as qualitative research designs and quantitative research designs respectively. Depending on research questions and orientation of the researcher, a choice is made in setting out the research plan.

In an experimental design, the researcher actively tries to change the situation, circumstances, or experience of participants that may lead to a change in behavior or outcomes for the participants of the study. The participants are ideally randomly assigned to different conditions, and variables of interest are measured. The researcher tries to control the other variables in other to avoid interference to casualty. Therefore, experiments are often highly fixed even before the data collection starts. This is quite different in cross-sectional and longitudinal studies. While cross-sectional design is based on a single examination of a section of population at one point of time, longitudinal design is concerned with observations being conducted over long periods on the same population or its representative sample. Experimental design, longitudinal design and cross-sectional design are not considered in this research.

Case study design is most fitting to this research and was applied appropriately. Case study as an empirically inquiry is chosen because it allows focus to be placed on the impact of ICT on SMEs. It was in these settings that data was gathered and utilized. It would have been impossible for the researcher to have a true picture of the impact if ICT on the firms that adopted it.

Case study research strategy or design is ideal when a holistic in-depth investigation is needed (Tellis, 1997), and   is intended to reveal facts from participants by using multiple sources of data such as face-to-face interviews, observation and written documents (Yin, 2009Ÿ. The qualitative case study methodology provides tools for researchers to study complex phenomena within their contexts (Baxter and Jack, 2008). Case studies can be used in all types of research and primary data can be collected from cross-border and cross-cultural settings.

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3.6 Sampling Techniques

The sampling of the firms was carried out using simple random sampling where only the SME owners or managers and workers were chosen. The SME owners or managers and workers were sampled using purposive sampling since these were key informants and possess the required information for the study.

The study was conducted among Ghanaians since the focus is on the impact of ICTs on the operations and performance of SMEs in Kumasi. However, the study focused on the performance and operations of supermarkets in Kumasi.

3.7 Study Sample

The sample size of the study was 3 due to the limited time for the study, which consist the managers, SME owners, and the workers who were chosen at random.

3.8 Response Rate

During data collection, out of the 50 questionnaires which were sent out to the field, 45 useable questionnaires were returned giving a response rate of 95%.

A total number often customers were selected from two shops, one ofthem has no access to ICTfacilities and one has a complete access to ICT facilities. The times used to serve these customers were all measured with each of their items, 5 items, 10 items, 15 items and 20 items. The result obtained is illustrated in table 3.1.

Number of items	Time used to serve a customer
5	3 minutes
10	8 minutes
15	10 minutes
20	1 1 minutes

Table 3.1 Time used in service and number of items without the use of ICT.

Number of items	Time used to serve a customer
5	1 minute
10	4 minutes
15	5 minutes
20	6 minutes

Table 3.2 Time used in service and number of items with the use of ICT.

A stock taking was also carried out in two shops, one with the use of Bar code scanners and the other without Bar code scanner. A total number of 100 items were selected for the exercise. The time used to take stock in both cases (with and without) the use of bar code readers were all measured and results obtained were displayed in table 3.3.

Number of items	Time used to take stock
10	15 minutes
20	20 minutes
30	27 minutes
40	32 minutes
50	40 minutes
60	45 minutes
70	52 minutes
80	55 minutes
90	58 minutes
100	1 hour

Table 3.3 Manual stock taking and time used

Number of items	Time used to take stock
10	2 minutes
20	3 minutes
30	5 minutes
40	7 minutes
50	9 minutes
60	10 minutes
70	12 minutes

80	15 minutes
90	23 minutes
100	20 minutes

Table 3.4 Stock taking using barcode reader and time used

3.9 Data Analyses

Data gathered from the questionnaire and interview was analyzed using the code of practice of thematic analysis regularly described to as template analysis as posited by Crabtree and Miller (1999) cited in Apulu (2012). Thematic analysis provides a structure

that captures the richness of data and also helps organize the data collected into a structure (Crabtree and Miller, 1999). Thematic analysis is used in qualitative research and focuses on examining themes within data. According to Boyatzis (1998), thematic analysis can be used as a way of seeing, a way of making sense out of seemingly unrelated material, and a way of analyzing qualitative information. A theme represents a level of patterned response or meaning fromThe data hat is related tothe research questions at hand.

3.9.1. Application

For this research, data were grouped into themes in order to analyze the data obtained from the interviews and questionnaires more effectively. According to Ryan and Bernard (2003), identifying themes is an important step before analysis. According to Holliday (2002), the themes can come from what the researcher sees during data collection and the researcher's mind through the process of the research. In this research themes were identified by looking across the entire data set and identifying a repeated pattern of responses, as suggested by Braun and Clarke (2006). Some of the themes include:

1. ICT impacts - The aim was to establish the impacts that ICT have had on SMEs that will enable them adopt more advanced ICT in future.

2. Factors that affect SMEs-The aim were to gain understanding of those factors that prevents SMEs from future adoption of advanced ICT systems in their firms.

For analyses of the questionnaires and interviews data, this research employed the three main steps of data analysis as posited by Miles and Huberman (1994) which are: data reduction, data display and conclusion drawing.

3.11 Summary

This chapter has outlined the methodology and research design employed in this research. The research combined both quantitative and qualitative research methods with a greater dominance on the qualitative method. Also, the chapter has identified the various data sources that were used in the research. The choice of the research strategy was based on the nature of the data. A survey was used in the first phase of the research while in the second phase, interviews, observations and documents were used to complement the results of the survey. This chapter also discussed the approaches adopted in the research as well as the criteria employed for selecting the cases. Also, ethical concerns with regard to data collection were emphasized as well as the method of data analysis.

CHAPTER FOUR

RESEARCH IMPLEMENTATION

4.0 Introduction

The research aimed at creating an integrated ICT application that will enhance the operations and performance of SMEs. This chapter deals with how the various methods and tools used in the research are implemented. This section will discuss the implementation and test of the solution.

The proposed framework is called Aditon Shop Management System (ASMS) which consist of 2 interacting components. These components are the User interface (Client) and the Database server.

4.1 Functions/Roles of the interactive components

4.1.1 User

a. Manages product inventory such as create and edit product, product supplied and product stock.

b. Manages accounting such as balance sheet, profit and loss, trial balance and account chart.

c. In charge of the setup such as the company, taxes, and configuration.

d. General ledger such as expense, purchase and sale transaction.

e. Human resources such as employee, payroll, employee account and report.

f. Point of sale such as cash sale, credit sale and sale report.

g. Report such as sale report, payroll, product inventory and general ledger.

4.1.2. Database

a. Verifies user account, username and password of the user.

c. Checks selected products with associated cost.

d. Records date of transaction.

e. Authenticate user.

f. Records supplier.

g. Records employer.

h. Records employer payroll.

4.2 System design of the Model

This system is designed on Client/Server architecture that is developed on the windows and network groups. This system includes two main pafls which are user interface module and server module. The purpose of this module is to pass request made by the client to the server. The server stores all transactions in a database which are related to the transaction details and product details. A module of supermarket system is shown below in figure.

Figure 4.1: A model of transaction system

4.3 A Model of existing software

Windows XP O/S		Windows XP O/S
Request	USER INTERFACE MODULE	SEVER MODULE (Database)
esponse		
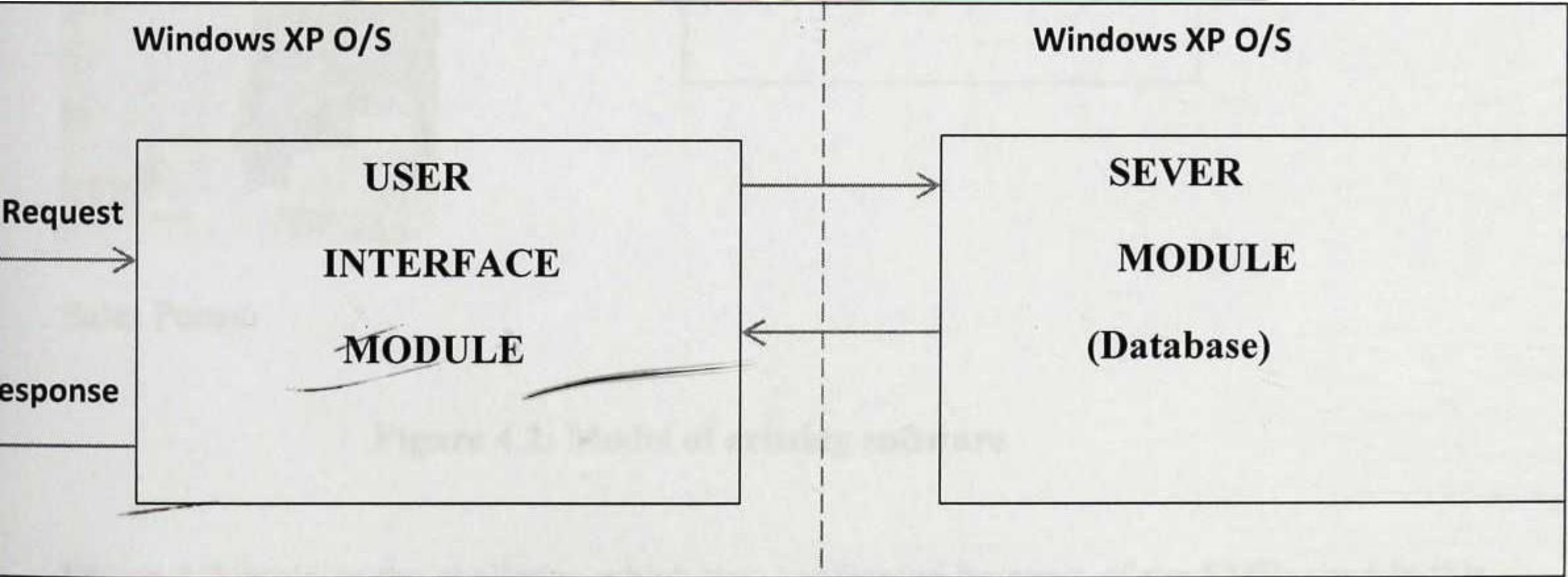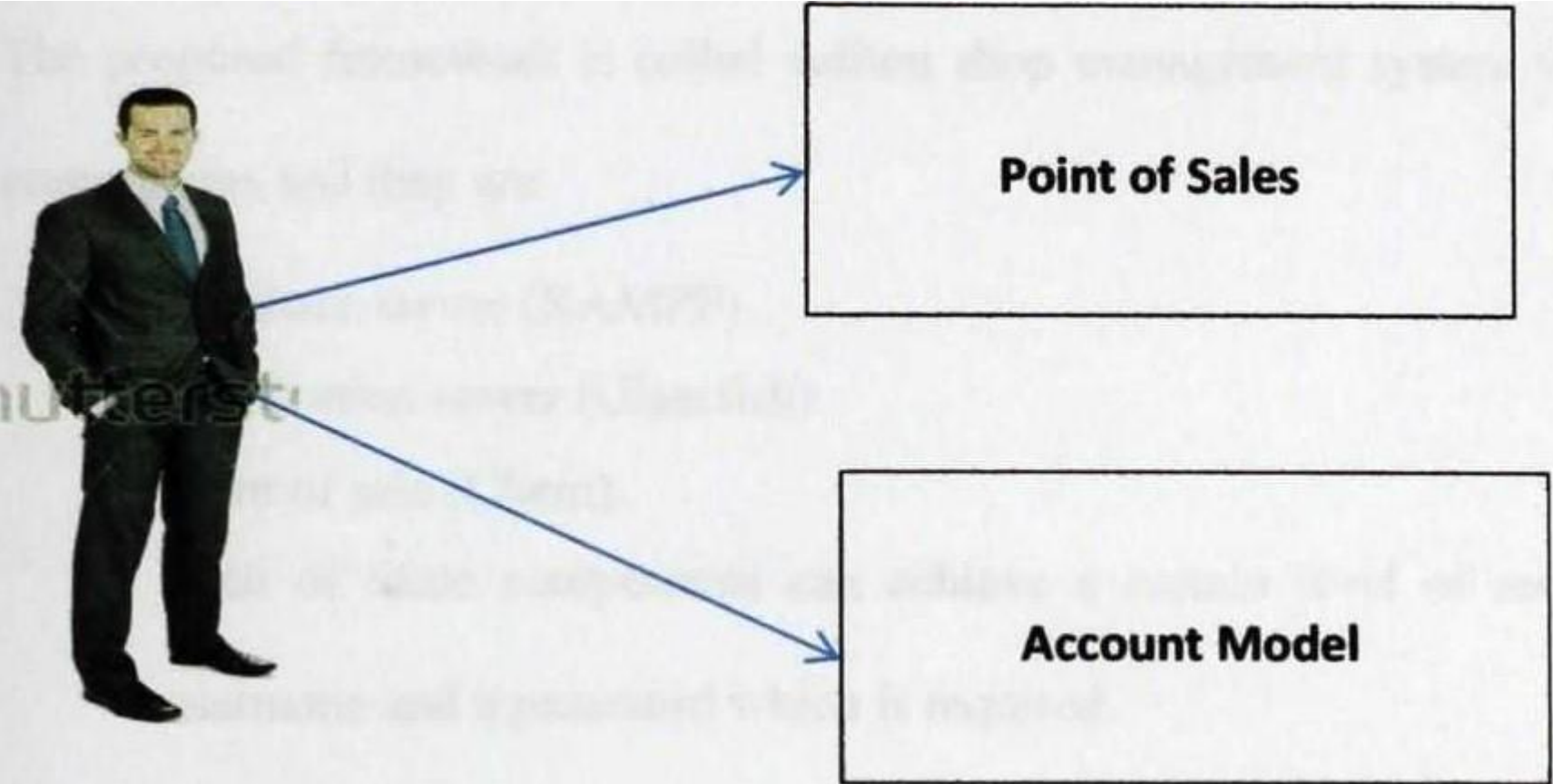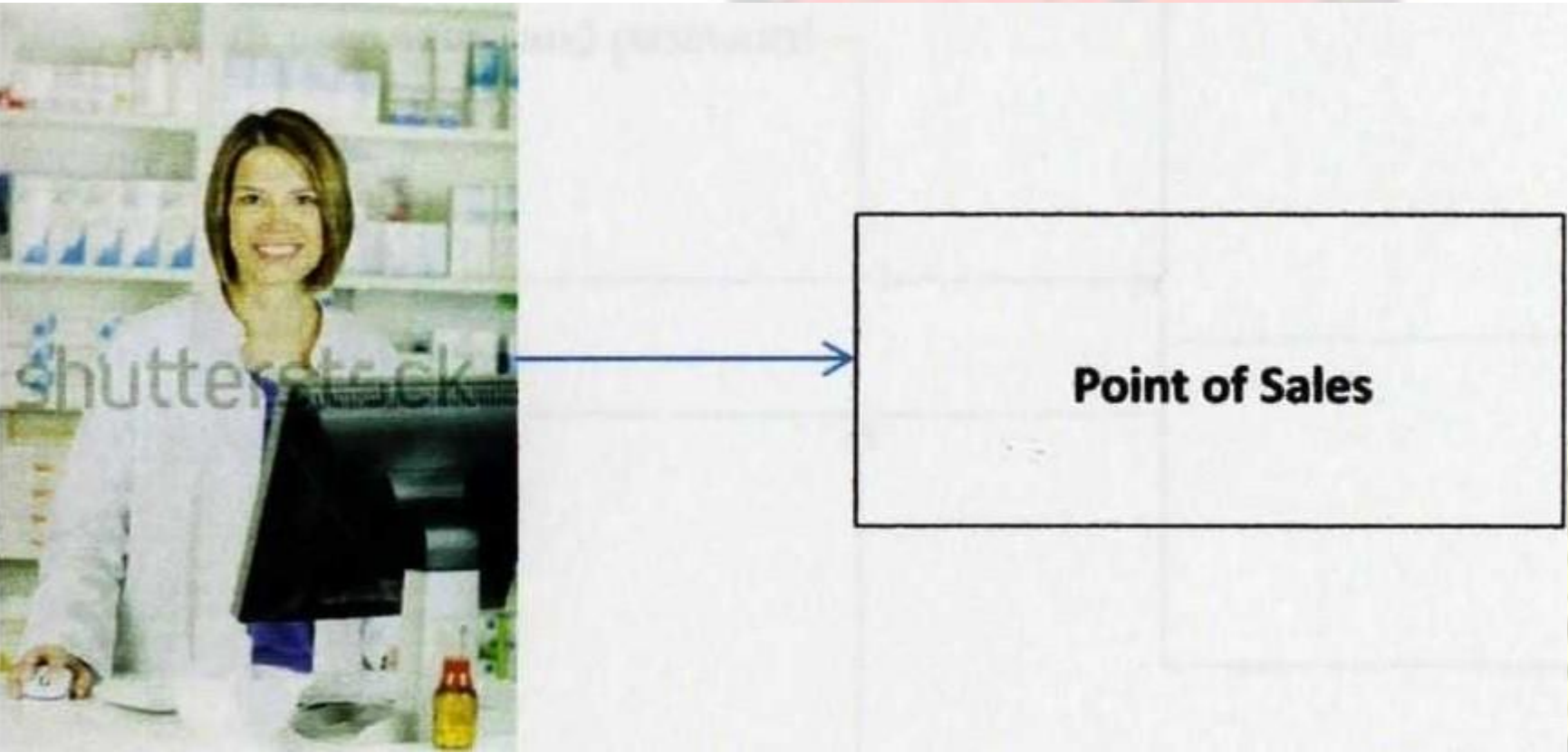
Administrator

Sales Person

Figure 4.2: Model of existing software

Figure 4.2 explains the challenge which was confronted by some of the SMEs used in this research. The parties involved in this model are the administrator and the sales person. Before this research was carried out, majority of the SMEs were using separate software in

their tRBiness. The Ecount model   different frcgn that of point of sales   the reg. So there was a ne«i for integated software to enable them enhance their tnzsinesses.

4.4 Propœed Framework

The proposed framework is called Aditon shop management sy•em which consists of 3 components and they are

- ➤ Database server (XAMPP) ➤
- Application server (Glassfish) ➤
- Point of sale (Client).

    Each of these components can achieve a certain level of security as there is a username and a password which is required.

4.5 Model for the proposed system
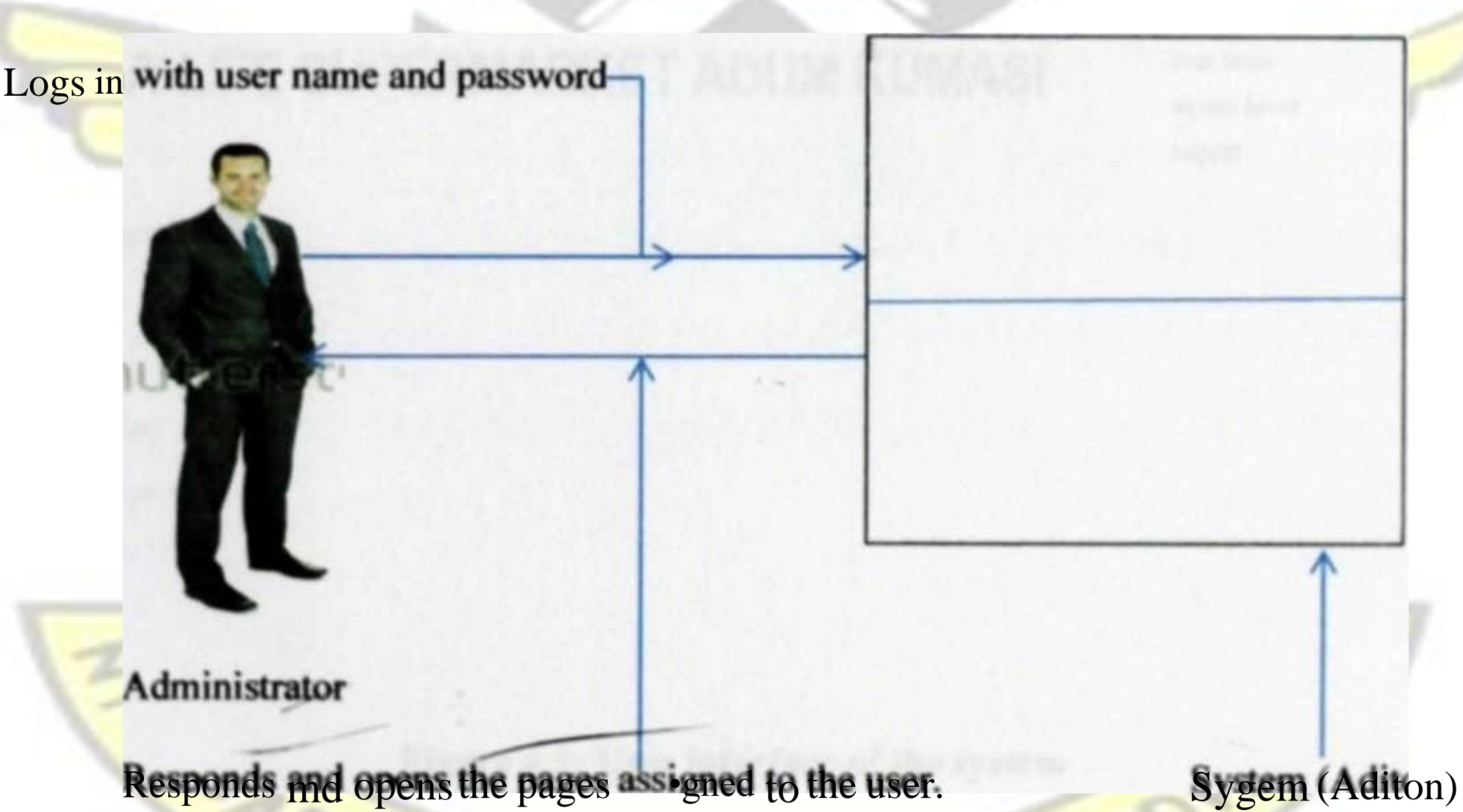
Figure 4.3: Model for the   system

ADITON SHOP MANAGEMENT SYSTEM

ADITON SHOP MANAGEMENT SYSTEM   Login

A-LIFE SUPERMARKET ADUM KUMASI

UserName
Password

Login   Cancel

Figure 4.4: Login Form

The login form shown in figure 4.4: allows users to access the platform. A user enters his or her username and password and then click on the "Enter" button to log in unto the system to work. On the other hand, the user can click on the "Cancel" button to cancel the login.

A-LIFE SUPERMARKET ADUM KUMASI UserCode

Access Level

Product Inventory

Acccxnting

set UP

General Leger

Human Resource

Pont ot Sale

Figur"ÃÛaanterface of the system

Figure 4 5 describes the interface of the system. When a user with his or her username and password logs in into the system successfully, it takes him or her to this interface where the user choses or clicks to the category that the user is been assigned to.

Product InventMy   Employee Category

EMPLOYEE INFORMATION

set Up

Figure 4.6: Employees Information Page

A new user will be given a user name and password by the employer to access the platform that is being assigned to him or her with is known as the Employees account. But before the user account is being given to the employee, his details would be recorded first. Figure

4.6 is an example of an employee's information which would be entered into the application and would be assigned to a particular category where he or she will belongs.

A-LIFE SUPERMARKET ADUM KUMASI

UserCode

Access Level

Product Inventory

Accounting

Set UP

EMPLOYEE
CATEGORY

Genera Legder

CategoryCode

Name
CategorySave D&te Reset

HumanResourc e

Enter Text

Category

Employee

Payrol

Category Name

Category Code

Employee Account

NO recordsfound.

Report

Pont of Sale

Figure 4.7: Employees Category

All the employees here belong to different categories assigned to them by their employer. A user is given a particular category and category codes to enable the user have access to the system.

It is on the page below that all the employees are being categorized and given an account to be able to access the system with their various codes and password.

A-LIFE SUPERMARKET ADUM KUMASI

User Code
Access Lev-et

Product Inventory   user Pages   SELECTED EMPLOYEE

	SUPPLIER
	PRODUCT
	PRODUCTSTOCK
	PRODUCTSUPPLIED
	COMPANY
	TAX
	CONFIGURATION
	EMPLOYEE
	EMPLOYEEACCOUNT
	PAYROL
	EMPLOYEEREPORT
	CREDITSALE
	CASHSALE

AccountngEmployee Name   Employee Code

set up

EMPLOYEE ACCOUNT

General

Human ResourceUser Name

Save   J___I

ErnpbyeeAccount

Enter   ErrqoyeeCode ▼

EMployee Name   Employee Code Category   Gender   Telephone Action

Point 0t Sate

NO records foundD

Figure 4.8: User pages

After a user has gotten the user name and password, the figure 4.9 is how the interface

will appear for the user to start work after he or she has logged in with the access code.

User Code
Access Level
Logout

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A-LIFE SUPERMARKET ADUM KUMASI

Product Inventory

Supplier

Product

Product Stock

Product Supplied

Supplier Name		Supplier Code	
Supplier Telephone		Supplier Postal Address	
Supplier Fax Number		Supplier Email Address	

Save   Delete   Reset

SUPPLIER INFORMATION

Enter Text Enter Search Value   --SELECT ONE-- ▼   Search

Supplier Name	Supplier Code	Supplier Telephone	Supplier Postal Addr.

Set Up No records found.

General Legder

Human Resource

Point of Sale

Figure 4.9: Suppliers Information

A-LIFE SUPERMARKET ADUM KUMASI

Aee•ss**Level**

Product Inventory

Supplier

Product

Product Stock

Product Supplied

Proaxt

PRODUCT SUPPLIED BY SUPPLIER

-SELECT C*-æ-   -   ▼   Product   SELECT

ONE--   Supplier Invoice

                   Supply Unit

Supply Oat•   29-Sep.2013   Save Supply   Delete   Reset

Packet

Set up

General Legder

Human Resource

Point of Sale

Report

| Supply Date | 29-Sep-2013 | Search | Print List |

Supplier	Product	Supply Date	Supply Unit	Qtty	Supply Inv.	Action
Favour	Red Wine	29-Sep-2013	Packet	12	67GJH	Select
Favour	Red Wine	29-Sep-2013	Packet	24	46798	Select
Diker	Pork Meat	29-Sep-2013	Packet	50	66567	Select

Figure 4.10: Product supplied by the suppliers

unit

50
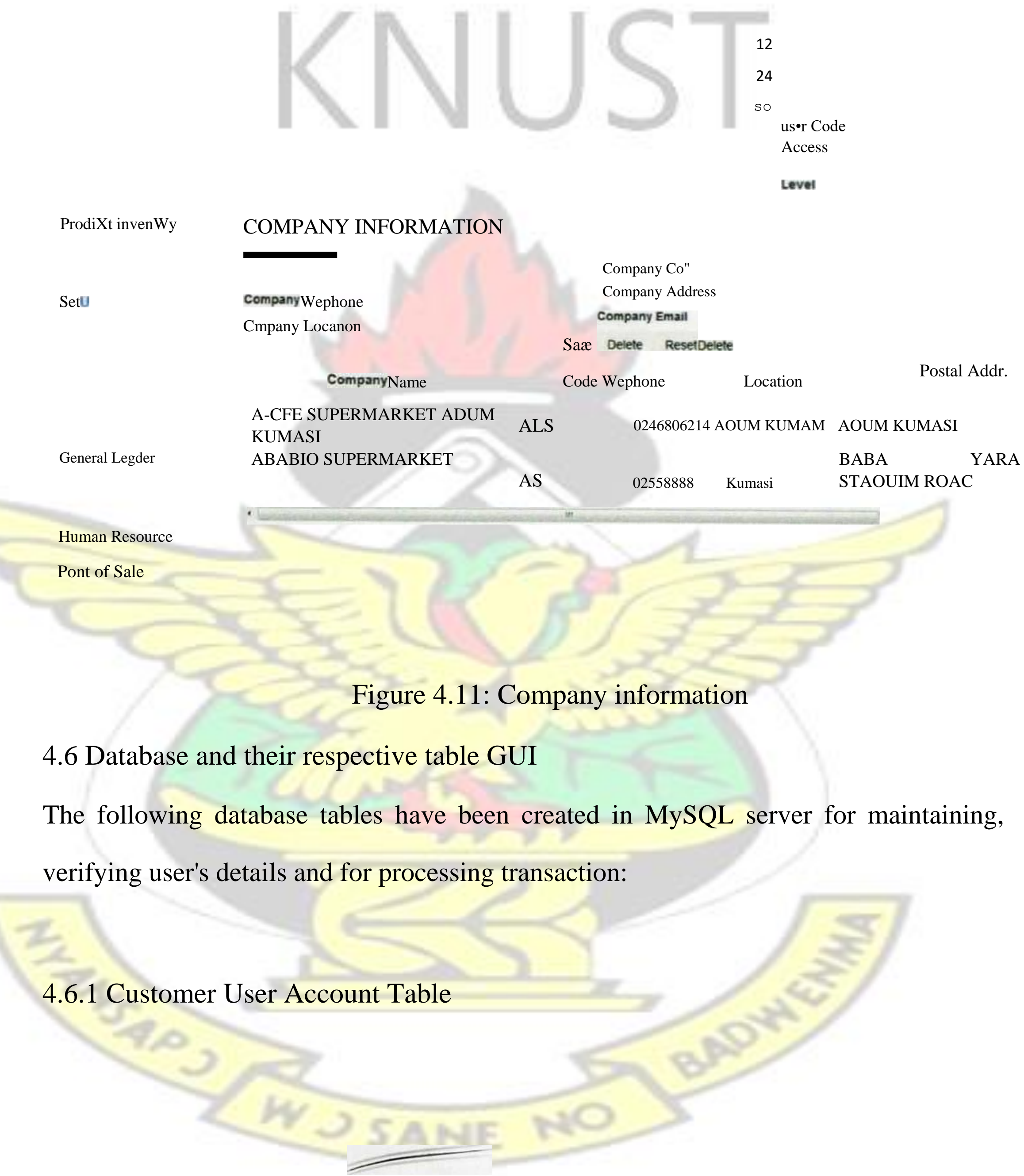
Figure 4.11: Company information

4.6 Database and their respective table GUI

The following database tables have been created in MySQL server for maintaining, verifying user's details and for processing transaction:

4.6.1 Customer User Account Table

The customer user account table helps maintain and manages users who have an account with the system. It contains details such as user account ID, username, password and last used date, this is shown in the table 4.12.

Table 4.12 Customer user account table

4.6.2 Product Table

This table contains a list of available products (i.e. product name), their categories and product code. This is shown in the table 4.13.
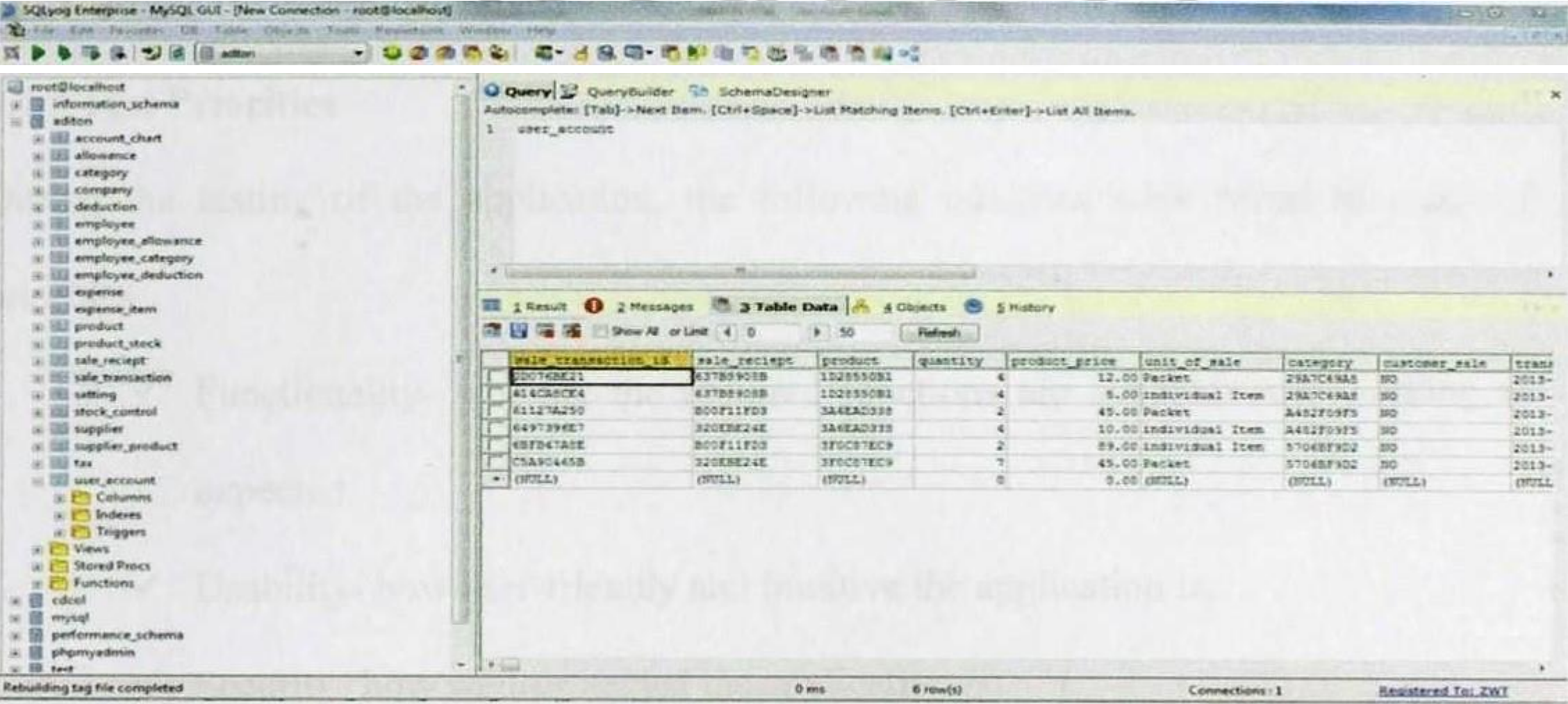
Table 4.13: Product Table

4.6.3 Sale Transaction Table

This table helps maintains and manages all sale transactions. Each transaction has sale transaction ID, products supplied, their unit price and quantity supplied customer's details and date of transaction. The sale transaction table is displayed in the table 4.14.

Table 4.14: Sale Transaction Table

4.7 Testing

In a software development projects, errors can occur at any stage in the development cycle. In the testing phase, the program is executed with a set of test cases and the output of the program for the Ft cases is evaluated to determine if the program is performing as expected. Testing is the process of executing a program with the intent of finding errors.

4.7.t_Testing Strategy

The testing was also done using the following strategy:

Component testing: Each component that makes up the application was tested. These include the product inventory, accounting, set up, general ledger, human resources, point of sale and report.

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s/ Integrated testing: The various modules of the application were integrated and tested to ensure the correct interworking of the components.

Validation testing: The integrated application was tested to ensure that it works correctly in a pseudo-live environment.

4.7.2 Test Priorities

During the testing of the application, the following qualities were tested in order of priorities.

v/ Functionality- whether the required functions are available and working as expected.

s/ Usability- how user-friendly and intuitive the application is.

•Z Security- how well-protected the application is.

✓ Performance- whether the response times are within acceptable limits.

4.7.3 Test Environment/ System Specification

Hardware and Software

The test environment will consist of:

v/ Processor:

✓ Processor Speed:

✓ Memory (RAM):

✓ System Type:

✓

    CD ROM Drive: 52X

✓ USB: 2.0

✓ Network Interface Card (NIC)

✓ Hard Disk Derive (HDL)):

Pentium IV Intel Processor

2.10 GHz

3.00 (3B 32/64 —

bit   Operating

System At least 20

(3B

✔ Operating System: Windows XP/VisafWindows 7

Ultimate.

4.8 Simulation Platform

This section describes the tools for implementation, programming language and framework for the proposed integrated software, inventory control and pay roll.

4.9 Tools for implementation

4.9.1 Integrated Development Tool (IDE) - Netbeans

Netbeans IDE version 7.3 is used for the development of the model because Netbeans is designed as a modular developer tool for a wide range of development tasks. The base IDE includes an advanced multi-language editor, debugger and profiler integration, file versioning control and unique developer collaboration features.

4.9.2 MySQL GUI Webyog sqlog Enterprise Edition 6.13

Webyog Sqlyog Enterprise Edition 6.13 was chosen for the development of the proposed model. SQLyog was developed keeping in mind the necessities of all who use MySQL as their preferred Relational Database Management System (RDBMS)

SQLyog MySQL GUI is the most powerful MySQL manager and administrative tool, combiiung the features of MySQL Query Browser, Administrator, phpMyAdmin and various other MySQL Front Ends and MySQL clients in a single intuitive interface.

4.9.3 Application Server — Glassfish server 3.1

Glassfish server version was chosen for the development of the model. Glassfish is the name for an open source development project for building a java application server. It is based on the source code for Sun Java System Application server PE 9. This server provides a structured process for developing a high quality application server that makes new features available faster than ever before. Glassfish is robust, commercial, production quality, scalable, compatible application server that is free for development, deployment and redistribution. Glassfish has extensive documentation, migration tool support and security support.

4.9.4 Database Server — MySQL server in Xamp 1.7.7

Xamp version 1.7.7 is used. It is a free and open source cross- platform web server solution stack package consisting mainly of Apache HTTP Server, MySQL database, and interpreter of scripts written in PI-IP and perl programming languages.

It is fully integrated transaction-safe, ACID compliant database with full commit, rollback, and crash recovery and row level locking capacities. MySQL delivers the ease of use, scalability, and performance that has made MySQL the world's most popular open source database.

4.10 Language and Framework

4.10.1 Java (Web Technology)

Java is designed to enable development of portable, high-performance applications. Java is a powefful platform that includes a complete set of APIs for distributed applications. It allows programs to run anywhere on the network (i.e. Java is platform independent, secure, multi-threaded and dynamic programming language. It gives freedom to run application on any operating system).

4.10.2 Java Server Faces (JSF)

Java Server Faces version 2.0 was chosen because it simplifies the building of user interfaces for java server application and development integration of web-based user interfaces.

4.10.3 Primefaces

Primefaces 3.2 version was used in designing the database schema as illustrated in figure 4.15. Primefaces is the first set of JSF components. It is a library component and a framework to create rich user interfaces with java.

Table 4.15 shows the Database schema of the proposed model
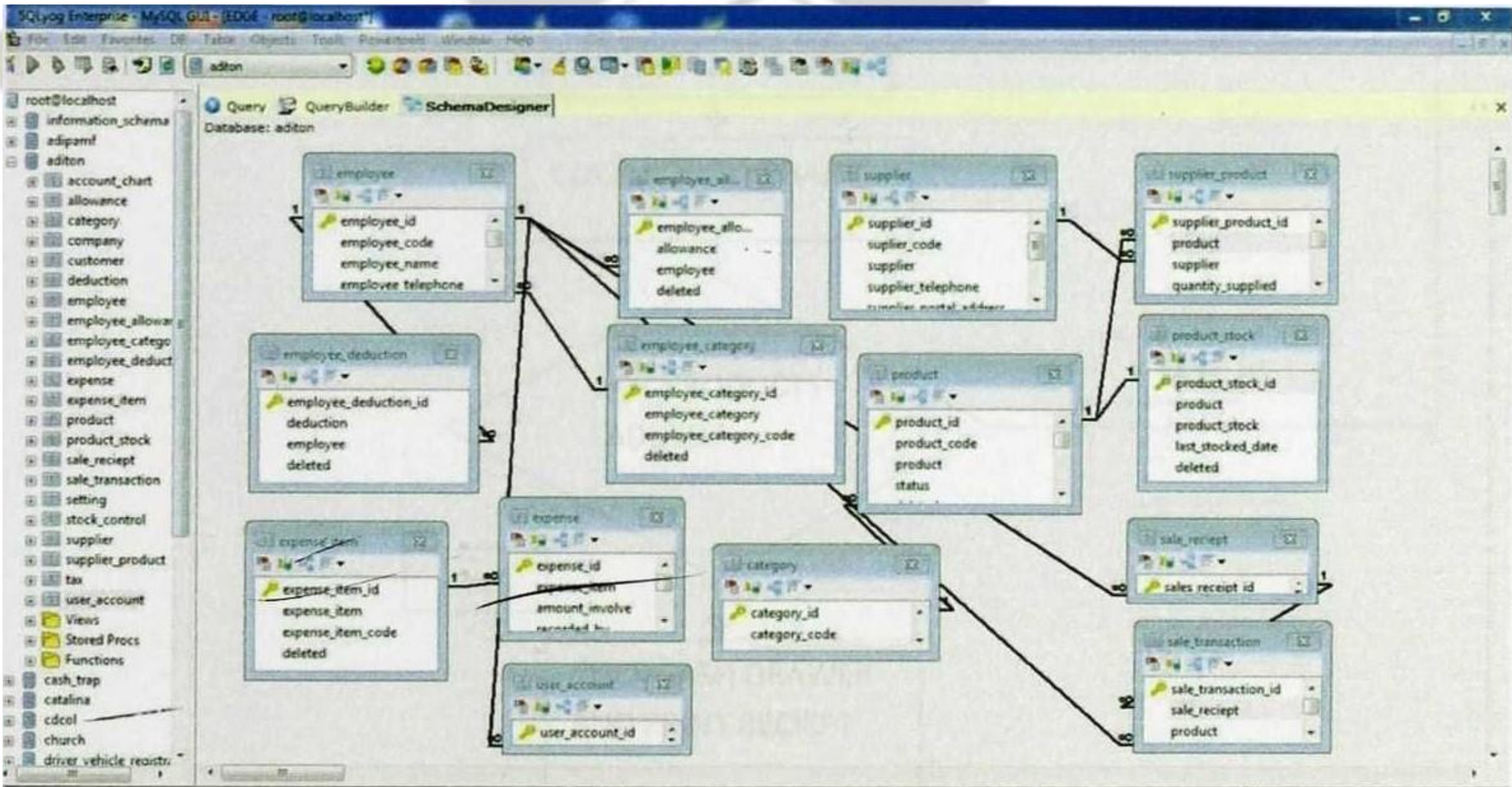
Figure 4.12: The System Flow chart for selling of items

```
                    START

                    USER

                    LOGIN

                  LOGGED          NO
                   IN?

   YES

              SELECT PRODUCT

              ADD QUANTITY

              SELECT SALE TYPE

              CLICK ADD TO CHART

              ALL PRODUCTS            NO
              ADDED?

   YES

              CLICK CASH DRAWER
              AND PRINT RECIEPT
```
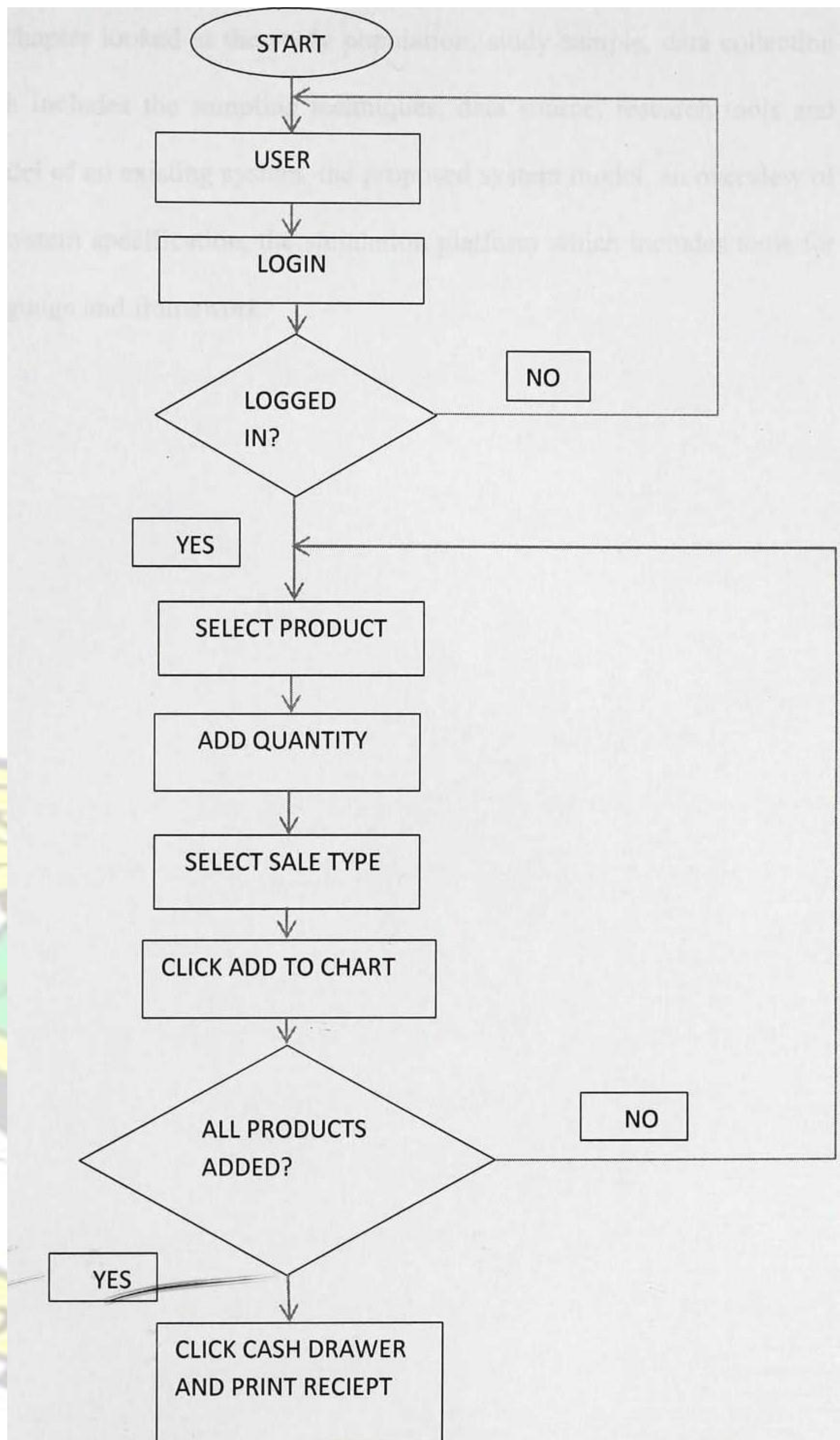
4.11 Summary

In conclusion, this chapter looked at the study population, study sample, data collection methodology (which includes the sampling techniques, data source, research tools and data analysis), a model of an existing system, the proposed system model, an overview of the system design, system specification, the simulation platform which includes tools for implementation, language and framework.
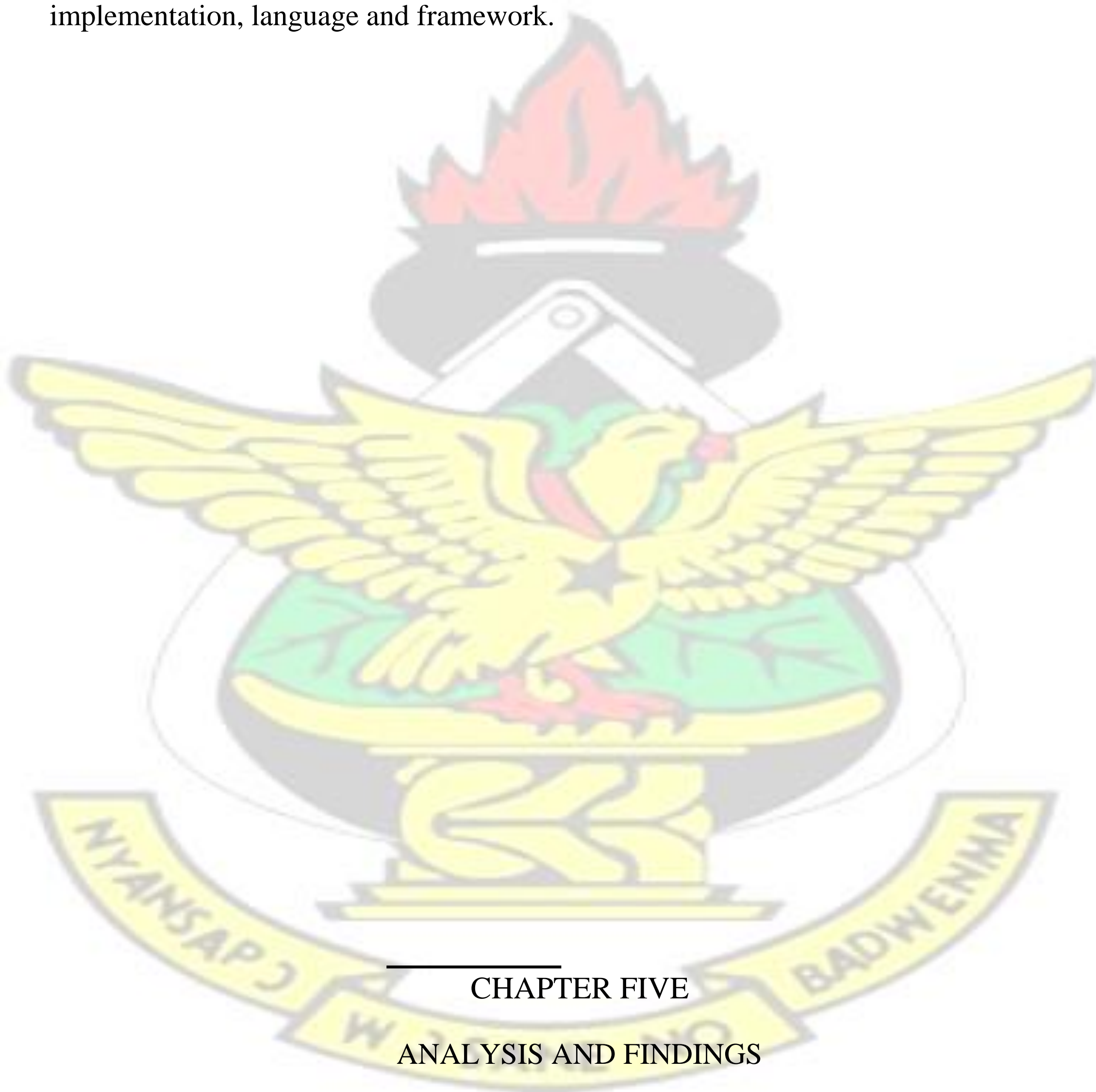
CHAPTER FIVE

ANALYSIS AND FINDINGS

5.0 Introduction

This chapter presents the findings of the qualitative study obtained in the research. This study is comprised of three SMEs that participated in the survey as cases for the purpose of this research.

This research was done using a sample of 45 respondents to assess the level and impact of ICT on the operations and performance of some selected SMEs in Kumasi. Responses obtained from questionnaires distributed are summarized in this chapter in the form of tables.

The overall aim of this research was to investigate the impact of Information and Communications Technology (ICT) on the selected small and medium-sized enterprises in Kumasi. The research has carefully gone through extensive literature review on the impact of ICT on SMEs particularly in Kumasi.

It was found that ICT can simply help firms to quickly locate more customers, outsource best suppliers, and most importantly reach suitable business partners worldwide.

A total number of ten customers were selected from two shops, one of them has no access to ICT facilitiesúd one has complete access to ICT facilities. The times used to serve these customers were all measured with each of their items. From table 3.1 and table 3.2, it was realized that less time was used to serve customers when ICT was in use and more time was required to serve customers when all activities were conducted manually.

Similarly, during the stock taking, using the manual method resulted in consuming more time and less time was used when ICT (barcode reader) was used as illustrated in table 3.3 and table 3.4 respectively.

Some of the identified Impacts of ICT on the operations of SMEs for example a Supermarket are as follows:

5.1 ICT and supermarket employees

When ICT was first introduced into supermarkets, there was a huge impact upon employees. No longer did items need to be individually priced. This reduced the need for so many staff. Some 30 years ago, a till was just a standalone calculator that produced a list of prices that a till operator took from labels on stock. Now with the use of ICT, cashiers at the tills have become 15% more efficient due to the increased speed of scanning rather than looking for the price and typing it in. However, they can be monitored to check how many items they are scanning per minute and mistakes are easy to spot. Fewer staff was needed and those that remained needed to be retrained to use the new technology.

5.2 ICT and customers

Customers have alyo-benefited enormously from the integration of ICT into the modern supermarkets. Some of the benefits are:

- The customer doesn't need to carry cash with them; they can pay for everything electronically. In shops, ICT is used in debit payment and recording transactions.

When making a purchase the customer will hand over their credit or debit card, which is then swiped. The bank will be contacted and the money will be debited from their bank account.

❖ There is less chance of being wrongly charged or given the incorrect change as the till calculates this for the cashier.

❖ An itemized receipt is given so it is easy to check that you have been charged correctly for your purchases.

❖ Queuing times at the checkouts are reduced as it is faster to scan items than to find the price and type it into the till.

❖ Because of the stock control systems, most goods will be in stock for the customers.

•3 Customers have a choice whether to visit the shop or purchase using the internet.

5.3 JUST IN TIME and the STANDARD METHOD OF STOCK CONTROL

In the standard method, a shop selling cookers keeps its stock in a shop and in an attached warehouse. When stocks in the shop are low it is replenished from the warehouse. A check is kept on how much stock is in the warehouse. When the warehouse needs new stock, an order is placed with the appropriate suppliers and the goods are delivered.

The 'just-in-time'—system takes advantage of a stock information system. As products pass through the electronic points of sales (EPOS), the relevant data is sent to a database containing information about stock levels. When stock falls below a set level more is ordered. Thus only a bare minimum of necessary stock is ordered and there is no need to

maintain a large, fully stocked warehouse. In some cases the system is fully automated, working out what stock is needed.

After the supermarket has closed at the end of the day, the following happens: +
The branch computer sends the details of every individual sale to the main computer at the Head Office.

❖ Using this information, the main computer system updates its record of the number in stock of every item in the store.

❖ The main computer also transmits these orders to computers in the distribution centers (large warehouses storing products ready for delivery to stores) across the satellite link.

❖ These distribution centers then deliver the required stock to the stores immediately.

❖ Price changes and prices of new products, special offers etc. are sent back to branch computer in the supermarket.

❖ New shelf labels are printed and the night staff of the supermarket places these on the shelves ready for the following day.

5.4 Qualitative Data Analysis (Report on Cases)

The findings of the qualitative study amongst the three SMEs that participated in the survey are presented in this section. The main tool used for data collection was semi-structured interviews in conjunction with the questionnaire to aid better interpretation of resulïšÃhe interviews created an avenue for the interviewer to ask further clarification. For example, where participants were asked to list the type of ICT applications in their

various SMEs, they identified just a few. However, during the interviews, more of those ICT applications were identified by respondents.

5.5 Overview of case study participants

Three of the SMEs that fully completed the questionnaires were selected on the basis of their size and ICT adoption. Details of those SMEs that were selected as cases for the purpose of the research are described in Table 5.1.

Table 5.1: Case study SMEs

SMEs	Type of Business	Number of employees	Year of establishment
Case A	Retail company	50 (medium)	2000
Case B	Manufacturing	40 (medium)	2005
Case C	Supermarkets	25 (small)	1999

5.5.1 Company's background

For the purpose of anonymity, the names of the cases have been disguised as CSA, CsB, CSC.

5.5.2 Case study A (CSA)

CSA is a retail company that was established in March 2000 and is mainly engaged in the sale of stationaries. Initially, the company was involved in the importation of electronics and slowly has moved on to the stationary business since 2003. CSA is medium-sized company with its headquarter in Accra and branches within Kumasi and currently has 50 employees. Majority of the company's management are from one family, therefore the company maintains close management system with almost every member of the family playing a key role. CSA has a sales manager, Administrator, account and Marketing manager. Currently, CSA utilizes some ICT applications such as ERP software architecture

for planning. The decision to adopt ICT was made by the managing director and it was adopted in 2010.

5.5.3 Case study B (CsB)

CsB is a company that manufactures washing detergents and beverages. It is a medium sized company and has 40 employees. The organizational structure of the company comprises a managing director, departmental managers, administration, quality control and accounts. The company uses the Peachtree accounting software to manage its account and also uses Microsoft office. Presently, the company does not have any technical department rather CsB has a consultant who manages the company's system. The company has separate software that manages their account and point of sale. One of the company's aim is to have their software been integrated. At some point, it was the marketing manager who suggested the idea of adopting ICT after attending a training programme on the relevance of ICT.

5.5.4 Case study C (CSC)

CSC is an industry established in 1999 which consists of markets, grocery stores and can also considers partly as a food service industry. Products offered by this supermarket usually include raw foodstuffs, prepared food can also be sold, fresh produce, household products, clothes and DVDs. CSC usually offers products at relatively low prices by using

their buying power to buy goods from manufacturers at lower prices than smaller stores can. -Atr-csc employees are full-time workers and presently the company has 25 employees. The company has a general manager, heads of department, marketing manager and accounts departments. At present, CSC is attempting to further reduce labor costs by integrating their application, where the Chief executive Director or managing director can oversee all that goes on in the company in one machine. The company has customized software specially designed for them. It was the company's secretary who suggested that CSC adopts some forms of ICT.

5.6 Level of ICT utilization in the Case Studies

This section aims to determine the level of ICT utilization amongst the three SMEs that have been selected as case studies for the purpose of this research. A measure of the level of ICT utilization simply means to identify the different types of ICT applications and facilities that are in use and the extent in which it's been used in the different SMEs.

CSA uses ERP for planning and intranet for sharing vital information amongst its departments. CsB uses Peachtree accounting software for compiling the company's information and updating accounts. CSC uses customized software specially designed for the company. Laptops and desktop computers are used for the different work stations in the company.

Although all the SMEs use some form of basic ICT but none of the three SMEs uses any integrated software. The SMEs regard the integrated software as a sophisticated ICT tool. The aim of the researcher in this research is to introduce integrated software for these three SMEs.

5.7 The Impact of ICT on the Organizational Performance of SMEs

ICT plays a very important role in the organizational performance of SMEs as it helps in creating business opportunities and enables SMEs to fully compete with their competitors. Choosing the appropriate ICT applications for a particular business not only assists in cutting down costs but also helps in improving the company's internal processes, enhancing communication and can also provide the opportunity for the company to advertise their products and services online. The research findings show that there are several positive impacts associated with the adoption and effective utilization of ICT amongst the different SMEs that were selected as cases. This was measured based on value added to the company in terms of productivity after adoption. It is quite interesting to note that some of the impacts or benefits experienced by the case SMEs are in line with the reasons (motivators) behind their decisions to adopt or invest in ICT. This indicates that the SMEs are experiencing their

returns on investment. It implies that the SMEs' desires or intended objectives are being fulfilled by improving their organizational performance. It is of critical importance to investigate the impact of ICT investments on companies' organizational performance in various contexts. This is because ICT is an essential tool that should be aligned with a company's organizational strategy. However, the research findings indicate that the benefits derived from ICT investment vary significantly amongst SMEs but to a large extent depend on the type of ICT investment (i.e. hardware, software and communication-applications). Respondents in each SME were to comment on the

impact of ICT on their company's performance. Some impacts of ICT, identified based on the case-studies include the following:

5.7.1 Competitive Advantage

One company is of the opinion that the impact of ICT is helping them stay competitive. According to a respondent, "The company has been able to remain competitive in the retail market were many medium companies are facing immense difficulties just because we as a company decided to invest in ICT. ICT is currently the trend in the business world" (CSA general manager).

"It has also assisted in enhancing the company's business. I can now sit in my comfort zone and access whatever goes on in the company at whole" (CsB Administrator).

5.7.2 Efficiency

The three SMEs that participated in the study identified efficiency as an impact of ICT on their company's performance.

"ICT is excellent. Without ICT, this company will not have the power and knowledge of how we can manage the company's operations ourselves."

"ICT helps our company to allocate jobs to each department on the system and its used for checks and balances of all our accounts".

"ICT makes our work easier, for example, in taking record of stocks. In the past, it takes us weeks to get stock and order done, but since we started using the modern and integrated ICT software, we can do our stock within a few hours" (Administrator CSC).

5.7.3 Planning

"ICT helps us in planning; it also helps in terms of database management, production and inventory".

"1CT—õnstitutes the life wire of the efficient management of the company's business (CSA, CO, CSC)".

5.8 Factors that can affect the future adoption of advanced ICT solutions

Based on the respondent's experiences with the use of ICT, they were asked if they would like to further adopt more advanced ICT applications in future. All the three SMEs indicated the intention to utilize advanced ICT solutions in future; they also identified some factors that could possibly stop them from adopting these sophisticated technologies. Comments made by each of the respondents are summarized below.

5.9 Summary of the comments from the case studies (CSA, CsB, CSC)

Concerning future plans towards the adoption of sophisticated ICT, the branch managers of the case studies states that,

"As the organization is growing more and more, the company would require some more advanced technologies". In future, the company tends to adopt ICT system for inventory that will keep the company's inventory record close and perfect and also to adopt internet. Meanwhile, in terms of factors that can affect the adoption of more sophisticated ICT, they said that,

"There are many factors such as lack of skills that can stop the adoption of ICT, if the employees do not have computer skills, the company will need to train these employees on how to use the computers.

They have to be computer literate but the majority of our employees do not like change; they are never ready-to learn". (Branch managers)

5.10 Participants' Recommendations to SMEs

Respondents from every SME were given an opportunity to advise other SMEs based on their experience with the use of ICT. Three SMEs (CSA, CsB, CSC) responded.

Managing Director of CSC states that:

"Gone are the days when adoption ICT seems to be a status symbol. ICT is now an essential tool and a lifeline in all fields. For example, even a farmer should use technology in approaching farming from a different perspective. ICT adds value to SMEs. ICT helps in account management which is a problem in many SMEs. This means management of accounts for financial information that can easily be done with a computer. ICT helps in terms of accuracy; therefore it is essential that companies adopt it. ICT is a good working tool so the earlier SMEs adopt ICT, the better for them" (Managing Director-CsB).

"The volumes of data that are hovering around in the industries nowadays are so voluminous that a company cannot do without using ICT to handle or manage data. Therefore, if SMEs really want to have some form of competitive edge, they need to use various technologies" (Managing Director-CsA).

CSA managing director states:

"To the best of my-knowledge, I still think a lot of SMEs do not use ICT but ICT is very good and our company is willing to adopt more ICT. It helps to widen a company's scope and enhances your relationship with other companies. I would recommend that all SMEs adopt some form of ICT......Once a company can use the internet and use good software

and also maintain their systems, the company is bound to experience some level of development. In future, we want to use better software to manage the company's accounts for example, Sage software" (Managing Director-CsA).

5.11 Summary of Research Findings

A summary of the research findings from the case studies is given in the following tables: Tables 5.4, 5.5, 5.6, 5.7 and 5.8.

Table 5.4: Types of ICT applications in SMEs

Case Studies	Basic ICT	Sophisticated ICT
CsA	Internet and Microsoft office suite	ERP, Intranet, Network servers
CsB	Internet and Microsoft office suite	Peachtree
CSC	Internet and Microsoft office suite	Business soft software

Table 5.5: Motivators for ICT adoption

Motivators	Cases
Efficiency	
Competitive Advantages	
Technological advantage	
Information availability	

The respondents were asked to comment on the motivators behind their decisions to adopt ICT. The participants gave a wide range of reasons that led to their decision to adopt ICT.

And they are been summarized in table 5.5.

Table 5.6: Impact of ICT on SMEs organizational performance

Impacts	Cases
Competitive advantage	
Efficiency	
Business Enhancement	
Increase Awareness	

Respondents in each SME were requested to comment on the impact of ICT on their company's organizational performance. The responses to this question are similar to the responses that were given regarding their reasons for adopting ICT which are in table 5.6.

Table 5.7: Drawbacks associated with the use of ICT

Drawbacks	Cases
Complex modern software packages	
Power Outage	
Cost	

Participants were requested to comment on the disadvantages or drawbacks they have experienced in terms of using ICT in their different organizations. The participants identified various drawbacks which includes the drawbacks in table 5.7.

Table 5.8: Factors that can affect future adoption of more advanced ICT applications

Cases	Factor
CsA	• Cost of adoption

	• Training of staff
	• Lack of skill amongst employees
CsB	• Cost of implementation of advanced ICTs
	• Lack of skills
	• Running cost (maintenance)
	• Cost of generating power (Electricity)
	• Cost of staff training
CSC	• Lack of skills
	• Lack of finance
	• Cost of hiring consultants
	• Electricity

Based on the respondents' experiences with the use of ICT, they were asked if they would like to further adopt more advanced or sophisticated ICT applications in future. All the

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three SMEs indicated their intention to utilize more advanced ICT solutions in future notwithstanding; some respondents identified some factors that could possibly stop them from adopting these sophisticated technologies. Comments made by respondents from each of the participating SME are summarized in the table 5.8.

5.12 Summary

This chapter presents the findings of the data obtained from the survey/interviews. The survey was based on a sample of three SMEs. Findings show that all the three SMEs that participated are adopters of ICT but mainly use Microsoft office suite in terms of software applications. The research further identified some impacts of ICT on the organizational performance of the selected SMEs and has highlighted drivers behind their decision to adopt ICT.

The result also shows that there are many factors preventing SMEs from adopting ICT. Comments were provided by the three SMEs that participated in order to help SMEs that are yet to adopt ICT, to begin to adopt, especially with the current developments in the world.

CHAPTER SIX

SUMMARY AND CONCLUSION

6.1 Conclusions

In conclusion, the use of ICT will reduce the time spent in SMEs various operations. Implementation of ICT will surely increase productivity in SMEs.

Investigations that were carried out on the three SMEs has proved and brought to light most of the publications which relate to the use and impact of ICT on SMEs. Owners of SMEs who were interviewed possess a number of basic ICT tools in their businesses and they also say yes that technology performs a vital role in their businesses. They in addition admitted that they have inadequate understanding as regards to ICT which influences the ICT decision-making within business.

Essential technologies are before now in place in the SMEs interviewed, but they are not utilized as an integrated solution.

Implementation of ICT ought to be concerned that SMEs are not the same and as a result possess diverse needs for ICT. It is very essential for SMEs to implement ICT solutions that are limited to its needs. There are hindrances that prevent SMEs from implementing ICT, such as lack of understanding regarding the way ICT is designed, absence of required IT expertise and high setup cost.

6.2 Recommendations

The-data generated from SMEs in Kumasi based on this study shows clearly that ICT plays an important role in the operations and performance of SMEs.

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In summary, the recommendations for SMEs to implement ICT in their businesses are as follows:

➤ SMEs ought to invest in educating their staff management concerning the impact of ICT in their business and the benefits.

> SMEs have a duty to advance employing or contracting out educated ICT experts.

➤ICT decisions ought to be informed and based on ICT knowledge.

Lastly, due to the enormous potentials, impact and opportunities that ICT provides to SMEs, the researcher recommends that SMEs in Kumasi should be more educated and encouraged to take advantages of these ICT.

6.2.1 Directions For future research

Based on our findings on the impact of ICT of SMEs, the following recommendations are made.

From the review of the literature, it appears that no existing research had examined the level of utilization of advanced ICT solutions in SMEs. It will be useful to conduct further research in this area.

Future research should expand the understanding of ICT adoption and the impact beyond the scope of the current research.

6.3 Limitations oJfhe study

It is important to remember at this stage that all research suffers from limitations. The minoHimitation of the study is the inability to use a larger sample size since only few SMEs in Kumasi utilize ICT in their organizations and also because of the time frame.

Another limitation is the inability of those SMEs to make available vital information on their operations and software. Therefore, the participants could have hidden some vital information from the researcher, which could possibly have improved the research outcome, without the researcher's knowledge.

In administering the questionnaire, some of the respondents needed convincing that the work was only for academic purposes before they participated. These respondents were not very sure if the outcome of the questionnaire would expose them to the bad light of their competitors. This affected the number of responses gathered.

Also, further research could focus on collecting and analyzing empirical data from SMEs and comparing the results with the findings of this study.

6.4 Research Contributions

This section of the chapter discusses the contributions of this research.

6.4.1 Contributions to the General Body of Knowledge

This research has contributed to the existing body of literature and the field of information systems by identifying the inadequacies of previous studies regarding ICT adoption in developing countries, with particular emphasis in Kumasi. The research has empirically identified key factors affecting the adoption of ICT including advanced ICT solutions amongst SMEs in Kumasi in a particular geographical location.

No previous study had empirically considered how SMEs in Kumasi use ICT or had identified-the types of ICT applications commonly used by SMEs in Kumasi. Therefore, this study adds to the existing body of literature and makes specific contributions to the field

of IS by providing insights on the adoption and impact of ICT amongst SMEs in Kumasi as well as being able to identify the types of ICT applications mostly used by the SMEs. The research has also identified key motivating factors for ICT adoption in SMEs in Kumasi and impact of ICT with respect to the organizational performance of many SMEs that use ICT solutions. Although some literatures have identified both the factors to ICT adoption in SMEs but Adopting ICT is not just a solution to SMEs having the latest technologies, as the impact of ICT to SMEs is paramount as well. The research findings suggest that many SMEs would like to adopt advanced ICT if the ICT consultants were reliable and if they will have ICT expertise as employees in their companies.

The research has also identified key motivating factors for ICT adoption in SMEs and common benefits of ICT with respect to the organizational performance of many SMEs who effectively utilize ICT solutions. Although some literatures have identified both the barriers to and the benefits of ICT adoption, only a few literatures have considered SMEs' effective use or utilization of ICT.

6.5 Discussion

The responses obtained from the participants have enabled the researchers to identify some motivators to the impact of ICT on SMEs. ICT has changed the manner in which enterprises transact and sell their products. The respondents stated that a major motivator for their adoptioy—of ICT is to have some sort of competitive advantage. ICT can be

described as a strategy for keeping at pace with current global developments. ICT is often seen—as—anenabler that will allow smaller enterprises to upgrade the value of their processes and gain higher value for their products and services (Drucker and Payne, 2010).

Apulu and Latham (2010) state that appropriate use of ICT can assist SMEs gain competitive advantage by reducing costs and improving core business processes. The case studies show that all the SMEs focused on one major reason for adopting ICT which is to have some form of competitive advantage. Therefore, based on the literature review and the case results, it can be said that a major motivator for adopting ICT in SMEs in Kumasi is to have some form of competitive advantage. The impact of ICT can also assist organizations to increase efficiency.

Respondents realized that the world is changing globally, hence, it was necessary for them to have ICT at the forefront of their various organizations in order adapt to new business environments. Respondents thought it was important to move from manual data processing to automated data processing.

6.6 Summary

It is expected that future research will extend knowledge of ICT adoption and effective utilization by considering other regions beyond the area covered by this research. This research found that SMEs' owners/managers attitudes towards ICT play a key role in promoting the effective utilization of ICT amongst employees.

This chapter has presented the contributions of this research to the body of knowledge, the research method adopted for the study and how it was applied, key limitations of the present research as well as recommendations for future research. The research also adds to

the body of knowledge by empirically providing evidence that can increase the knowledge ofIC-T-adoption and usage in SMEs. The research findings are beneficial to academics, and policy makers.

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Dear respondent,

I am a student of Kwame Nkrumah University of Science and Technology Kumasi, Department of Computer Science. Am presently working on "The Impact of ICT on the operations and performance of SMEs in Kumasi. I request you kindly fill the questionnaire below and I assure you that the data generated shall be kept confidential.

Thank you for your co-operation.

Sincerely,

Uchegbu Favour.

Personal Information

1. Sex: F

2. Age: 40-49C]   50-59   60 andabove

3. Name of SME:..

4. Location: ....

5. What is your occupaⅠonal status?
_____

_____

6. Type of business

Retail   Services Manufacturingû Finance [2 Constructiona Supermarket C:]

Others, please Specify..∙∙∙

7. Educational level of respondent

University graduate   Professional Certificate   Polytechnic/HND☐

Vocation/TechnicalÛ   Secondary school/SSS[2   Middle School☐}

8. How many employees does your business have?

1-10   11-20   2 1-30   31-40   41-50

9. How would you rate your computer literacy level?

DBeginner   Proficient C] Advanced

10. Does your business use any ICT technology?

Yes = No Cl

11. In which of these ways is it used?

DCust0Ðer checkout a Account management   Human resource

Pay Stoc Controa

9.   Who maintains technology in your business?   In-house   Outsourcing[2
10.   How dependent is your business on technology?

Partly dependenta   wholly dependentCZ] Not dependent C]

11.   What challenges do you find in implementing ICT solutions in your business?

Irregular electricity supply C] Skilled Personnel C] Maintenance C]

12.   Do you store customer's information in your business?

13.   Which type of application software does your organization use?

    Package software (e.g MS Office)

    Customized software (e.g specially designed for your organization) C]

    13. How would you rate the application?

    Easy to use a fairly difficult DDifficult

15. What do you consider as major benefits of the current software used in your organization? Beneficial in :- Stock controlû Personnel TransactionC] Recording Human resource   management

16.——What other ICT tool do you think you still need to improve your performance at work?

_____

_____

_____

_____

_____

17. What are the modes of operations in your firm? Onlinel:::::]

In Shoa Distributiorc::] Servicesa

18.   Other comments/ recommendations

_____

_____

_____

_____

THANK YOU FOR YOUR TIME!

Appendix B —Interview Questions for SMEs

Company Name:..
....

Address:... ....
....

TelephoneNumber:.........................

Name of participant:..
....

Position:. . ...··

Background Interview Questions

This section comprises of general question about the company.

1. What are your duties in the company?

1. What is the history of this company?

2. What products do you offer to your customers?

3. What are your company's goals and objectives?

4. How many employees do you have in your company?

7. Are they all full time workers?

8. Do your employees abi e by the policies?

9.-Who initiated the idea to adopt ICT in your company?

10. Who were involved in the decision making process?

I I. What was the type(s) of ICT solution considered for adoption?

12. What were the major motivators for ICT adoption in your organization?

13. What are the impacts of ICT on your company's organizational performance?

14. Are there any factor(s) affecting the effective utilization of your company's ICTs?

15. Would you consider adopting more sophisticated/advanced ICTs in the future?

18. Does your company have an IT department?

19. Please describe the various ICT applications that are in your company.

21. Please describe the experience(s) you have gained from adopting ICT.

22. Does ICT have an effect on your company's organizational performance?

23. What are the benefits associated with the use of ICT in your company?

25. What are the drawback¾isseeiated with the use of ICT in your company?

26. From your point of view, what factors contribute to the success of adopting ICT?
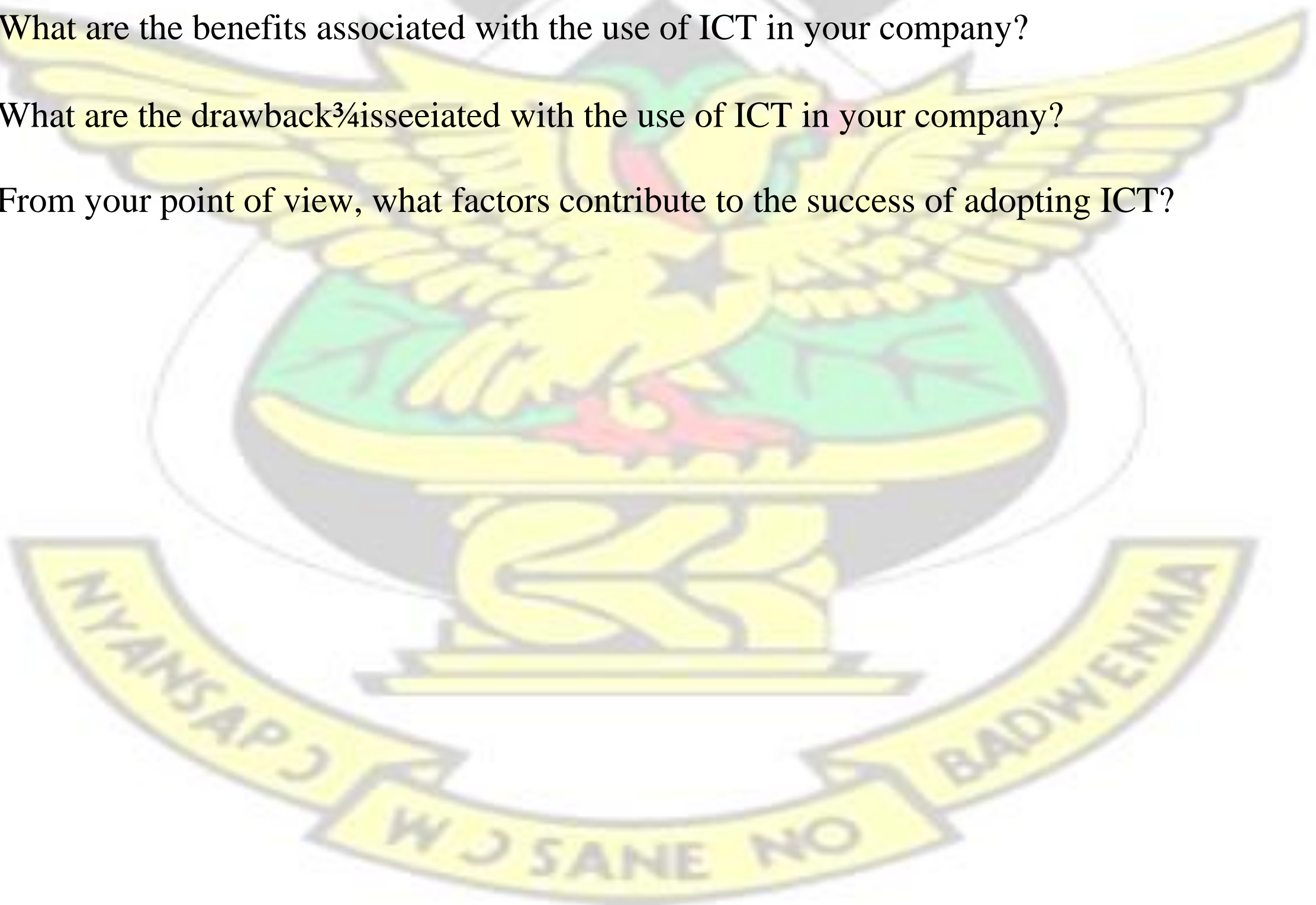
Appendix C: List of Participants

Companies	List of participants
CsA	Admin Officer
	Branch Manager
	Managing Director
CsB	Branch Manager
	Secretary
	Managing Director
CSC	Marketing Manager
	Branch Manager
	Managing Director