



**AN ASSESSMENT OF THE EFFECTIVENESS OF ICT ADOPTION ON
ZIMBABWEAN FIRMS IN THE OIL SECTOR POST DOLLARIZATION**

**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
MASTER OF BUSINESS ADMINISTRATION**

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DEDICATION

I dedicate this research study to all the employees, customers and suppliers of the oil sector and other stakeholders who are working tirelessly in the Petroleum industry. I hope that the study will contribute to the effective management of business through ICT adoption.

DECLARATION

Student's Declaration - I, **TENDAI MUTICHAKWA**, do hereby declare that this dissertation is the result of my own investigation and research, except to the extent indicated in the acknowledgements, references, and by comments included in the body of the report, and that this dissertation is therefore my original work and has not been presented in part or in full for any other degree in any other University.

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Supervisor Declaration – I, **GILFORD T. HAPANYENGWI**, confirm that the work reported in this dissertation was carried out by the candidate under my supervision as the University supervisor. This dissertation has been submitted for review with my approval as University Supervisor.

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ABSTRACT

The oil sector in Zimbabwe experienced mergers, acquisitions and relocation of some major oil players in the Petroleum industry soon after dollarization in 2009 and nothing much has changed in terms of how the firms operate. Their market pricing structure has remained virtually the same and there had been no meaningful growth of the sector, yet fuel is considered as the main driver of the economy of any country. Therefore, the assertion of the study is that if the oil sector is not managed effectively through ICT adoption, it would fail to drive the economy and all government effort would be wasted. This arises from the observation that during the post dollarization period the government commercialised the oil sector by allowing more fuel suppliers to emerge within the sector, unlike during the Zimbabwean currency era where The National Oil Company of Zimbabwe (NOCZIM) was the sole fuel supplier and distributor in the country. The main objective of the study was therefore premised on the examination of the effective management of business through ICT adoption within the Zimbabwean oil sector. Literature has shown that there was a problem of attempting to manage business through ICT adoption within the oil sector, not only in terms of ICT infrastructure deployment but also in the level of sophistication of ICT usage. The research also shows that indeed organisations within the sector were failing to fully utilise implemented ICTs. The study followed a qualitative research methodology that involved data collection through interviews and observation, the data was then categorised, coded and analysed manually. The key research finding has shown that the four interviewed organisations had adopted ICTs at their Head Offices, Depots and Retail Service stations. There were six major factors to ICT adoption decisions that were identified by the research findings. Furthermore, the results of the study agreed with literature review that there was indeed a relationship between strategy, people, processes and ICT adoption. The study acknowledges that success of technology was affected by the market, legal and social factors. It also observed that ICTs alone cannot improve business processes without the effort of human element. Managers and management need to take their role of planning, leading, organising and controlling to ensure success of ICT adoption.

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ABBREVIATIONS AND ACRONYMS

ARPA	-	Advanced Research Projects Administration
CEO	-	Chief Executive Officer
EDI	-	Electronic Data Interchange
ERP	-	Enterprise Resource Planning
ICTs	-	Information and Communication Technologies
IEA	-	International Energy Agency
ITU	-	International Telecommunication Union
mbpd	-	million barrels per day
MICT	-	Ministry of Information Communication Technology
NOCZIM	-	National Oil Company of Zimbabwe
NOIC	-	National Oil Infrastructure Company of Zimbabwe
TAM	-	Technology Acceptance Model
UTAUT	-	Unified Theory of Acceptance and Use of Technology
ZERA	-	Zimbabwe Energy Regulatory Authority

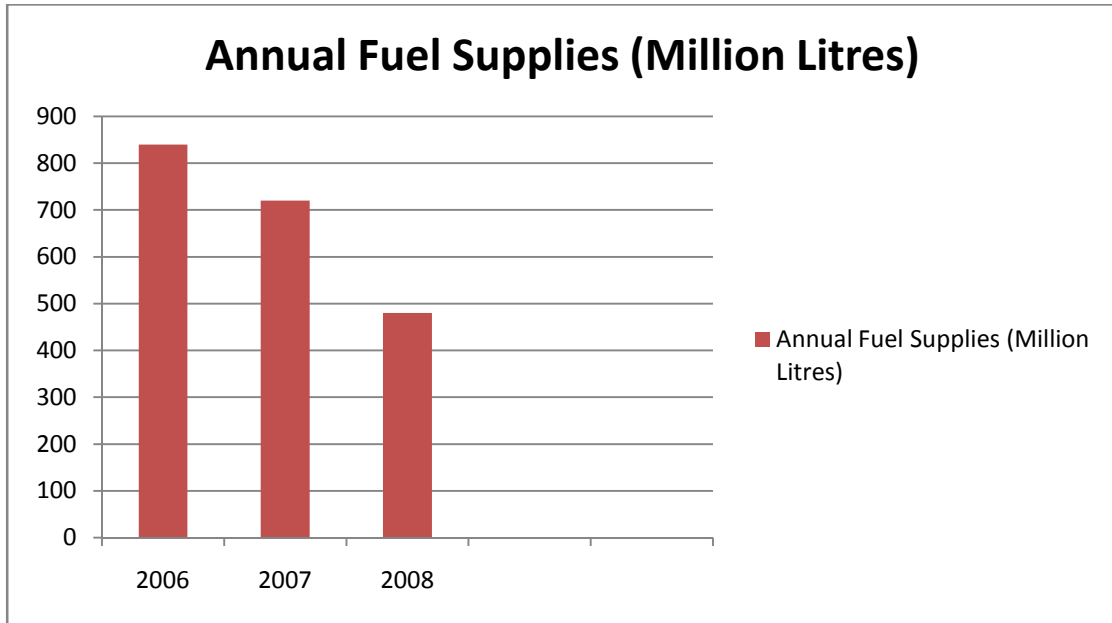
CHAPTER 1

INTRODUCTION

1.1 Background to the Study

Oil is the main non-renewable source of energy that is currently “fuelling” the world economy (United Nations Information Economy Report, 2013). Increased oil prices are considered to be a change of first order for the world economy. The oil sector itself has an impact on the use of Information and Communication Technologies (ICTs) in the global economy. Higher oil prices increase the risk of squeezing information technology budgets in oil-importing developing countries with regard to their increased consumption and their limited capacity to respond to oil price shocks (United Nations Information Economy Report, 2013). Some authors have however, questioned the effectiveness of ICT adoption on developing countries in the oil sector.

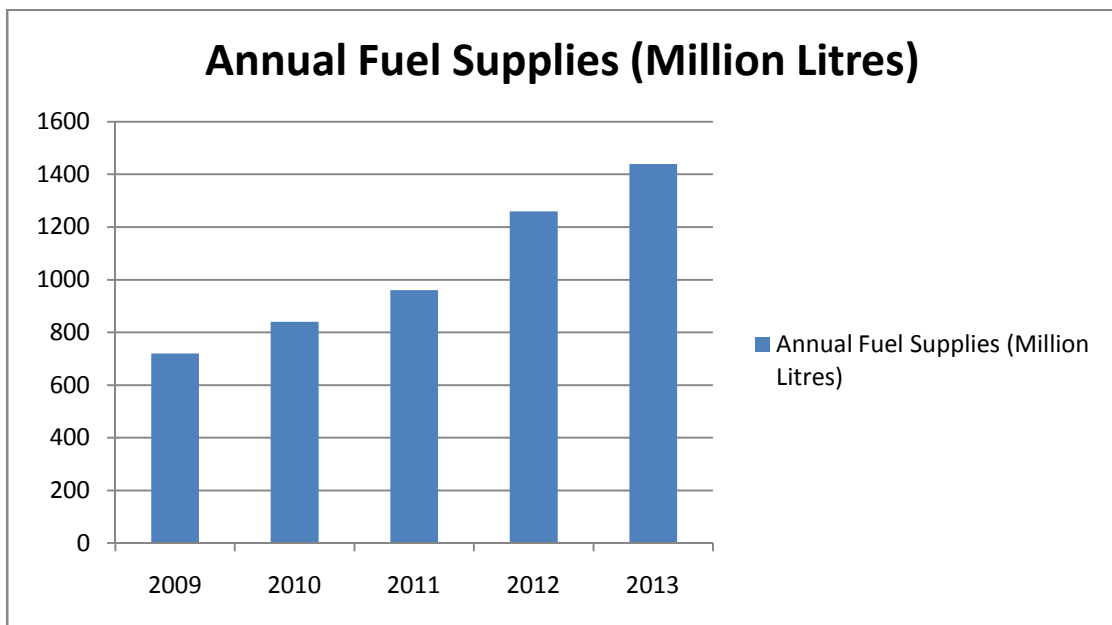
In Zimbabwe, prior to 2009, the state-owned National Oil Company of Zimbabwe (NOCZIM) enjoyed a monopoly for the importation of petroleum products (Bauer, 2013). According to NOCZIM Ministry of Energy (2009) annual fuel report, supplies decreased from 840 million litres in 2006 to 480 million litres in 2008. Refer to figure 1.1 (a) for annual fuel supplies from 2006 to 2008. When NOCZIM failed to supply fuel for the country a parallel market emerged where fuel was being sold in the black market. The oil sector was then liberalised with 80 companies as fuel traders and fuel supplies improved from 720 million litres in 2009 to 1 440 million litres in 2013 (Bauer, 2013; NOIC annual fuel report, 2014). Refer also to figure 1.1 (b) for annual fuel supplies from 2009 to 2013.



Years

Figure 1.1 (a) : Annual Fuel Supplies in the Country for the Period 2006 - 2008

Source : (NOCZIM Ministry of Energy Annual Fuel Report, 2009)



Years

Figure 1.1 (b) : Annual Fuel Supplies in the Country for the Period 2009 - 2013

Source : (NOIC Ministry of Energy Annual Fuel Report, 2014)

The alignment among business strategy, information and communication technology (ICT) and organisational transformation is truly one of the key

challenges facing corporate executives nowadays. The effective management of business through ICT adoption remains a challenge in the Oil sector, not only in terms of ICT infrastructure deployment but also in the level of sophistication of ICT usage (Pather and Uys, 2010).

Although the Oil sector in Zimbabwe had experienced mergers, acquisitions and relocation of some major oil players in the petroleum industry soon after dollarization in 2009, nothing much has changed in terms of how the firms operate. Their market pricing structure has remained virtually the same and there has been no meaningful growth of the sector yet fuel is regarded as the main driver of the economy in any country.

While some firms were licensed to produce bio-fuels in the country, they contributed insignificantly to the growth of the industry besides all the assistance that they got from the government, yet an Oil industry contributes to the development of the country through employment creation, faster delivery of goods and services.

The assertion of the study is that if oil sector business is not managed effectively through ICT adoption, the sector would fail to drive the economy and all the government efforts would be wasted. This arises from the observation that during post-dollarization period the government commercialised the oil sector by allowing more fuel suppliers to emerge in the fuel sector, unlike during the Zimbabwean currency era where NOCZIM was the sole fuel supplier and distributor in the country. This study therefore, seeks to assess the effectiveness of ICT adoption on Zimbabwean firms in the Oil Sector post dollarization.

1.2 Zimbabwe Energy Regulatory Authority (ZERA)

According to ZERA website [accessed: 07 June, 2014] the company was created in September 2011 following the promulgation of the Energy Regulatory Act (Chapter 13:23) which provides for regulation of the energy sector and other sections not provided for by the energy laws, the Electricity Act (Chapter 13:19) and Petroleum Act (Chapter 13:22). The mandate of ZERA is to regulate the energy sector in Zimbabwe.

The function of ZERA include; regulatory, energy licensing, research and development, energy access, security of energy supplies, energy efficiency and advisory role to key stakeholders thereby promoting value and growth in the energy industry.

1.2.1 Regulatory and Licensing

The Regulatory Authority ensures regulation of procurement, production, transmission, distribution, importation and exportation of energy derived from any energy source. The regulatory body also exercises licensing and regulatory functions in respect of the energy industry. In an attempt to uphold industry standards, ZERA establishes operating codes for safety, security, reliability and quality standards thereby promoting and maintaining effective competition within the industry.

1.2.2 Fuel Licensing

There are five categories of fuel licences that are offered by ZERA in the petroleum industry and these include; importers, wholesalers, retailers, blenders and ethanol production licences. When a registered company intends to get licensed on any one of the fuel licences, it must fulfil the stipulated requirements and conditions in the application form.

1.3 Oil Sector Market Environment

Following liberalization of the Petroleum Industry in 2009, a lot of small companies came to the fore within the Oil sector. Due to a plethora of challenges that most of the oil companies were experiencing soon after dollarization, there

has been a lot of acquisitions and mergers in the sector. Engen acquired Caltex while Zuva Petroleum took over BP/Shell in 2010. A lot of upcoming small oil companies disappeared from the scene.

The deregulation of the petroleum sector in 2009 allowed increased participation of private companies in the sector, unlike the period prior to 2008 where participation was dominated by international and foreign companies.

An in-depth analysis of Porter's model would assist in understanding the industry environment. Figure 1.3 briefly outlines the structure of the oil industry;

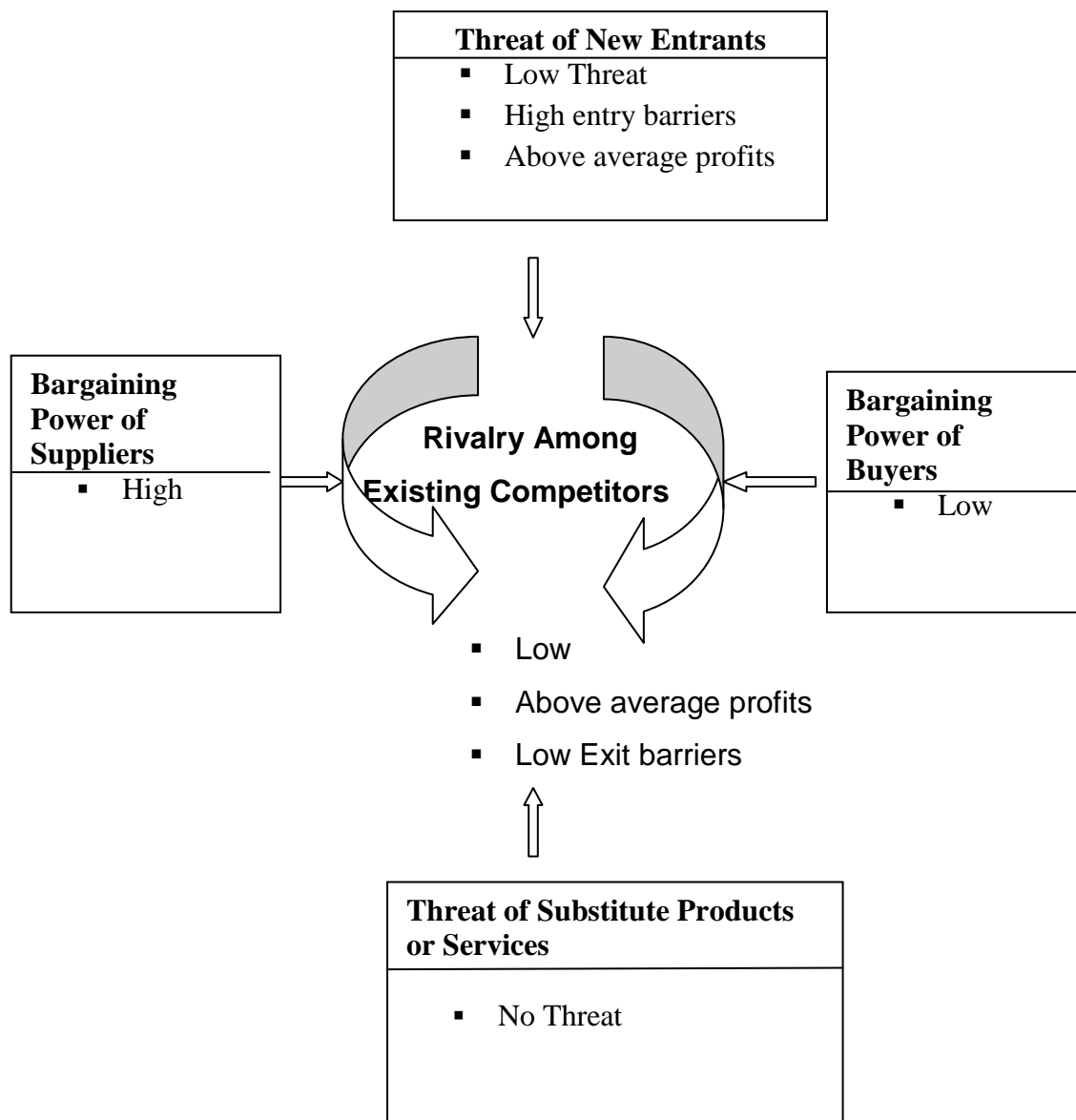


Figure 1.3 : Oil Industry Structure

Source: Porter's Five Forces that Shape Industry Competition (1980, 1985)

According to June 2014 ZERA database, there were 400 active retail sites countrywide with 37 registered oil companies operating in the country. These 37 active oil companies reflected a 46.25 percent of the registered oil companies since the liberalisation of the industry in 2009. Hence, there has been a decrease in the number of oil companies operating in the country from 80 in 2009 to 37 in 2014. Figure 1.3 on the previous page shows that the rivalry among the existing competitors was very low and there were also low exiting barriers due to liquidity of the fuel business.

The oil industry had low threat of new entrants while entry barriers were high due to high costs required to set up fuel infrastructure, high licence fees and high payments of fuel duty. But once a company would be well-established it could realise above average profits. The existing large oil companies in the industry enjoyed economies of scale through purchase of large quantities that act as barriers to new entrants who could not afford to match the minimum efficient scale.

Firms in the oil industry pursued almost the same strategies of forming strategic alliances with foreigners so that they would be able to access cheaper fuel from the international market, brand their retail outlets to differentiate themselves and reduce fuel prices (for those who were well-established) to gain competitive advantage. The strategies worked because all the oil companies supplied a homogeneous product into the market.

Suppliers of fuel were few and powerful. Therefore, focal firms were considered insignificant by the suppliers and these suppliers were integrating forward their business. Suppliers such as Glencore and Trafigura were negotiating with the Zimbabwean oil companies so that they could partner with them.

Although there had been some major changes in terms of statutory merger and rebranding in the oil sector in response to both macro and micro business and economic factors, it seemed little had been done internally to effectively manage business through ICT adoption. According to (Margherita and Petti , 2010), they cite that, the alignment among business strategy, ICT and organisational

transformation is truly one of the key challenges facing corporate executives nowadays. This study would assess the usage level of ICTs in line with business operations and the benefits that oil companies accrue. Main focus would be built around the ICTs that are in use, the level of networking infrastructure that would be in existence and business strategy, as well as fuel inventory management systems in operation. Finally, the study would form the basis of application in the whole petroleum industry.

1.4 Concepts

1.4.1 Adoption

O'Halloran (2009) acknowledges that the best definition of adoption within a social context is one that has a legal definition. In legal terms adoption is a legal method of creating between the child and one who is not the natural parent of the child an artificial family relationship analogous to that of parent and child (O'Halloran, 2009, p. 8).

In innovativeness research, Eveland (2011) defines adoption as making full use of a new idea as the best course of action available. He noted three underlying assumptions which include; some definable idea- which has much the same meaning to the people who use it, even in different settings, the uses to which the idea is put in different settings and availability of criteria for determining a new idea as the best course of action. Adoption is a basic dependent variable in innovativeness research and its major value is to distinguish between the result-states of innovation and non-innovation. Eveland's definition of adoption would be adopted for the study. While adoption can be defined in social context and applied in social families, only adoption in terms of innovation would be the focus of the study.

1.5 Statement of the problem

There was scramble for investment in Zimbabwe's fuel industry as foreigners (such as Glencore, Strauss, Trafigura and Puma Energy), were being pulled into the country due to the lower risks associated with using the multi-currency and high fuel consumption levels yet many firms that were operating in the country were failing to grow (www.zimbabwesituation.com, accessed 8-03-2014). Major players like BP/Shell, Mobil and Caltex pulled out of the country while the new players that came on board the likes of Engen, Redan, Zuva Petroleum and Sakunda Energy had done little in terms of contribution to the development of the economy.

An attempt by the government to make some public entities in the oil industry viable resulted in unbundling of 'The National Oil Company of Zimbabwe' (NOCZIM) in 2010 through the Ministry of Energy and Power Development. The company was unbundled into two entities, namely National Oil Infrastructure Company of Zimbabwe (NOIC) and Petrotrade. The former was mandated to handle transportation of fuel through pipeline, storage and handling of fuel at depots, while the latter was responsible for downstream activities that included both bulk fuel sales and direct fuel sales at service stations.

Though the challenges that the oil sector was facing include macro and micro-economic factors, the issue of failure of fully utilising ICTs could not be overemphasized. There was a real need to appropriately manage business through effective application of ICTs to improve on internal processes thereby contributing to the overall performance of the business. Hence, the major problem befalling many organisations was that of failing to fully take advantage of ICTs to access low cost fuel from the international markets, account for fuel inventory and sales and e-transacting through the use of smart cards when serving fuel at service stations. The supposed major causes were lack of tools and structures that form the basis of the five pillars that include; management commitment, ICT technical capabilities and competencies, ICT policy documentation, ICT-business strategy alignment skills and inadequate funding.

Some go to the extent of failing to make use of ICTs already put in place for purposes of aiding organizational success.

1.6 Research Objectives

The main objective of the study is to examine the effective management of business through ICT adoption within the Zimbabwean oil sector.

Specifically, this study will focus on the following objectives:

- a) To assess the extent of ICT adoption.
- b) To examine the best ways of resolving challenges to CT adoption.
- c) To identify the greatest influential benefits on ICT adoption.
- d) To identify major success factors to ICT adoption.
- e) To draw lessons and give recommendations to policy-makers and management.

1.7 Research Questions

The major research question was derived from the gap identified in the literature review and was presented as specified;

How to effectively manage business in the Zimbabwean Oil Sector through ICT adoption?

In attempting to respond to the above-stated major question, the study proposed the following sub-questions:

- a) What is the extent of ICT adoption in the Oil Sector?
- b) How best can challenges to ICT adoption be resolved?
- c) Which are the greatest influential benefits on ICT adoption?
- d) What are the major success factors to ICT adoption?
- e) What lessons can be learnt from the results of the study?

1.8 Research Proposition

The main proposition of the study was that the oil sector was failing to perform and grow due to lack of full exploitation of ICTs.

1.9 Justification of the Study

This study is important in many ways. ICTs present many opportunities for the oil sector to redefine strategic objectives and enhance or transform products, services, markets, work processes and business communication. While some oil companies have adopted ICTs they have not fully integrated ICT elements into main activities of the company. The study would provide a basis for understanding management of business through ICTs. The findings in this study would then be applied to the entire oil sector.

The significance of the research study would be that it seeks to address the problem of many companies that fail to fully utilise ICT opportunity in the oil sector. The study seeks to address among others the following;

- The study ensures that the oil industry grows thereby boosting the country's economy through exploitation of appropriate ICTs.
- The study will enhance ICT policies in the industry.
- The study will remove perception that business strategies alone would significantly contribute to organizational transformation. This ensures that the oil sector will be globally competitive. By adopting appropriate ICTs the oil sector would improve their service quality at service stations. They would also be able to keep sufficient stocks for the market without carrying the risk of overstocking or under-stocking fuel quantities. Management would be able to make quick decisions on sales and be able to analyse sales and purchase trends. The overall impact would be better performance and reduced fuel prices to consumers.
- The study will also provide recommendations to both managers and management in the oil sector on the importance of their role in ICT adoption and how best they can place an IT department in a company structure.
- Again, the research will help the researcher to get broad and in-depth understanding and knowledge on the effectiveness of ICT adoption in the oil sector.
- Ultimately, the research will assist the academia world in further carrying out similar researches in the same field.

1.10 Research Scope

The research study will be conducted to four oil companies in Harare only while data analysis will cover dollarization period. Since the study will consider four oil companies in Harare only, there are possible constraints of getting biased data that is not representative of the whole oil industry. Furthermore, company information is restricted to external people and this poses a great challenge. However, since the researcher has vast experience in the oil sector this would pose no great challenge for the purposes of this research study.

1.11 Organisation of the Study

Chapter two reviews literature related to the study and concludes with an analytical framework for the study. Chapter three is the Methodology chapter, which describes the research approach, the adopted research strategies and how the data analysis was carried out. Chapter four presents and discusses the study results. Finally, Chapter five provides conclusions and recommendations.

1.12 Chapter Summary

The chapter laid out the tone for the study. It pointed out that ICTs alone could not propel the business agenda without being properly harnessed and managed, specifically in the oil sector which drives all other sectors of the economy. The oil sector needs to consider the effective way of appropriately managing adopted ICTs to reduce operating costs and encourage growth. The study will attempt to assess the effectiveness of ICT adoption on Zimbabwean firms in the oil sector through the assessment of the extent of adopted ICTs, examination of the best ways of resolving challenges to ICT adoption, identification of the greatest influential benefits and major success factors.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter, a number of articles related to the study were analysed. The main focus of the study was to assess the effectiveness of Information and Communication Technology (ICT) adoption on Zimbabwean firms in the oil industry post dollarization. Furthermore, the research study looked at management of business through ICT adoption, the underpinning theory and the importance of ICT adoption. A discussion of various existing models, key concepts and variables pertaining to the study was conducted. The chapter concluded with literature synthesis and an updated integrated ICT adoption framework.

2.2 Review of Previous Researches

2.2.1 General Literature Review on ICT Adoption

The area of study had very few authors who studied the role played by ICT in the operations of the oil industry. However, numerous studies were conducted on the effectiveness of ICTs on economic development and transformation in sectors of education, health, agriculture, environmental management, tourism and ICT governance. The results of such similar studies were significant to the case study. The peculiarity of the study was that the oil industry came out of dollarization era to a multi-currency regime where there were a plethora of economic challenges characterised by fuel rationing, hyper-inflation, emergence of black market and brain drain. As such, the effectiveness of ICT may not necessarily be the same as in those earlier studies. However, the studies would still be relevant with regards to general ICT adoption issues. Adoption of ICT has issues that are cross-cutting.

Other related studies looked at the role of ICT in advancing growth in least developed countries. The studies covered on trends, challenges and opportunities. The following were some of the literature reviews that were conducted to fulfil the same domain of the research study.

Margherita and Petti (2010) identified some main factors affecting ICT adoption and process redesign within organisations, with the objective of defining a systematisation framework and a set of methods and tools useful for students and practitioners. Their findings showed that effective introduction of change required addressing aspects placed at strategy, people, process and enablers' level. The study confirmed that a system view of the components identified during findings was key to streamline ICT adoption and process redesign.

Lee et al (2008) developed a framework that evaluated business-ICT alignment. Specifically, the authors emphasised on internal business-ICT alignment between business and Information system groups. The study investigated the relationship among social alignment, technical alignment, information system effectiveness and business performance. The results indicated that alignment between business and information groups increased information system effectiveness and business performance. The study concluded that business-ICT alignment that resulted from socio-technical arrangements in the firm's infrastructure had positive impacts on business performance.

Wiley Periodicals (2005) differentiated between the role of ICT and human development when the journal revealed that critics expounded that there was a weak or absent positive relationship between ICT and human development. However, proponents of ICT strongly believed that ICT had the capability to provide developing nations with an unprecedented opportunity to meet vital development goals and thus empower them to "leapfrog" several stages of their development far more effectively than before. The study cited that protagonists of ICT for development, however, argued that growth of ICT should not become a "techno-quick-fix" for solving development problems as these might be unacceptable tradeoffs in less developed countries.

Wiley Periodicals (2005) concurred with the UN report (2006), Lee et al (2008) and Margherita and Petti (2010) on the effectiveness of ICT in an industry as its contribution to overall economic growth of a nation, enabler for enhancing human productivity - ICT being applied as control technology that leads to innovations in products and processes breaking barriers to human knowledge, participation and economic opportunity. However, the authors found out that quantitative assessment of the effectiveness of ICT had some difficulty that were embedded and integrated in all industrial and services sectors.

A study by Kyobe (2011) sought to investigate and empirically determine the influence on information and communication adoption of three important factors (capacity to adopt and use ICT, exposure to international environment and state policies) in South Africa. The approach to the study was based on a logarithmic transformation of data, followed by a regression analysis in order to determine the significance of the influence of each factor. The research results concluded that capacity to adopt and use ICT had the most significant influence on ICT adoption, followed by exposure to international environment. The effect of state policies was surprisingly not significant, deviating from the general claims that policy implementation and adoption of such policies were key determinants of adoption.

Keengwe, Kidd and Kyei-Blankson (2009) and Margherita and Petti (2010) in the study they conducted to explore the factors affecting ICT adoption process identified organisational support, leadership, training and development and resources as the predominant themes affecting ICT adoption process. However, Margherita and Petti (2010) identified strategy as a key aspect to ICT adoption process, although strategy is related to leadership.

2.2.2 Literature Review in the Oil Sector

The United Nations report (2006) conducted a research on role of ICTs in the oil sector for developing economies, the paper reviewed the state of play in the international petroleum market and it attempted to identify ICT-driven efficiency gains in both upstream and downstream stages of the global petroleum industry,

drawing on the experience and concerns of developing countries. The paper witnessed an increase in world demand for oil being driven by major developing economies, primarily China and India where energy and, in particular, oil consumption was increasing in both absolute and relative terms. The research quoted 3 million barrels per day (mbpd) of crude oil which represented half of China's consumption. Further, the study revealed that while China's share in the global oil market was 8 percent, since 2000 it had captured 30 percent of the growth in global oil demand. Below are figures 2.2.2.1 and 2.2.2.2 showing global oil supply and demand over the past years. Figure 2.2.2.1 shows global oil supply and demand in early years from 2002 to 2006 while figure 2.2.2.2 provides recent fuel supply and demand levels. The y-axis shows million barrels per day (mbpd) while the x-axis reflects the years that were studied.

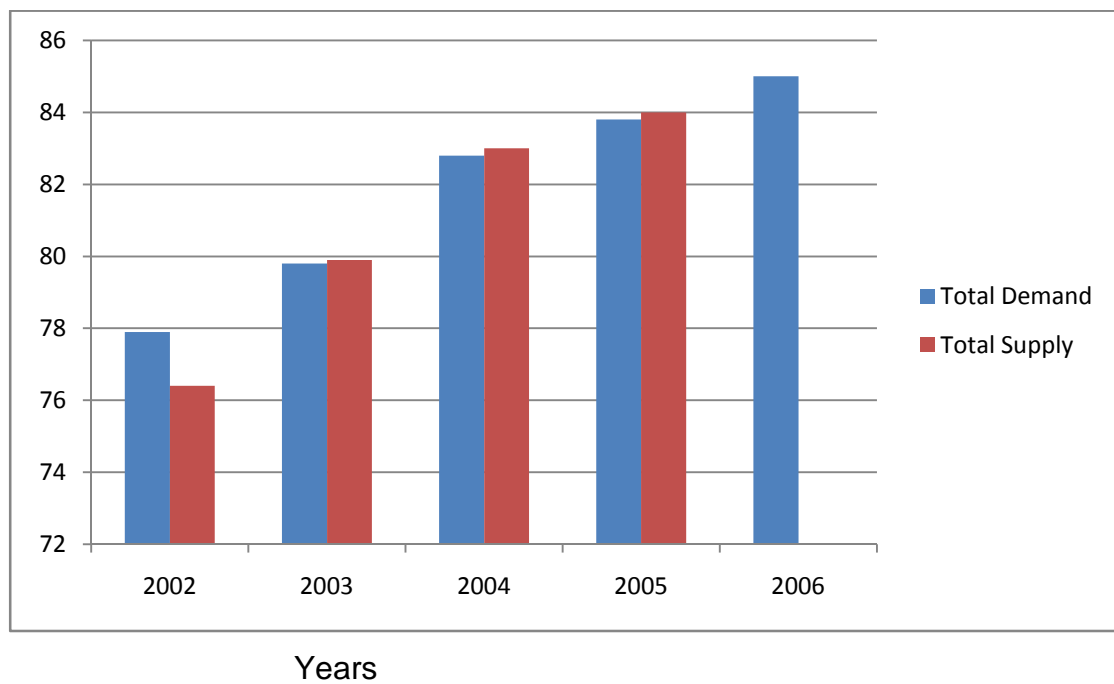


Figure 2.2.2.1 : Global Oil Supply and Demand

Source : (International Energy Agency (IEA), Oil Market Report, 12 May 2006)

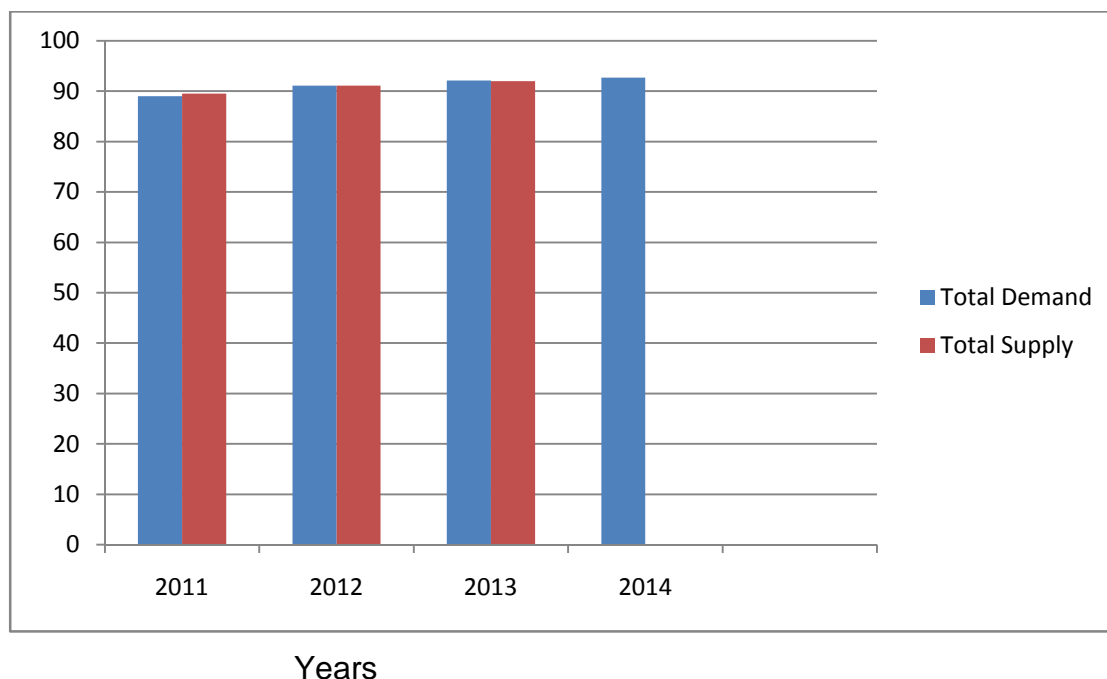


Figure 2.2.2.2 : Global Oil Supply and Demand

Source : (International Energy Agency (IEA), Oil Market Report, 11 April 2014)

The two figures show that both the global oil supply and demand had increased over the years. The global oil supply had increased from 76.4 million barrels per day (mbpd) in 2002 to 92 mbpd in 2013, representing a 20.4 percent increase in world oil supply in the past 11 years. On the demand side, global oil demand had increased from 77.9 mbpd in 2002 to 92.7 mbpd in 2014, representing an increase of 19 percent in the past 12 years. The trend in global oil supply and demand reflects that ICTs are required to effectively manage fuel supplies, stocks and sales in the ever growing market.

Furthermore, the paper analysed the usage of ICTs and related technologies within major International Oil Companies (IOCs) in the oil sector and established that ICT adoption was mainly driven by the desire to keep pace with competitors. A study by United Kingdom's Royal Institute of International Affairs concurred with the UN report that ICTs enhanced communication and exchange of knowledge among the five major national oil companies that included Saudi Arabia's Aramco, the Kuwait Oil Company (KOC), the Abu Dhabi National Oil Company (ADNOC), the National Iranian Oil Company (NIOC) and Algeria's Sonatrach thereby improving best practices.

The study investigated the implications of ICT between oil exporters and oil-importing countries and noted that oil exporters were exploiting ICTs while oil-importers were particularly interested in being able to buy petroleum at better prices and use it effectively rather than concentrating on ICT investment.

An argument was put forward that higher oil prices increased the risk of squeezing ICT budgets in oil using industries particularly, oil importing developing countries due to limited capacity to respond to oil price shocks. However, ICTs play a major role in increasing efficiencies, productivity and cutting costs.

Challenges to the implications of ICTs that needed to be addressed were revealed and included among others, lack of skilled human resources, the need for increased knowledge of cutting-edge technologies and business processes. A number of national oil companies in developing countries were failing to keep up with new technologies including ICTs due to lack of basic infrastructure and financial resources required to upgrade their technological capabilities.

2.2.3 Technological Advancement in Zimbabwe

The Ministry of Information Communication Technology (MICT) strategic plan (2010 – 2014) stated that the government of Zimbabwe had progressively shown an awareness and deep appreciation of ICTs since inception of Central Computing Services in 1972. The first draft of National ICT policy framework was produced in September 2007 and subsequently the Ministry of ICT was established to cater for the rapid ICT diffusion across all sectors of the economy and the need to align national economic development agenda.

The MICT strategic plan (2010 – 2014) revealed that analysis that was conducted on Sub-Sahara Africa - Zimbabwe included, showed that the region was one of the poorest regions in the world and had the lowest access to ICT resources.

However, according to the National Information and Communication Technology (ICT) policy framework (2012), an e-readiness survey that was conducted in Zimbabwe identified key developments in ICT sector and indicated the following areas;

- Deregulation of telecommunication sector.
- Establishment of regulatory frameworks for the ICT sector.
- Establishment of the Cabinet Committee on Scientific Research, Technology Development and Applications.
- A phenomenal growth in internet users.
- Expansion of network infrastructure.
- Massive computerization of government ministries.

2.2.3.1 General Problems

The government of Zimbabwe has made significant contributions to the investment in the existing pipeline, rail system and storage facility and it liberalised the oil sector to improve operation efficiency and competition (ICT policy framework, 2012). However, the oil sector is facing numerous problems that include failure to implement e-commerce systems for business transactions, high fuel pricing structure, lack of competition in the market, penetration of new entrants and pulling off, of former major oil companies (BP/Shell, Mobil and Caltex) and liquidity crunch in the economy.

Compounded to the above mentioned problems were challenges that the country was encountering in ICT development according to the ICT policy framework (2012). These challenges were specified as follows;

- Inadequate ICTs infrastructure.
- Inadequate ICTs skills.
- Limited institutional arrangements.
- Inadequate financial resources.
- Limited public private partnerships.
- Limited data management capacity.
- Inadequate bandwidth nationally and on the gateway.

2.3 Management of Business through ICT Adoption

Adoption can be seen as a process of information diffusion, culminating in a rationale choice to use (or not to use) the new technology (Keengwe, Kidd and Kyei-Blankson: 2009, p. 24).

ICT in the oil sector is considered as goods (such as software and communication equipment), services and management (such as telecommunication including transmission and display) adopted to generate growth and productivity in the industry. ICT has also gained acceptance and been implemented as a tool to improve process efficiency and overall productivity across the supply chain (Alkalbani et al, 2013). The research study focused on extent of usage of running enterprise resource planning (ERP) system(s), internet access, computer hardware and mobile/fixed phone(s) in the selected organisations in Harare. Outlined below are the descriptions of the aforementioned ICTs commonly implemented by most organisations;

a) Enterprise Resource Planning (ERP)- O'Brien (2005) defines an ERP as an integrated cross-functional software that reengineers manufacturing, distribution, finance, human resources and other basic business processes of a company to improve its efficiency, agility and profitability.

b) Internet- There are several definitions of internet but the definitions adopted suit this study. According to (Wiseman: 2000 p. 3)an internet refers to an open network. More specifically, the Federal Networking Council (FNC) has defined the internet as the global information system that is logically linked together by a globally unique address space based on the internet protocol (IP) or its subsequent extensions that supports communications.

Internet originated in the early 1960s when a division of a Department of Defense, Advanced Research Projects Administration (ARPA), developed the predecessor to the internet, ARPAnet to connect universities and high-tech defense contractors. In October 1969, a message was successfully transmitted between the research centres resulting in the birth of the internet.

In Zimbabwe, according to the reviewed National ICT policy framework (2012), internet penetration rate increased to 39.8% from 33.4% as of December 2012 due to the development and application of information technologies since independence in 1980.

c) Computer Hardware- Afriyie (2012) describes a computer as an electronic device that is composed of two basic units – hardware and software. According to him the word “hardware” in ICT refers to the physical parts of the computer that are visible to an individual. Basically, a personal computer consists mainly of a system unit and several accessories called peripherals. These peripherals in turn, can be grouped into two major categories commonly known as input and output devices. The input device refers to such peripherals as the keyboard, mouse, scanner and microphone, which can be used for entering data into the system unit while peripherals include, monitors, printers and speakers which take data out from the system unit and are therefore considered as output devices.

d) Fixed Phone - Different authors define a fixed telephone in various ways, thus the International Telecommunication Union (ITU) (2010) standardized the various definitions and adopted a single definition. According to ITU (2010) it defines a mobile telephone line as an active line connecting the subscriber’s terminal equipment to the public switched telephone network (PSTN) and which has a dedicated part in the telephone exchange equipment. The ITU noted synonymous terms of a fixed line with terms such as main station or direct exchange line (DEL) that are used in communication.

According to Postal and Telecommunications Regulatory Authority of Zimbabwe (POTRAZ) second quarter statistics report for the year 2012, fixed subscribers decreased from 373 849 to 346 849 mainly due to the increase in the number of internet subscribers who grew from 2.2 million in the first quarter of 2012 to 3.27 million in the second quarter of the same year.

e) Mobile Phone -The ITU code (2010) refers to a mobile cellular telephone to the subscriptions to a public mobile telephone service and provides access to Public Switched Network (PSTN) using cellular technology that include number of pre-paid SIM cards active during the past three months.

The definition was meant to include both analogue and digital cellular systems (IMT – 2000 (Third Generation, 3 G) and 4 G subscriptions to public mobile data services, private trunked mobile radio, telepoint or radio, paging and telemetry services were excluded. Below is table 2.3 showing subscriber data recorded in the POTRAZ second quarter statistics report for 2012 for mobile, fixed, data and internet subscribers;

Table 2.3 : Subscriber Data for Mobile, Fixed, Data and Internet

Service	Total Subscribers	Penetration Rate
Mobile Voice	10 914 770	86.6%
Data and Internet	3 266 411	25.9%
Fixed Voice	346 211	2.75%

Source : (POTRAZ, Second Quarter Report, 2012)

There has been increased fuel consumption in Zimbabwe over the past five years due to high imports of pre-owned vehicles and an increased use of generators as backup energy caused by electricity shortages. The realisation by the oil sector that fuel was a cash business, with low risks prompted players to invest in ICTs. With the adoption of the multi-currency regime, Zimbabwe has become a less risky market in the region in terms of currency exchange as the money comes in hard currency.

In recent years, the oil industry has begun to embrace technology to address ever-growing pressure from consumers to deliver high-quality service. The sector appreciated the significance of ICT in efficient management of fuel inventory, accounting for sales revenue and purchase of low cost fuel from the global market (Alkalbani et al, 2013).

Oil companies in developed countries have had ICT strategies and initiatives in place for over a decade, while developing countries are still attempting to understand and apply the concept of ICT in particular that apply knowledge management (Alkalbani et al, 2013).

2.4 Underpinning Theory of ICT Adoption

A number of theories have been explored in relationship to ICT adoption in various fields. Basically, there are two major theories that have been commonly used in many studies namely; the Concerns-Based Adoption Model (Hall and Hord 1987) and Rogers' Diffusion of Innovations (Rogers, 2003).

According to Keengwe, Kidd and Kyei-Blankson (2009), concerns-based adoption model is used to study the process of adopting innovations. The model describes eight different levels of use of an innovation: non-use, orientation, preparation, mechanical use, routine, refinement, integration and renewal. While concerns-based adoption model focuses more on the adoption process of an innovation, the diffusion of innovations theory looks at both the adoption and the diffusion of an innovation and this theory forms the underpinning model of this study.

2.4.1 The Diffusion of Innovation Theory

Rogers (2003) and Yusuf and Derus (2013) define diffusion as a process by which an innovation is communicated through certain channels over time among the members of a social system. From the definition there are four main elements in the diffusion of innovations which include; innovation, communication channels, time and social system (Rogers, 2003).

Dooley et al (1999) and Stuart (2000) described Rogers' theory as a widely used theoretical framework in the area of technology diffusion and adoption. The theory provides a model for other sectors of the industry seeking a theory-based approach to study adoption and diffusion of ICT that enhances technology leadership. Figure 2.4.1 shows an ICT adoption and implementation model.

2.4.1.1 Main Elements of Diffusion of Innovation Theory

The discussion that follows outlines the four main elements that have been previously mentioned on diffusion of innovation theory. The four elements are the cornerstone of technology adoption and diffusion in the oil industry which forms the basis of this study.

i. The Innovation

Rogers (2003) defines innovations as an idea, practice or object that is perceived as new by an individual or other unit of adoption. The perceived newness of the idea for the individual determines his or her reaction to it. If an idea seems new to the individual, it is an innovation. Newness of an innovation maybe expressed in terms of knowledge, persuasion or a decision to adopt. Most of the new ideas whose diffusion has been analysed are technological innovations. When an innovation exists, there is need for communication to spread the innovation.

ii. Communication Channels

Diffusion can be considered as a particular type of communication in which the message content that is exchanged is concerned with a new idea. At the preliminary stage the diffusion process involves an innovation, an individual or other unit of adoption that has knowledge of or has experience using the innovation, another individual or other unit that does not yet have knowledge of, or experience with the innovation and a communication channel connecting the two units. Heterophily and diffusion is an obvious principle of human communication that involves transfer of ideas between two individuals who are similar or homophilous (Rogers, 2003).

iii. Time

Consideration of time in diffusion involves innovation-diffusion process, innovativeness and an innovation's rate of adoption. The innovation-decision process is a process when first knowledge about an innovation is passed to form an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea and to confirmation of the decision.

An individual seeks information at various stages in the innovation-decision process in order to decrease uncertainty about an innovation's expected consequences which either leads to adoption or rejection.

Innovativeness is the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system. There are five adopter categories, classified on the basis of their innovativeness that include; innovators, early adopters, early majority and laggards. The rate of adoption is the relative speed with which an innovation is adopted by members of a social system.

iv. Social System

Rogers (2003) defines a social system as a group of individuals or organizations working together to achieve a common goal. The social and communication structure of a system facilitates or impedes the diffusion of innovations in the system.

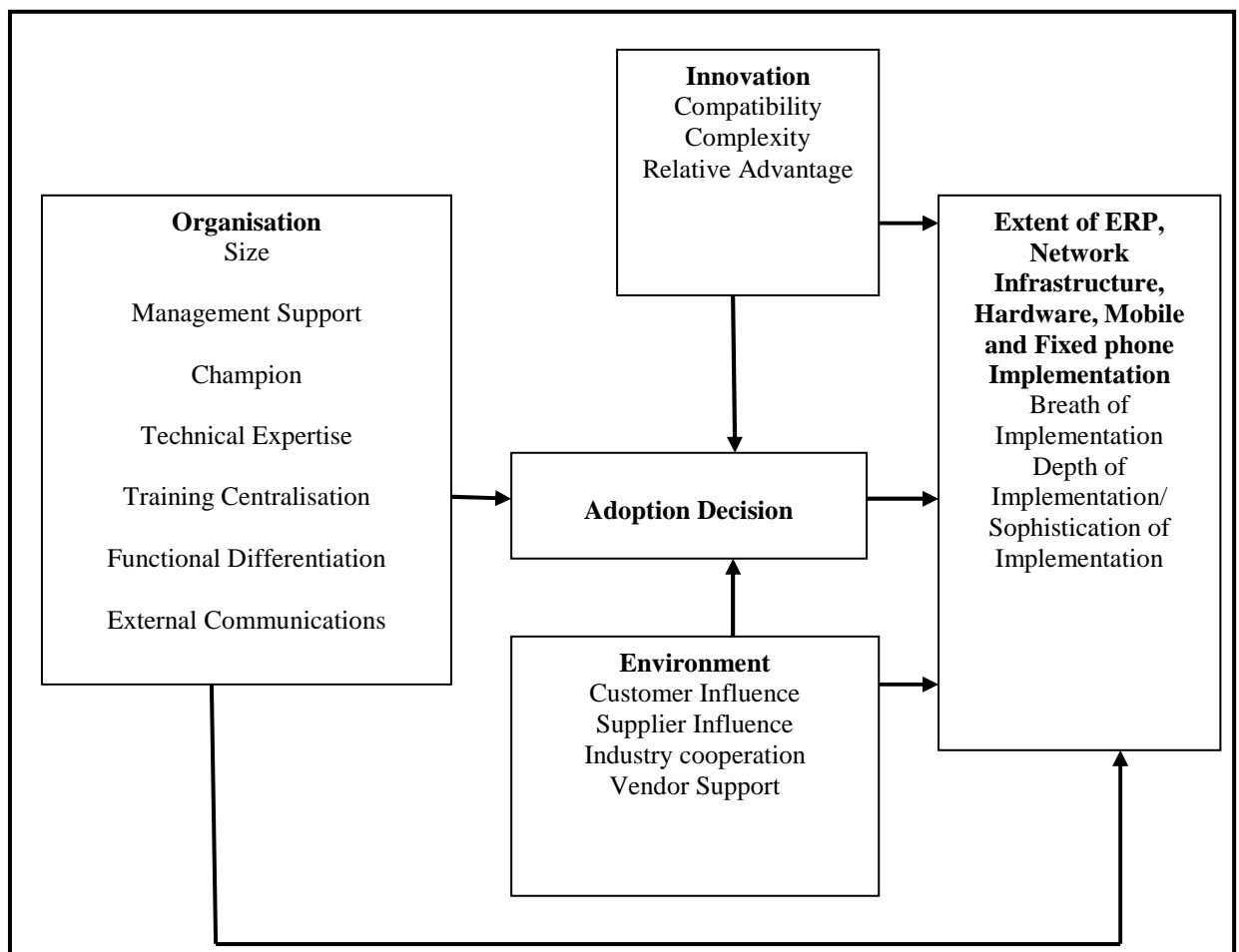


Figure 2.4.1: ICT Adoption and Implementation Model

Source: (Adapted from Larsen and Mcguire, 1998)

2.4.1.2 Factors Influencing Adoption Decision

The ICT adoption and implementation model looked at four factors that result in an organisation making decision to adopt an ICT. These factors include; type of innovation, organisational factors, and extent of implementing a certain type of ICT. The following is a discussion of the sub-variables of the key factors mentioned above;

- i. **Organisation Size** - Large organizations would tend to have greater volume of business transactions and thus, could realize greater benefits of ICT innovations. Because of their size, large organizations may adopt ICTs that interact with their trading partners.
- ii. **Management Support** -The adoption of ICTs requires significant organizational resources. Innovations which are viewed favourably by management are more likely to receive the funding for implementation. Management support may be required to effect changes in procedures and or organizational structure when implementing an innovation which crosses organizational boundaries.
- iii. **Product Champion** -Organisations are faced with many technologies, and a product champion can overcome barriers to adoption.
- iv. **Technical Expertise** - An innovation is more likely to be adopted when there is technical expertise available in the organization. Diffusion theory suggests that firms possessing technical expertise might be better equipped to identify and evaluate ICTs to the firm regarding the appropriateness of the innovations to the firm.
- v. **Training** -Richardson (2011) found that the availability of training was positively correlated with the extent of use of customer-based inter-organisational systems. Training was also significant factor in explaining the difference between ICT adopters and non-adopters. The results suggested that training could facilitate both the initial adoption and subsequent diffusion of ICT.
- vi. **Functional Differentiation** –represents the degree to which an organization is divided into subunits. Research done by Richardson (2011) found that functional differentiation was positively correlated with technical

innovations but there was no significant correlation with administrative innovations.

- vii. **Communications** - The availability of communication channels was associated with greater use of ICTs. Organisations frequently scan the environment looking for solutions or to see how other organizations have dealt with similar problems. External communications, including books, trade journals, seminars and conferences provide opportunities to learn about possible solutions.
- viii. **Vendor Support** -Vendor support can influence the spread of innovation. Richardson (2011) found out that the stronger the links between the innovation suppliers and customers the more likely was the adoption.
- ix. **Complexity** -The complexity of the technology determine whether an organization acquires an innovation.
- x. **Compatible** - Richardson (2011) claimed that if an innovation is perceived to be advantageous; is compatible with existing norms, beliefs and past experiences; has a relatively low level of complexity; can be experimented with; and use of the innovation has observable results, including being able to see others using the innovation, then there will be an increased likelihood of adoption.

2.4.1.3 Justification of the ICT Adoption Framework

The model was developed in mature industries which had better developed infrastructures to deal with innovations, hence there was a need to test the model in less developed countries. Although the model was developed based on EDI, none of the organisations had made the technology a strategic initiative. The model when tested in the oil industry could then be applied in other sectors of the economy.

The findings to the study concluded that customer influence was paramount in the adoption decision while industry cooperation played a significant role in ICT adoption (Larsen and Mcguire, 1998 and Richardson, 2011).These variables required further investigation within the context of the study.

2.5 Significance of the Study

This study brought a cocktail of benefits in many ways. It was noted from the study that if ICTs were properly adopted an array of benefits could be realised in organisations in particular and the oil sector in general. These benefits include improved internal operations, customer satisfaction, oil sector growth, employment creation, enhanced ICT policies, value addition by management and boards on their role in ICT adoption. While some oil companies have adopted ICTs they have not fully integrated ICT elements into main activities of the company. The study provided a basis for understanding management of business through ICTs. According to MacGregor et al (2006), the benefits that accrue from adopting ICTs would include extended market reach, operational efficiency, greater potential for partnerships, ability to undertake strategic planning and better management of fuel supplies and sales.

Since the oil sector is an enabler for economic productivity and growth, improvement in process efficiency would contribute to quality of service delivery that ultimately results in increased performance. Customers would benefit convenient service. Oil companies would be able to keep sufficient fuel stocks for the market without carrying the risk of overstocking or under-stocking fuel quantities. Management would be able to make quick decisions on sales and be able to analyse sales and purchase trends. The overall impact would be better performance and reduced fuel prices to consumers.

Furthermore, the study will remove perception that business strategies alone would significantly contribute to organizational transformation. This ensures that the oil sector will be competitive globally.

Jean (2007) stated that ICT facilitates coordination and monitoring of business activities as well as impacting on partner opportunism. Despite some promising and optimistic views of the contribution of ICT on business value, however, there has been a long debate on the impact of ICT on organisational performance, which is called the "IT productivity paradox". The paradox basically points out that ICT does not necessarily enhance productivity or business performance; in fact it

may even be viewed as a commodity which can easily be replicated by competitors (Car, 2003) , thus diminishing the prospects of developing sustainable competitive advantage. Jean (2007) mentioned that it was still a challenge for managers to effectively manage and capitalise ICT capabilities.

Although previous studies have been conducted on the effectiveness of ICT on business performance, however, it has not been firmly established how ICT affects specific organisational processes. This study would attempt to establish how ICT affects organisational processes.

2.6 Discussion of Technology Adoption Models

According to Resatsch (2010), technology adoption occurs on an organisational level and an individual level. A number of models were said to have been used to explain adoption on an individual level including the social cognitive theory (SCT), theory of reasoned action (TRA), the theory of planned behaviour (TPB) and the technology acceptance model (TAM). Extension models to TAM were combined into a single model. Following is a description of the key models and theories.

2.6.1 Social Cognitive Theory (SCT)

Social cognitive theory provides a framework for understanding, predicting and changing human behaviour. The theory identifies human behaviour as an interaction between personal factors, behaviour and the environment (Resatsch, 2010). The interaction influences the thoughts and actions of a person, involving human beliefs and cognitive competencies. Beliefs and competencies are modifiable by social influences and structures. The interaction between the environment and a person's behaviour determines the aspects of their behaviour and therefore the environment modifies the behaviour (Resatsch, 2010).

2.6.2 Theory of Reasoned Action / Theory of Planned Behaviour (TRA / TPB)

Resatsch (2010) outlined that the theory of reasoned action (TRA) was drawn from fundamental theories of human behaviour and it comes before the theory of planned behaviour (TPB). The theory of reasoned action states that specific behaviour of people is determined by a person's intention to perform that behaviour. Behaving in a certain way is viewed to be a function of an individual's attitude toward the behaviour and subjective norm.

Due to the major limitation of TRA in its assumption that someone voluntarily forms an intention to act, yet in practice, time, money or organisational constraints limit the freedom to act. In order to overcome the limitations of TRA, the theory of planned behaviour (TPB) is used to extend TRA by factoring in a key construct of perceived behavioural control (PBC). The constructs were not invented especially for information technology research however; they provide a basis for later research in that area and were adopted widely. Figure 2.6.2 shows the added key construct- the perceived behavioural control.

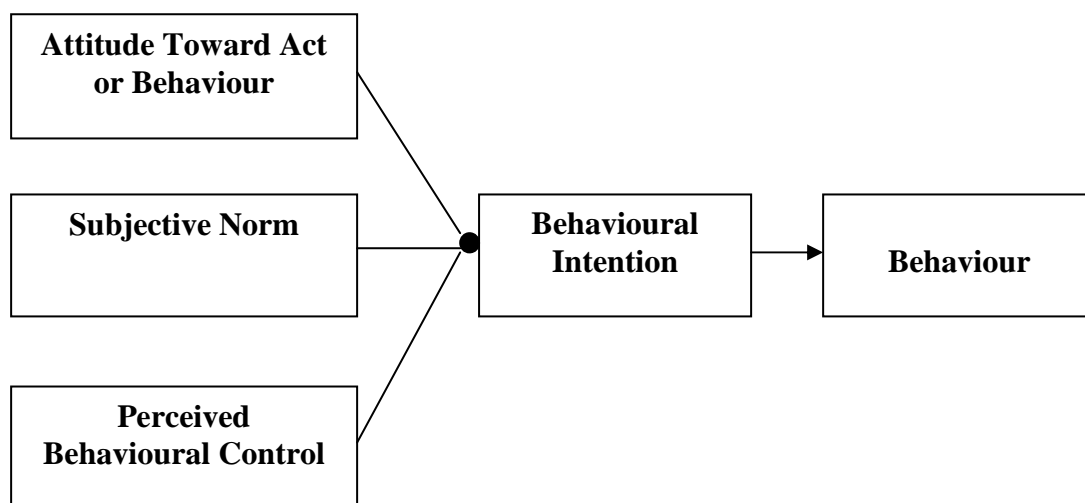


Figure 2.6.2: Theory of Planned Behaviour

Source: (Resatsch, 2010)

2.6.3 Technology Acceptance Model (TAM)

The model assumes that perceived usefulness and perceived ease of use are the main variables that determine an individual's intention to adopt an innovation. User acceptance was indicated as the pivotal factor determining the success or failure of an ICT project.

One of the four major concepts that were identified from a number of articles with a strong relationship to ICT adoption focused on people. Margherita and Petti (2010) explained that people and processes were mutually influenced because of the central role of the human resource component in the execution of processes and the important impact that process change may have on the behaviour of individuals and teams.

The TAM Model is widely regarded as a relatively robust theoretical model for explaining ICT use by individuals that are the fundamental building blocks of any organisation. Clegg, Courpasson and Phillips (2006) confirm that 'It was evident that organisation theories' key concerns were to be constituted within the assumption of the individual as an element in an organisation conceived as a system', TAM may be considered to be adopted at the organisational level.

The model highlights the critical role of extrinsic motivation and, in particular, expectations of task-related performance gains in end-users' adoption and use of ICT innovations. Perceived usefulness and perceived ease of use were two beliefs that were identified as functions of end users' attitude toward adoption and use of ICT innovation. Perceived usefulness defines the degree to which an individual believes that using a particular system would enhance his or her job performance while perceived ease of use relates to the degree to which an individual believes that using a particular system would be free of physical and mental effort.

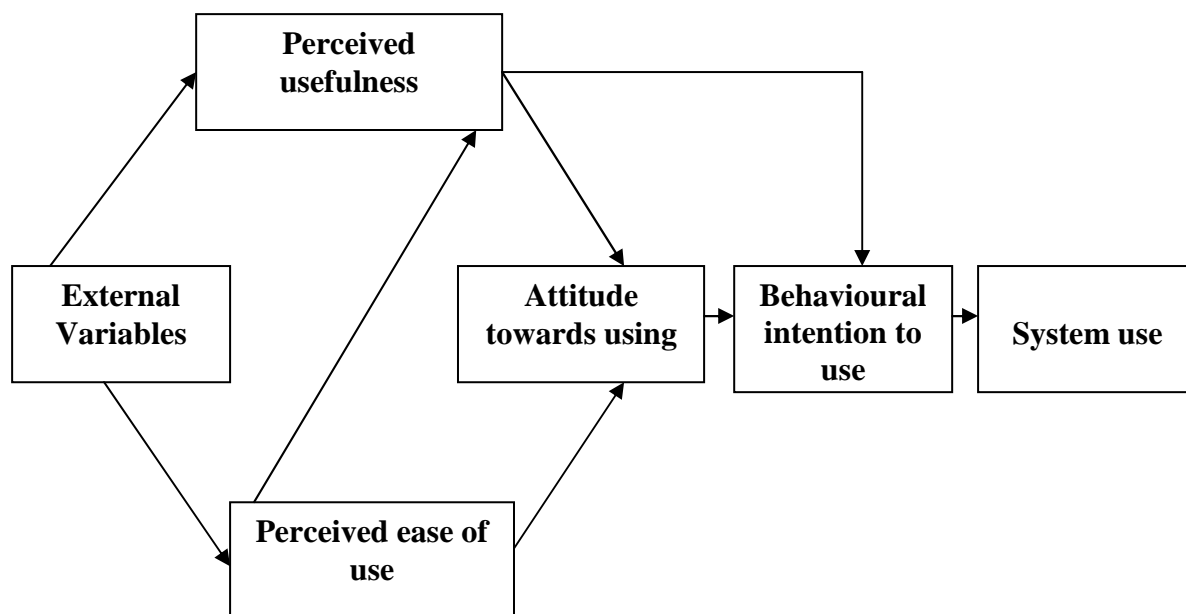


Figure 2.6.3: Technology Acceptance Model (TAM)

Source: (Resatsch, 2010)

2.6.3.1 Limitations of Technology Acceptance Model (TAM)

Critics of TAM conclude that a limitation of the model is that it excludes influences on personal behaviour, economic factors and outside influences. TAM was subsequently developed into the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et.al, 2003).

Many ICT adoption models have been tested in large companies only and many revolve around adoption of Electronic Data Interchange (EDI), internet and e-business. The main problem from the literature was to define the factors that impact the successful adoption of ICT. Neither have these models been tested and applied to successful adoption of all ICT infrastructures rather than just a specific technology.

2.6.4 Task Technology Fit (TTF)

Resatsch (2010) cited the limitation of TAM from an organisation perspective as lack of task focus. Although the “usefulness” concept implicitly includes tasks, ICT utilisation may be better measured with a more explicit inclusion of task characteristics. The task technology fit addresses the assessment of information systems from an ex-post view. The model asserts that for an information technology to have a positive impact on individual performance the technology;

must be utilised and must be a good fit with the tasks it supports (Goodhue, 1995). The measure of the TTF consists of eight factors: quality, locatability, authorisation, compatibility, ease of use, production timeliness, systems reliability and relationship with users (Goodhue, 1995). Figure 2.6.4 outlines the task-technology fit model.

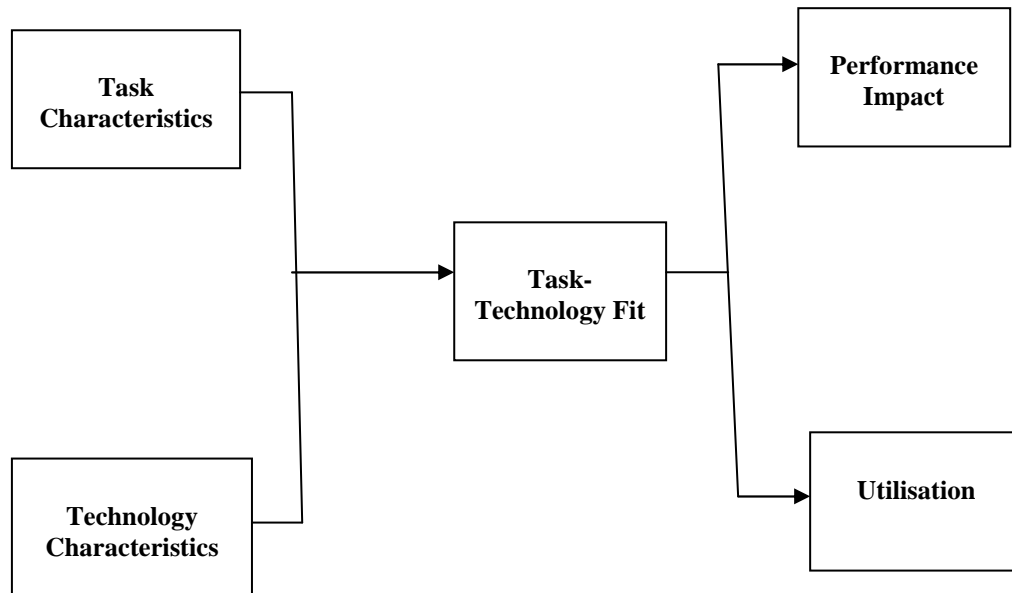


Figure 2.6.4: Task-Technology Fit Model (TTF)

Source: (Goodhue, 1995).

2.6.5 Motivational Model (MM)

Psychology supports the general motivation theory as an explanation for many aspects of human behaviour in specific contexts (Resatsch, 2010). In information technology research motivational theory has been discussed to add to insights on technology adoption (Venkatesh et.al, 2003). Davis applied both motivational aspects, extrinsic and intrinsic motivation to the domain of information system. Extrinsic motivation applies if users want to perform an activity that is influenced by achieving valued outcomes that are distinct from the activity itself while intrinsic motivation applies if users perform activities for no other reason than the activity itself. Motivational models do not have specific core constructs (Resatsch, 2010).

2.6.6 Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT came about as a result of eight reviewed models when determining similarities (Resatsch, 2010). The eight reviewed models were; the theory of reasoned action, the technology acceptance model, the motivational model, the theory of planned behaviour, the personal computer utilisation, the innovation diffusion theory and social cognitive theory.

All other models were empirically compared using within-subjects and longitudinal data from four organisations (Venkatesh et al., 2003). Seven constructs out of all the other models are direct determinants of intention or usage in one or more of the individual models.

According to UTAUT, the intention to use information technology can be determined by three predecessors: performance expectancy, effort expectancy and social influence. Hence, intention to use is to apply influence on actual behaviour toward information technology adoption with facilitating conditions (Zaman et al., 2009). Figure 2.6.6 shows the complete UTAUT constructs as tested by Venkatesh et al. (2003);

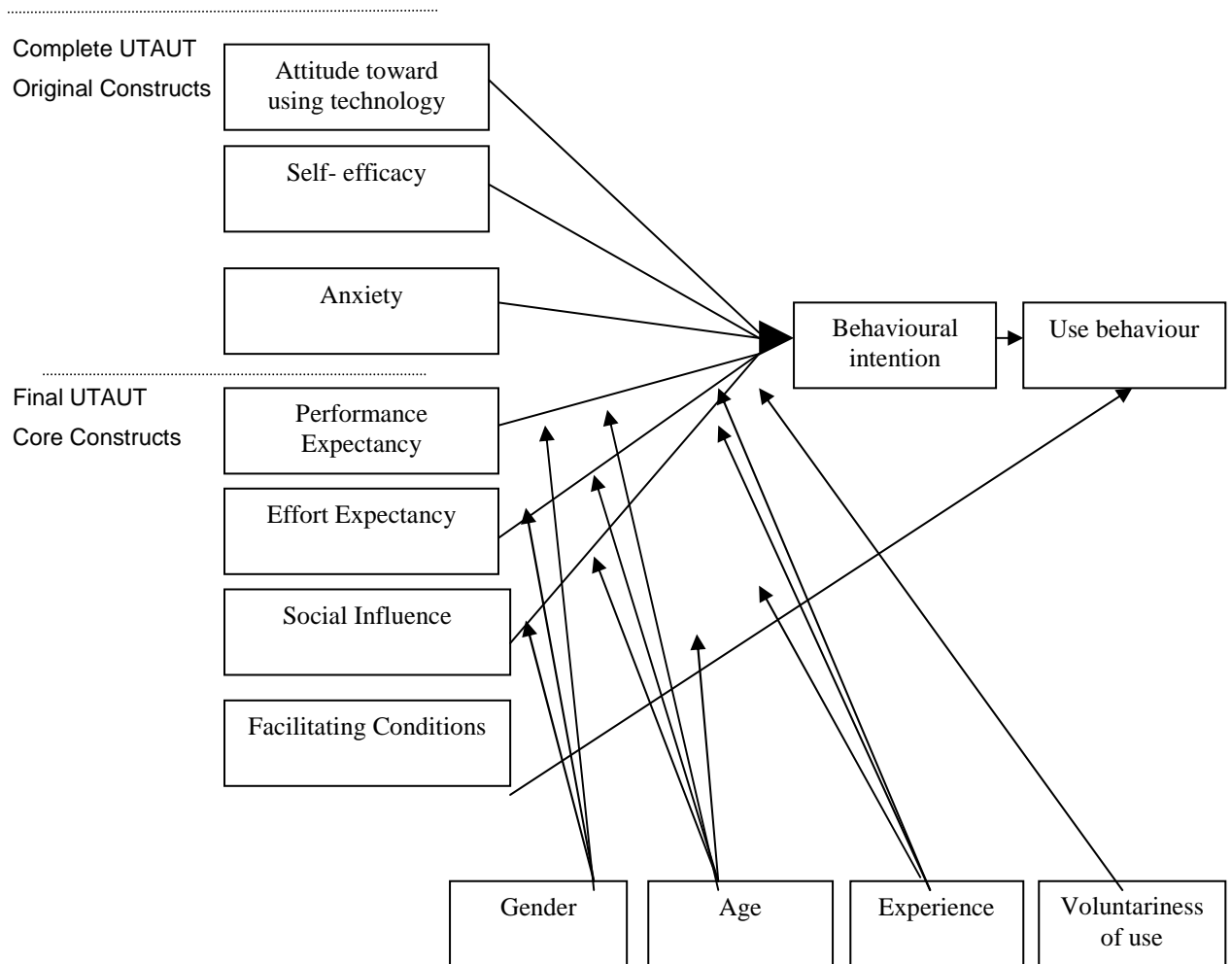


Figure 2.6.6: Original UTAUT Constructs

Source: (Venkatesh et al., 2003)

2.6.6.1 Definitions of Core Constructs

The following core constructs were defined by Venkatesh et al. 2003;

- i. **Performance Expectancy (PE)** is the degree to which an individual believes that using the system will help him or her to attain gains in job performance
- ii. **Effort Expectancy (EE)** is the ease associated with the use of the system.
- iii. **Social Influence (SI)** is the degree to which an individual perceives that important others believe he or she should use the new system.
- iv. **Facilitating Conditions (FC)** is the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system.

- v. **Self-Efficacy (SE)** is the judgment of one's ability to use a technology (e.g. computer) to accomplish a particular job or task.
- vi. **Anxiety (ANX)** is evoking anxious or emotional behavior when it comes to performing a behavior (e.g. using a computer).
- vii. **Attitude Towards Using Technology (ATUT)** is individual's overall affective reaction to using a system.

2.6 Key Variables / Dimensions

The following four key variables emanated from the ICT adoption conceptual framework discussed earlier in this chapter. Following are the brief discussions of the various dependent, independent and moderator variables;

- a) **Innovation** - For an organization to make an ICT adoption decision, Richardson (2011) noted that the innovation type was supposed to be compatible with existing technology. Furthermore, the complexity of the technology was a major factor that required an organization to take into consideration before adoption while at the same time weighing the relative advantage that the technology brings into the organization.
- b) **Organisational Factors** – Larsen and Mcguire (1998) found that organizational size, professionalism and task complexity help explain the level of adoption of modern ICTs.
- c) **Environmental Factors** - Larsen and Mcguire (1998) noted that the ultimate success of a technology was affected by market, legal and social factors. The observation that entire industries were doing a poor job of managing technology suggested that there were environmental factors which affected the use of technology. Organisations that were faced with competition sought to adopt innovations for competitive advantage or were forced to adopt innovations to prevent a competitor from gaining an advantage. An organisation's trading partners were part of its environment. Larsen and Mcguire (1998) identified customers as a source of problems for ICT departments because customers required new or modified systems. Industry cooperation was necessary for the development of

standards thereby facilitating the spread of new ideas, through conferences and trade shows.

- d) **Extent of ICT Implementation** - It has been suggested that the use of technology had both a “breath” and “depth” component (Larsen and McGuire, 1998). Breath of implementation refers to how widely an ICT is used in the organization, for instance, the proportion of people using an ICT. Depth of implementation refers to how extensively an ICT is used in a part of an organization. The sophistication of implementation refers to the degree to which the technical features of an ICT are used in an organization.

Richardson (2011) acknowledges that the current theoretical framework was conceptually grounded in Rogers’s model of the diffusion of innovations theory. Rogers’s model sought to explain the processes by which innovations are adopted by members of a society. Table 2.6 shows Rogers’s model describing five characteristics that impact a person’s choice to adopt an innovation.

Table 2.6 : Innovation Characteristics

Characteristic	Description
Relative advantage	Degree to which an innovation is perceived as a better idea
Compatibility	Degree of consistency with one’s values, experiences and need
Complexity	Perceived degree of difficulty with using the innovation
Observability	Degree to which one can see results of using the innovation
Trialability	Degree to which the innovation can be experimented with or practiced

Source : (Challenges of adopting the Use of Technology in Less Developed Countries, Richardson, 2011)

2.7 Literature Synthesis and Conceptual Framework

The review of the literature has identified four major points. First, ICT adoption required a system view addressing aspects placed at strategy, people, processes and enabler levels. ICTs were regarded as enablers for enhancing human productivity while ICTs alone could not contribute to increased performance. Literature revealed that adoption of ICTs could be applied as control technology that leads to innovations in processes, products and services. Second, was the capacity to adopt and use the technology. Literature pointed out that capacity to adopt and use technology had the most significant influence on ICT adoption. Third, was the exposure to international environment. Success of technology was affected by the market, legal and social factors. Organisations facing competition sought to adopt innovations for competitive advantage. Lastly, was organisational support in terms of leadership commitment, provision of resources, training and development.

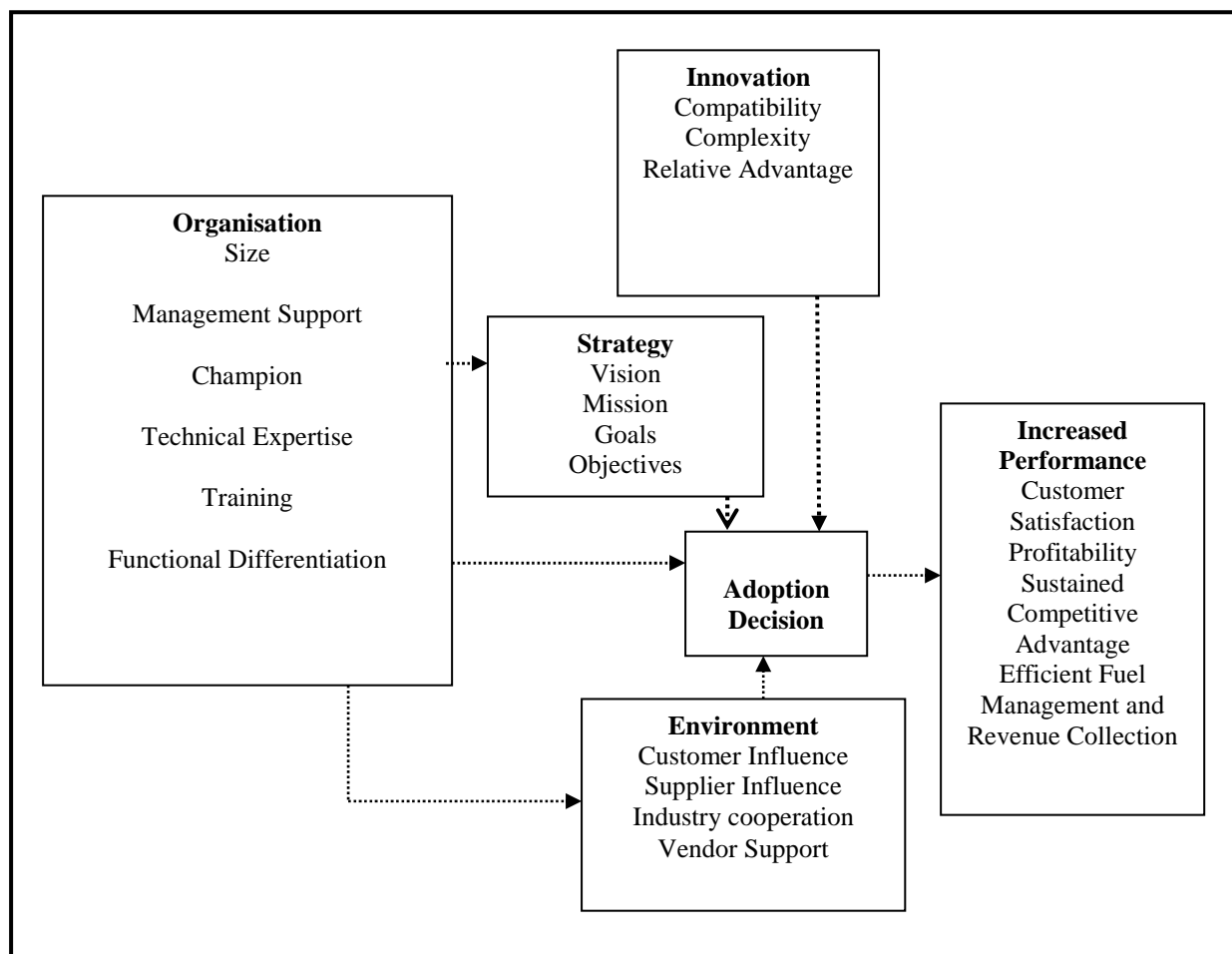


Figure 2.7: Analytical framework for the Study

2.8 Chapter Summary

The chapter looked at literature review and identified that developing countries are facing the problem of managing business through ICT adoption mainly because they are still attempting to understand and apply ICT concept (Alkalbani et al, 2013). Furthermore, it looked at diffusion of innovation model and concluded that strategic factors are significant to ICT adoption decision in addition to organisational, environmental and innovation factors. ICTs were considered as control technology that must be aligned with business strategy for effective ICT adoption. Once these dimensions are combined the outcome would be increased company performance. The literature acknowledges that the capacity to adopt and use technology had the most significance influence on ICT adoption. Various models have been discussed but this study has settled on diffusion of innovation because the research would attempt to assess the impact of ICT adoption in the oil sector not in a single organisation. The model was once used before but in developed countries. Finally, the chapter concluded with an analytical framework with strategy as a factor to ICT adoption and increased performance as an added outcome.

CHAPTER 3

METHODOLOGY

3.1 Introduction

According to Saunders, Lewis and Thornhill (2009) the term methodology refers to the theory of how research should be undertaken. The study followed a qualitative research methodology that involved data collection through interviews and observation, then analyse the data to get concepts from the study. The chapter drew entirely from qualitative sources in the form of case study for four oil companies in the oil sector. The study was built via interviews using an “interview guide” rather than a structured questionnaire. This was considered appropriate “as it would allow for relaxed conditions that are conducive to information elicitation and promotes the conditions where an interviewee can introduce research foci not pre-considered by the researcher” (Galloway and Mochrie, 2009, p.250). Furthermore, the chapter covered interpretivism philosophy and inductive approach. A detailed discussion on research strategies and research instrument was explained. Finally, the methodology chapter discussed purposive non-random and stratified random sampling methods before drawing conclusion on the importance of considering ethics and values when accessing organisations under study.

3.2 Recap of the Problem Statement

Though the challenges that the oil sector was facing include macro and micro-economic factors, the issue of failure of fully utilising ICTs could not be overemphasized. There was a real need to appropriately manage business through effective application of ICTs to improve on internal processes thereby contributing to the overall performance of the business. Hence, the major problem befalling many organisations was that of failing to fully take advantage of ICTs to access low cost fuel from the international markets, account for fuel inventory and sales and e-transacting through the use of smart cards when serving fuel at service stations. The supposed major causes were lack of tools

and structures that form the basis of the five pillars that include; management commitment, ICT technical capabilities and competencies, ICT policy documentation, ICT-business strategy alignment skills and inadequate funding. Some go to the extent of failing to make use of ICTs already put in place for purposes of aiding organizational success.

3.3 Methodological Framework

3.3.1 Research Question

The major research question was derived from the gap in the literature review and was presented as specified;

How to effectively manage business in the Oil sector through ICT adoption?

In attempting to respond to the above-stated major question, the study proposed the following sub-questions:

- a) What is the extent of ICT adoption in the Oil Sector?
- b) How best can challenges to ICT adoption be resolved?
- c) Which are the greatest influential benefits on ICT adoption?
- d) What are the major success factors to ICT adoption?
- e) What lessons can be learnt from the results of the study?

3.3.2 Propositions

The main proposition of the study was that the oil sector was failing to perform and grow due to lack of full exploitation of ICTs.

The literature review found out that ICT adoption required a system view addressing aspects placed at strategy, people, processes and enabler levels. Secondly, the literature review pointed out that capacity to adopt and use technology had the most significant influence on ICT adoption. Thirdly, findings showed that the success of technology was affected by the market, legal and social factors. Ultimately, the review of literature identified lack of management support as an important factor to ICT adoption.

3.4 Research Design

A research design is a plan of a research (Flick, 2009). It attempts to address four problem areas on ; questions that would be addressed by the study, the data that would be relevant to the study, the type of data to be collected and the way the results would be analysed. Flick (2009) and Saunders, Lewis and Thornhill (2009) emphasised the importance of relating a specific research design to the problem statement, research questions and research objectives.

The study looked at the inductive research approach and the justification as opposed to deductive approach. This was followed by a qualitative methodology or descriptive study design that provided a detailed description of the various factors that affected the problem under study. Research strategy and research instrument were explained while population and sample size were considered basing on relevant people who were able to provide data for the research.

3.4.1 Research Philosophy

According to Saunders, Lewis and Thornhill (2009), research philosophy is a term that relates to the development of knowledge and the nature of that knowledge. The research philosophy adopted in this study followed an interpretivism philosophy. Interpretivists or phenomenology promotes the idea that subjective thought and ideas are valid. It aims to see the world through the eyes of the people being studied (Chikova, 2013). Below is figure 3.4.1 showing a reseach 'onion' with links to research philosophies, research approaches and research strategies;

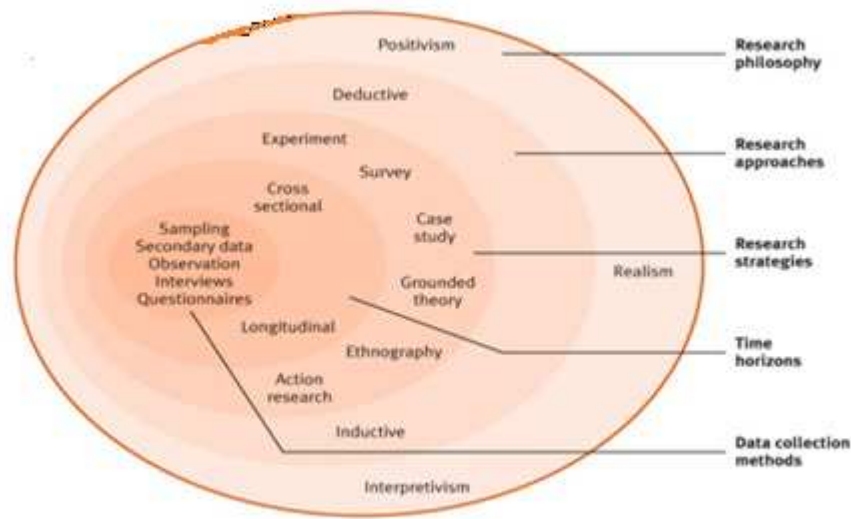


Figure 3.4.1: Research 'Onion'

Source: (Saunders, Lewis and Thornhill, 2009)

3.4.2 Research Approach

The research focused on inductive research approach. The inductive approach aimed at collecting data, analysing that data and use inductive approach to justify the outcome. The study applied an analytic induction to qualitative data analysis. It presented a systematic assessment of the extent of ICT adoption, examined challenges of ICT adoption and best ways of resolving them, identified the greatest influential benefits on ICT adoption and identified major success factors to ICT adoption in order to develop concepts and ideas. Inductive approach involves planning to explore data and develop theories from them that will subsequently relate to the literature (Saunders, Lewis and Thornhill, 2009).

The inductive approach was opted for the study rather than the deductive approach because of the exploratory and descriptive nature of the research which involved data collection, organisation and analysis that was guided by grounded theory. The inductive approach was found better suited to an interpretive paradigm that allowed for making sense of the obtained data. The strength of the inductive approach lies in understanding the context within which

the research takes place and not focusing on a cause- and effect relationship (Collins, 2010). The approach involves the researcher as part of the research process and it gives an understanding of the meanings participant attached to various contexts to ICT adoption.

The deductive approach was not suitable for the research study because the approach is normally better suited to a positivist paradigm where the researcher would be separate from the research process.

3.4.3 Research Methodology

Arthur, et al (2012), Thomas (2009) and Kumar (2008) distinguished methodology and methods when they noted that methodology relates to procedures or logic that should be followed while methods are the techniques or procedures used to gather data. Techniques are considered to take various forms ranging from questionnaires, interviews, observations, videos and focus groups. The methodology for the study would follow qualitative methodology that is interpretivist or ideographic in nature. Methods are closely linked with the research questions and sources of data collected (Arthur et al, 2012). The method chosen depends in part on the used methodology.

Qualitative research involves analysing and interpreting texts and interviews in order to discover meaningful patterns, descriptive of a particular phenomenon (Saunders, Lewis and Thornhill, 2009). The methodology was developed in social sciences to enable researchers to study social and cultural phenomena. Qualitative or descriptive studies involve the systematic collection and presentation of data to give a clear picture of a particular situation, especially the description of various factors that affect the problem under study. Qualitative research has several desirable strengths in terms of data collection, for instance, realism, richness and a longitudinal perspective, locating the meaning of experience within the social world and placing the phenomena within their context. As such these characteristics are crucial in seeking to explain phenomena and to generate theory (Saunders, Lewis and Thornhill, 2009).

In this study, the qualitative research methodology was applied to investigate the effectiveness of ICT adoption within the oil sector. Specifically, the study examined organisational, technology characteristics, strategy and environmental factors to determine whether they constituted to ICT adoption decision that ultimately result in increased performance. The qualitative approach was appropriate to the study because the research problem required elicitation of participants' views on effective management of business through ICT adoption. Furthermore, literature review showed that most of the studies that were conducted in the past applied quantitative methodology and the researcher was keen to conduct the research using the qualitative methodology.

In contrast, quantitative research methodology generates numerical data. The essential characteristic of quantitative research is that it reduces phenomena to numerical codes. The methodology is grounded in a hypothetico-deductive approach in which investigators mount hypotheses (or predictions) about the expected associations or cause-effect relationships between variables (Jensen, 2013). Certain hypothetical expectations are proposed and then accepted or reflected through the collection and analysis of scientific data.

3.4.4 Research Strategy

Research strategies were used for exploratory, descriptive and explanatory research. The research strategies employed in the study provided answers to the research questions and met stated objectives. There are a number of strategies that can be used to conduct research that include; action research, case study, experiment, survey, grounded theory, ethnography and archival research. This study adopted; case study and action research and the following discussion provide details of each of the two selected research strategies.

3.4.4.1 Case Study

The strategy was employed to the research study to empirically investigate the effectiveness of ICT adoption in the oil sector in its real life context using multiple sources of evidence. The research strategy was appropriate to the study since the boundary between the phenomenon being studied and the context within which it was studied were not clearly evident.

The case study provided a rich understanding of the context of the research and the processes that were being enacted. It was useful in explanatory and exploratory research of the study. The case study was conducted to four companies in the oil sector and the outcome was generalised to the whole sector. The data collection techniques employed included; interviews and observation.

3.4.4.2 Action Research

The strategy involved the researcher during the research study. The researcher was part of one of the organizations that were under study. The strengths of the action research strategy were that there was recognition for devoting time to diagnosing, planning and taking action and involvement of employees throughout the process.

3.4.5 Research Instrument

3.4.5.1 Semi-structured Interviews

The study collected primary data from the enlisted subjects. Interview method was adopted to explore the views of ICT specialists, managers and executives on the effectiveness of ICT adoption. A framed interview guide had a list of themes that were prepared covering ICT-business strategy alignment, organisational factors (organisation size, capabilities), external influence (industry cooperation, customer influence, supplier influence, vendor support), innovation characteristics (compatibility, complexity, relative advantage) and adoption decision. There were sub-questions that followed each theme designed to address the five factors in detail.

The semi-structured interviews were applied due to the exploratory and explanatory nature of the study and data collected were audio-recorded and subsequently transcribed prior to data analysis. Explanatory study was conducted to infer causal relationships among variables. Face-to-face and telephone interviews were both conducted to gather data required to provide information for each of the factors identified in the literature review.

The semi-structured interview method provided the opportunity to probe answers, where interviewees were required to explain, or build on their responses. Greener (2008) and Saunders, Lewis and Thornhill (2009) found out that interviews were significant in establishing personal contact since managers were more likely to agree to be interviewed, rather than complete a questionnaire, especially where the interview topic was seen to be interesting and relevant to their current work. The use of personal interviews enhanced the richness of collected data.

3.4.5.1.1 Scooping Study

The interview guide was scoped on four individuals to test for accuracy and validity of the research instrument before the actual launch. Few changes were noted and adjusted according to what the respondents understood and in line with the study objective.

3.4.5.2 Participant Observation

Participant observation method added considerably to the richness of the research data. The method involved; systematic observation, recording, description, analysis and interpretation of employees' behaviour during transaction processing. The researcher was an employee to one of the companies under study, hence, the researcher was not merely observing what was happening but practised in the field thereby gaining experience in both the industry and at operational levels.

3.4.6 Population and Sample

There are various sampling techniques that are available for use depending on the nature of the study and the characteristics of the surveyed population. These techniques can be categorised into random and non-random sampling techniques. Random sampling techniques include; simple random sampling, systematic random sampling, stratified random sampling, cluster random sampling and multi-stage random sampling. Some of the non-random sampling techniques are quota, purposive, snowball, self-selection and convenience. Both random and non-random sampling techniques were adopted. In carrying out the

research study purposive non-random and stratified random sampling methods were applied for data collection and analysis.

A case study of companies in the oil sector was conducted to the study prior to data analysis. The study was appropriate to the research since it involved examination of four companies in the oil sector, instead of the entire population of the companies then the information gathered was analysed and inferred about the group as a whole. Interviews were carried out with ICT technical staff, managers and senior executives of the selected four companies. The case study presented many advantages. It took less time to interview 18 employees from the four companies, hence, data processing and analysis also consumed less time since there were fewer records than if interviews were conducted to 37 active oil companies in the sector.

3.4.6.1 Purposive Non-random Sampling Method

According to Saunders, Lewis and Thornhill (2009), purposive sampling involves selection of members from a population to comprise a sample because they specifically meet some prescribed purpose or possesses specific attributes of interest that address the purpose of a particular research problem under investigation.

The research study focused on companies in the oil industry, specifically four companies in Harare. Selection of three companies was done according to market share of 10% and above. Refer to table 3.4.6.1 overleaf. The market share was derived from 2013 annual fuel product throughput volumes for each company calculated as a percentage of the total fuel throughput for the whole year. The researcher applied purposive non-random sampling method to select the companies because they met the prescribed attributes of the research study while the fourth company was randomly selected since it was the sole service provider to all other companies in the sector.

Table 3.4.6.1 : Market Share for Three Selected Oil Companies for the year 2013

Oil Company	Annual Fuel Throughput Volume in Thousand Litres	Percentage Market Share
Firm A (Case A)	360 000	25%
Firm B (Case B)	234 000	16%
Firm C (Case C)	156 000	11%
Others	690 000	48%
Grand Annual Fuel Throughput	1 440 000	100%

Source : (NOIC Annual Fuel Report, January 2014)

3.4.6.2 Stratified Random Sampling Method

Stratified random sampling method was used for the heterogeneous population made up of different elements that included departments and positions. The method categorised the heterogeneous population into sub-groups with similar attributes. After dividing the population into groups, each homogeneous group was then sampled using simple random sampling.

Since the selected four oil companies were made up of employees of various positions in various departments whose views on the effectiveness of ICT adoption were required, stratified random sampling was appropriate for the study. Stratification was done by departments and positions.

3.5 Data Analysis

The qualitative data analysis started with collection of data through interviews and the data were explored through manual analysis. The data were then categorised and coded and analysed through content analysis since the data commenced inductively, without predetermination or a priori. The identification of categories was guided by the purpose of the study. Strauss and Corbin (2008)

suggest three main sources to derive names of categories that include; utilisation of terms that emerge from data, basing categories on the actual terms used by respondents and derive terms used in existing theory and the literature. Finally, a cross case analysis of the identified concepts was applied to the four cases under-study.

During participant observation, data collection and analysis were part of the same process. Collection of data and analysis were done simultaneously. The data collected were recorded in a diary to aid memory.

3.5.1 Factor Analysis

Exploratory factor analysis was conducted to summarise the information in a large number of variables into a smaller number of factors. Performing factor analysis assisted in determining the different facets of factors that influence ICT adoption decision in the oil sector. Figure 3.5.1 shows the various factors that were combined to form single variable;

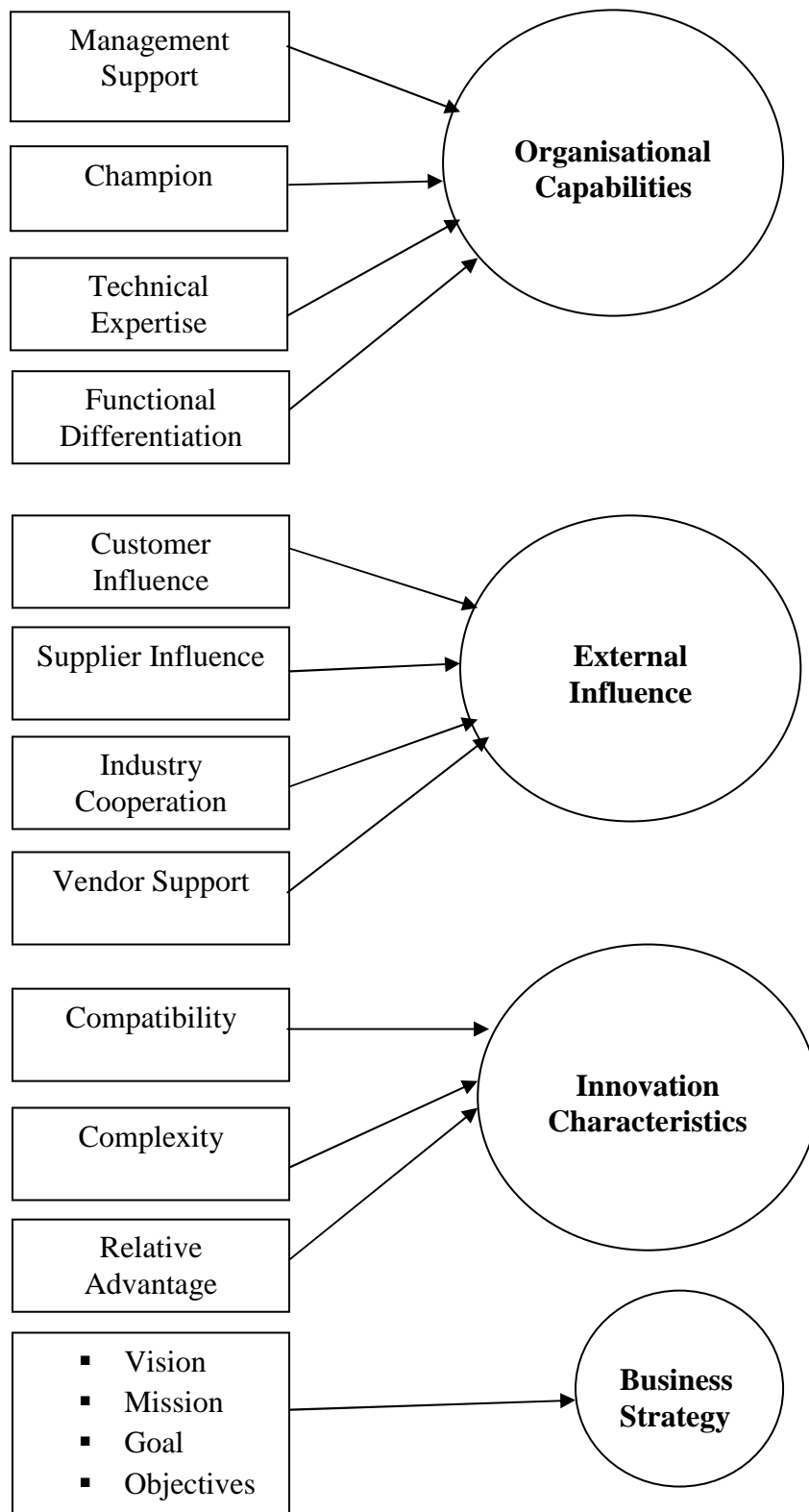


Figure 3.5.1: Factor Analysis for ICT Adoption Decision

Source: (Saunders, Lewis and Thornhill, 2009)

The overall identified factors include; Organisational size, Organisational capabilities, Business strategy, External influence, Innovation Characteristics and ICT adoption decision.

3.6 Validity and Reliability

3.6.1 Validity

The interviews that were conducted targeted skilled ICT personnel, managers and senior executives who had the requisite business understanding in the industry, hence, the data collected addressed the research problem. The interviews were also recorded and transcribed, maintaining the original responses of the respondents. In support of the view of maintaining the respondents' responses, Klenke (2008) acknowledges that validity in qualitative research involves determining the degree to which researchers' claims about knowledge correspond to the reality (or research participants' construction of reality).

3.6.2 Reliability

The interview guide was designed to address each of the five objectives of the cross-sectional study and where additional information was required to clarify a point, related follow-up questions were posed. The interview guide was adapted from literature review and the research instrument was tested for internal consistency prior to the actual launch. Hence, the data collection technique was able to yield consistent findings.

3.7 Ethics and Values

Prior to actual interviews, a request for permission to access the four oil companies was made through an electronic mail to the Chief Executive Officers of the relevant organisations with an attachment of an interview guide. The permission was granted due to the nature of the study and the fact that the researcher had already developed some relationships with some of the executives within the oil industry since he was an employee in the oil sector.

Participants were willing to be interviewed since the research topic was of much interest in the sector.

3.8 Chapter Summary

The chapter outlined the methodology pursued for the study. Firstly, a recap of the problem statement and research questions were presented. In addition, the chapter explored research philosophy and research design followed by a detailed discussion on the research strategies and instruments. Furthermore, it analysed the sampling methods, sampling frames, analytical procedures and explained on data validity and reliability. Finally, the chapter fully explained on how ethical issues and values were ensured during data collection phase.

CHAPTER 4

FRAMING AND ANALYSIS OF DATA

4.1 Introduction

The chapter covered the profiles of the four organisations that were under study. Interviews were carried out with eighteen selected respondents who were able to enrich the data. The collected data was analysed based on the prepared questions on the interview guide (Appendix 1) using manual analysis through content analysis for each case (Appendix 2). The data was then categorised and coded before an inter-case comparison and analysis of the identified concepts was applied to the four cases under-study to find out emerging relationships across the cases. Finally, the chapter concluded with a discussion of substantive findings to the study.

4.2 An Overview of the Cases

Case A was a private indigenous oil company that had 25 percent market share with 41 own retail service stations and 44 retail dealer sites (these are dealer owned and operated retail service stations but selling the firm's fuel) in the oil industry. It had a staff complement of 300 employees. The organisation adopted various information and communication technologies (ICTs) to manage its business processes.

Case B was a private foreign-based oil company with a staff complement of 256 employees. It had 16 percent market share with 37 own retail service stations and 38 retail dealer sites. The organisation adopted a number of ICTs to manage its business operations.

Case C was a public oil company that had 11 percent market share with 10 own retail service stations and 16 retail dealer sites. The organisation had a staff complement of 103 employees and it had implemented a number of ICTs to manage its business operations.

Case D was a public oil infrastructure company that facilitated the transportation of petroleum products into the country and provided fuel storage and re-delivery service in the oil sector. It had 4 depots around the country and had 168 employees. Table 4.2 overleaf shows a summary of the extent of ICT adoption in the four organisations;

Table 4.2 : Extent of ICT Adoption within the Four Oil Companies

	Case A	Case B	Case C	Case D
Hardware				
Servers	6	10	4	4
Desktops	20	52	50	53
Laptops	70	30	15	21
Tablets	20	No	4	4
Telephone Extensions	60	32	50	41
Mobile Phones	40	40	60	12
Digital Fuel Dispensers	123	111	30	No
Printers	30	20	39	44
Photocopiers	5	5	4	5
Scanners	30	10	5	3
Faxes	6	2	5	6
Software				
SAP	Yes	Yes	No	No
Ms Dymanics 2009/ 2013	No	No	Yes	Yes
Microsoft Exchange / linux	Yes	Yes	Yes	Yes
Forecourt management system	Yes	Yes	Yes	No
Electronic fuel card system	No	Yes	No	No
Enraf Tank Gauging system	No	No	No	Yes
Antivirus Software	Yes	Yes	Yes	Yes
Firewall	Yes	Yes	Yes	Yes
Network				
Optic Fibre	Yes	Yes	Yes	Yes
Wireless	Yes	Yes	Yes	Yes
Website	Yes	No	Yes	No

All the four organisations had over a hundred employees. The respondents had academic and professional qualifications ranging from masters, degrees, and certifications in their related business fields. Below is figure 4.2, a pie chart showing number of employees for the four cases that were understudy.

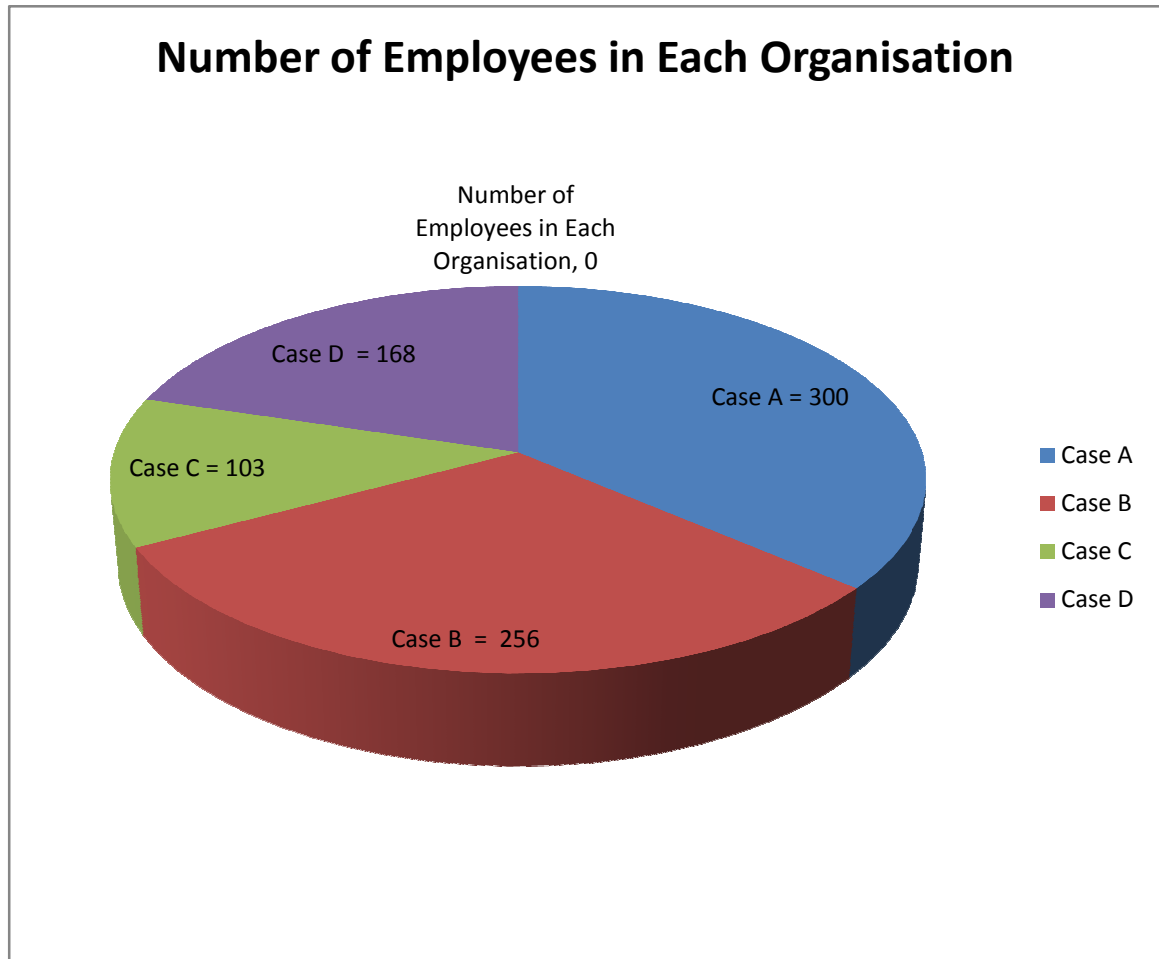


Figure 4.2: Pie Chart Showing Number of Employees for Each Case

Case A had four key departments that include Finance, Marketing and Sales, Human Resources, and Engineering. ICT, Audit and Purchasing sections were under the Finance department while Public Relations were under Marketing and Sales department. ICT section had only two personnel who were responsible for implementing ICT projects and providing support to the business operations. The Audit section had an Auditor in the section. Human Resources, Engineering and Marketing and Sales had a number of employees that were working in the departments. ICT and Audit had very few staff relative to the business operations at hand.

The departments for Case B were Finance and Administration, Human Resources and Operations. Audit Section reported directly to the CEO and had four personnel. ICT and Administration sections were under Finance and Administration department. Operations department had the greatest number of sections which include Marketing and Sales, Logistics, Loss Control, Safety Health and Environment, Maintenance and Quality Control. In the ICT section there was an ICT Administrator who manages all ICT operation in the organisation.

The departments for Case C were Finance, Sales, Operations and Human Resources and Administration. The Human Resources and Administration department had a number of sections that include Procurement, Security, Administration, Training, Human Resources and Salaries. Operations had Logistics and Maintenance sections while Finance had ICT section. Audit section reported directly to the Chief Executive Officer. There was shortage of employees in the ICT section since there was an ICT Administrator and her assistant.

Case D was composed of three main departments namely; Operations, Finance and Human Resources. ICT and Procurement sections were under Finance department while Quality Control, Marketing, Maintenance, Safety, Health and Environment and Loss Control and Risk were under Operations department. Audit section reported directly to the Chief Executive Officer (CEO) and had three staff. The ICT section had two staff members who manage ICT project implementation and support business operations in the company. Additional ICT staff was required for hardware support and maintenance since the two available ICT specialists were specialised in networking and systems implementation.

All the four organisations that were understudy had adopted a lean structure as evidenced by the number of the departments that were ranging between three and four. ICT section had a maximum of two employees who were responsible for ICT projects implementation and support of business operations within the organisations. Services such as hardware maintenance, Local Area Network support and maintenance and customization work were being handled through outsourcing.

4.3 Data Framing and Analysis

4.3.1 Extent of ICT Adoption in the Oil Sector

Appendix 2 on content analysis, pertaining to the extent of ICT adoption concept showed that all the four companies that were interviewed had varied ICT hardware. Most of the respondents (15 out of 18) cited that there was no strong ICT emphasis in their organisations besides being on paper. In two of the organisations that were interviewed the management team relied on the reports from managers within the organisation, regardless of the fact that there was a running enterprise resource planning system. Personnel working in the ICT section were concerned that they were not represented by an ICT technical director within their organisations since all the interviewed organisations had a Finance department with an ICT section reporting to the Finance Manager or Finance Director who ultimately reports ICT issues to management. The three organisations had two ICT Specialists each while the fourth organisation had one ICT specialist yet they all manage and support three to four key departments within the organisations.

The interviewed organisations had all implemented enterprise resource planning systems and antivirus software as security system. The depots and retail service stations were either connected with optic fibre, wireless or both. Cases A and C were using emails, telephone, internet, mobile phones and website to conduct business operations. Case C was using the internet for comparing prices of fuel supplies on the international market while case C was using their website to market their product. Cases B and D were in the process of developing their websites. Case B was using the internet to check fluctuation of fuel prices on the international market with a view to sourcing cheaper product. Case D was using electronic mails to send loading authorities to depots informing depot personnel to allow authorised customers to collect their products from the depot. All the companies were using mobile phones for communication, receiving and sending both personal and business information. The four organisations had no broadband links with their customers and suppliers save for the internet that they

used to check fuel price fluctuations on the international market on Platts site which provided benchmark price assessments in the physical energy markets.

All the four interviewed organisations had the required hardware, software and network infrastructure necessary to perform business operations. Case D had installed a tank gauging system that monitored fuel stocks stored in the tanks for their customers. All the other three Cases had retail service stations with digital fuel dispensers installed. Some retail service stations were running forecourt management system that was being used to manage fuel inventory and sales. The organisations had secured servers and they had also installed security systems onto them and on desktops and laptops to protect the installed software. The system users were still learning the implemented systems while senior management was not familiar with the reports that they were supposed to run in order to monitor, evaluate and control business operations but rather they relied heavily on reports from departmental managers.

The following are tables 4.3.1(a) – 4.3.1(d) showing analytical evidence that lead to categorisation of the extent of ICT adoption in the oil sector see also appendix 2 attached at the end of the research study.

Table 4.3.1(a) : Extent of ICT Adoption for Case A

Question	Respondent	Response (Verbatim Phrases)
B1. How do you appraise status of ICT in your company?	13	Evidence 13: The period 2010 going backward, we used to do most of our business operations through excel and pastel applications, but in 2011 when we implemented SAP our business processes were now integrated and the company has recently launched a website. In a nutshell “I can say we are now above average on ICTs in the organisation”.
B1. How do you appraise status of ICT in your company?	14	Evidence 14: “.....my view is that we are now above average in terms of ICT adoption however, ICT section has inadequate personal who can address the business operations” You find that The Company has 4 departments that include Finance, Marketing and sales, Human Resources and Engineering with adequate staff with the exception of ICT section that has only two staff and services such as ICT hardware maintenance, Local Area Network Maintenance and customization of systems are being outsourced.
B1. How do you appraise status of ICT in your company?	15	Evidence 15: “.....most of the processes are done through ICTs and I think we are now above average in ICT adoption”
B1. How do you appraise status of ICT in your company?	16	Evidence 16: “I can safely say that we are now above average, although we still need to perfect our processes” In my view I suppose there is need for having an ICT department rather than having a section”

Table 4.3.1(b) : Extent of ICT Adoption for Case B

Question	Respondent	Response (Verbatim Phrases)
B1. How do you appraise status of ICT in your company?	17	<p>Evidence 17: “We managed to successfully implement SAP which integrated our systems. In my opinion we are now above average.....” The main drawback that I am seeing is that ICT is not being taken seriously since we have one person manning the ICT section. The organisation has Finance and Administration, Human Resources and Operations department which require ICT support and the ICT Administrator supports users on how to run the systems only. Network support and hardware maintenance are done by third parties.</p>
B1. How do you appraise status of ICT in your company?	18	<p>Evidence 18: “The organisation had invested heavily in ICT adoption and I can say that we are above average”, considering that a number of our remote retail service stations are not yet linked with the Head office but the organisation has one ICT specialist who does everything in the company.</p>

Table 4.3.1(c) : Extent of ICT Adoption for Case C

Question	Respondent	Response (Verbatim Phrases)
B1. How do you appraise status of ICT in your company?	1	Evidence 1: Our head office is connected to optic fibre while half of the remote service stations access internet through dongles and the remaining half of the service stations link with head office through optic fibre. In short I can say that “the organisation is now on average in terms of ICT implementation”. I can say that given that we have got only two ICT Specialists that is the best that we can achieve as an organisation.
B1. How do you appraise status of ICT in your company?	2	Evidence 2: Most of our transaction are now being processed through the system and what “I would conclude is that we are now half way in ICT adoption”
B1. How do you appraise status of ICT in your company?	3	Evidence 3: “I can say that since we managed to implement various ICT hardware and systems we are on average on ICT adoption”, although we still need to adopt e-card fuel transaction. The major challenge is that the organisation has inadequate ICT staff who can provide the support that is required companywide. Imagine that all the four departments that we have – Finance, Sales, Operations and Human Resources and Administration, they all require ICT support.
B1. How do you appraise status of ICT in your company?	4	Evidence 4: Considering the fact that we are using e-mails and be able to access the internet, although we have not managed to link all our retail service stations. “I can therefore, say that we are on average on ICT adoption, but of course you also need to consider how the organisation places ICT in the company structure”.
B1. How do you appraise status of ICT in your company?	5	Evidence 5: In my view, “we are now above average” in terms of ICT adoption considering the fact that the company had implemented a company system, payroll and security systems. What is required now is to support the implemented systems so that we get value out of the investment. However, with two ICT personnel, we are unlikely to achieve our best in terms of ICT adoption since we rely mostly on external service on customization of the system
B1. How do you appraise status of ICT in your company?	6	Evidence 6: “Obviously we are on average in ICT adoption....”

Table 4.3.1(d) : Extent of ICT Adoption for Case D

Question	Respondent	Response (Verbatim Phrases)
B1. How do you appraise status of ICT in your company?	7	Evidence 7: The organisation has adopted various ICT hardware and had implemented a system although one of its depots is not yet linked with its head office. "What I can say is that we are half way" in ICT adoption since we still need to implement a website. I think the organisation needs to place ICT as a department in the organogram and add one more staff.
B1. How do you appraise status of ICT in your company?	8	Evidence 8: Although we have an enterprise resource planning system (ERP), there is much need of customising the system to fully benefit. Otherwise, "I can say that we are now on average in terms of ICT adoption". We are having problems in terms of getting adequate support from the ICT personnel and this frustrates business operations.
B1. How do you appraise status of ICT in your company?	9	Evidence 9: The organisation has three key departments that include Operations, Finance and Human Resources but Human Resources has no Human resources system yet. The systems that we have implemented are still not yet integrated when considering enraf tank gauging system, "so in short we are now on average". We are on average because the implemented systems need to be customised and integrated but with only two ICT Specialists it would take some time for us to achieve what we want.
B1. How do you appraise status of ICT in your company?	10	Evidence 10: "We are on average in terms of ICT adoption" considering that most organisations pride themselves that they have much hardware but having little software that solves the business problem.
B1. How do you appraise status of ICT in your company?	11	Evidence 11: A lot of areas still require improvements and many systems do not communicate together. In the organisation I can say "we have made it half way in terms of ICT adoption"
B1. How do you appraise status of ICT in your company?	12	Evidence 12: Considering the fact that all managers have now mobile phones that receive and send mails, I see that as a great achievement. "What I would say is that we are over half way in ICT adoption". For the organisation to realise full benefits of ICT adoption additional staff is still required to augment the two available ICT personnel.

4.3.2 Relationship between Strategy, People, Processes and ICT Adoption

On the relationship between business strategy and ICT adoption, (10 out of 18 respondents) mentioned that ICT adoption was a support function of business strategy, however, that depended on business objectives. On the other hand (8 out of 18 respondents) mentioned that business strategy was objective driven to ICT adoption and that applied much in organisations that had ICT as one of their objectives.

On the relationship between people and ICT adoption, three major views were raised that included technology drivers (in the case of employees), stakeholder driven (in the case of stakeholders) and employee motivation. Employees in the organisation were regarded as technology drivers (9 out of 18 respondents) since ICTs on their own could not drive business operations while (8 out of 18 respondents) mentioned that ICT adoption was a result of stakeholder input. On employee motivation (1 out of 18 respondents) explained that ICT adoption was related to employees since motivated employees would likely accept change that comes with ICT adoption.

The findings on the link between processes and ICT adoption revealed that introduction of technology in the organisation was intended to address the business problem. The respondents (13 out of 18) highlighted that the outcome of ICT adoption was to provide a solution to a business problem. On the other hand (5 out of 18 respondents) were of the view that adoption of ICT was a tool that was considered to integrate different processes within the organisation.

Basically, the findings had shown that there was a relationship between strategy, people, processes and ICT adoption. ICT adoption in an organisation would succeed if business strategy incorporates employees as technology drivers and stakeholders such as customers, regulatory bodies and shareholder requirements. Employee motivation would be an important factor when implementing ICT projects.

The following are tables 4.3.2(a) – 4.3.2(d) showing analytical evidence that lead to categorise the relationship between strategy, people, processes and ICT adoption. Refer to appendix 2 attached at the end of the research study for more details.

Table 4.3.2(a) : Relationship between Strategy, People, Processes and ICT Adoption for Case A

Question	Respondent	Response (Verbatim Phrases)
B6. How does ICT adoption link with business strategy, people and processes?	13	Evidence 13: Since the organisation is expanding, “ICT adoption would provide support to business operations”. On people, employees “drive business processes” while “adoption of ICTs dovetail processes....”
B6. How does ICT adoption link with business strategy, people and processes?	14	Evidence 14: “.....ICT adoption supports business strategy”, while stakeholders “are engaged through meetings with other departments and externals”. Processes “provide solution to the business”.
B6. How does ICT adoption link with business strategy, people and processes?	15	Evidence 15: An organisation may operate without ICTs.... so ICT adoption acts as a support function. “Employees drive technology” and “ICT adoption integrates business processes”
B6. How does ICT adoption link with business strategy, people and processes?	16	Evidence 16: Depending on the structure of the organisation, lean structure companies, “ICTs act as the backbone of the business”. “Communication is required with customers and suppliers to collect information on their requirements”. ICT adoption “provides a solution to processes.”

Table 4.3.2(b): Relationship between Strategy, People, Processes and ICT Adoption for Case B

Question	Respondent	Response (Verbatim Phrases)
B6. How does ICT adoption link with business strategy, people and processes?	17	Evidence 17: In our business strategy “ICT adoption is part of the corporate objectives”. “Engage stakeholders so that they know the benefits of ICT adoption” The business processes go hand in glove with ICT adoption “since they solve the business problem”.
B6. How does ICT adoption link with business strategy, people and processes?	18	Evidence 18: “ICT adoption is one of our goal”, since we would like to be the leading oil company locally and beyond. “Employees are engaged to embrace change”. ICT adoption provides a solution to business processes.

Table 4.3.2(c) : Relationship between Strategy, People, Processes and ICT Adoption for Case C

Question	Respondent	Response (Verbatim Phrases)
B6. How does ICT adoption link with business strategy, people and processes?	1	Evidence 1: "ICT adoption is one of our major objectives" of becoming 70% ICTs by 2018. We have also considered motivating our employees since we are targeting to be one of the most preferred employers. Business processes are firstly evaluated "to see whether they address a business problem and if there is need to adopt ICTs then...."
B6. How does ICT adoption link with business strategy, people and processes?	2	Evidence 2: "ICTs drive company performance", while employees are trained so that "they are able to adopt to the new technology". ICT adoption "must provide a total solution to business operations".
B6. How does ICT adoption link with business strategy, people and processes?	3	Evidence 3: "ICT adoption supports business objectives". "Both employees and customers are engaged to embrace change through technology adoption". "Business processes must dovetail with business objectives"
B6. How does ICT adoption link with business strategy, people and processes?	4	Evidence 4: ".....supports business function." "Employees are technology drivers while ICT adoption provides solution to business"
B6. How does ICT adoption link with business strategy, people and processes?	5	Evidence 5: "ICT adoption assists in coming up with effective business strategy" Employees resist change while shareholder require report, "so both drive technology,ICTs provide solution"
B6. How does ICT adoption link with business strategy, people and processes?	6	Evidence 6: "ICT adoption is a support function to business strategy". "Both employees and other stakeholders need to be engaged" so that they own the technology rather than enforce the adoption. "ICT adoption provides a solution to business processes" through faster and efficient processes.

Table 4.3.2(d): Relationship between Strategy, People, Processes and ICT Adoption for Case D

Question	Respondent	Response (Verbatim Phrases)
B6. How does ICT adoption link with business strategy, people and processes?	7	Evidence 7: "ICT adoption facilitates business strategy". The internal people are the drivers of the technology" and must be motivated so that they would not resist change. ICT adoption is a result of evaluation of business processes and "attempt to adopt technology that provides a solution....."
B6. How does ICT adoption link with business strategy, people and processes?	8	Evidence 8: ".....ICTs play an important role in reducing turnaround time. They provide the necessary support function...." "When employees embrace change, obviously they would be able to successfully adopt ICTs". You find that there is relationship between customer order processing and posting loadings in the system 'which integrates well with business objective oriented at satisfying customers".
B6. How does ICT adoption link with business strategy, people and processes?	9	Evidence 9: "ICT adoption is one of the objectives of the organisation since all business operations are intended to be ICT driven....." "Both employees and other stakeholders provide synergy input to ICT adoption". When we look at our business greater emphasis" would be placed at integration of processes"
B6. How does ICT adoption link with business strategy, people and processes?	10	Evidence 10: "ICT adoption directly links with business strategy since the company had incorporated ICT adoption as one of its key objectives". ".....involvement of the stakeholders such as the employees and customers so that they know the benefit of the technology would make the adoption succeed". In terms of business processes, "I can say no one weapon that can create efficiencies".
B6. How does ICT adoption link with business strategy, people and processes?	11	Evidence 11: Although "ICT adoption has been considered as part of the company's main objectives", the ICT department is not well- represented...in terms of driving the objective. Stakeholders are engaged when implementing ICTs. "On business processes, my view is that the stronger the ICTs the better the company performs".
B6. How does ICT adoption link with business strategy, people and processes?	12	Evidence 12: "The goal of the company is to satisfy customers through adopting ICTs". "Consider what is best for the employees and customers". The business processes must dovetail with business function.

4.3.3 Resolution to ICT Adoption Challenges

The research findings revealed six critical challenges to ICT adoption. These challenges include; resistance to change, lack of financial resources, lack of management commitment, lack of exposure to international environment, rapid technology changes and lack of product support. Among these challenges, resistance to change was identified as the most influential challenge to ICT adoption since (6 out of 18 respondents) confirmed during interviews. Lack of financial resources came second with (5 out of 18 respondents) expressing the same view. The third influential challenge was lack of management commitment with (4 out of 18 respondents) highlighting the same view. Lack of exposure to international environment, rapid technology changes and lack of product support were each ranked the same with (1 out of 18 respondents) according to interview results. Refer also to appendix 2 for the specific details.

4.3.3.1 Resistance to Change

The best ways to resolve resistance to change was to provide the necessary training and to institute disciplinary measures to enforce change. Training employees would allay fears of adopting the technology. Once employees have an understanding of the benefits that are derived from the introduction of the technology they would easily accept and take full ownership of the technology. One of the Chief Executive Officers from the interviewed organisations mentioned that at times it would be appropriate to consider taking disciplinary measures for those who resist the change since this tool has been proven as a working solution in the past.

4.3.3.2 Lack of Financial Resources

The liquidity crunch that the country was currently facing made it very difficult for most companies to access funds from the banks, however, the research findings revealed that financial resources could be availed through improvement on company performance and reduction of operating costs.

4.3.3.3 Lack of Management Commitment

Lack of management commitment was the third challenge that was most influential to ICT adoption. All the respondents (4 out of 18) had the same view that if workshops and seminars were conducted prior to adoption, management could gain a clear understanding of the derived benefits before commitment.

4.3.3.4 Lack of Exposure to International Environment

The research found out that lack of exposure to international environment could be resolved through engagement in foreign workshops among ICT specialist, Managers and Management.

4.3.3.5 Rapid Technological Changes

ICTs have become a topical issue in the 20th century and as such, many developing countries have shifted their focus to ICT adoption in an attempt to effectively manage their business operations. The results of the research have found out that there was need for the government to come up with a comprehensive national ICT policy that protects companies, especially when they want to upgrade to a higher version of both hardware and software or customise their systems since there was rapid technological changes within the industry. Most of the developing countries were slow in ICT adoption because they were not aware of the security implications and the derived benefits that would be realised after the upgrade of their ICTs.

4.3.3.6 Lack of Product support

The challenge of lack of product support could best be resolved by having a national ICT policy that covers the terms and reference of the operations of ICT vendors so that they do not overcharge or sell products that they are unable to support.

The following are tables 4.3.3(a) – 4.3.3(d) showing analytical evidence that lead to the resolution of ICT adoption challenges. Refer to appendix 2 attached at the end of the research study for more details.

Table 4.3.3(a) : Resolution to ICT Adoption Challenges for Case A

Question	Respondent	Response (Verbatim Phrases)
B8. How best can the challenges to ICT adoption be resolved?	13	Evidence 13: The issue on lack of financial resources require “to consider improving on performance”, since there is liquidity crunch in the market.
B8. How best can the challenges to ICT adoption be resolved?	14	Evidence 14: “Resistance to change can best be resolved through conducting trainings both internally and externally”
B8. How best can the challenges to ICT adoption be resolved?	15	Evidence 15: On lack of financial resources “you need to evaluate cost against service delivery.....”
B8. How best can the challenges to ICT adoption be resolved?	16	Evidence 16: “Training is the foremost thing to consider when there is resistance to change”

Table 4.3.3(b) : Resolution to ICT Adoption Challenges for Case B

Question	Respondent	Response (Verbatim Phrases)
B8. How best can the challenges to ICT adoption be resolved?	17	Evidence 17: “Resistance to change can only be resolved through training”, you find that in an organisation there is a combination of young and old employees of which old employees tend to resist the change.
B8. How best can the challenges to ICT adoption be resolved?	18	Evidence 18: Since management is key to organisational transformation, the lack of management commitment can be resolved by conducting seminars and workshops.

Table 4.3.3(c) : Resolution to ICT Adoption Challenges for Case C

Question	Respondent	Response (Verbatim Phrases)
B8. How best can the challenges to ICT adoption be resolved?	1	Evidence1: The lack of management commitment can be resolved “through holding ICT benefits awareness programs to management”.
B8. How best can the challenges to ICT adoption be resolved?	2	Evidence 2: ”. The challenge of Lack of financial resources can best be resolved through evaluation of operating costs against service delivery”.
B8. How best can the challenges to ICT adoption be resolved?	3	Evidence 3: The lack of financial resources challenge hinges upon the performance of the company. The only way to resolve the challenge would be “to improve on company performance” so that you plough back the profits into the business.
B8. How best can the challenges to ICT adoption be resolved?	4	Evidence 4: ICT adoption requires a lot of capital at the initial stages, so the lack of financial resources challenge can be resolved “through improvement on company performance”.
B8. How best can the challenges to ICT adoption be resolved?	5	Evidence 5: Resistance to change can best be handled through “institution of disciplinary measures to the sacred cows”.
B8. How best can the challenges to ICT adoption be resolved?	6	Evidence 6: for management to make an informed decision to adopt ICTs, the decision must be based on the thing that they have an appreciation of it, hence lack of exposure to international environment “requires engagement of management in foreign workshops”.

Table 4.3.3(d) : Resolution to ICT Adoption Challenges for Case D

Question	Respondent	Response (Verbatim Phrases)
B8. How best can the challenges to ICT adoption be resolved?	7	Evidence 7: “Rapid changes to technology can best be resolved by having a national ICT policy that guides organisations that would want to adopt the technologies”.
B8. How best can the challenges to ICT adoption be resolved?	8	Evidence 8: “If a group of employees are resistant to change, the only way that makes them align to others is through enforcement of disciplinary measures”.
B8. How best can the challenges to ICT adoption be resolved?	9	Evidence 9: The lack of product support challenge requires the government to drive the shots “through drafting of a comprehensive national ICT policy that attempts to enforce the issue of product support by those companies offering ICT products”.
B8. How best can the challenges to ICT adoption be resolved?	10	Evidence 10: “Resistance to change requires training on the part of everyone involved in the ICT adoption project”.
B8. How best can the challenges to ICT adoption be resolved?	11	Evidence 11: “In order to resolve the challenge of lack of management commitment, the management team must attend workshops” where they would be taught the benefits of the ICTs before adoption.
B8. How best can the challenges to ICT adoption be resolved?	12	Evidence 12: Lack of management commitment can be caused by management perception and “the only way of getting rid of it is through conducting management workshops”, so that they have a good understanding of the values and benefits of the technology.

4.3.4 The Greatest Influential Benefit on ICT Adoption

The research findings noted eight benefits that had an influence on ICT adoption and these include, improved business processes and operations, centralised information processing, quality product and services, efficient fuel stock management, easy communication, sustained competitive advantage, customer satisfaction and increased market share. However, among the eight benefits, improved business processes (11 out of 18 respondents), had the greatest influence on ICT adoption. The seven other benefits had (1 out of 18 respondents) each, who acknowledged that the benefits had some influence on ICT adoption. Refer to appendix 2 for more details.

4.3.4.1 Improved Business Processes and Operations

Improved business processes and operations was considered to be the greatest influential benefit to ICT adoption and the (11 out of 18 respondents) had the same view that when an organisation had improved business processes and operations, then other benefits would follow such as quality product and service, efficient fuel management, easy communication, sustained competitive advantage, centralised information processing and increased market share. Furthermore, the respondents mentioned that improved business processes and operations result in generating accurate and timeous reports which would enable prompt decision making. The greatest advantage was that organisations would be able to procure fuel from the international markets at cheaper prices, thereby cutting costs.

However, on the other hand the respondents (7 out of 11) had different views. Respondent1 explained that centralised information processing had the advantage of being able to manage operations from a central point while respondent3 emphasised on customer satisfaction as a benefit that was influential to ICT adoption in that once a customer was happy there would be continuity of business. Respondent6 explained that quality product and service was influential to ICT adoption because customers would be attracted to do business with the organisation. Respondent7 identified efficient fuel stock management as influential to ICT adoption and explained that their line of

business was to manage third party fuel stocks, hence, the benefit played a major role in adopting ICTs in the organisation. Easy communication was a benefit that was mentioned by respondent8 as being influential to adopting ICTs. The respondent explained that one can easily check fuel prices in the international market and plan beforehand. Respondent9 identified sustained competitive advantage benefit as influential to ICT adoption when he explained that they were able to handle large volumes of transactions within seconds and they were also making use of their website to provide customer feedback to a number of customers and they have ultimately managed to increase their market share.

The following are tables 4.3.4(a) – 4.3.4(b) showing analytical evidence that lead to the greatest influential benefit on ICT adoption. Refer to appendix 2 attached at the end of the research study for more details.

Table 4.3.4(a) : The Greatest Influential Benefit on ICT Adoption for Case A

Question	Respondent	Response (Verbatim Phrases)
9B(i) Which benefit has the greatest influence on ICT adoption among others? Explain why?	13	Evidence 13: Improved business processes and operations benefit “has the greatest influence on ICT adoption among others because there would be visibility of processes and increased business efficiency.....”
9B(i) Which benefit has the greatest influence on ICT adoption among others? Explain why?	14	Evidence 14: “I would say improved business processes and operations has the greatest influence among other benefits since all other benefit like customer satisfaction, increased market share and efficient fuel stock management are a result of improved business processes and operations”.
9B(i) Which benefit has the greatest influence on ICT adoption among others? Explain why?	15	Evidence 15: “If you have managed to attain improved business processes and operations, obviously all other benefits that I have mentioned would follow suite”
9B(i) Which benefit has the greatest influence on ICT adoption among others? Explain why?	16	Evidence 16: “Improved business processes and operations benefit has the greatest influence on ICT adoption so that you realise real time transaction processing and be able to make prompt decisions”.

Table 4.3.4(b): The Greatest Influential Benefit on ICT Adoption for Case B

Question	Respondent	Response (Verbatim Phrases)
9B(i) Which benefit has the greatest influence on ICT adoption among others? Explain why?	17	Evidence 17: "In my view, I would say, improved business processes and business operations benefit has the greatest influence on ICT adoption. This is so because an organisation would be able to have the benefits of easy communication within and with its stakeholders. Technology enlighten work performance"
B8. How best can the challenges to ICT adoption be resolved?	18	Evidence 18: "The most influential benefit among others is improved business processes and operations since accurate and timeous reports would be easily generated from the system. The most important thing is that technology has made the world a global village, I am now able to procure fuel while I am in my office from the international market".

4.3.5 Success Factors to ICT Adoption

The results of the research findings identified seven success factors to ICT adoption which include; organisational capabilities, business strategy, technology characteristics, organisational size, adoption decision, external influence and geographical spread. Organisational capabilities had the greatest frequency (13 out of 18 respondents) followed with business strategy (9 out of 18 respondents). Technology characteristics was the third success factor (8 out of 18 respondents) while organisational size and adoption decision both had each (7 out of 18 respondents). External influence had (4 out of 18 respondents). External influence had (4 out of 18 respondents) and was the sixth factor. Geographical spread (1 out of 18 respondents) was the least factor among all the others. Figure 4.3.5 shows the number of respondents for each of the seven factors with the highest frequency indicating the greatest success factor among others.

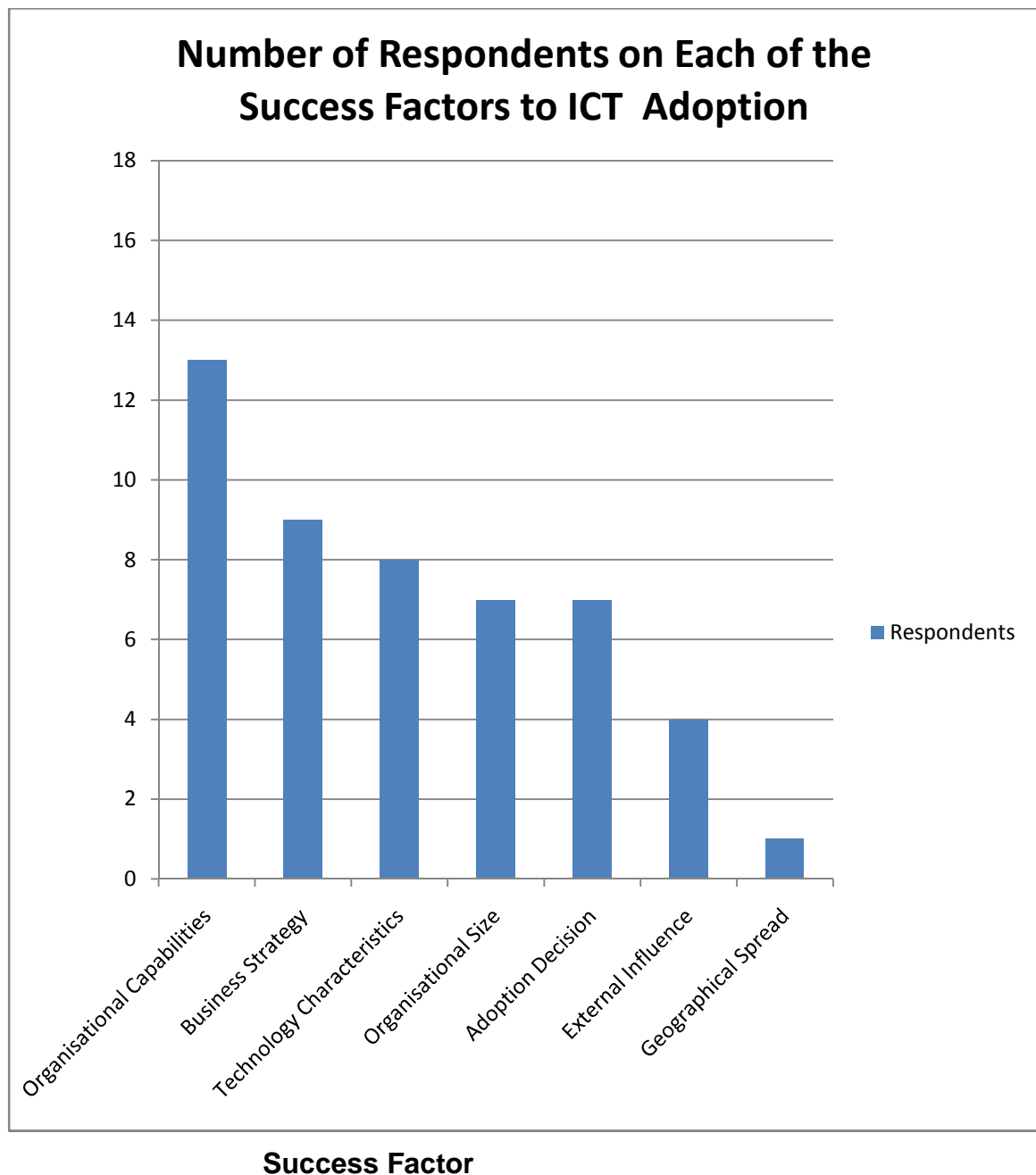


Figure 4.3.5 : Frequencies for Seven Identified Success Factors to ICT Adoption

4.3.5.1 Organisational Capabilities

Most of the respondents highlighted that organisational capabilities were a major success factor to ICT adoption. Capabilities are complex bundles of individual talents, attitudes, skills and accumulated knowledge exercised through organisational processes, and unique styles that enable firms to co-ordinate activities and make use of their resources (David, 2011). The view of the

respondents was that if management was committed and financial resources were available and all the employees shared the same vision, understanding the benefits of the technology, the ICT adoption decision was bound to be made successfully within the organisation.

4.3.5.2 Business Strategy

Business strategy was the second major success factor. The respondents pointed out that for an organisation to make an adoption decision that was as a result of the initiation of a corporate strategy emanating from aiming to satisfy its customers, increase its market share or increase profit.

4.3.5.3 Technology Characteristics

The third success factor was technology characteristics. On technology characteristics, the respondents mentioned on complexity in terms of adoption, compatibility and customizability as the most important characteristics to consider before making an adoption decision.

4.3.5.4 Organisational Size / Adoption Decision

Organisational size and adoption decision were both on fourth position. Different views were raised concerning the size of the organisation as a success factor to ICT adoption. The respondents (4 out of 7) expressed the view that the bigger the organisation in terms of the number of employees and function the success the organisation in terms of ICT adoption. Others (3 out of 7 respondents) supported the idea that the bigger the function of the organisation the more pressed the organisation would be in terms of adopting ICTs.

On adoption decision, the respondents mentioned that the factor comes as the final implementation decision after considering all other factors. The adoption decision was dependent on organisational size, organisational capabilities, business strategy, technology characteristics external influence and geographical spread.

4.3.5.5 External Influence

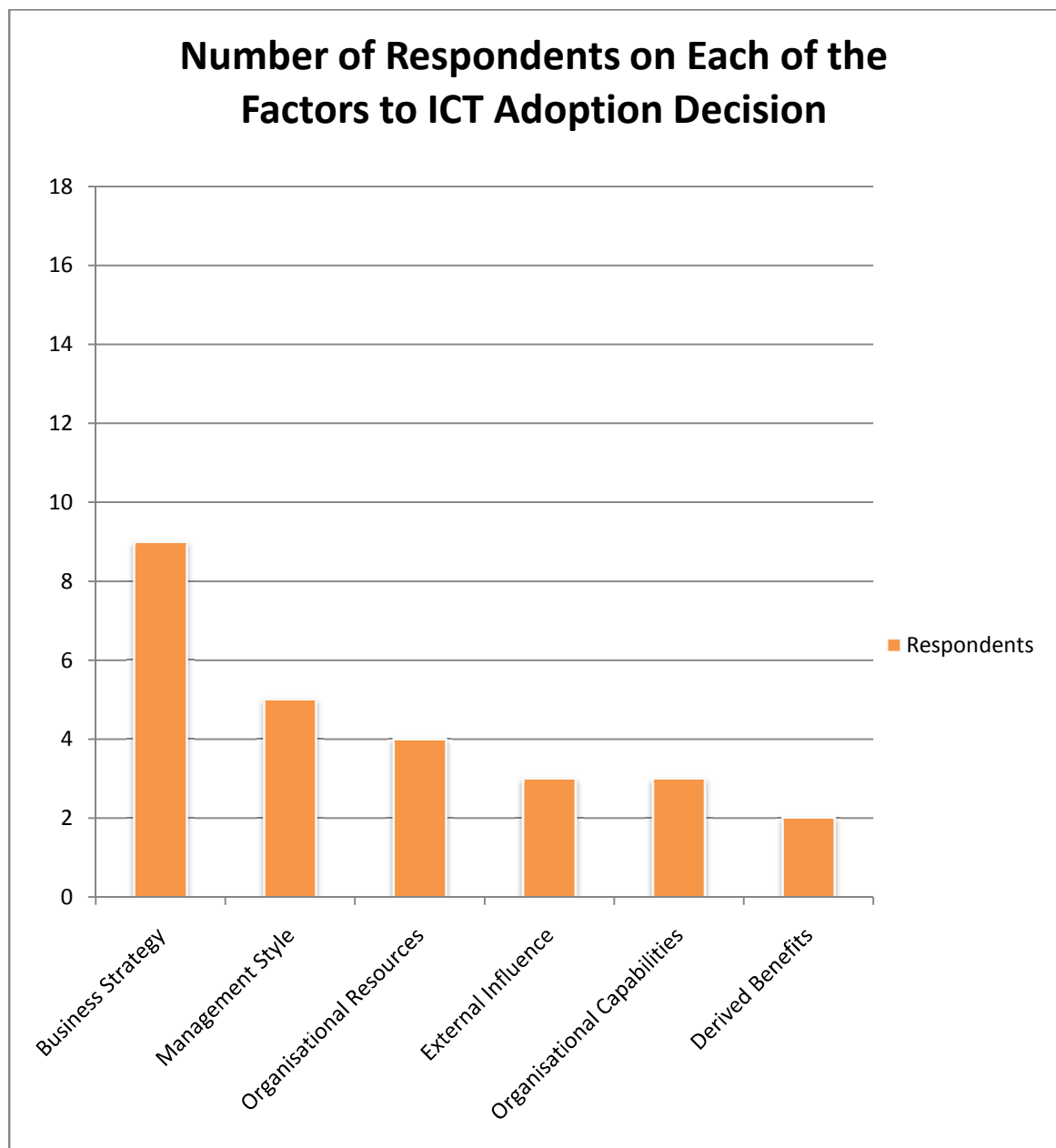
External influence was not considered much as a success factor to ICT adoption, but it had influence since the respondents pointed out that adoption of ICTs could be as a result of external influence from customers, competitors, suppliers and other key stakeholders.

4.3.5.6 Geographical Spread

Geographical spread was the least success factor to ICT adoption and the respondent explained that if the technology was to be adopted there was need to consider the distance from the source of the technology and the location where the technology was going to be installed or implemented.

4.3.6 Factors Affecting ICT Adoption Decision

The research results came out with six factors that affect ICT adoption decision and these were mainly; business strategy, management style, organisational resources, external influence, organisational capabilities and derived benefits. Business strategy had the greatest response and was the most influential factor among others (9 out of 18 respondents) followed with management style (5 out of 18 respondents). The third factor was organisational resources (4 out of 18 respondents) while external influence and organisational capabilities both had each (3 out of 18 respondents). Organisational capabilities had (3 out of 18 respondents). The least factor among others was derived benefits (2 out of 18 respondents). Figure 4.3.6 below shows the frequencies of the six factors to ICT adoption decision.



Factors Affecting ICT Adoption Decision

Figure 4.3.6 : Frequencies for the Six Factors to ICT Adoption Decision

4.3.6.1 Business Strategy

According to research findings, business strategy was the greatest factor that affects ICT adoption decision. The views of the respondents were that for an organisation to make ICT adoption decision that must be in line with corporate strategy. The respondents mentioned that ICT adoption was one of their objectives that the organisations were pursuing.

4.3.6.2 Management Style

Management style was the second greatest factor and the respondents pointed out that management influence the direction of the organisation through the type of decisions that they make at the end of the day.

4.3.6.1 Organisational Resources

Availability of resources was mentioned as the third critical factor in adopting ICTs. The respondents highlighted that if the financial and human resources were not available then the decision to adopt the technology would not be made.

4.3.6.3 External Influence / Organisational Capabilities

External influence and organisational capabilities had both the same number of respondents. The respondents explained that competitors, customer influence, supplier influence and government influence were major factors that affect adoption of ICTs.

On organisational capabilities, the respondents acknowledged that skills and experience were required for the successful implementation and installation of the appropriate technology.

4.3.6.4 Derived Benefits

Technology benefit was the least important factor. The respondents were of the view that evaluation of the relative advantage of adopting the technology would result in making informed decision of adopting the technology. However, the respondents pointed out that the evaluation process was too complex since the benefits could only be realised when the technology would be in use.

The following are tables 4.3.6(a) – 4.3.6(d) showing analytical evidence that lead to the above discussion on the factors that affect ICT adoption decision. Refer to appendix 2 attached at the end of the research study for more details.

Table 4.3.6(a) : Factors Affecting ICT Adoption Decision for Case A

Question	Respondent	Response (Verbatim Phrases)
B11. Which factors affect ICT adoption decision and explain why?	13	Evidence 13: “Organisational resources affect ICT adoption decision because without the funds you cannot do anything”.
B11. Which factors affect ICT adoption decision and explain why?	14	Evidence 14: “An organisation can make an adoption decision to counter pressure from competitors”.
B11. Which factors affect ICT adoption decision and explain why?	15	Evidence 15: “Customers may specify certain requirements which the organisation attempts to incorporate within their business processes.....”
B11. Which factors affect ICT adoption decision and explain why?	16	Evidence 16: “Management style affects the decision to adopt technology through the way it directs the organisation.....”

Table 4.3.6(b) : Factors Affecting ICT Adoption Decision for Case B

Question	Respondent	Response (Verbatim Phrases)
B11. Which factors affect ICT adoption decision and explain why?	17	Evidence 17: “If management style does not promote technology adoption, then the organisation might lag in terms of ICT adoption”
B11. Which factors affect ICT adoption decision and explain why?	18	Evidence 18: “ My view is ICT adoption decision must be aligned with corporate strategy”

Table 4.3.6(c) : Factors Affecting ICT Adoption Decision for Case C

Question	Respondent	Response (Verbatim Phrases)
B11. Which factors affect ICT adoption decision and explain why?	1	Evidence1: “There must be financial and human resources for the decision to be made, otherwise the organisation would do nothing”
B11. Which factors affect ICT adoption decision and explain why?	2	Evidence 2: “As an organisation we placed ICT adoption as one of our corporate objectives, hence the ICT adoption decision is just in line with our objectives”.
B11. Which factors affect ICT adoption decision and explain why?	3	Evidence 3: “Corporate strategy is a key factor among others because there is no ways an organisation wake up and just decide to have ICTs without aligning its decisions to corporate strategy...”
B11. Which factors affect ICT adoption decision and explain why?	4	Evidence 4: “Business strategy is the foremost factor that affects ICT adoption decision since an organisation is guided by its vision and mission statements. If an organisation follows an expansion route, obviously it has adopt the appropriate technology that fulfils its objectives”
B11. Which factors affect ICT adoption decision and explain why?	5	Evidence 5: “One of our objectives is to integrate and link all our retail service stations with our head office, therefore the adoption decision was already made at strategic planning workshop”
B11. Which factors affect ICT adoption decision and explain why?	6	Evidence 6: “In my view corporate strategy is one of the factors, because the strategy that you make is the one that determine whether or not you would make an adoption decision”

Table 4.3.6(d) : Factors Affecting ICT Adoption Decision for Case D

Question	Respondent	Response (Verbatim Phrases)
B11. Which factors affect ICT adoption decision and explain why?	7	Evidence 7: "An ICT adoption decision can only be reached after considering the goals of the organisation and I would say one of our goals is be the first brand in the oil industry. In order for that to be achieved we have incorporated adoption of ICTs as our objective".
B11. Which factors affect ICT adoption decision and explain why?	8	Evidence 8: "I think the business strategy is an important factor in that the way you want to model your business processes determines whether you should make a decision to adopt ICTs even if funds are unavailable the organisation would work towards achieving that objective"
B11. Which factors affect ICT adoption decision and explain why?	9	Evidence 9: "The style of management is a determinant factor. The way management perceives ICTs determine the level of support and commitment that it puts when making adoption decision"
B11. Which factors affect ICT adoption decision and explain why?	10	Evidence 10: "In my view, I would say that resources are required before making adoption decision. To add more on that, one needs to evaluate the benefits and the skills within the organisation...."
B11. Which factors affect ICT adoption decision and explain why?	11	Evidence 11: Organisational capabilities play an important role to adoption decision because you may decide to install or implement a certain technology but then fails due to lack of skills and experience". I can say that an organisation needs to also weigh the benefits of adopting the technology."
B11. Which factors affect ICT adoption decision and explain why?	12	Evidence 12: "I would suggest that two factors are key to ICT adoption decision and these are resources and management style. Without the resources, it would be difficult to implement the technology" "Management style assists in the manner in which decisions are made in an organisation".

4.3.7 Inter-case Comparison and Analysis

Concept = Extent of ICT Adoption in the Oil Sector

Question = B1. How do you appraise status of ICT in your company?

Table 4.3.7(a) : Cross-Case Analysis for Question B1.

Respondent	Case A	Case B	Case C	Case D
1			Average	
2			Average	
3			Average	
4			Average	
5			Above average	
6			Average	
7				Average
8				Average
9				Average
10				Average
11				Average
12				Above average
13		Above average		
14		Above average		
15		Above average		
16		Above average		
17	Above average			
18	Above average			

The cross-case analysis table 4.3.7(a) above shows that cases A and B were above average in terms of ICT adoption. Both cases were private organisations with more than two hundred and fifty employees. Cases C and D were public firms that were on average on ICT adoption and both had less than two hundred employees. According to the findings, the research had shown that organisation size was a factor to ICT adoption and this was also supported by literature review in the conceptual framework.

Concept = Relationship between Strategy, People, Processes and ICT Adoption

Question = B6. How does ICT adoption link with business strategy

Table 4.3.7(bi) : Cross-Case Analysis for Question B6 i)

Respondent	Case A	Case B	Case C	Case D
1			Objective driven	
2			Support function	
3			Support function	
4			Support function	
5			Support function	
6			Objective driven	
7				Support function
8				Support function
9				Objective driven
10				Objective driven
11				Objective driven
12				Objective driven
13	Support function			
14	Support function			
15	Support function			
16	Support function			
17		Objective driven		
18		Objective driven		

Table 4.3.7(bii) : Cross-Case Analysis for Question B6 ii)

Respondent	Case A	Case B	Case C	Case D
1			Employee motivation	
2			Technology drivers	
3			Stakeholder driven	
4			Technology drivers	
5			Technology drivers	
6			Technology drivers	
7				Technology drivers
8				Technology drivers
9				Stakeholder driven
10				Stakeholder driven
11				Stakeholder driven
12				Stakeholder driven
13	Technology drivers			
14	Stakeholder driven			
15	Technology drivers			
16	Stakeholder driven			
17		Stakeholder driven		
18		Technology drivers		

Table 4.3.7(biii) : Cross-Case Analysis for Question B6 iii)

Respondent	Case A	Case B	Case C	Case D
1			Solution	
2			Solution	
3			Dovetail	
4			Solution	
5			Solution	
6			Solution	
7				Solution
8				Dovetail
9				Dovetail
10				Solution
11				Solution
12				Dovetail
13	Solution			
14	Solution			
15	Dovetail			
16	Solution			
17		Solution		
18		Solution		

The results of the research findings have identified that there was a relationship between strategy, people, processes and ICT adoption. Table 4.3.7(bi) had shown that Case A attributed ICT adoption to business strategy as providing a support function while Case B had a different view that ICT adoption was as a result of corporate objectives. However, Case C was dominated with the idea that ICT adoption was a support function while Case D had the same view with Case B. In conclusion, the organisations that had ICT as one of their main objectives acknowledged that ICT adoption was related to the business strategy because it was objective driven unlike those which gave the reason that it was due to support function.

On relationship between people and ICT adoption (table 4.3.7(bii)) , Case D had a dominant view that ICT adoption was a result of attempting to satisfy stakeholder requirements while in Cases A, B and C had all identified employees as technology drivers and other stakeholders as major drivers of technology adoption.

On the relationship between processes and ICT adoption (table 4.3.7(biii)), all the four Cases highlighted that ICT adoption provided a solution to business processes.

The research findings were in agreement with the literature synthesis that identified that ICT adoption required a system view addressing aspects placed at strategy, people and processes. However, the research findings had revealed that ICT adoption was related to business strategy in that ICT adoption was either a support function or part of the company's objectives. Furthermore, the results have noted that ICT adoption was related to people mainly in two ways, employees as technology drivers and other stakeholders who specify their requirements for technology adoption. Finally, the findings noted that ICT adoption was related to business processes in that they provide a solution to business processes.

4.4 Discussion of Key Findings

4.4.1 Research Findings from Observation

In addition to the interview results, the research findings obtained considerable evidence through participant observation. During participant observation the researcher observed ICT hardware, implemented systems, installed network infrastructure and deployed technology at retail service stations in the four organisations that were interviewed.

The research findings observed that one of the visited four retail service stations had a running forecourt management system that prompted the Site Manager to replenish fuel stocks when the set re-order level was reached. All the four retail service stations were installed with digital fuel dispensers that enabled Pump Attendants to program number of litres or the amount specified by the customer when refuelling motor vehicles.

The research findings through observation corroborated with interview outcomes in that all the four organisations had adopted ICTs at their Head Offices, Depots and Retail Service Stations.

4.4.2 Findings Related to the Conceptual Framework

The research findings identified six major factors to ICT adoption decision that include; business strategy, management style, organisational resources, external influence, organisational capabilities and derived benefits. The business strategy was the most influential factor to ICT adoption decision contrary to the view of literature synthesis that pointed out that capacity to adopt and use technology had the most significant influence. The four organisations that were under study had objectives that were in place. Therefore, the business strategy was a tool that the companies applied when running organisations. The findings identified that ICT adoption was either regarded as a support function or was driven by the objectives of the organisation. The companies that emphasised that ICT adoption was a support function to the business operation had not incorporated ICTs as one of their objectives and as a result supported the view of the literature review which stated that there was no business alignment to ICT adoption. However, contrary to that, the findings had also established that there were companies that were aligning their business strategy to ICT adoption.

The second important factor was management style. Management directs and leads the way an organisation performs. Management perceptions on ICTs influenced the adoption decision. The factor was not mentioned in the literature review, hence it was an added factor among others.

The third important factor was organisational resources. Availability of funds was important to the organisation on decision making to ICT adoption. The human element was required to carry out the actual implementation of ICT projects.

External influence was also considered as a third factor and the research findings confirmed that customers and other stakeholders like industry players, government and regulatory bodies had an influence on ICT adoption decision.

The results of the research findings supported what the literature review confirmed to be the third most influential factor to ICT adoption decision.

The least factor was benefits derived from technology adoption. The results of the research findings identified that complexity of technology was a factor that complicated the process of attempting to quantify derived benefits before adoption. The two other technology characteristics were compatibility and customizability.

4.4.3 Discussion of Propositions

The results of the study were in agreement with literature review that there was indeed a relationship between strategy, people, processes and ICT adoption. The relationship between ICT adoption and business strategy confirmed that ICT adoption was either regarded as a support function or objective driven to business strategy. The relationship between ICT adoption and people had shown that employees drive the technology while other stakeholders (Customers, Government and Regulatory bodies) specify requirements. On relationship between ICT adoption and processes, ICT adoption provides solution to business processes.

The research results had identified business strategy to be the greatest factor that affects ICT adoption rather than capacity to adopt and use the technology as revealed in the review of the literature.

The research confirmed that the success of technology was affected by the market, legal and social factors. Further investigations into the study had identified that market had a positive effect to the success of technology when there is high level of competition, when companies are performing well and when the technology is available.

Secondly, success of technology was affected positively by legal factor when enforcement of compliance is relaxed, when the national ICT policy promotes ICT

development and adoption, when energy policy supports investment and growth of the sector and when issues of copyrights were enforced in the country.

Finally, success of technology was affected positively by social factor when there is high level of technology acceptability, when technology supports social networking, when cultural background makes people easily adapt to new technology and when there is high level of motivation among employees in an organisation.

According to the findings of the study, leadership support and commitment influence technology adoption when management avail resources, dictates technology adoption pace and motivates employees. The outcome would be successful implementation of adoption projects and building of teamwork within organisations among employees and among organisations.

4.5 Chapter Conclusion

There were 18 respondents that were interviewed from four organisations that were under study. A content analysis of the interview responses was tabulated (see appendix 2) based on key questions of the study. The research results established five major concepts that were attempting to address the research questions of the study. Verbatim phrases were presented in tables as evidence of the responses from the interviewed respondents. Furthermore, participant observation collaborated with the research findings from the interviews. The chapter looked at the findings related to the conceptual model that was presented in the review of the literature and concluded with a discussion of the propositions.

CHAPTER 5

CONCLUSION, RECOMMENDATIONS AND FURTHER RESEARCH

5.1 Introduction

This chapter concludes the study and provides recommendations based on the findings. The conclusions are based on the objectives of the study. The main thrust of the recommendations from the study will aim at improving management of business through ICT adoption in the oil sector. At the end of the chapter, suggestions for further research were identified for further enhancement of the study in the future.

5.2 Conclusion

The conclusion to the study was based on the objectives set out in Chapter One, where each conclusion attempted to address a specific research question related to the objective.

5.3 Answer to Research Questions

5.3.1 What is the extent of ICT adoption in the Oil Sector?

The research concludes that companies in the oil sector had average to above average ICT adoption with varied ICT hardware deployed at their Head Offices, Depots and Retail Service stations. The companies had network infrastructure installed, that was protected with firewall and they were able to access the internet as well as receive and send electronic mails. The two public companies had implemented Microsoft Dynamics Nav, an Enterprise Resource planning system that they were running in the organisation at their head offices and depots to purchase company items and procure fuel, management of fuel sales , financial and management accounting, fuel inventory management and generation of reports. The two private organisations had implemented Systems Application and Products (SAP) system, an Enterprise Resource Planning system that they were running at their head offices for the same business

operations as done by the public companies. Fore court management system was being used at retail service stations although the system was not integrated with the existing enterprise resource planning system that was implemented at head office. Some retail service stations were operating on Microsoft excel application and the output from the application was then captured into the main enterprise resource planning system.

5.3.2 How best can challenges to ICT adoption be resolved?

Chapter four identified six most crucial challenges to ICT adoption specified according to their order of being most influential to ICT adoption and these include; resistance to change, lack of financial resources, lack of management commitment, lack of exposure to international environment, rapid technological changes and lack of product support.

Resistance to change - The best way of resolving the challenge is through training and institution of disciplinary measures to enforce change.

Lack of financial resources - The challenge can be resolved through utilisation of retained earnings and reduction of operating costs since the country was facing serious liquidity crunch.

Lack of management commitment – According to the findings lack of management commitment challenge can be resolved through conducting workshops and seminars specifically for management prior to ICT adoption so that the management can gain a clear understanding of the benefits that are derived from adopting the technology into the organisation.

Lack of exposure to international environment – The challenge can be resolved through engaging ICT Specialists, Managers and Management in international workshops.

Rapid technological changes - The results of the study found out that there was need for the government to craft a comprehensive national ICT policy that protects companies adopting ICTs from being short-changed by unscrupulous suppliers and service providers of the technologies.

Lack of product support - This was the last challenge which could be resolved by having a comprehensive national ICT policy that obliges ICT vendors to sell ICT products that they have expertise in terms of technical and end-user support.

5.3.3 Which are the greatest influential benefits on ICT adoption?

The research findings identified eight greatest influential benefits on ICT adoption. The benefits have been specified according to the order of their greatest influence and they include the following; improved business processes and operations, centralised information processing, quality product and services, efficient fuel stock management, easy communication, sustained competitive advantage, customer satisfaction and increased market share.

5.3.4 What are the major success factors to ICT adoption?

Organisational capabilities, business strategy, technology characteristics, organisational size, adoption decision, external influence and geographical spread were the seven success factors to ICT adoption that were identified in the results of the study.

5.4 Discussion of the Main Proposition

The research results have confirmed that the oil sector was failing to perform and grow due to lack of full exploitation of ICTs. The research results had assessed the extent of ICT adoption and identified that all the four companies that were investigated had deployed varied ICT hardware, had installed network infrastructure, implemented enterprise resource planning systems and security software. All the companies had access to internet. At retail service stations there were digital fuel dispensers that were installed with some service stations running forecourt management system. However, resistance to change was identified as a major challenge and ICT was regarded as a tool for supporting business operations. In some organisations, senior management could not be able to extract reports from the system that they implemented in their organisations. In all the organisations, ICT was relegated to ICT section and it reported to a Finance Manager or Finance Director who ultimately presented ICT issues to management.

Therefore, the study has shown that organizations in the oil sector had adopted ICTs that they are failing to properly manage in order for them to fully realize the benefits of their investment.

5.5 Theoretical Contribution

The final analytical framework identified business strategy as the most influential factor to ICT adoption decision contrary to the view of the literature synthesis that pointed out that, capacity to adopt and use the technology was the most influential factor. Thus, the factor explains the reason why the organisations that were understudy had a position of a Business Strategist or Business Development Manager in their company structure. The second important factor was management style and it was not mentioned in the literature review. The findings of the study cited that management perceptions on ICTs influence ICT adoption decision. The third factor that was identified was external influence. Government influence and regulatory bodies' influence were the two additional sub-factors to external influence that were identified besides customer influence, supplier influence and industry cooperation that were mentioned in the initial conceptual framework.

Technology benefit was the least identified factor in the final model, with customizability as an added characteristic among those mentioned in the initial analytic model.

Ultimately, the adoption decision has to be made to enable adoption of the technology. When an organisation makes an adoption decision with the required resources, organisational capabilities and having good management style the outcome would be efficient fuel management and revenue collection, customer satisfaction, profitability and sustained competitive advantage. Figure 5.5 summarises the discussion of the final conceptual framework for the study.

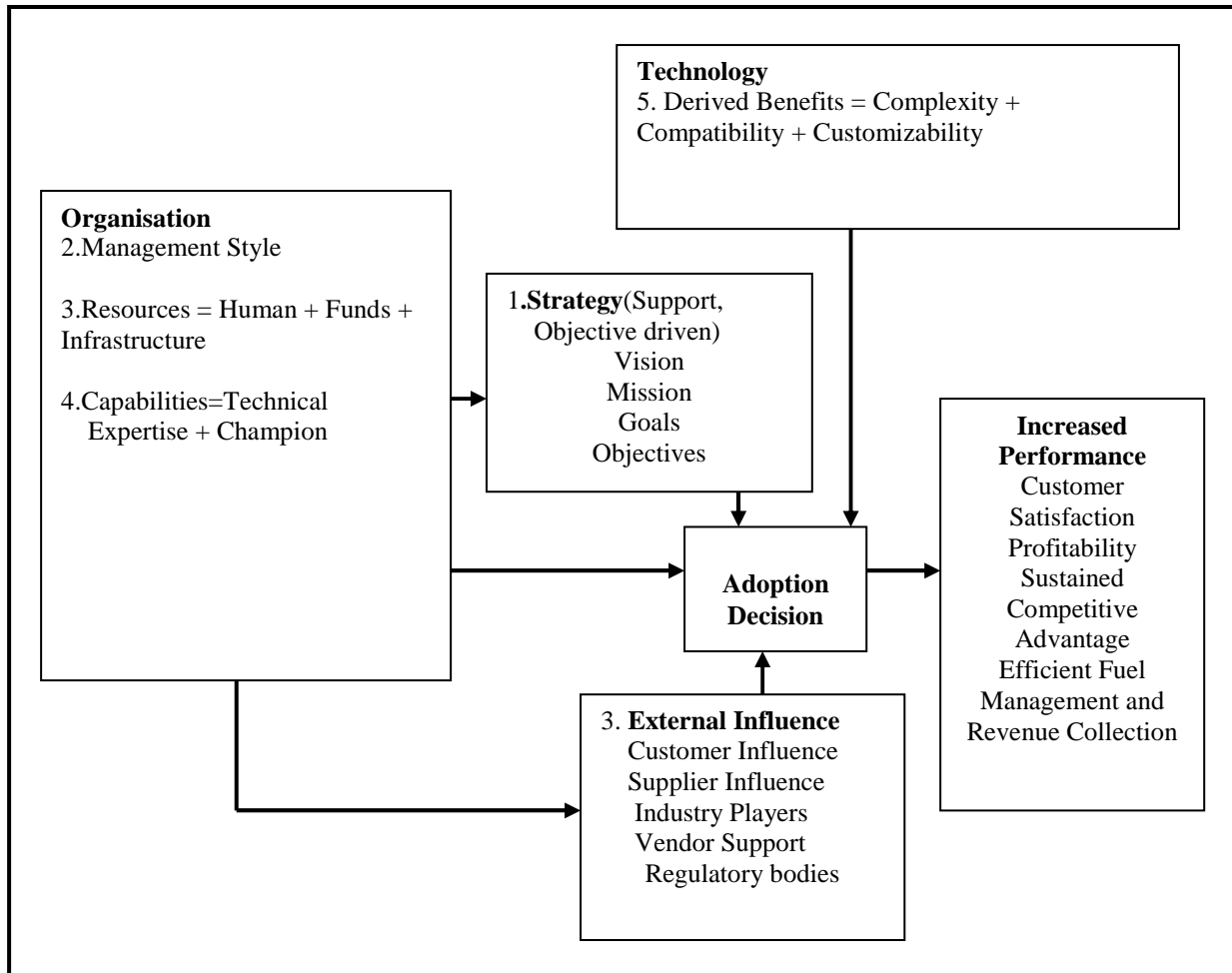


Figure 5.5: Final Conceptual framework for the Study

5.6 Policy Recommendations

Recommendations that have emanated from the results of the study that can assist the oil sector to effectively adopt ICTs have been suggested. The government needs to safeguard all sectors adopting ICTs through crafting comprehensive national ICT policy and conducts ICT policy awareness programmes so that all parties involved understand the contents of the document and operate within its scope. ICT companies must sell technologies and software that they have expertise in terms of technical and end-user support. The ICT companies must also be certified partners of international ICT companies such as (Microsoft, HP, FuelTech, Fluid Control). Software copyrights must be enforced so that genuine software is accessed within the market.

In addition to the national ICT policy, there is need for the government to craft an energy policy that promotes partnership between local oil companies and foreign companies. Again, the government must conduct energy policy awareness programmes so that all parties involved become aware of the developments that would be taking place in the sector. The Energy policy should attract foreigners so that they invest in the oil sector in partnership with local oil companies rather than discontinue business operations like what happened with Mobil and BP/Shell.

5.7 Managerial Recommendations

The recommendations from the results of the research would assist both managers and senior management to effectively manage business through ICT adoption. Firstly, senior management should take a lead in driving ICT projects. Secondly, they should learn how to extract useful reports from implemented systems rather than relying solely on reports that are generated by departmental managers. On the other hand managers should enforce complete change when adopting ICTs and avoid running manual and automated parallel systems for too long.

Furthermore, ICT section should be elevated to ICT department with an ICT Director reporting to the Chief Executive Officer (CEO). ICTs should be viewed as business drivers rather than providing support function to the business operations.

Finally, ICT adoption must be aligned with business strategy and ICT projects must be budgeted for prior to implementation.

5.8 Research Limitations

Prior to data gathering, when I was attempting to seek authority to access two of the companies that were under study, I encountered a challenge that required an explanation of how I was going to make a presentation of the collected data. When I assured the Chief Executive Officers of the two companies that the presentation of the information would not mention names of organizations, I was made to sign a confidential and secrecy form where I declared my details and

agreed that I was not going to divulge the companies' information to third parties. That was a major breakthrough and I managed to successfully conduct the research study.

5.9 Areas of Further Research

The research has shown the effective ways of adopting ICTs and it explained the factors affecting ICT adoption decision and explored the best ways of resolving the challenges to ICT adoption. The study has however not explained the effective ways of implementing ICTs. An interesting area of further study would be to investigate the effective ways of implementing enterprise resource planning systems within the Zimbabwean oil sector.

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APPENDICES

Appendix 1 - Interview Guide

Interview Guide for “An Assessment of the Effectiveness of ICT Adoption on Zimbabwean Firms in the Oil Sector Post Dollarization”

The interview guide is based on a Dissertation for Masters in Business Administration(MBA) studies that the student is carrying out at the University of Zimbabwe.

All responses provided by a respondent are going to be treated in strict confidence and shall be used only for the purpose of the academic research. In the study, there shall be no mention of either individuals, companies or their agencies.

I would like to take this opportunity to thank you for the time that you have spared and the cooperation.

MBA STUDENT

GRADUATE SCHOOL OF MANAGEMENT, UZ

SECTION A
ADMINISTRATIVE INFORMATION

This section is designed to gather information about you and the organisation.

A1. Can you give brief background information about yourself (your experience, the kind of projects that you have worked on in the past)?

A2. What is your highest academic qualification?

A3. Can you also provide your highest professional qualification? (e.g Chartered Accountant, Institute of Marketing Management)

A4. In which job category are you in, and how long have you been working for the organization?

_____ years

A5. Kindly provide a brief profile of your organization?

A6. Based on your experience, is corporate culture on paper or is it reflected in practice? _____

A7. How many retail service stations do you own? _____

A8. How has your organization been performing since the introduction of multi-currency system in 2009?

SECTION B

This section is designed to gather information on effective management of business through ICT adoption.

Extent of ICT Adoption and Links with Business Strategy

B1. How do you appraise status of ICT in your company?

B2. What type of ICT Hardware does your organization use to run business operations?

Desktop Computers [] Laptops [] Tablets []
Telephone [] Cell phone [] Digital fuel Dispensers []
Printers [] Photocopiers [] Scanners [] Fax Machines []
Servers []
Other (specify) _____

i) How many of these are;

▪ Desktop Computers _____

▪ Laptops _____

▪ Tablets _____

- Telephone

- Cell _____ phone

- Digital _____ fuel _____ dispensers

- Printers

- Photocopiers

- Scanners

- Fax

- Servers

- Other _____ (Specify)

B3. Can you highlight the type of systems that are currently running within your organization and specify their function?

B4. How are your retail service stations / depots linked with the Head Office / suppliers and customers?

Head Office -	LAN []	MAN []	WAN []	N/A []
Suppliers-	LAN []	MAN []	WAN []	N/A []
Customers-	LAN []	MAN []	WAN []	N/A []

B5. Which mode of communications do you use to manage business operations?

Broadband Fibre [] Wireless [] Phone [] Mobile []
 Skype [] E-mail []
 Other (specify) _____

B6. How does ICT adoption link with business strategy, people and processes?

Strategy:- _____

People:- _____

Processes:- _____

Challenges of ICT Adoption

B7. What are the major challenges of ICT adoption?

i) Which among the mentioned challenges has the most significant influence on ICT adoption? Explain why you say that?

ii) How do you rank the challenges according to their influence on ICT adoption?

B8. How best can the challenges be resolved?

i)

ii)

iii)

iv)

v)

vi) Other:-

Derived Benefits of ICT Adoption

B9. What benefits and values have ICTs brought for the organisation?

i) Which benefit has the greatest influence on ICT adoption among others ?

ii) Explain why?

Major Success factors to ICT adoption

B10. Can you highlight major success factors to ICT adoption?

B11. Which factors affect ICT adoption decision and explain why?

B12. Can the market, legal and social factors affect success of technology? _____

Explain how?

Market _____

Legal _____

Social _____

B13. What is the foremost thing that you can consider when faced with competition?

B14. How can leadership support and commitment influence innovation adoption?

Interview guide, **Source:** (Adapted from Richardson, 2011 and Li, 2012)

THE END

Appendix 2 - Content Analysis

Content Analysis for “An Assessment of the Effectiveness of ICT Adoption on Zimbabwean Firms in the Oil Sector Post Dollarization”

Table 4.1 :Content Analysis of Interview Responses

Question	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18
B1. How do you appraise status of ICT in your company? Code 1= Extent of ICT adoption	Average	Average	Average	Average	Above Avg	Average	Average	Average	Average	Average	Average	Above Avg	Above Avg	Above Avg	Above Avg	Above Avg	Above Avg	Above Avg
B2.What type of ICT Hardware does your organization use to run business operations?	Varied	Varied	Varied	Varied	Varied	Varied	Varied	Varied	Varied	Varied	Varied	Varied	Varied	Varied	Varied	Varied	Varied	Varied
B3. Can you highlight the type of systems that are currently running within your organisation and specify their function?	ERP	firewall	Antivirus	Fore court	ERP	ERP	ERP	Enraf Tank Gauge	Antivirus	ERP	ERP	Antivirus	ERP	Forecourt	Antivirus	Firewall	ERP	E-card

	Wireless	email	Objective driven	Technology drivers
	Optic Fibre	Internet	Objective driven	Stakeholder driven
	Wireless	Mobile Phone	Support function	Stakeholder driven
	Optic Fibre	E-mail	Support function	Technology drivers
	Wireless	Internet	Support function	Stakeholder driven
	Optic Fibre	Telephone	Support function	Technology drivers
	Optic Fibre	Telephone	Objective driven	Stakeholder driven
	Wireless	E-Mail	Objective driven	Stakeholder driven
	Wireless	E-mail	Objective driven	Stakeholder driven
	Optic Fibre	Website	Objective driven	Stakeholder driven
	Wireless	Internet	Support Function	Technology Drivers
	Optic Fibre	Mobile Phone	Support function	Technology drivers
	Optic fibre	Mobile phone	Objective driven	Technology Drivers
	Wireless	Website	Support Function	Technology drivers
	Wireless	Website	Support Function	Technology Drivers
	Optic Fibre	Internet	Support function	stakeholder driven
	Wireless	Telephone	Support function	Technology Drivers
	Optic Fibre	E-Mail	Objective driven	Employee Motivation
B4. How are your retail service stations/depots linked with the Head Office/Suppliers and customers?				
B5. Which mode of communications do you use to manage business operations?				
B6. How does ICT adoption link with business strategy, people and processes? i) Strategy Code 2 = Relationship between strategy, people, processes and ICT adoption ii) People				

Solution	Lack of mgmt commitment	Conduct workshops
Solution	Resistance to change	Training
Solution	Resistance to change	Training
Dovetail	Lack of financial resources	Evaluate cost Vs service delivery
Solution	Resistance to change	Training
solution	Lack of financial resources	Improve on company performance
Dovetail	Lack of management commitment	Conduct workshops
solution	Lack of mgmt commitment	Conduct workshops
Solution	Resistance to change	Training
Dovetail	Lack of product support	National ICT policy as guide
Dovetail	Resistance to Change	Take disciplinary measures
Solution	Rapid technology changes	National ICT policy as guide
Solution	Lack of exposure to international environment	Engage in foreign workshops
Solution	Resistance to change	Take disciplinary measures
Solution	Lack of financial resources	Improve on company performance
Dovetail	Lack of financial resources	Improve on company performance
Solution	Lack of financial resources	Evaluate cost Vs service delivery
Solution	Lack of mgmt commitment	Conduct workshops
iii) Processes	iii) Which among the mentioned challenges has the most significant influence on ICT adoption? Explain why you say that?	B8. How best can the challenges be resolved? Code 3 = Resolution to ICT adoption challenges

	Improved bus. processes	Business strategy
	Improved bus. processes	Organisational capabilities
	Improved bus. processes	Organisational size
	Improved bus. processes	Organisational capabilities
	Improved bus. processes	Organisational capabilities
	Improved bus. processes	Organisational size
	Increased market share	Organisational size
	Improved bus. processes	Organisational capabilities
	Improved bus. Processes	Organisational capabilities
	Sustained competitive advantage	Technology characteristics
	Easy communication	Organisational capabilities
	Efficient fuel stock management	Organisation size
	Quality product and service	Organisational capabilities
	Improved bus. processes	Organisation size
	Improved bus. processes	Organisational capabilities
	Customer satisfaction	Organisational capabilities
	Improved bus. Processes	Business strategy
	Centralised information processing	Organisational size
i) Which benefit has the greatest influence on ICT adoption among others? Code 4 = Greatest influential benefits on ICT adoption		
B10. Can you highlight major success factors to ICT adoption? Code 5 = Success factors to ICT adoption		

Adoption decision		
Technology characteristics		
Organisational capabilities	Technology characteristics	
Technology		
Organisational capabilities	External influence	Technology characteristics
Technology characteristics	Business strategy	
Business strategy	Adoption decision	
Business strategy		
Organisational size	External influence	Business strategy
Adoption decision		
External influence	Business strategy	
	Organisational capabilities	External influence
Organisational capabilities	Business strategy	Adoption decision

Business strategy	Adoption decision	
Adoption decision		
Adoption decision	Geographical spread	Technology characteristics
Technology characteristics		

Business strategy	
Management style	
Management style	
External influence	
External influence	
Organisational resources	Management style
Organisational resources	Management style
Organisational capabilities	Derived benefits
Organisational resources	Derived Benefits
Management style	
Business strategy	
Business strategy	
Business strategy	
Business strategy	
Business strategy	
Business strategy	
Business strategy	
Business strategy	
Business strategy	Organisational capabilities
Organisational resources	External Influence
<p>B11. Which factors affect ICT adoption decision and explain why?</p> <p>Code 6 = Factors affecting ICT adoption decision</p>	

	Level of competition
	Market performance
	Level of competition
	Level of competition
	Market performance
Business strategy	Market performance
	Level of competition
	Market performance
Organisational capabilities	Level of competition
	Level of competition
	Market performance
	Market performance
	Market performance
	Market performance
	Market performance
	Market performance
	Level of competition
	Availability of technology
	Level of competition
	<p>B12. Can the market, legal and social factors affect success of technology? Explain how?</p> <p>Code 7 = Relationship between the market, legal, social factors and success of technology</p> <p>i) Market</p>

National policy that supports technology	Cultural background
Issue of copyrights	Cultural background
Issue of copyrights	Cultural background
Compliance	Social networking
Compliance	Acceptability of technology
National ICT policy that supports technology	Acceptability of technology
Energy policy that support partnerships	Acceptability of technology
Issue of Copyrights	Acceptability of technology
Issue of Copyrights	Motivation
Issue of Copyrights	Social networking
Issue of Copyrights	Acceptability of technology
Issue of copyrights	Social networking
Energy Policy that supports partnerships	Acceptability of technology
Compliance	Acceptability of technology
National ICT policy that supports technology	Acceptability of technology
National ICT policy supports technology	Acceptability of technology
Compliance	Acceptability of technology
Compliance	Social networking
ii) Legal	iii) Social

Reduce fuel price within margins	Avail resources
Reduce fuel price within margins	Avail resources
Contain costs	Successful implementation of projects
Contain costs	Avail resources
Form strategic alliance	Successful implementation of projects
Technology adoption	Successful adoption decision
Improve customer service	Successful adoption decision
Technology adoption	Successful implementation of projects
Form strategic alliance	Builds teamwork
Technology adoption	Avail resources
Form strategic alliance	Avail resources
Technology adoption	Employees are coerced to adapt
Technology adoption	Avail resources
Reduce fuel price within margins	Leadership dictate Technology adoption pace
Form strategic alliance	Successful adoption decision
Reduce fuel price within margins	Successful implementation of projects
Technology adoption	Successful implementation of projects
Reduce fuel price within margins	Motivates Employees
B13. What is the foremost thing that you can consider when faced with competition?	B14. How can leadership support and commitment influence innovation adoption?

Key :-R1.. R18 - Respondent 1 to Respondent 18

Avg - Average