AN INVESTIGATION ON THE RELATIONSHIP BETWEEN INFORMATION TECHNOLOGY AND PRODUCTIVITY – A CASE STUDY OF NATIONAL OIL CORPORATION OF KENYA

BY

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DECLARATION

This proposal is my original work and has not been presented for a degree in any other University.

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DEDICATION

This study is dedicated to my parents Dismas Ochieng' and Risper Ochieng' and to my dearest loving children Mitchelle Auma, John Were and Noela Adhiambo, for their tireless sacrifice and encouragement throughout my study.

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ABBREVIATIONS

ATM	-	Automatic Teller Machine
CEO	-	Chief Executive Officer
CMA	-	Cash Management Account
EDI	-	Electronic Data Interchange
ERP	-	Enterprise Resource Planning
ICE	-	Information Communication Electronics
ICT	-	Information Communication and Technology
ITAA	-	Information Technology Association of America
IT	-	Information Technology
KPC	-	Kenya Pipeline Company
KPLC	-	Kenya Power and Lightning Company
MIS	-	Management Information Systems
NOCK	-	National Oil Corporation of Kenya

ABSTRACT

The purpose of this study was to investigate the relationship between information technology and productivity. Specifically, the objectives were three, firstly to establish the status of ICT investment at NOCK, secondly, to establish the benefits and challenges of ICT and lastly to establish the relationship between ICT and productivity at NOCK. Data was obtained using case study to analyze the relationship between ICT and productivity. A total of 53 respondents were received.

Generally the study found that the major challenges facing ICT usage were having a poor ICT implementation strategy and inadequate user training which affected ICT diffusion and therefore the benefits that the organization would have derived from the use of ICT. Decisions to adopt ICT were dominantly affected by the customers, suppliers and competition, perhaps because they perceive that ICT will enhance an organizations service delivery. Employees who had used ICT for long 11-15years, demonstrated that they felt that ICT had an impact. ICT does not seem to have a measurable impact on productivity until it reached a critical mass of diffusion and experience. Productivity gains from ICT investments materialise only after time. On productivity it was noted that generally ICT has had a positive impact on the organization on the delivery of services, quality of services and also impacted the morale of the employees.

The study recommends that for ICT to impact an organization, management support is critical from the inception of ICT initiatives to the time the initiatives are implemented in the organization. Training is also a very important element both to build capacity. Its quality, content and continuity have to be included at all times for sustainability. Training needs should be focused on the available facilities and employees sensitized on their importance. Having ICT facilities that users are not well trained on will have minimum impact on the organization. Prior to implementation of ICT initiatives, ICT Benefits need to be agreed upon prior to ICT investments and also prioritized for an organization to be able to measure the impact of ICT. The impact of ICT can be maximized when other areas of the organization are considered together rather than in isolation such as human resources, organization structure and business processes alignment.

CHAPTER ONE: INTRODUCTION

1.1 Background Information

The advent of the Internet, digitization, and the ability to access information and data from remote locations had created dramatic changes by the end of the twentieth century (Ostrow, 1998). Developments like expert systems, wireless networks, virtual connections, interactive Web interfaces, virtual reference services, and personal Web portals indicate greater changes since the start of the new millennium. The potential and inevitability of information and communication technologies application for growth, and development of countries, businesses, Education, and leisure and sports organizations, are now widely accepted. Such benefits are brought about by the capacity of ICT to create new services, new sources of revenue, new markets, new employment opportunities, and increased productivity and cost effectiveness (Crede and Manell, 1998).

Today governments around the world are attempting to realize the benefits of ICT and are making efforts to ensure widespread access to these technologies, networks and applications. Some governments are doing this by promoting access in schools, libraries, and communal facilities such as ICT parks and digital villages. The government of Kenya recognizes the importance the critical role ICT plays as an enabler to its development, and in its contribution towards the growth of other sectors of its economy. As part of the on-going public sector reforms, the government has endeavored to leverage the use of information technology in order to give Kenyans services that are prompt convenient and responsive to their demand. Accordingly the government's objective is to ensure that the country has a competitive telecommunications industry which delivers reliable and affordable services and products for the economic and social benefit of its citizens.

As part of the Kenyan government initiative to provide its citizens with prompt, convenient and responsive services, a number of public sector institutions both within the government ministries and state corporations have moved quickly to learn and adopt new information technologies. Kenya Pipeline Corporation (KPC), a state corporation has

implemented and installed an on-line Enterprise Resource Planning Solution for its core business operations and linking its branch offices to its head office. The system enables them provide their customers. Kenya Power and Lighting Co (KPLC) another state corporation has also implemented systems that enable customers enquire and pay for their electricity bills through their mobile phones and their accounts are credited within two days.

1.1.1 Productivity

In Industrial engineering, productivity is generally defined as the relation of output (i.e. produced goods) to input (i.e. consumed resources) in the manufacturing transformation process (Sumanth, 1994). Bernolak (1997) provides a useful verbal explanation of productivity as related to manufacturing; "Productivity means how much and how well we produce from the resources used. If we produce more or better goods from the same resources, we increase productivity. Or if we produce the same goods from lesser resources, we also increase productivity. By "resources", we mean all human and physical resources, i.e. the people who produce the goods or provide the services, and the assets with which the people can produce the goods or provide the services. The resources that people use include the land and buildings, fixed and moving machines and equipment, tools, raw materials, inventories and other current asset". This definition captures two important characteristics. First, productivity is closely related to the use and availability of resources. This means that a company's productivity is reduced if its resources are not properly used or if there is a lack of them. Second, productivity is also strongly connected to the creation of value. Thus, high productivity is achieved when activities and resources in the manufacturing transformation process add value to the produced goods.

It has been argued that productivity represents one of the most important basic variables governing economic production activities (Singh *et al.*, 2000). Grossman (1993), for example, discusses productivity improvement as one of the key competitive advantages of an enterprise in the following way: "Companies need to realise that gains in

productivity are one of their major weapons to achieve cost and quality advantages over their competition". In spite of the fact that productivity is seen as one of the most vital factors affecting a companies' competitiveness, many researches argue that productivity is relegated to second rank, and neglected or ignored by those who influence production processes (Singh *et al.*, 2000; Sink and Tuttle, 1989; Broman, 2004). Though the term is widely used, it is often misunderstood, leading to productivity being disregarded or even to contra productive decision making.

Despite the seemingly apparent and obvious benefits of ICT, doubts about its effect on productivity have accompanied ICT spending from the very beginning of its commercial exploration and numerous studies have thus already attacked this problem. The issue has also been known as "IT productivity paradox", named after Solow (Brynjolfsson, 1993).

1.1.2 Information Technology

Information technology (IT), as defined by the Information Technology Association of America (ITAA-2002), is the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware. ICT deals with the use of electronic computers and computer software to convert, store, protect, process, transmit, and securely retrieve information.

Orlikowski and Gash (1992) defined ICT as any form of computer-based information system, including mainframe as well as microcomputer applications. ICT here also refers to computer technology, hardware, software, multimedia applications, Internet, Web applications, email, digital materials, electronic databases, virtual collections, remote access and other communication technologies. The information technology umbrella can be quite large, covering many fields. Information and Communication Technology (ICT) is one of the important driving forces for modern development. With the advancement of Information and Communication Technology, one can live in the global village irrespective of distance, national and international boundaries. Information technology is a general term that describes any technology that helps to produce, manipulate, store, communicate, and/or disseminate information. Presumably, when speaking of

Information Technology (IT) as a whole, it is noted that the use of computers and information are associated. The term Information and Communication Technology (ICT) springs from the convergence of telecommunication, computing and broadcasting through the use of digital information. It covers any products that will store, retrieve, manipulate, transmit and receive information electronically in a digital form.

1.1.3 Kenya Vision 2030, First medium term plan (2008-2012)

The main objective of Vision 2030 is to have a globally competitive and prosperous Kenya, (Kenya Vision 2030, 2008). Within this vision there are a number of areas which have been addressed information and communication technology (ICT) being one of them with a focus of "Strengthening the foundation for a knowledge economy". The Government of Kenya recognizes the importance of ICT in economic development and has therefore initiated major steps to promote its use. One of the major initiatives that the Government is pursuing is to improve ICT infrastructure in order to bridge the digital divide and lower the cost of communications. With such initiative it only implies that the Government recognizes information to be a resource which must be generated, collected, organized, leveraged, secured and preserved to enhance national prosperity.

In 2007, the Government launched the ICT Board to oversee the development of ICT in Kenya and the National Analogue Digital Broadcasting Migration Plan to be finalized by 2012 (Kenya Vision 2030, 2008). There are a number of ICT programmes and projects that have been aligned for implementation by 2012, some of which the implementations have already begun. To mention, notably, the East African Marine Systems (TEAMS) – that will see installation of a submarine cable that will extend from Mombasa to Fujairah in the UAE, thus providing Kenya with an affordable high-capacity bandwidth. Local and Wide Area Networks – Local Area Networks (LANS) have also been installed in all government ministry headquarters.

With such huge investments the Government has made in ICT the extent to which these investments have influenced the productivity of its work force is yet to be established.

1.1.4 National Oil Corporation of Kenya

The National Oil Corporation of Kenya is a state corporation established in April 1981 under the companies Act (Cap 486). State corporations (Gichira,1982) are government owned enterprises, which are created through an Act of parliament. Their mandate is to provide prompt service to its citizens, and to continuously find means of improving their service levels to customers.

The mandate of the corporation is to participate in all aspects of the petroleum industry including commercial importation, exportation and distribution of petroleum products with the objective of stabilizing market prices (www.nockenya.co.ke). The corporation has 100% Kenya Government shareholding with the Treasury as the main shareholder (99%) and the Ministry of Energy as the other shareholder and parent ministry (1%)

In1997 National Oil Corporation of Kenya entered the retail sector starting with the development of six fully fledged service stations. These have seen further expansions to sixty more stations countrywide (National Oil Strategic Plan, 2008-2013). The corporation also owns and operates a wholesale depot known as the National Nairobi Terminal. In order to increase efficiency in downstream operations, National Oil Corporation is in the process of investing extensively in computer hardware, software, communications infrastructure, and will soon be implementing an Enterprise Resource Planning (ERP) system.

A number of recent studies have tried to establish a positive relationship between IT or ICT investment and productivity, have shown mixed results. Many attempts to justify the business value of increased investments in IT have also shown mixed results. While findings from earlier studies have been conflicting, recent firm level studies indicate that IT investments have a positive impact on productivity (Oliner and Sichel, 1994, 2000; Lehr and Lichtemberg, 1999; Brynjolfsson and Hitt, 1996). These studies have been conducted in private institutions and countries other than Kenya, and are not localized with no study having being done within the Kenyan public sector.

It is against this background that this study attempts to explore whether there is a relationship between IT and productivity, looking at a case study of National Oil Corporation of Kenya, a state corporation. It will also investigate the benefits the corporation has achieved by investing and adopting ICT.

1.2 Problem Statement

The seemingly obvious yet elusive relationship between ICT and productivity has accumulated a great body of research (Brynjolfsson, 1993; Hitt and Brynjolfsson, 1996; Lucas, 1993) exploring the ICT productivity impact, have produced findings that are plagued with ambiguity and inconsistencies. Some researchers reported no relationship between ICT and productivity (Byrd and Marshall, 1997), some others provided evidence of such relationship (Bender, 1986; Brynjolfsson, 1993). Few studies showed negative or dysfunctional ICT productivity effects (Weill, 1992). The apparent problem of the impact of ICT on productivity can be illustrated typically in the case of ATM banking (Weill, 1992) where ICT investments did not increase the productivity output (i.e. the number of transactions per banking employee), while the benefits of the new automated banking service seemed rather obvious, with customers being able to access banking services at their convenience, avoiding the long banking queues. There could be other reasons for this such as some customers may not have bought into the idea of using ATM's or further still some customers continue going to the bank in some cases even more than four times withdrawing small amounts of money.

Despite some promising and optimistic view of the contribution of ICT on business value, however, there has been a long debate on the impact of ICT on organizational performance, which is called the "IT productivity paradox" (Brynjolfsson, 1993). This paradox basically points out that ICT does not necessarily enhance productivity or business performance.

Since the change of government in Kenya in 2003(National Rainbow Alliance Coalition came into power in 2003) and in the current coalition government, state corporations have entered into performance contracts with their parent ministries. NOCK for example,

has entered into a performance contract with the Ministry of Energy. These contracts specify the targets that state corporations should achieve within a given period of operation. Amongst the targets that these corporations must achieve within a given financial year that are related to IT are; automation (IT) and service delivery innovation (Letter from the Office of the President, Permanent Secretary, Secretary to the cabinet and Head of the public service, Ref No. OP/CAB/13/1/1A). At the time of performance appraisals, the corporations are expected to demonstrate and provide evidence on the extent to which they have achieved this target.

To achieve such a target, investments in information technology within state corporations and government ministries have and will continue to increase. As the investments in IT have been continuously growing in the state corporations over the past decade, determining the true impact of IT investments on productivity has been a major concern for board of directors, managers of the corporations and the respective authorities within which the state corporations fall.

Whereas the introduction of new technology in office operations can potentially have a lot of usefulness, the same technology can potentially have devastating effects in terms of efficiency and effectiveness if not well planned for affecting overall productivity of the workforce. Unfortunately, with the increasing use of information technology systems in state corporations in the country, little effort has been put in place to investigate the impact of these systems. Research within the government sector is limited. This study in part will try to fill this gap by examining the benefits investments in ICT has had in these organisations, and its impact on productivity.

It is against this background that an assessment of the relationship between information technology and productivity within the National Oil Corporation of Kenya became important. The motivation for this study was, to find out if state corporations are engaging and investing in Information technologies that impact on their productivity.

1.3.1 Research Question

The research sought to answer the following questions

a) What is the status of ICT at National Oil Corporation of Kenya?
b) What benefits has National Oil derived from its ICT investments?
c) Is there a relationship between information technology and productivity in National Oil Corporation of Kenya?

1.4 Objective of the study

1.4.1 General Objective

The study aimed at establishing the linkage between information technology and productivity within the National Oil Corporation of Kenya.

1.4.2 Specific Objectives

The study examined the impact information technology had in the enhancement of productivity within the National Oil Corporation offices in Kenya. In order to establish this, the study aimed at:

i. To establish the status of ICT at NOCK.
ii. To establish the benefits NOCK has obtained from investing in ICT.
iii. To establish the challenges the corporation had faced during its implementation of ICT.
iv. To establish the relationship between ICT and productivity at the Corporation.

1.5 Importance of the study

Given the strong drive to invest in ICT within the state corporations, the study will form a basis of determining the right technologies to implement and conditions required for these investments to be internalized to improve output, efficiency and generally service provision from the general workforce that will be used to position Kenya as a prosperous economy to global markets.

The research will contribute very much to:-

1. Policy makers in the state corporations sector who may utilise the results of the study to help align ICT to their strategies, to enhance efficiency in service delivery and improve competitiveness.
2. ICT Managers within state corporations as they make decisions that leverage investments in ICT with the business.
3. The study will be of assistance to the researchers and academics that plan on pursuing this area of research in the future.

1.6 Limitations of the study

There were some difficulties in trying to get information in that some of the interviewees were not interested in giving information. Time was also another limitation the researcher had to work around. Time was short and thus the researcher had to spend most of the time in the field. However, the mentioned limitations will not have a significant effect on the results.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

It is believed that until recently, the IT literature seemed almost uniformly positive that IT had positive effects in organisations, focusing on case studies of spectacular IT successes. The case evidences suggested, for example, that Native American Airlines had not only gained direct strategic advantages over late-moving rivals, but had significantly altered industry structure by creating switching costs among reservation agents and erecting IT-based entry barriers (Thomas and Anne, 1997). From the outset, IT researcher's advocated tight IT-strategy linkages, asserting that IT affects firms' strategies, strategies have IT implications, and firms must somehow integrate strategic thrusts with IT capabilities (Rackoff, Wiseman, and Ullrich, 1995; Bakos and Treacy, 1986; Beath and Ives, 1996). Porter and Millar (1995), for example, related IT to the value chain, concluding that the main strategic purpose of IT is to coordinate activities in the chain. Rockart and Short (1989) argued that IT serves primarily to 'manage organizational inter-dependence,' i.e., to solve coordination problems among departments and strategic business units, hence improving the overall efficiency in an organisation.

2.2 Productivity

A very early appearance of the term productivity was as used by Quesnay (1776) in the *Journal de l'Agiculture* over twenty centuries ago. Since then it has been applied in many different circumstances at various levels of aggregation, particularly in relation to economic systems (Tangen, 2002a). To improve productivity, an important conclusion is therefore that, one must eliminate waste: waste can be considered to be the opposite of what productivity symbolizes. How then does IT play a role in increasing productivity? Does it help in elimination of waste in terms of organisational resources? Well one can say that it does, as it helps to re-engineer processes and eliminate waste in business processes. Processes are enhanced and are done within a shorter time. Manual business processes become automated with the introduction of IT and enhance service delivery or production of goods is enhanced increasing the overall efficiency of the organisation.

Information Technology is regarded as a fundamental factor of production (Hannan and Freeman, 1994). Its role as an important organization resource just like land, capital or labour is increasingly being realized. All levels of the organization need it for planning at strategic level, for control at the supervisory level, and for operational management on a day to day level. It is needed by organizations for purposes of planning, control and coordination; (Peteraf 1993). The proficiency, timeliness and accuracy of factual information at the disposal of the manager, can give a business a considerable edge over its competitors, and increase and organizations performance and productivity.

2.2.1 Productivity variables

When looking at productivity, increased productivity can be said to have happened in a firm using the following measures; cost reduction, inventory reduction, increased flexibility in operations, reduction in delivery time of goods and services, improved quality of products and services and increase in efficiency. How productivity is assessed continues to be an interesting research topic for researchers and practitioners.

Table 1: Productivity variables

Productivity Variables	Outcome
Flexibility	Frequent new products and services. Firm can also have a wide product and service range
Reduced/short delivery time	Faster operations
Improved quality of products and services	No errors in processes which do not waste time or effort having to re-do things
Dependable delivery	Delivering exactly as planned
Reduced cost of operations	Increased profitability
Increased efficiency	Reduction in operational costs
Increased employee productivity	Employees are able to do more within a shorter period of time.

2.2.1 Impact of IT investments on productivity

As the investments in IT have been continuously growing over the past four decades, determining the true impact of IT investments has been a major concern for managers and researchers. Thus, various studies have attempted to assess the business value of the IT investments in the past. While some recent studies have claimed that investments in IT have associated with organizational productivity (Brynjolfsson and Hitt, 1996: Dewan and Min, 1997; Shao and Lin, 2000), other researchers argue that in determining the IT impact one should consider time lags (Yaylacicegi and Menon, 2004), the indirect costs associated with IT investments (Love *et al.*, 2004) and potential costs associated with human factors (Cardnali, 1998). Some researchers however are still debating whether IT adds value to organizations (carr, 2003; Scharage, 2003; Dejarnett *et al.*, 2004) and thus this issue is worthy for further investigation.

Various researchers have examined the IT impact on productivity at the firm level, but their findings have been conflicting. Weill (1992) found that strategic or information IT investments were not associated with any firm performance, while transactional IT investments were significantly associated with strong firm performance. Loveman (1994) found no evidence of IT impact on output or labour productivity in his study despite of disaggregating IT according to IT intensity, industry and market share. Lee and Menon (2000) reported that IT capital was associated with increased productivity, but IT labour did not. Shao and Lin (2001) found that IT investments have a positive effect on technical efficiency in the firm's production process. Kudyba and Diwan (2002) reported that investment in IT contributed positively to a firm level productivity. Comparing their results to other studies, the authors found that the increase in IT productivity increased over the years.

Using healthcare industry dataset, Yaylacicegi and Menon (2004) found that IT capital had a positive impact on organizational productivity starting from the sixth year after the IT spending. Myung and Kweku (2006) reported that the IT impact on productivity can be maximized when investments in other related areas are considered together than when they are considered in isolation. Therefore, IT investments decisions should not be made

without consideration of the levels of other investments within an organization to avoid any waste in additional investments in IT. Technology must be harnessed in a positive manner through a formalized scanning and development process if the organization is to recognize the technological benefits that ICT can offer productivity improvement.

2.3 Information Technology

Globalization forces have changed the way we do business (Ruey-Jer, 2007). Companies increasingly focus on their core capabilities. The global competition among contemporary businesses is increasingly harmonising ICT operations as well as the corresponding ICT hardware and software into their processes. When implanted properly, there is a general change from transactional relationship towards a more collaborative relationship in the way organisations are doing business (Myhr and Spekman, 2005). A good example is adoption of collaborative relationship in the supply chain management where ICT plays a crucial role in managing organisational relationships amongst supply chain members (Wang *et al.*, 2006). For example, Dell computer successfully capitalises on ICT to support its global operations. With the help of IT, Dell virtually integrated their complete value chain with their customers, distributors and suppliers. Dell is therefore in a position to reap a lot of production efficiency such as improving speed and flexibility in the global IT industry (Joan, 1998).

Businesses have acquired many different types of tailor-made ICT systems ranging from software to hardware platforms which they adopt to support their core business functions. From a global perspective, organisations across the world now routinely interact with the same global suppliers (e.g., HP Compaq, IBM, Microsoft, etc.) and consultants (PriceWaterhouseCoopers, Gartner, etc), and are thus exposed to the same standardised information, education and procedures of multinational companies. This unification process may also contribute to increased homogeneity with respect to the perception of ICT investments in companies.

Thomas and Anne (1997) argued that in business applications, the range and strategic impacts of such systems are vast. An example they gave was like in the pharmaceuticals distribution, where some companies provide pharmacists with computer terminals that

allow them to enter orders directly, simultaneously improving customer service and increasing switching costs, hand held computers and a sophisticated data management system that improve service and reduce costs, making delivery services profitable and affordable to customers.

2.3.1 Benefits of investing in IT

When ICT is properly implemented and utilised some of the perceived benefits that an organisation expects to derive include increase in operational efficiencies, as it eliminates manual re-entry of data (automation impacts), facilitates easy retrieval, sharing and search of consolidated databases (informate impacts), which are vital for informationalising products/services and streamlining, reengineering processes (transformate impacts). Increased use of ICT leads to reduced cost of coordination amongst buyer-supplier activities (Bakos, 1986), in terms of searching and communication between transacting parties, creating a more collaborative inter-organisational relationship. Implementation of EDI for instance can achieve strategic payoffs such as reduced cycle time. Supply chain communication systems can enhance supply chain capabilities including information exchange, coordination and responsiveness. ICT can reduce coordination costs through better information exchange quality and thus can enhance coordination capability. It has also been demonstrated (Jacobides and Croson, 2001) that advanced ICT can facilitate the acquisition of performance data and motivates firms to increase their control and monitoring efforts vis-à-vis their competitors and hence enhance their performance.

2.3.2 Challenges in realisation of ICT benefits

ICT has been identified as a key driver in any business if implemented properly. There are however some challenges that organisations might have that may lead to a very low impact of ICT (Vachara and Derek, 2006). The first challenge is a lack of technology awareness that influences ICT investment decisions. Some senior managers are unaware of key potential ICT innovation benefits. Lack of technology awareness may also obscure the ICT investment opportunity. This is because knowledge about a construction

process (such as estimating or cost control) may be limited to more conventional/traditional methods rather than how ICT may be used to effectively re-engineer these processes. Lack of technology awareness can lead to implementation of immature ICT applications which can lead to incomplete ICT functions, thus technological benefits that do not fit with the organisations needs.

The second challenge is associated with a senior manager's lack of experience in ICT adoption when introducing ICT applications into an organisation. This can also lead to user resistance leading to poor acceptance or no acceptance at all of the ICT investment. The third challenge is failing to gain expected business results. To obtain investment top management, the ICT department or the implementer often presents an ideal preferred outcome benefit of an ICT investment, which may be based on consultant recommendation or software vendor recommendation. This challenge arises if information about benefits or potential barriers is not being based on organisational reality. This can happen because of a misunderstanding of the organisation's true level of ICT readiness, not understanding the business processes that the organisation employs or the relationship between these processes or it may be as a result of misrepresenting potential benefits that are unlikely to be actually realised. Thus to realise true benefits from ICT investments, the evaluation of ICT benefits should be truly concerned with the organisational context.

Other challenges that may hinder the realisation of true benefits from ICT could be that some of the organisations are not prepared to embrace new technologies and view ICT as changes being forced upon them (Muhammad, 2004). Most of these are uncertain about IT applications and the ultimate benefits to their organizations. They perhaps have little knowledge of what technologies to acquire, how to implement them, and what problems to solve. Some of the reasons for their ignorance may be; lack of knowledge of appropriate technologies, and the skill to analyze and evaluate automation projects and their implementation. Another reason hindering wider use of IT could be the inadequate provision of hardware, software, and IT-based resources and systems and low level of knowledge of professionals.

2.4 Productivity paradox

Impact of information technology on firm productivity has received significant attention in information systems literature. Although many studies were performed to investigate this effect, the results were not conclusive in supporting a systematic effect.

The relationship between information technology (IT – or more recently information and communications technology – ICT) and productivity has been extensively debated over the last three decades. In the 1980s and 1990s, empirical research generally did not find relevant productivity improvements associated with IT or ICT investments (Strassman, 1990: Loveman, 1988: Franke, 1987). The "productivity paradox" concept then arose when the Nobel Laureate Robert Solow remarked that "You can see the computers everywhere but in the productivity statistics" (Constantino, 2004). In fact, it can be argued that productivity growth has slowed as investments in ICT have grown. Hitt and Brynjolfsson (1996) found that IT spending had a positive impact on productivity and provided significant value for consumers. Dasgupta *et al.* (1999) found that IT had negligible or even negative impact on organizational productivity across manufacturing and service firms. Considering intangible benefit (better coordination), Shin (1999) found that IT reduced coordination costs and thus, the author's findings further implied that IT can contribute to firm productivity and performance.

For many economists, this is proof that information technology does not affect productivity. However, the available evidence is mixed and does not solve the paradox. A review of extensive literature review of Gera *et al.* (1999) arrived at the conclusion that ICT capital does not contribute to increases in output and productivity growth.

Brynjolfsson (1993) tries to explain this productivity paradox and summarises the explanations into four categories. The first category, *Measurement errors*. He mentions here that there are obvious problems in measuring and comparing ICT investments owing to rapid price and quality changes, and statistics generally fail to measure qualitative improvements in the output of service industries. The second category, *Time lags*. ICT would not have a measurable impact on productivity until it reached a critical mass of

diffusion and experience (David, 1990; Willocks and Lester, 1996). David (1990) argues that productivity gains from ICT investments materialise only after time and depend significantly on network externalities and on changes in the complementary infrastructure. The third category, *Management practices and or Organisational resources.* It could be argued that these have not evolved sufficiently to take full advantage of technology. The fourth category, *redistribution.* ICT might help individual firms relative to competitors, but not increase productivity in the whole organisation or economy.

More recently, as new data has become available and new technologies have been applied, empirical investigations have produced evidence that ICT is associated with improvements in productivity (Oliner and Sichel, 1994, Lehr and Lichtemberg, 1999. Brynjolfsson and Hitt, 1996). A summary of some of the available results is given in Table 2.4.

Table 2.4 – Summary of available results on effects of IT investments on productivity

Studies	Sample	Results
Gilchrist *et al.* (2001)	Panel of Fortune 1000 US firms, 1987-1993	IT productivity is greater in producer firms than in user firms
Loveman (1998)	60 business units	IT investments added nothing to output.
Strassman (1990)	ComputerWorld survey of 38 companies	No correlation between IT and profits or productivity
Alpar and Kim (1991)	FED data	The methodology used to assess IT impacts can affect the results
Melville (2001)	31 US industries, 1965-1991	Benefits of IT increase with time
Plice (2001)	6 industry sectors for 38 countries	IT capital shows five to eight times higher ROI than non-IT capital for developed countries
Brynjolfsson and Hitt (1996)	600 large US firms, 1987-1994	Firms that adopt IT and decentralised organisations are 5 per cent more productive than those that adopt only one of these.
Greenan and Mairesse (1996)		There is positive relationship between a firm's productivity and the fraction of its employees who report using a PC at work.
Zwick (2003)	9,000 to 14,000 German establishments, 1997-2000	Investments in ICT substantially increase the average productivity of German establishments.
Tallon *et al.* (2000)	150 worldwide firms, 1988-1999	Greater alignment of IT with business strategy results in greater payoffs

Summary by: Author

Daveri (2003) advanced two possible complementary explanations for the failure of the catch-up in ICT spending to be reflected in higher productivity growth. Firstly, ICT investment may be simply unproductive in impact and generate no additional output upfront. Secondly, ICT investment may have a positive growth effect, but other factors act in parallel to hamper aggregate growth. As a result, productivity may still lag behind these other countervailing negative effects.

Progress in ICT innovation is claimed to bring labour productivity growth in many ways (Saito, 2001): The first route is the efficiency improvement in the ICT industries themselves – such as the computer and semiconductor industries. This is considered to be the contribution of ICT on the production side. Under rapid technological innovation ICT industries have succeeded in reducing output prices and their profits. The increase in the share of ICT industries contributes to an increase in the labour productivity of the whole economy of countries even here in Kenya. The second route is through ICT capital deepening, which is a contribution on the user side. According to standard growth accounting analysis, output growth can be decomposed into labour input, capital input, and technological progress. Labour productivity can be decomposed into technological progress and the capital equipment ratio (capital stock per worker). As companies actively invest in ICT and ICT capital stock accumulates, labour productivity should increase. The third route is the synergistic effect of ICT capital deepening on other capital stock and labour. When companies use ICT equipment such as computers to control capacity utilisation or the input of raw materials, the efficiency of current capital stock could increase and the same occurs with efficiency of labour resources, as organizational flexibility increases. In the same way, through the development of internet transactions, corporate efficiency can also increase through network externalities.

2.5 A firms performance and IT

Thomas and Baron (1994), argue that many people who claim to be discussing productivity are actually looking at the more general issue of performance. It is therefore worth looking at the impact of IT on a firm's performance.

2.5.1 Performance

Productivity is a multidimensional term related to the ratio between output and input. Performance is an even broader term that covers both overall economic and operational aspects, including objectives of competition and manufacturing excellence whether related to cost, flexibility, speed, dependability or quality. Performance is an umbrella term for all concepts that considers the success of a company and its activities. Some

high-performance operations that most companies aim to accomplish are: a) Fast operations that reduce administrative overheads and time to deliver goods and services b) flexible operations that adapt to changing circumstances quickly c) dependable operations that can be relied on to deliver goods and services as planned. This in turn has led to performance objectives, especially those relating to quality being seen as part of the concept of productivity by some researchers (Al-Darrab, 2000).

2.5.2 Efficiency and effectiveness

Sink and Tuttle (1989) define effectiveness as "doing the right things", while efficiency means "doing thing right". Most researchers concur that efficiency is strongly connected to the utilisation of resources and mainly affects the denominator (inputs) of the productivity ratio. Effectiveness, on the other hand, is linked to the creation of value for the customer and mainly influences the numerator (outputs) of the productivity ratio. A combination of high values of efficiency and effectiveness in the transformation process leads to high productivity. It is therefore possible for an effective system to be inefficient and also possible for an efficient system to be ineffective. What impact then does IT have, on making systems efficient and effective and in turn affect a firm's performance?

2.5.3 A firm's performance and impact of IT

What impact does IT have on a firm's performance? In a resource-based conceptual analysis of the impact of IT on a firm's performance, Clemons and Row (1991) advanced a commodity view of IT, arguing that competitive imitation or replication eventually erodes most IT-based advantages, non imitators are eliminated, and above normal returns to the IT eventually vanish. The authors also argued that, not only is IT unlikely to differentiate competitive performance, but they may not even improve overall industry returns, since customers and suppliers may co-opt any potential efficiency gains for themselves in terms of IT utilization.

The notion that IT per se does not generate sustainable performance advantages has received increasing support in recent IT research, and has produced a perspective known as the strategic necessity hypothesis, to which most IT researchers now adhere (Clemons,

1998). This hypothesis consists of two propositions: first IT improves performance of the firm by increasing internal and external coordinating efficiencies, and firms that do not adopt them will have higher cost structures and therefore loose out on competitive disadvantage, secondly notwithstanding the point above, firms cannot expect IT to produce sustainable advantages because most IT systems are readily available to all firms' competitors, buyers, suppliers, and potential new entrants in competitive factor markets. Firms would appear to have only three feasible paths to IT-based competitive advantage (Thomas and Anne, 1997): either reinvent IT advantages perpetually through continuous, leading-edge IT innovation; or move first and erect unassailable first- mover advantages; or embed IT systems in organizations in such a way as to produce valuable, sustainable resource complementarity. It is also noted that perpetual innovation may hypothetically increase a firm's performance, but these advantages vanish if innovation either ceases or stumbles, and are haunted by ever-shortening IT development cycles or obsolesce. First- mover IT advantages seem more promising, particularly those such as involving proprietary systems customized to exploit firm specific strengths or opportunities. (Kettinger *et al.*, 1994) suggest that such advantages rarely endure. For these reasons, the resource view has focused on resource complementarity as the most feasible path to a sure impact of IT.

Despite its less optimistic view of IT systems direct performance impacts, the strategic necessity hypothesis does appear to fit the emerging empirical evidence, and its resource based origins provide a solid theoretical foundation for investigating the contexts and conditions under which IT may produce competitive advantage, thus affecting a firm's performance. Particularly, it points toward a more balanced perspective, one that acknowledges the commodity view, while allowing the possibility of advantages arising from merging IT systems with other resources: if IT systems per se do not provide distinctive advantages, then firms must use them to leverage or exploit firm specific intangible resources such as organizational leadership, culture, and business processes (Henderson and Venkatraman, 1993).

2.6 Effect of organizational resources on IT investments

Walton (1989) and Benjamin & Levinson (1993) classified resources as Organizational, Business, and Technological, and argued that IT impact depends on the integration of resources across these categories. Keen (1993) divided resources into Human, Business, and Technology resources, and developed a 'fusion' framework that strongly parallels resource based theory, arguing that the key to IT success lies in the capacity of organizations to fuse IT with latent, difficult-to-imitate, firm-specific advantages embodied in existing Human and Business resources. Keen (1993) for example, identified resources such as CEO commitment to IT, IT planning, and process re-design to produce a successful IT impact. Using the Walton framework, Benjamin and Levinson (1993) focused on the role of organizational flexibility in gaining a successful IT impact. According to Keen (1993, pg. 19), "The wide difference in competitive and economic benefits that companies gain from information technology rests on a management difference and not a technical difference. Some business leaders are somewhat better able to fit the pieces together than others".

The IT literature, contingency approaches, the strategic necessity hypothesis, and resource-based theory point to the same conclusion: that IT utilization advantage depends heavily on exploiting relationships among complementary organizational resources. Also, though currently popular, the notion that firms should merge technology with human dimensions is not new (Emery and Trist, 1995). Based on earlier empirical studies, Miller and Rice (1997) developed the socio technical framework as a reconciliation of human, organizational, and technological needs, arguing that maximized technological utilization and performance requires simultaneous optimization of an organization's social and technological subsystems.

Subsequently, leading organizational researchers working in the 1960s and 1970s (Child and Mansfield, 1992; Perrow, 1990) showed that technologies performed poorly in the absence of proper alignments with structures and cultures, conclusions that have received consistent support throughout the so-called 'human relations' (Roethlisberger and Dickson, 1999; McGregor, 1990) and contingency schools, as well as in more recent

research linking organizations and technology (Huber, 1990). There emerges, a relationship between IT and six potential complementary resources: open organization, open communications, organizational consensus, CEO commitment, organizational flexibility, and IT-strategy integration. The cultural variables most frequently linked with IT performance are open organization and open communications. Zuboff (1998), for example, argued that the benefits of IT lay in their capacities to release information throughout an organization, and that, artificial cultural or structural constriction negate their value. As such, he urged firms to embrace an open philosophy, allowing employees access to operating information traditionally controlled by upper management, and repudiating traditional hierarchies, top-down communications, and autocratic command and control.

Zuboff (1998) argued that the informated organization must operate lean, retraining or eliminating middle managers, and fostering frequent, unstructured communications across functional and project boundaries. Ultimately, executives must change from controlling authority figures to supporting counsellors, relinquishing authority to those best positioned to make timely, informed decisions. Although new IT systems require extensive adaptations from managers, users, and technologists, firms often respond sluggishly, unable to execute the higher-order changes necessary to merge IT with patterns of interpersonal behaviours and communications (Orlikowski and Gash, 1992), hence causing IT to have little or no impact at all.

Zuboff (1998) suggested that IT systems often fail to impact an organisation because managers under-estimate the magnitude of the required organizational shifts, as well as their own resistance to implementing the principles of open organization. Empirical results in the organizational ecology literature have shown that innovations affecting core organizational features (such as structures and cultures) produce the most powerful resistance to adoption because managers perceive them as posing the most significant survival risks (Freeman, 1994). In resource terms, managerial resistance to open organization acts as an isolating mechanism that impedes a successful IT, and protects the performance advantages of firms that combine IT with open cultures.

Earlier researches also suggest that complementarities may exist between its utilization and organizational consensus, i.e., organizational trust, cooperation, and the absence of fundamental conflict. Rockart and Short (1989) argued that IT if well utilized, records an increase in mutual dependencies across organizational functions, enabling more frequent and elaborate communications among disparate interests, and requiring personnel to interact more seamlessly. In a retail industry analysis, Clemons and Row (1991) argued that new retail IT systems require stores to interact more cooperatively with their own home offices and distribution centres, as well as with suppliers connected through Electronic Data Interchange (EDI) systems. Kanter (1994) concluded that the most effective innovators 'reduce rancorous conflict and isolation between organizational units; create mechanisms for exchange of information and new ideas across organizational boundaries; ensure that multiple perspectives will be taken into account in decisions; and provide coherence and direction to the whole organization, creating an enabling environment for IT to impact the organisation. In this team oriented cooperative environments, innovation flourishes.

2.6.1 Effect of senior management support on the impact of IT

A successful IT impact requires a top executive who acts as 'business visionary' and 'prioritizer,' clearly supporting and articulating the need for IT, and communicating its functionality within the context of the organization's strategy, structure, and systems. Neo's (1998) analysis produced a similar result. He reported that management vision and support, differentiates, successful from unsuccessful IT utilization and impact. The same notion arises in Clemons and Row (1991), who fielded the general concept of the 'senior management entrepreneur', as one who is, willing to view IT as a central part of business thinking, willing to examine how strategic decisions are affected by IT systems, and willing to examine cross functional IT applications. CEO commitment enhances IT utilization success and the overall impact by making resources available for implementation, by integrating IT with business strategy and processes, and by ensuring continuity in IT investments over time (Kettinger *et al.*, 1994). The evidence suggests that many CEOs find IT threatening, and that CEOs' verbalized commitments are

frequently perceived as shallow, uninformed and unsupported by resource deployments (Kanter, 1994).

In Clemons, (1996) the importance of selecting strategic opportunities, applications that are consistent with and support the firm's strategic objectives, requires real links between management information systems and strategic planning. It also requires the ability to seek out, to find, and to recognize these strategic opportunities. Rockart and Short (1989) made the additional point that not only does planning improve IT effectiveness, but IT may provide the systems and information that can make planning more effective, creating a symbiotic IT-planning relationship. Clemons (1996), for example, lamented that most of the spectacular successes were, in fact, accidents, with managers developing IT systems as solutions to pressing problems without recognizing their potential strategic impacts.

2.6.2 Effects of training on IT impact

Following a research on the integration of IT training with other management practices, Goad (2001) concluded that every organization needed to have well adjusted, trained and experienced personnel to perform activities that would lead to the achievement of its strategic objectives. In emphasizing the need for continual employee training Carnavale (1990) wrote; "...as jobs in today's dynamic organizations have become more complex, the importance of employee education has increased. When jobs were simple, easy to learn, and influenced to only a small degree by technological changes, there was little need for employees to upgrade or alter their skills. But that situation rarely exists today. Instead, rapid job changes are occurring, requiring employee skills to be transformed and frequently updated."

In his view Raymond (2002) believes that an organization that desires and expects greater impact of IT on the output of the workforce has to train its workforce in Information technology for the following reasons: First, ability to keep pace with the knowledge based economy has an ever-increasing demand for a well educated and skilled workforce. Second, possession of skills required for many conventional occupations are changing

rapidly, making many skills to quickly become obsolete as new jobs, new technologies and new industries emerge. Third, today's workplace requires higher levels of education and skills. The equipment we use to do our jobs is more sophisticated requiring regular skills update. Fourth, the 21st century requires those employees who are creative, adaptable and skilled enough to accommodate technological advancement and change. Fifth, how we do our work has also changed. Teachers, police officers, forestry workers and company chief executive officer's alike use increasingly sophisticated information technology to do their work. If training is well done then an organisation will expect to reap more benefits from implementing IT.

CHAPTER THREE: RESEARCH METHODOLOGY

This chapter outlines the research methodology used in the study. It includes the research design, population of interest, sample design and size, data collection methods, research instruments used and data analysis procedures and presentation.

3.1 Research design

A research design is a program that guides the investigator in the processes of collecting, analyzing and interpreting observations (Chava and Nathmias, 2005). It allows inferences concerning causal relations and defines the domain of generalizabilty.

This research utilized case study design, which is one of several ways of doing research whether it is social science related or even socially related. It is an intensive study of a single group, incident, or community (Shepard and Greene, 2003). Case study as a research design involves an in-depth, longitudinal examination of a single instance or event: a case. Another suggestion is that case study should be defined as a research strategy, an empirical inquiry that investigates a phenomenon within its real-life context. It provides a systematic way of looking at events, collecting data, analyzing information, and reporting the results. Case study research means single and or multiple case studies. It can include quantitative and or qualitative evidence and relies on multiple sources of evidence and benefits from the prior development of theoretical propositions. As a result the researcher may gain a sharpened understanding of why the instance happened as it did, and what might become important to look at more extensively in future research. For this research, the case study design was used to facilitate a deeper and sharpened understanding of the relationship between information technology and productivity by looking at National Oil Corporation as a "case".

3.2 Population and sampling

The target population on interest in this study was National Oil Corporation of Kenya. This organization was purposively selected for the study because it represents a similar

structure in operation and business compared to other state owned corporations and further information would be easily accessed and readily available. Secondly, the cooperation was also ideal for the study given that it has many branches distributed sparingly within the country which would give good results. This paper will involve a cross sectional study of all the management levels conducted within selected branches and outlets of National Oil Corporation of Kenya.

The population comprised 194 staff working at branches and outlets of National Oil Corporation of Kenya. The target population sample comprised 96 respondents across all the management levels based in Nairobi, interviewed using the structured questionnaire. This number conforms to the widely held rule of thumb that, to be representative, a sample should have thirty (30) or more test units. Census sampling was used to administer the structured questionnaire in order to establish the status of ICT. Out of the target population sample of 96, the number of responses received was 53.

3.3 Data collection

Primary data was be collected and gathered from respondents through the delivered structured questionnaires comprising of both closed and open-ended questions.

The basic design of the questionnaire was based on closed questions and a five-point Likert scale (1=strong disagreement; 2=disagreement; 3=moderate; 4=agreement and 5=strong agreement) to correspond to the respondents perceived impact and benefit of ICT investment and adoption. There was an open ended part that enabled respondents express their opinion. The detailed structured questionnaire survey (self administered) was presented to the person in charge of ICT at NOCK, other personnel of NOCK and the managers or supervisors at the service stations who are charged with the responsibility of using ICT. The questionnaires were delivered to and collected from the corporation and stations in person. The questionnaires were administered by use of a research assistant who dropped and picked the questionnaires to ensure high rate of return. A covering letter that explained the nature of the study accompanied the questionnaire.

The questionnaire was divided into four sections namely Section "A", Section "B", Section "C" and Section "D". Section "A" sought bio data of the respondents. Questions in section "B" focused on the level of computerisation and ICT facilities available; usage of ICT facilities available; training provided; reasons why ICT was adopted and the importance of these reasons, and the challenges faced. Questions in section "C" sought to evaluate the perceived benefits of ICT investment or adoption in the organisation through four factors; employee/customer satisfaction, Management of organisational resources, organisational structure, information and costs, and working conditions. Questions in section "D" sought to evaluate the effects investments in ICT have had on productivity.

3.4 Data analysis

The findings from the questionnaires shall were subjected to statistical treatment using Statistical Package for Social Sciences (SPSS) to enable data interpretation. The collected data was edited for completeness and consistency and coded to enable the data to be analysed. Descriptive statistics was utilized in the analysis in the study. Data output from the analysis was presented in frequencies to facilitate analysis of the various benefits and status of ICT at NOCK, in order of attainment. For the third objective, percentage distribution was used to establish whether there was any relation between information communication technology (ICT) and productivity.

CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION

4.0 Introduction

This chapter is divided into six sections. The first section describes the socio-demographic characteristic of the respondents while the second section establishes the status of ICT at NOCK by describing the level of computerization and type of ICT facilities found at NOCK. Section three identifies the sources of pressure for the adoption of ICTs and analyses the level of pressure exerted by each of the sources. As in any other purchase decision, the potential adopter seeks information (technical and economic) from both internal and external sources. These are analyzed in the fourth section, while the fifth section discusses the challenges faced during adoption of ICT technologies. The sixth section presents the opinion of respondents on the productivity of ICT adoption in National Oil Corporation of Kenya.

4.1 General information of the respondents

Table 4.1 below shows the profile of the respondents. The socio-demographic characteristics covered are gender; age and level of education (see Table 4.1 below). The majority of the respondents were male (62.3%), while female respondents were 37.7 percent. In terms of age, 54.7 percent of the respondents were aged 26-35 years, while those aged 36-45 years were 35.8 percent. Less than 6 percent of the respondents were aged below 25 years and only 1.9 percent of the respondents were aged 50 years and above. When one considers level of education, 64.2 percent of respondents have college and or University education and 30.2 percent had at least secondary education; 5.6 percent of the respondents had only primary level of education.

Table 4.1 Socio-demographic Characteristics (N=53)

	FREQUENCY	PERCENTAGE
Gender		
Male	33	62.3
Female	20	37.7
Respondent's Age		
Below 25 Years	3	5.7
26-35 Years	29	54.7
36-45 Years	19	35.8
46-50 Years	1	1.9
51 + Years	1	1.9
Level of Education		
Primary	3	5.6
Secondary	16	30.2
College/University	34	64.2

4.2 Computerization and type of ICT facilities

Majority of the respondents have used computers for between 11-15 years (Figure 4.1). The result show that the use of ICT at NOCK has occurred steadily in the 5 years interval. Figure 4.1 shows that majority of the employees at NOCK have worked for a period between 3-5 years. From an analysis of the trend on the number of years computers have been used, it shows that there is an increase in usage at an interval of five year.

A question was posed to the respondents to indicate the type of ICT facility they use while working at NOCK. Table 4.2 presents the ICT facilities available and being used at NOCK. In terms of ICT availability and usage, the survey reveals that Personal computers and internet services are the ICT facilities which are mostly available and used at NOCK. Of all the respondents that responded to the question on the types of ICT facilities available 88.7 percent use Personal computer whilst 81.1 percent use internet. Access to extranet and PDA/Palmtops was rather low as only less than 20 percent of the respondents have used such facilities. Communications and exchange of information was the predominant usage to which the computers were put. The results demonstrate that

77.4 percent of the respondents are using email services. Other facilities available include ERP software data base servers and servers.

Figure 4.1 Number of years of computer usage

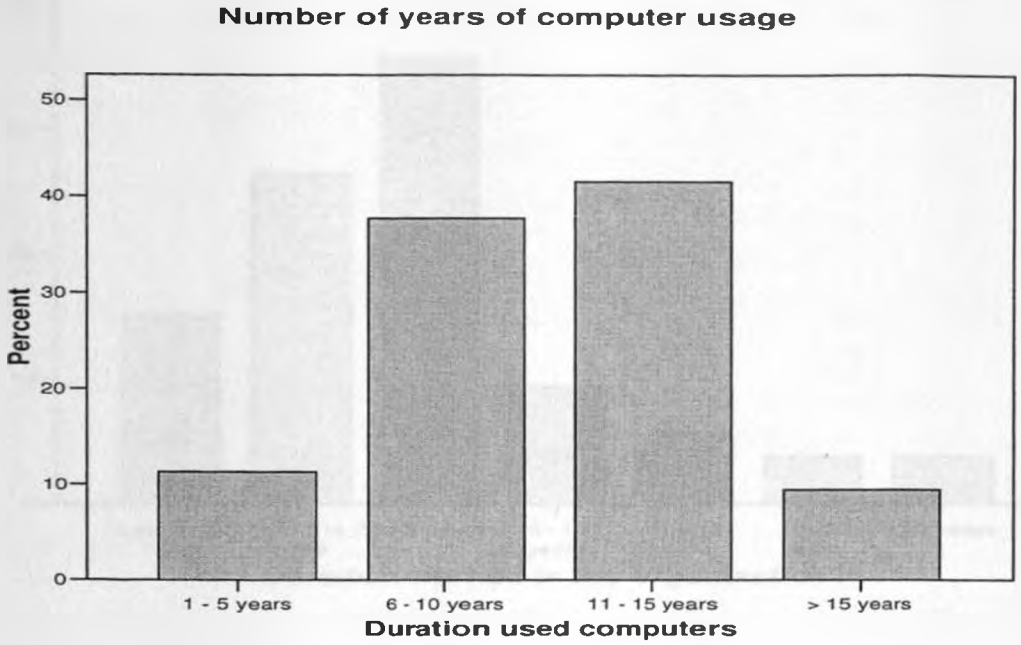

Figure 4.2 Duration worked at NOCK

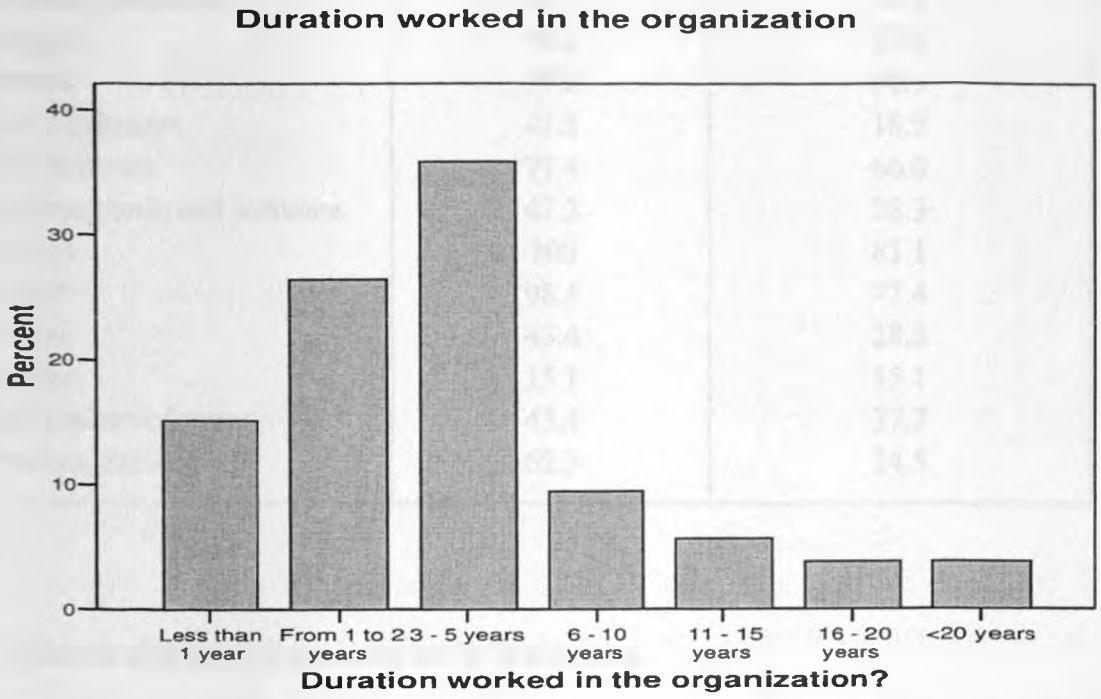

Table 4.2 Types of ICT facilities and usage (N=53)

ICT Facilities	Availability (%)	Usage (%)
Personal computers	98.1	88.7
Laptops	98.1	43.4
Servers	79.2	50.9
PDA's/palmtops	41.5	18.9
ERP Software	77.4	66.0
Reporting tools and software	47.2	28.3
Internet	100	81.1
E-mail	98.1	77.4
Intranet	43.4	28.3
Extranet	15.1	15.1
Application software	43.4	37.7
Database Server	62.3	24.5

4.3 Source and level of pressure for ICT adoption

The respondents were asked to indicate the sources of pressure and the levels of such pressure in their decision to adopt ICT. Table 4.3 shows the responses. External sources such as customers, competition and suppliers affected the decision to adopt ICT compared to internal sources. The level of pressure from competition, customers, and suppliers were rated "high" by majority of the respondents. 52.8 percent of the respondents rated customers as the highest source of pressure followed by competitors (50.9 %) and suppliers (47.2%). The results also show that the least source of pressure came from trade association and labour unions at 9.4 percent.

Table 4.3 Source and level of pressure for ICT adoption

Source of pressure	Level of pressure exerted		
	Low (%)	Moderate (%)	High (%)
Customer	20.8	26.4	52.8
Competition/Business trend	11.3	37.7	50.9
Supplier	37.7	15.1	47.2
Government	41.5	45.3	13.2
Trade association	50.9	39.6	9.4
Computer vendors	43.4	37.7	18.9
ICT consultants	28.3	47.2	24.5
Labour Union	62.3	28.3	9.4
Staff	11.3	43.4	45.3

4.4 The purpose for investing in ICT

The information organizations seek would relate to the technical feasibility of ICT as well as the possible impact of ICT adoption on organizational performance. The bottom line of an organization's performance is profitability, which is determined by interplay of several factors, such as cost efficiency, productivity, customer relationship, competitive position, and employee/labour relations (Olukunle & Sunday, 2008).

Table 4.4 suggests that, in general, most of the factors were considered to be of much importance in the decision on ICT adoption. For most factors, the respondents strongly agreed to the statements on the purpose of ICT adoption by NOCK. Improvement of quality of customer service, customer relations, employees productivity, labour/employees relation, flexibility of the organization and to improve status were the few factors that were perceived as "highly" or "very" important by not less 40 percent of the respondents.

Table 4.4 Purpose for investing in ICT (N=53)

Purpose	Strongly disagree (%)	Disagree (%)	Moderate (%)	Agree (%)	Strongly Agree (%)
To increase return on investment	4.1	16.3	26.5	38.8	14.3
To improve image among competitors	5.1	4.3	35.8	34.0	20.8
Reduction of operational costs	3.8	1.9	18.9	47.2	28.3
Improvement of quality of customer services	7.5	11.3	12.0	20.1	45.3
(Improved customer relations)	7.5	5.7	13.2	32.1	41.5
Improvement of employee productivity	1.9	9.4	20.8	26.4	41.5
Increase productivity	7.5	17.0	35.8	22.6	17.0
To improve labour/employee relations	5.7	5.7	26.4	15.1	47.2
Improved record keeping and tracking of documents	5.7	7.3	12.5	28.3	41.5
Gain competitive advantage	10.1	20.1	41.5	18.9	9.4
To meet government demands and requirements	30.2	41.5	18.9	9.4	9.4
To comply with customers public& community interests	3.8	13.2	7.5	41.5	34.0
To achieve quality improvements in process	3.2	6.6	23.5	45.1	21.6
Flexibility/adaptability of organizational activities	3.8	13.2	7.5	36	41.5
Increase volume and speed of output	18.9	43.4	32.1	94.3	5.7
To meet corporate objectives	7.5	22.6	32.1	37.7	
To achieve a "world class" status	5.1	2.9	9.0	34.0	49.1
A way of improving current systems by eliminating legacy systems	3.8	7.5	13.2	47.2	28.3
To align the systems with the overall company strategy	7.5	10.2	12.4	37.7	32.1
To focus on efficient operations that remove bureaucracy	5.7	8.1	20.2	39.6	26.4
To acquire a more effective process for managing its business	3.8	7.5	34.0	28.3	26.4
To improve the efficiency of the management system	7.5	9.4	24.5	30.2	28.3
To meet shareholders demands and requirements	3.8	20.8	35.8	24.5	15.1

4.5 Challenges faced in ICT at NOCK

The study examined several challenges faced with ICT usage. Table 4.5 presents the percentage of respondents and their perceptions on the various challenges. An important finding from the study reveals that a large percentage of senior management at NOCK supports ICT initiatives (52.8%). The analysis shows that the major challenge facing the organization is a poor ICT implementation strategy. 43.4 percent of the respondents strongly agree that the ICT in NOCK was poorly implemented. Training was also cited as a major impediment faced by employees towards utilization of ICT. 35.8 percent strongly disagreed with the statement that there was adequate user training.

Table 4.5 Challenges faced in ICT usage at NOCK

Statement	Strongly disagree (%)	Disagree (%)	Moderate (%)	Agree (%)	Strongly Agree (%)
Senior management do not support ICT initiatives	52.8	30.0	7.5	3.8	5.8
The ICT system was poorly implemented	30.2	1.9	18.9	5.7	43.4
User training was adequate	55.8	15.1	15.1	10.8	3.2
Users resisted implementation of ICT	20.8	22.6	35.8	17.0	3.8
Change management was done prior to utilization of ICT	11.3	17.0	32.1	30.2	9.4
Organization did not acquire the right ICT tool	50.0	28.8	11.5	5.8	3.8

4.6.1 Benefits of ICT at NOCK

With respect to the contributions of ICT to the firm, the perceived benefits of investing in ICT at NOCK have been grouped into four categories; employee/ customer satisfaction, benefits in management of organization resources, organization structure, information and cost and working conditions.

Table 4.6.1 illustrates the perceptions on employee/customer satisfaction. The majority of respondents strongly agree that ICT improves employee productivity (35.8%), 34 percent

of the respondents strongly agree that ICT improved customer service delivery and has enhanced confidence of customers in the organization of NOCK internal processes. In terms of boosting the morale of the staff, the feeling is moderate (45.3%). The results also show that ICT adoption has not led to the creation of a virtual office, whereby employees could choose to work outside the organizational physical premises. 31.4 % of the respondents strongly disagree that ICT has led to the creation of a virtual office where an employee can choose to work outside the organizational physical premises. Contrary to the fear often expressed that ICT adoption reduces employment opportunities, respondents disagreed (35.8%) to the statement that adoption of ICT "reduced the number of employees in the organization".

Table 4.6.1 Employee/Customer satisfaction (N=53)

Benefit	Strongly Disagree (%)	Disagree (%)	Moderate (%)	Agree (%)	Strongly Agree (%)
Increase staff morale	9.4	9.4	45.3	17.0	18.9
Improved customer service delivery and performance	5.7	7.5	24.5	28.3	34.0
Improves employee productivity	2.0	3.7	22.6	35.8	35.8
Enhanced confidence of customers in organizations internal processes	3.8	11.3	28.3	34.0	22.6
Reduced the number of employees in the organization	18.9	35.8	20.8	20.8	3.8
Creation of a virtual office	31.4	23.5	19.6	13.7	11.8

4.6.2 Benefits of ICT in the management of Organization resources

The perceived effect of ICT adoption on resources management was also positive. 39.6 percent of the respondents strongly agreed that ICT has greatly improved efficiency in financial and accounting controls. In terms of decision making, over 60 percent of the respondents agree that ICT has improved the tempo of decision making. The results showed that respondents agreed to the statements that ICT adoption "improved work flow, reduced processing time but did not change the management hierarchy.

Table 4.6.2 Management of organization resources (N=53)

Benefits	Strongly Disagree (%)	Disagree (%)	Moderate (%)	Agree (%)	Strongly Agree (%)
Improved efficiency in financial/accounting control	10.1	5.0	7.5	37.7	39.6
Faster decision making process	3.1	8.5	20.5	43.4	24.5
Improved the reliability of accounting and financial reports)	7.5	9.4	9.4	37.7	35.8
Improved workflow and business process	8.1	3.8	20.2	47.2	20.8
Increased ability for timely product/services delivery	6.3	8.8	17.0	41.5	26.4
Changed the management hierarchy by reducing approval levels	17.0	43.4	18.9	15.1	5.7
Abolishing some organizational units	15.1	45.3	32.1	3.8	3.8
Reduced processing time	7.7	21.2	21.2	25.0	25.0
Reduced in operational costs	3.9	15.7	15.7	39.2	25.5

4.6.3 Organizational structure, information and costs

This hybrid factor measures the perceived impact of adoption on organizational structure, information and costs. As expected, ICT application improved records keeping as well as information security, confidentiality, and retrieval. It also necessitated organizational

restructuring, and brought flexibility and adaptability in organizational activities. While ICT adoption was not seen as increasing employee redundancy, it was perceived as reducing the inventory cost. As such, respondents perceived ICT adoption as beneficial to the quality of information and cost control.

Table 4.6.3 Organizational structure, information and costs (N=53)

Benefit	Strongly Disagree (%)	Disagree (%)	Moderate (%)	Agree (%)	Strongly Agree (%)
Improved record keeping and retrieval	7.5	9.4	9.4	34.0	39.6
Improved information security and confidentiality	1.1	1.9	14.0	45.3	37.7
Necessitated organizational restructuring	9.4	20.8	22.6	20.8	26.4
Brought flexibility and adaptability in organizational activities	5.7	9.4	28.3	32.1	24.5
Increased employee redundancy	22.6	43.4	15.1	13.2	5.7
Reduced inventory with a reduction in inventory costs	9.4	3.8	17.0	32.1	37.7

4.6.4 Working conditions

The fourth factor mainly deals with issues such as remuneration of IT staff, working hours, accuracy of personnel records, and staff training needs. Surprisingly, ICT adoption was not perceived to have improved the remuneration of IT-skilled staff above that of other employees 37.7 percent of the respondents disagreed with the statement that ICT adoption improved remuneration if ICT staff. As expected there is a general consensus that adoption of ICT has significantly reduced the paper works. 48.1 percent of the respondents agreed with the statement that adoption of ICT reduces paper work. However, adoption was perceived to have increased the flexibility of staff working hours, even though as earlier indicated, such work would still be on the premises of the organization, as well as improved the accuracy of personnel records

Table 4.6.4 Working Conditions (N=53)

Benefits	Strongly Disagree (%)	Disagree (%)	Moderate (%)	Agree (%)	Strongly Agree (%)
Increased flexibility of staff working hours	11.3	13.2	20.8	34.0	20.8
Increased flexibility of staff working locations - one can work from home or a virtual office	35.8	32.1	5.7	13.2	13.2
Improved remuneration of ICT staff above that the other employees	26.4	37.7	17.0	4.7	13.2
Improved accuracy of personal records	3.8	3.8	22.6	43.4	26.4
Reduction of paper work	5.3	6.2	21.2	48.1	19.2

4.7 The impact of ICT on the overall productivity

The productivity of investing in ICT at NOCK was ascertained by asking the respondents to give their opinions on a number of statements. The results show that over 50 percent of the respondents agree that ICT has had an impact on dependable delivery, which is, delivering exactly as planned. Over 45 percent of the respondents agree that investment in the ICT has increased the flexibility in the operation, that is, it has enabled adoption of new products, services and has also widen the product portfolios. There is a general agreement by the respondents that investment in ICT has reduced the delivery time (43.4%) and enhanced the quality of product and services (35.8). 41.5 percent agree that ICT has increased the efficiency in business operations and 30.2 percent agree that ICT has lead to increased profitability.

Table 4.7 Impact of ICT on the overall productivity (N=53)

Impact	Strongly Disagree (%)	Disagree (%)	Moderate (%)	Agree (%)	Strongly Agree (%)
Increased flexibility in operations	11.3	3.8	20.8	45.3	18.9
Reduced/short delivery time	3.8	3.8	26.4	43.4	22.6
Improved quality of products/services	3.8	7.5	34.0	35.8	18.9
Dependable delivery	7.5	1.9	30.2	50.9	9.4
Reduced cost of operation	3.8	7.5	17.0	43.4	28.3
Increased profitability	9.4	15.1	28.3	30.2	17.0
Increased efficiency in business operations	5.1	10.0	20.8	41.5	22.6
Increased employee productivity	7.5	17.0	15.1	32.1	28.3
Satisfied with the effects of the ICT investments in the organization.	7.5	17.0	15.1	32.1	28.3

CHAPTER FIVE: SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

5.1 Introduction

This chapter outlines the summary of the finding, conclusion and recommendations. This is in the line with the objectives and elements of the study. Based on the findings it makes conclusions and recommendations on investigation on the relationship between Information Technology and Productivity, a case study of National Oil Corporation of Kenya.

5.2 Summary

The study examined the impact information technology has had in the enhancement of productivity within the National Oil Corporation offices in Kenya. It established the status of ICT at NOCK, the benefits NOCK has obtained from investing in ICT, the challenges the corporation has faced during its implementation of ICT and the relationship between ICT and productivity at the Corporation.

The study utilized a case study design, the basic design of the questionnaire was closed ended and a five-point Likert scale (1=strong disagreement; 2=disagreement; 3=moderate; 4=agreement and 5=strong agreement) which corresponded to the respondents perceived impact and benefit of ICT investment and adoption.

The population of the study comprise 194 staff working at branches and outlets of NOCK, and a population sample size of 53 respondents selected across all the management levels within departments, interviewed using the structured questionnaire. Census sampling was used to visit sites in order to establish the status of ICT. The collected data was edited for completeness and coded to facilitate analysis. Statistical Package for Social Sciences (SPSS) was used to analyse the data. Descriptive statistics was used to show the distribution of the respondents

The findings of the study reveals that decisions that lead to the adoption of ICT at NOCK are influenced more by customers, suppliers, and competition than from inside sources such as government, trade associations or unions. Customers were considered the most important source of pressure to adopt ICT. The findings indicate that despite the availability of the ICT facilities, their usage is relatively lower. Other than communications, a few of the respondents use computer for routine data storage and transaction processing. The major challenges that affect ICT from the study are having a poor implementation strategy and inadequate training. If ICT is well implemented a number of benefits are derived within the organization which in turn affect the organizations performance, profitability, efficiency and productivity. Efficiencies are seen in financial control, reduction in paper work, improved record keeping, amongst others.

The study also reveals that investments in ICT has had a positive impact on productivity where most respondents agreed that there was reduced delivery time, improved quality of products and services, dependable delivery, increased flexibility in the operations, increased efficiency in business operations and a reduction in cost of operations.

5.3 Conclusion and Recommendation

From the foregoing result, ICT is currently triggering important structural changes in the productivity of National Oil Corporation of Kenya. These new technologies have implications for the competitiveness of the company, the competitive dynamics in markets, the efficiency in business operation and the firm profitability. The empirical evidence presented in this study, based on firm-level data from staff, corresponds with the theoretical predictions that suggest that ICT and innovation are positively associated with productivity growth at the firm level.

The findings further indicate that the people do appreciate the contribution of ICT to the performance of their firms, but the various barriers such poor implementation and inadequate training are a hindrance to their progress. This requires the firm to develop policies that are geared towards addressing these barriers and promotion of ICT adoption

and usage. ICT implementation is a management activity that needs to start from the top, CEO level. Top management decisions to invest in ICT and for ICT success requires effective management and planning and cascading to the macro and micro levels of an organization. For ICT to have an impact on productivity and for users to realize the benefits of ICT, management should help them understand real benefits and constraints that may occur before investing and implementing ICT initiatives. If few people utilize ICT, the impact on productivity may not be obtained, thus user learning, training and sharing of barriers should be a critical component of the ICT implementation strategy otherwise there will be no impact felt on productivity and overall no benefits gained in the long run.

The study will assist policy makers in the state corporations sector who may utilise the results of the study to help align ICT to their strategies, to enhance efficiency in service delivery and improve competitiveness. It will assist ICT Managers within state corporations as they make decisions that leverage investments in ICT with the business by highlighting potential pitfalls that should be avoided. These pitfalls include inadequate user training and having a poor implementation strategy.

Results also revealed that for ICT to have an impact on productivity, a more strategic approach to ICT implementation and management is required. The productivity relationship with ICT was conducted in the context of NOCK, findings are valid within this specific context. Future research could investigate productivity in other state corporations and government sector and the country in general, as the sample used focussed on NOCK. Further research is recommended using a much larger sample.

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QUESTIONNAIRE

This questionnaire seeks to collect information on the state of information technology, reasons as to why your firm has implemented information technology, perceived benefits of information technology and the effects of information technology on productivity.

Definition of Information Communication and Technology (ICT):

ICT can be defined as any form of computer-based information system, including mainframe as well as microcomputer applications. ICT also refers to computer technology, hardware, software, multimedia applications, Internet, Web applications, email, digital materials, electronic databases, virtual collections, remote access and other communication technologies.

Please provide the following information frankly and honestly. All information received will be treated confidentially and used for academic purposes only.

(Please tick where appropriate)

SECTION A: BIO-DATA

This section seeks to collect the respondent's demographic data.

1. Please indicate your gender (Please choose one answer): [ ] Male [ ] Female?

2. Please tick the age bracket in which you fall(Please choose one answer):

Below 25	26-35	36-45	46-50	51 and above
☐	☐	☐	☐	☐

3. What is the highest level of education you have attended? (Please choose one answer)

Primary Education	
Secondary School (O/A level)	
College	
University Degree	
Doctorate Degree(PhD)	
Others (Specify)	

4. Which department do you work (Please specify)?

5. What position do you hold in this organization? (Please specify)

6. How long have you worked in the organisation?(Please choose one answer)

Less than 1 year	From 1 to 2 years	3-5years	6-10 years	11-15 years	16-20years	<20 years

7. How long have you used computers? (Please choose one answer)

1 - 5 years	**6 – 10 years**	**11-15 years**	**>15 years**

SECTION B:The following statements describe the level of computerisation, ICT facilities and their usage within your National Oil. Please indicate the option that indicates the level of computerisation in your organisation and the ICT facilities that your organisation has.

8. Types of ICT facilities within your organisation;

FACILITY	**What types of ICT facilities does your organisation have? Please tick those apply. You can choose more than one answer.**	What ICT facilities do you use **Please tick those that apply. You can choose more than one answer.**
Personal Computers		
Laptops		
Servers		
Personal Digital Assistants(PDA's)/Palmtops		
ERP Software		
Reporting tools and software		
Internet		
E-Mail		
Intranet		
Extranet		
Application Software		
Database server		
Others(Please specify)		

(**Note:** The following is a Rating / Ranking scale for the purpose of answering the question below on the sources of pressure and the levels of such pressure)

Remark	Low	Moderate	High
Points/Marks	**1**	**2**	**3**

9. What are the sources of pressure and the levels of such pressure in your organisations decision to invest in ICT?

		LEVEL OF PRESSURE EXERTED		
ITEM	**SOURCE OF PRESSSURE**	LOW	MODERATE	HIGH
(a)	Customer;			
(b)	Competition/Business trend;			
(c)	Supplier;			
(d)	Government;			
(e)	Trade association;			
(f)	Computer vendors;			
(g)	ICT consultants			
(h)	Labour Union			
(i)	Staff			

The following statements describe organisation structure issues, training, staff involvement and reasons for investing in ICT in your organisation. Please indicate the level that best describes your opinion

(**Note:** The following is a Rating / Ranking scale for the purpose of answering the questions below)

Remark	Strongly Disagree	Disagree	Moderate	Agree	Strongly Agree
Points/Marks	1	2	3	4	5

10. As for the **Organisation structure support, training and involvement of staff** in the investment in ICT how would you rate the following?

ITEM		Strongly Disagree	Disagree	Moderate	Agree	Strongly Agree
(a)	Senior leadership team has a clear vision & strategy for the business success					
(b)	Senior leadership team involve staff within their departments in coming up with corporate strategy					
(c)	Information Communication and Technology is part of the corporate strategy;					
(d)	Annual budgets for our department is prepared with everyone's contributions;					
(e)	ICT investment is part of our departmental annual budget					
(f)	Staff are trained prior to any adoption of ICT facilities;					
(g)	Staff training in ICT is a continuous process;					
(h)	Staff are involved in identifying ICT initiatives prior to investments;					
(i)	Benefits of ICT investments are communicated to staff before the investments are actually made;					
(j)	Organisational changes related to ICT are planned well in advance;					
(k)	Senior leadership team support initiatives to invest and adopt ICT					
(l)	Senior leadership team appreciate the role ICT plays in the organisation					

11. What is the purpose of investing/adopting ICT in your organisation?

ITEM	PURPOSE FOR INVESTING IN ICT	Strongly Disagree	Disagree	Moderate	Agree	Strongly Agree
(a)	To increase return on investment;					
(b)	To improve image among competitors;					
(c)	Reduction of operational costs;					
(d)	Improvement of quality of customer services;					
(e)	Improved customer relations					
(f)	Improvement of employee productivity;					
(g)	Increase productivity;					
(h)	To improve labour/employee relations;					
(i)	Improved record keeping and tracking of documents;					
(j)	Gain competitive advantage;					
(k)	To meet government demands and requirements;					
(l)	To comply with customers, public and community interests;					
(m)	To achieve quality improvements in process and business operations;					
(n)	Flexibility/adaptability of organisational activities;					
(o)	Increase volume and speed of output;					
(p)	To meet corporate objectives;					
(q)	To achieve a "world class" status;					
(r)	A way of improving current systems by eliminating legacy systems;					
(s)	To align the systems with the overall company strategy;					
(t)	To focus on efficient operations that remove bureaucracy;					
(u)	To acquire a more effective process for managing its business;					
(v)	To improve the efficiency of the management system;					

ITEM	PURPOSE FOR INVESTING IN ICT	Strongly Disagree	Disagree	Moderate	Agree	Strongly Agree
(w)	To meet shareholders demands and requirements;					
(x)	Other(s), please specify;					

12. What challenges have you faced with ICT?

ITEM	CHALLENGES FACED	Strongly disagree	Disagree	Moderate	Agree	Strongly Agree
(a)	Senior management do not support ICT initiatives					
(b)	The ICT system was poorly implemented					
(c)	User training was adequate;					
(d)	Users resisted implementation of ICT					
(e)	Change management was done prior to utilisation of ICT					
(f)	Organisation did not acquire the right ICT tool					
(x)	Other(s), please specify;					

SECTION C:

The following statements describe the perceived benefits of investing in ICT at National Oil Corporation of Kenya. Please indicate the level that best describes your opinion

13. What are the perceived Benefits from investing in ICT at National Oil.

a) Employee/Customer Satisfaction

ITEM	THE BENEFITS DERIVED FROM INVESTING IN ICT ARE?	Strongly Disagree	Disagree	Moderate	Agree	Strongly Agree
(a)	Improved employee remuneration;					
(b)	Increased Staff Morale;					
(c)	Improved customer service delivery and performance;					
(d)	Improves employee productivity;					
(e)	Enhanced confidence of customers in organisations internal processes;					
(f)	Reduced the number of employees in the organisation					
(g)	Creation of a virtual office where an employee can choose to work outside the organisational physical premises					
(h)	Other(s) please specify;					

b) Benefits in the management of organizational resources

ITEM	THE BENEFITS DERIVED FROM INVESTING IN ICT ARE?	Strongly Disagree	Disagree	Moderate	Agree	Strongly Agree
(a)	Improved efficiency in financial /accounting control					
(b)	Faster decision making process					
(c)	Improved the reliability of accounting and financial reports;					
(d)	Improved workflow and business process;					
(e)	Increased ability for timely product /services delivery;					
(f)	Changed the management hierarchy by reducing approval levels					
(g)	Abolishing some organisational units					
(h)	Reduced process time					
(i)	Reduction in operational costs					
(j)	Other(s) please specify;					

c) Organisational Structure, information and costs

ITEM	THE BENEFITS DERIVED FROM INVESTING IN ICT ARE?	Strongly Disagree	Disagree	Moderate	Agree	Strongly Agree
(a)	Improved record keeping and retrieval;					
(b)	Improved information security and confidentiality;					
(c)	Necessitated organisational restructuring;					

ITEM	THE BENEFITS DERIVED FROM INVESTING IN ICT ARE?	Strongly Disagree	Disagree	Moderate	Agree	Strongly Agree
(d)	Brought flexibility and adaptability in organisational activities;					
(e)	Increased employee redundancy;					
(f)	Reduced inventory with a reduction in inventory costs ;					
(g)	Improved quality of information and cost control;					
(h)	Other(s) please specify;					

d) Working conditions

ITEM	BENEFITS DERIVED FROM INVESTING IN ICT	Strongly Disagree	Disagree	Moderate	Agree	Strongly Agree
(a)	Increased flexibility of staff working hours;					
(b)	Increased flexibility of staff working locations – one can work from home or a virtual office					
(c)	Improved remuneration of ICT staff above that of other employees;					
(d)	Improved accuracy of personnel records;					
(e)	Reduction in paper work					
(f)	Other(s) please specify;					

SECTION D:

The following statements describe the perceived impact ICT has had on overall organisations productivity. Please indicate the level that best describes your opinion

14. Impact of ICT on the overall productivity of your organisation;

ITEM	INVESTMENT IN ICT HAS HAD THE FOLLOWING IMPACT ON PRODUCTIVITY	Strongly Disagree	Dis-agree	Moderate	Agree	Strongly Agree
(a)	Increased flexibility in operations – frequent new products and services, wide product/ service range;					
(b)	Reduced/short delivery time due to faster operations;					
(c)	Improved quality of products/services due to error free processes which do not waste time or effort having to re-do things.					
(d)	Dependable delivery which can be relied on to delivering exactly as planned;					
(e)	Reduced cost of operations					
(f)	Increased profitability due to increased productivity.					
(g)	Increased efficiency in business operations					
(h)	The employee productivity has increased. Employees are able to do more within a shorter period of time					
(i)	Other(s), please specify;					

15. Overall, how would you rate your satisfaction with the investment in information Communication and Technology (ICT)

	Strongly Disagree	Dis-agree	Moderate	Agree	Strongly Agree
I am satisfied with the effects of the ICT investments in the organisation					

16. What should be done to encourage organizations to invest and adopt information Communication and Technology (ICT)?;

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17. Please highlight any other information Communication and Technology (ICT) practices or issues from your company's experiences that can enrich this study;

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(Thank you for your cooperation).

Appendix I: Letter of Introduction

National Oil Corporation of Kenya,

AON Minet House, 7th Floor

P.O. BOX 58567 – 00200,

NAIROBI

Dear Sir / Madam,

RE: INTRODUCTION LETTER

I am a Postgraduate student undertaking a Master of Business Administration (MBA) degree at the University of Nairobi. I am currently carrying out research proposal project in partial fulfilment of the degree requirements.

The research proposal topic is: ***'Information Technology and Productivity'*** in your firm.

Your organisation has been chosen to be used as a case study for this research. I would therefore like to request for your assistance in completing the questionnaire attached to enable me complete the research. The information you provide will be treated with strictly confidential and will only be used for academic purposes (this research). Your cooperation in completing the questionnaire will be highly appreciated.

A copy of this final project will be available to you on demand.

Yours faithfully,

Elizabeth A. Ochieng'

Reg. No. D61/7019/04