EFFECTS OF ELECTRONIC INFORMATION ON PROVISION OF MEDICAL SERVICES AT MOI TEACHING AND REFERRAL HOSPITAL

BY

MARTHA FRED NDESO

A Thesis Submitted to the School of post Graduate Studies in Partial Fulfillment of the Requirements for the Award of the Degree of Masters in Information Systems, Department of Computing Sciences, Faculty of Information Sciences and Technology

Kisii University

October, 2016

DECLARATION

Declaration by the Student

This thesis is my original work and has not been submitted for examination to any other university or institution of higher learning.

Martha Fred Ndeso **Signature……** **Date...……**

MIN14/20168/13

Approval by the Supervisors

This thesis has been submitted for examination with our approval as university Supervisors.

Name of Supervisor **Signature……** **Date...……**

Dr. Cleophas Maende

Senior Lecturer

Faculty of Information Science & Technology

Department of Computing Sciences

Kisii University

Name of Supervisor **Signature……** **Date...……**

Dr. Jotham Milimo Wasike

Lecturer

Faculty of Information Science & Technology

Department of Computing Sciences

Kisii University

COPYRIGHT

DEDICATION

I dedicate this work to my Dad Mr. Fred Shitsinzi and my Mum Mrs. Robai Shitsinzi who have been my pillars and mentors. To my husband Chris Anudo and my son Darryl Anudo for their understanding, constant encouragement and support. God Bless You All.

ACKNOWLEDGEMENT

The process of working on this thesis has been a worthy experience and I would like to acknowledge the following for their invaluable contributions and support. Above all, I am most grateful to God Almighty for His graciousness throughout the times of my study. This would not have been possible without His will. Special thanks to my family for their interest, encouragement, support and prayer. I am greatly indebted to Kisii University for supporting me throughout my studies. Special thanks go to my Supervisors Dr. Jotham Wasike and Dr. Cleophas Maende for their invaluable input and encouragement. I thank them for the encouragement, insight, time, effort and counsel given to me in this work I also wish to acknowledge the support of my colleagues and friends. Thank you for sharing your thoughts to improve this work. May God reward you all for the work you have done to make this work complete.

ABSTRACT

In today's competitive organization, the major challenge is effective management of information. The only sure way of managing gathered information in an efficient and effective manner is by use of technology. Hence, the implementation of health information system involves significant financial investment from health care providers. Policy decision makers therefore need to have a good understanding of how information systems can be effectively implemented, and how they are used by health care staff subsequently once they have been set in within work processes. The study was guided by the following research objectives: to assess how infrastructure facilities affects provision of medical services in Moi Teaching and Referral Hospital; to determine the effect of social structure on provision of medical services in Moi Teaching and Referral Hospital and to determine the effect of Staff ICT skills and expertise on provision of medical services in Moi Teaching and Referral Hospital. Descriptive survey design was used to elicit data from the employees of Moi Teaching and Referral Hospital who had been selected to form the study sample through Cluster sampling, Proportionate sampling and Simple random sampling techniques. The target population was 3144 staff from various departments. The sample size was 175 staff. Structured questionnaires were the main data collection tools. Inferential analysis was used to analyze the quantitative data. The study findings indicated that there is a strong positive non-linear correlation between the dependent variable and independent variables. R_2 is a measure of how much of the variability in outcome is accounted for by the predictors. Also, the value of R_2 has increased to 0.525 or 52.50% of variation in Adoption. The study concluded that the factors that predict provision of medical services at MTRH are infrastructure facilities 26%, social structure 21% and skills and expertise 16%; when staff motivation, working environment and hospital policy are held constant. The study, therefore, recommends that the Moi Teaching and Referral Hospital should ensure that their systems are up to date with the current systems in the markets and they are regularly updated. This is because old systems are prone to security threats since they can be manipulated by people with bad intentions like hackers which can compromise the security of vital information. Also, the hospital management should ensure that they award appropriate salaries and allowances to the human resource. This will be a source of motivation to the employees who are a crucial determinant of the quality of provision of medical service in the hospital. The study was purely cross sectional. The study recommends a longitudinal study in the same so as to establish long term relationship between the variable.

TABLE OF CONTENTS

DECLARATION ..... **i**

COPYRIGHT ..... **iii**

DEDICATION ..... **iii**

ACKNOWLEDGEMENT ..... **iv**

ABSTRACT ..... **v**

TABLE OF CONTENTS ..... **vii**

LIST OF TABLES ..... **xi**

LIST OF FIGURES ..... **xii**

LIST OF ACRONYMS AND ABBREVIATIONS ..... **xiii**

CHAPTER ONE

INTRODUCTION **1**

1.1 Background of the Study. 1

1.1.1 Health Sector in Kenya 6

1.1.2 Service Delivery 7

1.1.3 E-information and Information Communication System 8

1.1.4 Moi Teaching and Referral Hospital 10

1.2 Statement of The Problem 10

1.3 Research Objectives 12

1.4 Research Questions. 12

1.5 Significance of The Study 12

1.6 The Scope and Delimitation of the Study 13

1.7 Limitations Of Study 13

1.8 Operational Definition of Terms 14

1.9 Conceptual Framework 16

CHAPTER TWO

LITERATURE REVIEW 18

2.1 Introduction 18

2.2 Theoretical Foundation 18

2.2.1 Diffusion of Innovations Theory 18

2.2.2 Critical Mass Theory 20

2.2.3 New Public Management Theory 21

2.2.4 Governance Theory 22

2.3 E- information Strategy 23

2.5 Service Delivery 36

2.6 Benefits if Information application 38

2.7 Review of Previous Studies 42

2.7 Knowledge Gap 45

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY 46

3.1 Introduction 46

3.2 Study Design 46

3.3 Location of the study 46

3.4 Target Population 47

3.4. Sample size 49

3.5 Research instruments 51

3.6 Data Collection Procedure 51

3.7 Data Validity and Reliability 51

3.7.1 Construct Reliability Tests 52

3.8 Data Analysis 53

3.9 Ethical Considerations 54

CHAPTER FOUR

PRESENTATION OF RESULTS AND ANALYSIS 55

4.1 Introduction 55

4.2 Data Preparation and Screening 55

4.3 Demographic profile of the Respondents 56

4.3.1 Gender of the respondents 56

4.3.2 Age Categories 57

4.3.3 Respondents Level of education 58

4.3.4 Working experience of the respondents 59

4.4 Infrastructure Facilities 60

4.4.1 Facilities in place to ensure effective E-Information 60

4.5 Social structure 61

4.5.1 Social structure on E-information in the institution 62

4.6 Skills and Expertise 64

4.7 Provision of Medical Services 67

4.7.1 E-information on provision of medical services 68

4.8 Multiple Regression Analysis. 69

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS 73

5.1 Summary 73

5.2 Conclusions 73

5.3 Recommendations 74

5.4 Suggestions for Further Studies 76

REFERENCES 77

APPENDICES

APPENDIX I: QUESTIONNAIRE

APPENDIX II: RESEARCH PERMIT

APPENDIX III: RESEARCH AUTHORIZATION

LIST OF TABLES

Table 3.1 Target Population 48

Table 3.2: Sampling frame 50

Table 3.3 Summary of Reliability test results 52

Table 4.1: Gender of the respondents 56

Table 4.2: Age of the respondents 57

Table 4.3: Facilities in place to ensure effective E-Information 60

Table 4.4 Social structure on E-information in the institution 62

Table 4.5 Skills and Expertise 65

Table 4.6 E-information on provision of medical services 68

Table 4.8: Regression coefficients 71

LIST OF FIGURES

Fig 1.1 Conceptual framework 16

Fig 4.1 Level of Education..... 58

Fig 4.2 Working experience of the respondents 59

LIST OF ACRONYMS AND ABBREVIATIONS

GOK: - Government of Kenya

ICT: - Information and Communication Technology

IS: - Information Systems.

IT: - Information Technology

MIS: - Management Information Systems.

MTRH: - Moi Teaching and Referral Hospital

NGO: - Non Governmental Organisations.

SPSS: - Statistical Package for Social Sciences.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study.

Denmark is the world's leading country in the use of this technology in healthcare. Approximately 98% of primary care physicians use electronic medical records, and with this technology they are able to send and receive patients' clinical data, to and from specialists, to the pharmacy, hospital, as well as to send patients reminders electronically. (Pretty and Johansen, 2010). From this case study, the critical success factors in the Danish model that can be emulated by developing countries such as

Kenya in their future approach towards scaling up ICT in health care included; The development of a national policy that supports the development of a National Health Information Technology policy which enhances quality, efficiency and patient centeredness, as well as the requirement for all primary care physicians to use Electronic Medical Records by 2004. There was also the requirement to use email technology to communicate with patients. Closer home, communication between patients and clinicians can be addressed via email even without an EMR system in Kenya, whereby patients' laboratory reports and medical reports could be emailed to reduce back and forth movement between patients and providers (Pretty and Johansen, 2010)

In Denmark, a non-governmental body- MedCom coordinated and supported the health information technology development and in Kenya, this would begin with a government policy to support the use of EMRs, such as the standards and guidelines developed for EMR systems developed by the Ministry of Health in 2010.

The presence of every Danish citizen having a national Person Identification Number has enabled the patient's entire medical history to be accessible to providers, and every Kenyan who is within the system can be given a unique PIN number for the purpose of using EMRs. This number could be attached to medical files, including patient allergies, previous hospitalizations, and other such pertinent medical issues, that could be accessed from any inter-related EMRs, or Electronic Health Records. Following the United Nations Conference in Bangkok (Thailand) on the 9th to 10th (Reffat, 2006).

December 2009, on 'ICT Applications in e-health: Improving Community Healthcare Services towards achieving the MDGs', a paper was presented on the present situation of ICT use in Indonesia. Indonesia has a population of 230 million, 60% of who live in the rural set up. The use of ICT in this fast developing country that is very similar to Kenya has been mainly used to improve and streamline the referral system while improving health service delivery to all people in its 33 provinces. The main objectives in this study were mainly to evaluate the competence of healthcare providers, as well as to assess ICT applications in community level recording and reporting, outbreak management system, telemedicine referral systems, use of paperless prescriptions, as well as the use of Local Area Network (LAN) to support the transfer of medical information. The main lesson learnt from this study was the importance of capacity building and competence of healthcare providers in the use of ICTs, the presence of some cultural barriers, the need for more funding towards technology and operational costs, and the widespread availability of telecommunication infrastructure. Conclusions from the study advocated for the promising outcomes of ICT use in healthcare despite the challenges faced, the need for the involvement by the community, institutions, private and public sector to achieve sustainability(Hook and Werner, 2013).

Bangladesh's national ICT policy was for ICT to be used in Medical records, the referral system through the use of telemedicine especially for rural patient management, as well as in distant medical and health education. This technology was to be used further in the development of mass awareness for prevention of diseases in the management of disease outbreaks. The above were to be implemented after all public hospitals and medical research centers were linked by computer networks (Bangladesh National ICT Policy – 2008).

Egypt alongside several other African countries has not been left behind in the establishment and refinement of their National ICT policies which have significantly affected their health care sectors. Just like Bangladesh, Philippines and Indonesia, these have been well articulated and currently being implemented in the areas of Telemedicine.

A satellite Personal Digital Assistant (PDA) (handheld computers or palm tops) project conducted in Kenya and Uganda in 2000, was excellent in showing the use of these gadgets in the rural set up for not only gathering information but also in increasing accessibility to necessary practical medical information for healthcare providers.(Hook and Werner, 2013).

In this satellite project the PDAs were given to 6th year Medical students from Makerere and Moi Universities, having been loaded with reference medical material. These included Medical textbooks like Harrison's textbook of medicine, Harriet Lane, Griffith's 5 minute clinical consult, 5 minute pediatric consult, HIV/AIDS, TB, and Malaria guidelines specific to Kenya and Uganda, a medical calculator with over 40 8 formulae, World Health Organization (WHO) Essential Drug List as well as an Essential Drug List specific to Kenya and Uganda.

The emergence of Information and Communication Technology has provided means for faster and better communication, efficient storage, retrieval and processing of data and exchange and

utilization of information to its users, be they individuals, groups, businesses, organizations or governments. ICTs have to be used in order to create and deliver a service, which is useful and has an effective impact for the businesses and for the citizens. Information and communications technology (ICT) is an integral component of government operations and service delivery. ICT is increasingly used as a strategic tool to more efficiently support any Government's priorities and program delivery. In order to have a successful e-information, the Information and Communication Technology (ICT) solutions, which are at the very core of the e-information infrastructure, have to be reachable by all citizens (Reffat, 2006).

Electronic information uses a range of information technologies, such as the Wide Area Networks, Internet, and Mobile Computing, to transform government operations in order to improve effectiveness, efficiency, service delivery and to promote democracy.

Electronic information is a fundamental element in the modernization of the public and private sector. It provides a common framework and direction across the public sector and enhances collaboration within and among public sector organizations and institutions, between Government and the business community, and between Government and the citizens that it serves in the implementation of Government Policies. It also identifies ways of developing the skills needed by public servants to realize the new opportunities offered by ICT advancement such as the internet (E-information, 2014).

On the other hand, medical record keeping in Public health facilities is still done manually, a state that is complicated by the number of patients seen in these institutions, these being the health facilities thatare easily accessible as well as affordable to the majority of Kenyans. Kenyatta National Hospital as a representation of public health institutions is the oldest referral and teaching hospital in Kenya. It has a bed capacity of 1800 beds, with over 6000 staff

members, an average annual outpatient visit of 600,000, and an average annual in-patient attendance of 89,000 patients. Suffice it to say, the number of records required to be maintained is enormous and requires a Medical Records department with a work force of 227, consisting of Medical Records officers, Medical Records Assistants and Clerical Officers.

Following the assessment made on ICT in Healthcare by the Kenya Private Sector Alliance / AITEC at The Kenya ICT in Healthcare Conference, Nairobi (2013), there were several challenges found in healthcare that could be addressed by ICT:

Kenya does not have a properly functioning referral system. This has led to the excessive burden on the main national referral hospitals, namely the Kenyatta National Hospital, and Moi Teaching and Referral Hospital. A streamlined ICT based referral system would go a long way to decongest these two hospitals and this may be through introduction of e-health solutions through tele-consultations, such as is currently being practiced in Bangladesh. The backbone of these solutions will however require the standardization of medical records through their computerization.

There were significant losses incurred in the public healthcare system due to inefficient management and logistics. This is especially felt with inefficient management of patient records, which are the back bone of report generation, and eventual decision making regarding administration of these facilities. There is need for improved and better integrated Health Management Information Systems to cater for and improve the uptake of administrative functions of ICT such as in patient identification, as well as in use of standardized coding for medical diagnoses, drugs, tests and to eventually improve the use of referral systems by Kenyans.

Though there is a lot being done by the private sector especially such as AAR Healthcare, there are plenty of opportunities that can be taken up by all players within the health sector. This includes the need to set up regulatory bodies on ICT use in healthcare regarding such issues as standardization of patient records for future retrieval towards improving the quality of these records for timely clinical decision making

1.1.1 Health Sector in Kenya

Quality is defined by International Organization for Standardization is a relative concept and if the inherent characteristic of a service meets the requirements of the customer, it can be rated as high quality (Reinartz, 2014).

In a service industry, like healthcare, experience of the patient plays a crucial role in rating and assessment of quality of services. Quality in healthcare may comprise of newer technology, newer and effective medication, and higher staff to patient ratios, affordability, efficiency and effectiveness of service delivery (Tam, 2005). The health sector comprises the public system with major players including the Ministry of Health and parastatals organizations, and the private sector, which includes private for profit, Non-Governmental Organizations, and Faith Based Organizations facilities (RoK, 2010). In healthcare industry service quality has become an imperative (Ennis and Harrington, 2011) in providing patient satisfaction because delivering quality service directly affects the customer satisfaction, loyalty and financial profitability of service businesses. In healthcare, service quality can be broken down into two quality dimensions: technical quality and functional quality (Dean and Lang, 2008).

In Kenya, Health services are provided through a network of over 4,700 health facilities countrywide, with the public sector system accounting for about 51 percent of these facilities. The public health sector consists of the following levels of health facilities: national referral

hospitals, provincial general hospitals, district hospitals, health centres, and dispensaries. Health services are integrated as one goes down the hierarchy of health structure from the national level to the provincial and district levels (RoK, 2011). The two national referral hospitals are Kenyatta National Hospital in Nairobi and Moi Referral and Teaching Hospital in Eldoret.

1.1.2 Service Delivery

Service is defined as a product or activity that meets the needs of a user or can be applied by a user. To be effective, services should possess these attributes like: available and timely at time and space scales that the user needs; Dependable and reliable in that they need to be delivered on time to the required user specification; Usable meaning that they need to be presented in user specific formats so that the clients can fully understand; Useful meaning that they need to respond appropriately to user needs; Credible for the user to confidently apply to decision-making and responsive and flexible to the evolving user needs.

Parasuraman, Zeithmal and Berry (2011) listed five determinants of service quality by order of importance to include reliability, responsiveness (willingness to help customers and prompt service assurance), and the ability to convey trust, empathy and individualized attention to customers. Other service quality measurement tools studies have found that well managed service companies have the following practices: strategic concept and top management support, high standards of service delivery, service monitoring systems, satisfying customer complaints and emphasis on employee satisfaction.

Service delivery is a continuous, cyclic process for developing and delivering user focused services. Quality service delivery involves a comparison of expectations with performance. According to Lewis and Booms (2013) service quality is a measure of how well a delivered service matches the customer's expectations. The main reason to focus on quality is to meet

customer needs while remaining economically competitive at the same time. This means satisfying customer needs is very important for the enterprises survival and it requires understanding and improving of operational processes, identifying problems quickly and systematically, establishing valid and reliable service performance measures and measuring customer satisfaction and other performance outcomes. According to Kundenbindun (2008) service quality is a business administration's term and describes the degree of achievement of an ordered service.

1.1.3 E-information and Information Communication System

E-information has several meanings. One narrow definition focuses only on Internet-applications inside organization. However, narrow definition sometimes is expanded to include the use of the Internet in restructuring government-citizen interactions and related political relationships (Farelo & Morris, 2006). A broader definition looks at e-information as the use of ICT to strengthen organization performance in areas such as more effective and more efficient provision of services, opening new channels for people to access information, and making institution more accountable to its citizens. Kumar and Best (2006) defined e-information in public sector as the use of information and communication technologies (ICTs) in the public sector to improve its operations and delivery of services. Government organizations have public functions that are of general interest to citizens and businesses. While exercising their tasks like research, policy making, policy execution, democratic control, communication with the citizens, and internal administrative processes, information emerges

E-information therefore involves using ICTs to transform both back-end and front-end government processes and provides services, information and knowledge to the public. It has the potential to help build better relationships between government and the public by making

interaction with citizens smoother, easier, and more efficient. Indeed, public organizations e.g hospitals report using electronic information to improve core ministries operations and deliver information and services faster, cheaper. Wide range of information technologies, such as the Wide Area Networks, Internet, and Mobile Computing, are used by e-computing to transform operations through the relevant departments in order to improve effectiveness, efficiency, service delivery and to promote democracy.

ICT as any technology used to support information gathering, processing, distribution and use (Beynon-Davies, 2012). According to Al-Qallaf & Al-Azmi, (2012) ICT is the integration of computer and communications technologies for the creation, processing, dissemination and transmission of information. ICT consists of hardware, software, data and communication technology.

The emergence of Information and Communication Technology has provided means for faster and better communication, efficient storage, retrieval and processing of data and exchange and utilization of information to its users, be they individuals, groups, businesses, organizations or governments. Information and Communication Technologies have to be used in order to create and deliver a service, which is useful and has an effective impact for the businesses and for the citizens.

Application of Information and Communication Technology (ICT) in the public hospitals is aimed at changing the way the hospitals conduct their operations. In order to attain this vision, it is important that the hospital stocks the necessary ICT skills set for the implementation and maintenance of e-information. In order to have a successful e-information, the Information and Communication Technology (ICT) solutions, which are at the very base of the e-information infrastructure, have to be reachable by all citizens (Reffat, 2006).

1.1.4 Moi Teaching and Referral Hospital

In Moi Teaching and Referral Hospital, the management of medical records started way back in 1917 when it was a cottage hospital. The records created were manually and few as compared to today. Since then, the hospital has not adopted an optimal medical records' system that has seen the hospital shifting from one system to another. In October 2009, the hospital adopted the Automated Medical Records System (AMRS) registration module in all OPDs registration centres. This system was originally started by Indiana University in collaboration with Moi University in 2002 in AMPATH centre. The system did not replace the manual registration system but instead worked hand in hand as a backup in times of electronic system failure (MTRH Strategic Plan 2005-2010).

Currently, the hospital has introduced a more integrated electronic health records system commonly known as HMIS capable of electronically managing health information system and management information system (fun-soft) with the aim of automating the outpatient services to improve the management of patients' medical records. It is from this basis that the researcher is motivated to conduct the study (MTRH Strategic Plan 2008-2012).

According to a study, Maseh, (2010), conducted at MTRH on the management of in-patient medical records, found that data collection, storage and maintenance of patient medical record was not efficient thus impacting negatively on the management of health services, patients care and decision making processes in the hospital.

1.2 Statement of The Problem

Provision of medical services is a continuous, cyclic process for developing and delivering user focused services. Quality service delivery involves a comparison of expectations with performance (Mutali, 2008). To be effective, services should possess these attributes like:

available and timely at time and space scales that the user needs; Dependable and reliable in that they need to be delivered on time to the required user specification; Usable meaning that they need to be presented in user specific formats so that the clients can fully understand; Useful meaning that they need to respond appropriately to user needs; Credible for the user to confidently apply to decision-making and responsive and flexible to the evolving user needs (Kundenbindun, 2008).

E-information is increasingly becoming a fundamental tool for enhancing public administration. Despite the advantages touted globally for implementing e-information, literature showed no evidence that any of the Kenyan e-information's objectives: enhancing delivery of public services, improving information flow to citizens, promoting productivity among public servants, and encouraging citizens' participation has been achieved (Njuru, 2011). Provision of medical service at Moi Teaching and Referral hospital has been marred by delays, poor information management as the files were manually maintained making information retrieval difficult.

Several researchers and scholars have reviewed the concept of e-information in Kenya. For instance, Mutinda (2004) looked at the Roadmap to e-information using a case of Kenya. Were (2010) studied strategies adopted by the Kenyan government in introducing e-information. The research findings revealed that there is a relationship between various demographical characteristics and the knowledge of e-information and ICT literacy. Maranga (2012) studied on strategic interventions to enhance adoption of open source applications and creative commons licensed open content in the Kenyan Government.

From the above studies, there is no study that has sought to establish the effects of electronic information on provision of medical services. This study therefore sought to fill this knowledge gap.

1.3 Research Objectives

The main objective of the study was to investigate the effects of electronic information on provision of medical services in Moi Teaching and Referral Hospital.

The specific objectives of the study were:-

i. To assess how infrastructure facilities affects provision of medical services in Moi Teaching and Referral Hospital.
ii. To determine the effect of social structure on provision of medical services in Moi Teaching and Referral Hospital.
iii. To determine the effect of Staff ICT skills and expertise on provision of medical services in Moi Teaching and Referral Hospital.

1.4 Research Questions.

i. How infrastructure facilities do affects provision of medical services in Moi Teaching and Referral Hospital?
ii. What is the effect of social structure on provision of medical services in Moi Teaching and Referral Hospital?
iii. What is the effect of Staff ICT skills and expertise on provision of medical services in Moi Teaching and Referral Hospital?

1.5 Significance of The Study

Electronic information on service delivery is a key focus for many organisations, across both the public and private sectors. This study will provide knowledge to the MTRH management and the public on how the Electronic information affects provision of service in the public sector. This is important as it will enable the both management and workers to work on realizing the e-government objectives which is in line with vision 2030.

To date, there has been some improvement in the delivery of health care, resulting from the use of ICT in increasing the access that healthcare workers have to administrative data and patient medical records. In spite of this, not many studies have been done to assess the effect, if any, of ICT in health care management, and specifically on medical records especially in the private health institutions that have fully embraced ICT. This study therefore goes to ascertain any positive effects of ICT on EMRs, especially in improving the quality of medical data. This might go a long way in assisting those in the public and private sectors to embrace ICT in the use of

Health Information Management Systems, as well as to complement the Private sector in issues related to regulation of the same. Other beneficiaries of this study will include; researchers requiring organized medical data studying disease prevalence, government policy makers, as well as the Ministry of Health, towards eventual standardization of EMRs. In addition health care providers and facilities with intentions to adopt ICT will have an idea of the requirements that most standard systems must have in order to ensure that data meets the criteria for quality of medical records

1.6 The Scope and Delimitation of the Study

The study basically sought to determine the use of electronic information in provision of medical services at MTRH. The study was conducted in Eldoret town between August and October 2015. It targeted divisional chairpersons, heads of departments and employees of MTRH. The study used questionnaires as the data collection instruments. In terms of time scope the study, the study was limited to three months.

1.7 Limitations Of Study

One of the limitations of the study included incorporation from participants which affected the manner in which the respondents gave responses in the questionnaires or in the interviews. This

in turn determined the level of validity of data collected. To overcome the said limitations, the researcher ensured that the study begun as early as possible to accommodate any possible delays that arose in the course of the study. The items in the questionnaire were structured in the simplest way to avoid linguistic complexity that would hamper understanding and cause. Finally informing the participants adequately before collecting data was to avoid possible instances of receiving unduly filled questionnaires.

1.8 Operational Definition of Terms

E-Health: Administratively E-health is the health services rendered to citizens of the country through the use of technology.

Electronic Information: Electronic information refers to records that depend on relevant machines for access or reading, like the computer hardware and software such as e-mails, database and word processing.

Hospital: Health facility that provide inpatient, outpatient, and maternity services. The services are provided by doctors and specialists, supported by nurses among other health personnel.

Medical Records: A medical record is the type of record generated at the health care institution during the process of treating patients as the hospital clients. It is also known as a Personal Health Record (PHR) and is usually characterized by, amongst others, the nature and source of information contained.

Records: Records are recorded information, regardless of physical form or characteristics, storage media or condition of use like cards, correspondence, disks, maps,

memoranda, microfilm, papers, photographs, recordings, reports, tapes, and writings and other data, information or documentary material.

Service Delivery: is the general name for every activity performed in order to provide fast response, satisfying and efficient services the public or citizen problems. Simple definition has it that, service delivery is the service delivered or that requires delivery by the government to its citizens with an intention of meeting their living needs, right demands or expectations.

1.9 Conceptual Framework

The dependent variable is the Provision of medical services. The independent variables are the effect of electronic information.

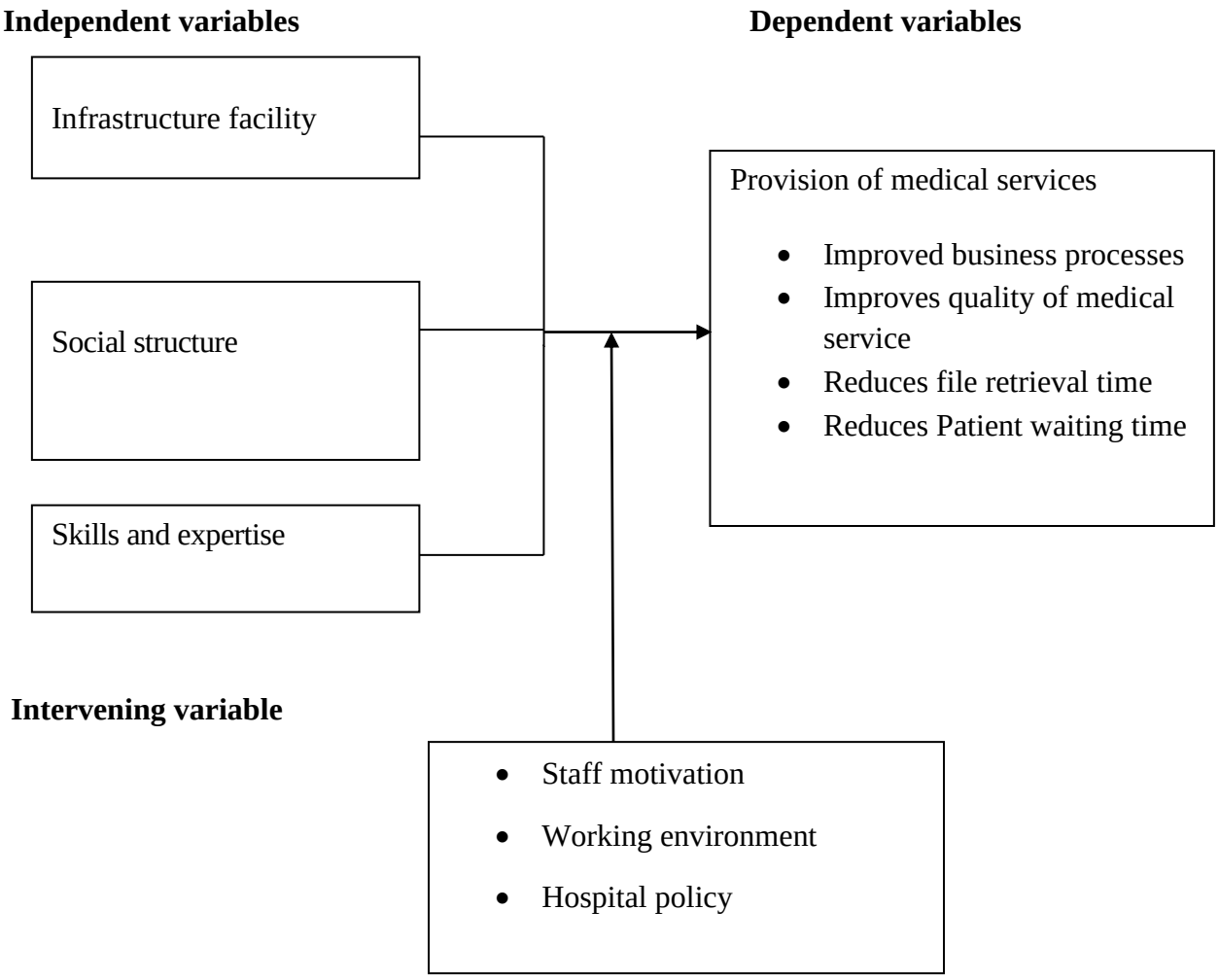

Fig 1.1 Conceptual framework

Source: Author (2015)

The conceptual framework illustrated in fig 1.1 shows how the various concepts are related in the study. This study adopted a conceptual framework where effects of electronic information are

independent variables whereas Provision of medical services is itemized as a dependent variable. The intervening variables were held constant during regression analysis.

Infrastructure facilities

By offering a common network computing and information infrastructure that is readily accessible to everyone - regardless of organizational and other boundaries -the integration and interoperability challenges that organizations had been confronting individually at an enterprise level is now being addressed collectively on a world- wide scale. Organizations that had already been opening up their operations to the external world through IS-enabled concepts such as virtual enterprise now have the momentum of the whole world behind them.

Social structure

A well-functioning people organization is as important as technical capabilities for project success. Every work product requires time and effort to produce. So whether they get produced, and to what quality, depends on motivation, reward structures, priorities, as well as on personnel capabilities. Yet the social organization is often implicit in how processes and products are organized, rather than explicitly designed, since there are few aids beyond generic project management tools. The human intellectual capital perspective highlights the importance of human knowledge and ingenuity in systems development.

Provision of medical services

Provision of medical services involves a comparison of expectations with performance. The quality of service is a measure of how well a delivered service matches the customer's expectations. The determinants of service delivery include; Improved business processes; Improves quality of medical service; Reduces file retrieval time; Reduces Patient waiting time

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter summarizes the information from authors and researchers who have carried out research in the same field of study. The specific areas covered in this chapter are the theoretical perspective, E- information and provision of medical service.

2.2 Theoretical Foundation

This study was anchored on four theories: Diffusion of innovations theory, critical mass theory Theory of planned behavior and technology acceptance model. These theories have been selected because of their explanations on service delivery in a technologically defined environment.

2.2.1 Diffusion of Innovations Theory

Diffusion of innovations (DOI) theory has been used by many IS researchers to explain the adoption and diffusion of information technologies. An innovation is an idea, practice, or an object that is perceived as new by an individual or another unit of adoption (Rogers 1995, Zaltman et al. 1973). Similarly, Daft (1978) defines an organizational innovation as “the adoption of an idea or behavior that is new to the organization adopting it” (Swanson 1994). Therefore, an innovation need not necessarily refer to a technology. It may refer to a renewal in terms of thought and action as well (Thong 1999). Also, as Rogers (1995) points out, the boundaries of an innovation may not be very distinct. Potential adopters may perceive an innovation being highly related to another new idea or a bundle of new ideas. Hence, it is possible to investigate the factors that influence local government participation in electronic information sharing with state agencies through a lens of diffusion of innovations theory, as

participation in such initiatives typically requires the introduction of new technologies, as well as new ways of thought and action.

Rogers (1983, 1995) identifies five innovation attributes that determine the adoption of innovations. These five attributes include relative advantage, compatibility, complexity, observability, and trialability, which have been extensively utilized by many researchers in order to explain the adoption and diffusion of IT innovations. Among these attributes, only relative advantage, compatibility, and complexity have been consistently identified as critical adoption factors (Kwon and Zmud 1987).

When conceptualizing the determinants of organizational innovation adoption, research suggests that it is necessary to look at different contexts (Thong 1999). Looking at the innovation attributes, as suggested by Rogers, constitutes only one of the many possible perspectives. Therefore, technological innovation research has determined several variables for studying organizational adoption in addition to innovation characteristics. For example, Damanpour (1991) argued that organizational innovations are affected by individual, organizational and environmental factors. Kwon and Zmud (1987) identified five predictors that may impact any of the six stages of IT implementation (initiation, adoption, adaptation, acceptance, routinization, infusion), -user community characteristics, organizational characteristics, technology characteristics, task characteristics, and environmental factors. The framework developed by Tornatzky and Fleischer (1990) proposed that technological context, organizational context, and environmental context influence the process by which innovations are adopted. Rogers (1995) posited that individual leader characteristics (attitudes towards change), internal characteristics of the organizational structure and external characteristics of the organization to be the independent variables related to organizational innovativeness.

Grover (1993) proposed that organizational factors, policy factors, environmental factors, support factors, and system-related factors determine the adoption of inter-organizational information systems. Thong (1999) identified four elements of context that affects the adoption of technological innovations by organizations, -characteristics of the organizational decision makers, characteristics of the technological innovation, characteristics of the organization, and characteristics of the environment in which the organization operates.

2.2.2 Critical Mass Theory

Another perspective used to explain the adoption of innovations has been the "critical mass theory," which looks at innovations that require collective action and collaboration among potential participants (Bouchard 1993). Bouchard (1993) states that an organization's decision to engage in a collective action will be dependent on its perceptions of what the group is doing, not on the characteristics of the innovation. She further argues that an organization's participation decision will depend on the number of the organizations that have already participated and/or soon plan to participate, who these participants are and their level of contribution. Kuan and Chau (2001) refer to the same issue, arguing that an organization's decision to adopt a technology is influenced by its business partners and competitors. They also state that, in many cases, the final decision may have nothing to do with the technology itself or the organization.

Grewal et al. (2001) reported that several diverse research streams have investigated this mimic king behavior of organizations as the "bandwagon effect," which suggests that, in some cases, organizations will engage in certain activities just because other organizations do.

Another unique characteristic of critical mass theory involves the creation of positive network externalities. Positive network externalities (Katz and Shapiro 1985), or network benefits, arise as a direct function of the number of the current adopters (Fichman and Kemerer 1993). Lou et

al. (2000) state that network externalities have two main effects on adoption. First, as more and more users adopt a technology, potential users find the technology more attractive.

2.2.3 New Public Management Theory

The theoretical underpinnings of ICT application in public services come from the new public management (NPM) which originated in the late 1970s in the United Kingdom, Australia and New Zealand. Since then, it has come to dominate thinking about the public sector reform and is hailed as a new paradigm. Different factors led to the emergence of NPM, some of which are: fiscal crises of governments, poor performance of the public sector in different arenas, imperious bureaucracy, lack of accountability, corruption, changes of people's expect ations and the emergence of better alternative forms of service delivery (Common 1998 & Minogue 1998 cited in Sarker 2006). In other words, large government was poorly performing being non-accountable and irresponsive to the beneficiaries, while on the other hand there has been a wave of competitive private sector customer oriented strategy; all this called for customer oriented, result driven and effectively enterprising government. NPM emphasised the need for "modern" bureaucracy with no "traditional" bureaucracy so as to "reinvent" government and changing its role from "rowing" to steering. Thus, NPM heralds the transformation of the citizen into a customer of public services, who pays for public services, and hence has choice and the exit option, and the opportunity to give feedback on public service delivery (Prakash & Singh). As per NPM philosophy modern government should be customer oriented, competitive and result oriented, and thus ICT has a room to play for enhancing the effectiveness of government services. In short, as a strong theoretical foundation, the concept of new public management is used to strengthen the need and importance of ICT in the public sector.

2.2.4 Governance Theory

The concept of "governance" is said to be as old as human civilisation. Simply put governance means: the process of decision-making and the process by which decisions are implemented (or not implemented). Osborne and Gaebler (1992) suggested ten principles of NPM which are: catalytic government, community owned government, competitive government, mission driven government, result oriented government, customer driven governments, enterprising government, anticipatory government, decentralised government and market oriented government. Governance nowadays occupies a central stage in the development discourse but is also considered as the crucial element to be incorporated in the development strategy.

Hasnat Abdul Hyde (cited on Abdellatif 2003) views governance not only about the "organs" or actors but rather it is about the quality of governance, which expresses itself through elements and dimensions. He states that: Just as the dancer cannot be separated from the dance, the organs or actors executing governance in their respective spheres cannot be relegated to the background. Different bilateral and multilateral aid donors subscribe their own perspective to define governance. The Asian Development Bank, for example, lists accountability, participation, predictability and transparency in its definition of governance. On the list of the UK Department for International Development (DFID), there are four interrelated elements of effective states: authority, responsiveness, accountability and legitimacy (Rahman & Robinson 2006). However, UNESCAP has come up with some eight major characteristics of good governance as participatory, consensus oriented, accountable, transparent, responsive, effective and efficient, equitable and inclusive and follows the rule of law Failing to pursue these principles can amount to bad governance and lead to failed states, which contribute to socially and economically unsustainable societies. Bad governance often produces ineffective central government with

illegitimate mandates, incoherent policies and unstable and incapacitated institutions, which ultimately result in unsustainable economies, unfair societies and public discontent. Good governance, on the other hand, helps minimise corruption, values the views of minorities and gives voice in decision making to the most vulnerable in society. An ethic of good governance helps government become more responsive to its citizens ‟present and future needs (Gessi et al., 2006). The concept of governance has highlighted the need of making the bureaucracy transparent and responsive, so the use of ICT in delivering public services gets prominence in the governance theories.

2.3 E- information Strategy

E-information is defined by the United Nations as "A government that applies ICT to transform its internal and external relationships" (United Nations, 2003). E-information is a complex socio-technical system in which heterogeneous stakeholders are interactively entangled to fulfill their best interests in providing services to the country's citizens. According to Matavire, Chigona, Roode, Sewchurran, Zane Mukudu, and Boamah-Abu, (2010) E-information is the use of Information and Communication Technology (ICT) to transform government by making it more accessible, effective and accountable. An E-information is an inclusion of all applications of information and communication technologies that improve efficiency, effectiveness, transparency and accountability of daily administration of government (Sharma, 2007). Evans and Yen (2006) notes that an E-information is a system were by there is effective provision of public services via information and communication technologies. It also implies electronic transaction between the government and other actors such as citizens or businesses in society through new technologies including the internet. However, Ndou (2004) argues that some of the

adopted E-information definitions are too narrow, which results in inadequate interpretations of its objectives.

Several classification schemes of the E-information implementation and development steps have being used by scholars and practitioners worldwide. According to the UN-DPEPA - ASPA classification, there are five stages of E-information. The first stage is One-way communication-basic website. In this stage the sites serve as a public information source, static information on the government is provided, FAQs may be found and contact information is provided. The second stage is two-way communication-enhanced website. At this stage the access to specific information is regularly updated; a central government homepage may act as a portal to other department sites; Useful documents may be downloaded or ordered online; Search features, e-mail and areas for comments are accessible. The third stage is interactive web presence. At this A National government website frequently acts as a portal; Users can search specialized databases; Forms can be downloaded and/or submitted online and secure sites and passwords begin to emerge. The fourth stage is portal personalization. At this point the users will be able to conduct complete and secure transactions online; The government website will allow users to customize a portal in order to directly access services based on specific needs and priorities and sites will be ultimately secure. The last stage is fully integrated portal. It is in this stage whereby the country provides all services and links through a single portal; no defined demarcation between various agencies and departments; All transactional services offered by government will be available online.

ICT allows a government's internal and external communication to gain speed, precision, simplicity, outreach and networking capacity, which can then be converted into cost reductions and increased effectiveness - two features desirable for all government operations, but especially

for public services. ICT also enables 24/7 usefulness, transparency and accountability, as well as networked structures of public administration, information management and knowledge creation. In addition, it can equip people to participate in an inclusive political process that can produce well-informed public consent, which is, increasingly, the basis for the legitimacy of governments (Reijswoud, 2008). E-information being facilitated by offers a host of transformation capabilities ranging from radically shrinking communications and information costs, maximizing speed, broadening reach, to eradicating distance (Jaeger & Thompson 2003). However, the full extent of the benefits of E-information remains an open ended question. Frameworks by Gupta and Jana (2003) assessing the tangible and intangible benefits of e-information's have been developed. With these issues taken into account, a systematic definition of E-information is adopted in this study.

Perspectives on the core requirements for successful implementation of E-information differ throughout literature. Borins (2002) asserts that E-information relies on the use of Information Technology (IT), implying the ability to use the appropriate technology is key. Stanforth (2007) argues that its implementation is dependent on the network of actors involved and is inherently a political process as opposed to it being a technology process. Ciborra (2005) argues that developing nations are not ready for E-information and it would only benefit privileged sections of society. This notion is supported by a study by Wheeler (2003) based on attempts to build an information society in Egypt which revealed the attempts only benefited the well-off. These examples highlight a design-reality gap in E-information projects as espoused by Heeks (2003) and Dada (2006).

2.4.1 Infrastructure facilities

For people working within the physical infrastructure of the organization, the right place to place information may be on the organization network. The considerations of both security and accessibility must always be taken into account in making data placement decisions. Database integration techniques were introduced to make use of data across multiple databases. Data warehousing provided powerful tools for understanding trends by enabling multi-dimensional analysis of data collected from the numerous operational databases in an organization. Data mining and knowledge discovery techniques enhanced these analyses (Bernstein et al., 2009).

By offering a common network computing and information infrastructure that is readily accessible to everyone - regardless of organizational and other boundaries -the integration and interoperability challenges that organizations had been confronting individually at an enterprise level is now being addressed collectively on a world-wide scale (Yang and Papazoglou, 2012). Organizations that had already been opening up their operations to the external world through IS-enabled concepts such as virtual enterprise now have the momentum of the whole world behind them.

There is a rapid development in the use of ICT in organizations. ICT plays a crucial role in the present knowledge based economy hence, organizations tend to rely heavily on ICT solutions in order to develop and grow their businesses (Asgarkhani and Young, 2010). The revolution in the use of ICT has profound implications for economic and social development and has pervaded every aspect of human life (Shanker, 2008). The use of ICT is widespread and regarded as an essential tool for the efficient administration of any organization and in the delivery of services to clients. Schware (2003), states that ICTs are being integrated into procedures, structures, and products throughout businesses, governments, and communities. The use of ICT increases the supply of information as ICT plays a key role in information sharing and dissemination. According to Spanos et al. (2002), ICT removes distance and time constraint

in accessing required information flows. ICT also reduces the cost of production as knowledge is produced, transmitted, accessed and shared at the minimum cost. There is a reduction in the degree of inefficiencies and uncertainty with the use of ICT because it enables businesses to interact more efficiently (Buhalis, 2003).

Shanker (2008) ascertains that the use of ICT in many organizations has assisted in reducing transactional cost, overcome the constraints of distance and have cut across geographic boundaries thereby assisting to improve coordination of activities within organizational boundaries. Also, Spanos et al (2003) state that buyers and sellers are able to share information and transfer goods across national borders with the use of ICT, which helps to increase access to global supply chains. ICT has also led to more transparency in organizations since it enables networking and information sharing that leads to demands for greater openness and transparency (Shanker, 2008; Kollberg and Dreyer, 2006). Jiménez-Zarco et al. (2006) further argue that ICT plays an important role in acquiring, creating and managing knowledge as it enables the diffusion of organizational data that can be crucial for effective decision making and control at all levels. Likewise, ICT helps in organizational planning and improves organizational communication and flexibility.

2.4.2 Social structure

One of the identified agents through which the world will constantly experience change is technology. In the business of trying to make information available in the right form to the right user both at the personal and organizational levels, and at the right time, the bid to cope with great flood of information has led to the need for a more sophisticated way of handling information faster and better (Adesanya, 2012).

Information and communication technologies (ICTs) are not new. According to Bruce (2005), during the so-called "Arab Spring" in 2011 Twitter proved very prominent in mobilizing people in autocratic

regimes, thus furthering processes of democratization in the Arab world. It raised a lot of hopes and fuelled a lot of optimism as to the direct democratic potential of applying ICT in politics. Yun and Opheim (2010) explained that although the origin of the ICT system goes back to the emergence of the telegraph and telephone in the late 19th century, it was not until after the Second World War that important innovations in a number of different and separate industries were made. This shaped the ICT trajectory that we experience these days, and from 1995 a new era started, characterized by the widespread use of the internet (Crede & Mansell, 2008). The emergence of the knowledge society, building on the pervasive influence of modern information and communication technologies, is bringing about a fundamental reshaping of the global economy. Knowledge has always been a factor of production, and a driver of economic and social development. However, the capacity to manipulate, store and transmit large quantities of information cheaply has increased at a staggering rate over recent years. The digitisation of information and the associated pervasiveness of the Internet are facilitating a new intensity in the application ofknowledge to economic activity, to the extent that it has become the predominant factor in the creation of wealth. ICTs are also facilitating a rapid globalisation of economic activity. Innovation, which fuels new job creation and economic growth, is quickly becoming the key factor in global competitiveness. ICT can be applied practically every area of life; they shape our private lives and our work. Within the social and economic sphere, ICT is also becoming increasingly important on a macroeconomic level. Not only is the ICT industry a steadily growing sector with a high economic significance, ICT-based solutions and technologies also make a valuable and very important contribution to value creation in other sectors, e.g. trade or manufacturing industries.

Most information systems require teams of people to develop and maintain. The organization of projects into process steps and artifacts implies a social organization among the people performing the work, with significant degrees of task specialization. Some tasks require great familiarity with the application

domain, while others require deep knowledge about specific technologies and platforms. Some require meticulous attention to detail, while others require oversight and vision (Basili and Caldiera, 2010).

A well-functioning people organization is as important as technical capabilities for project success (DeMarco and Lister, 2009). Every work product requires time and effort to produce. So whether they get produced, and to what quality, depends on motivation, reward structures, priorities, as well as on personnel capabilities. Yet the social organization is often implicit in how processes and products are organized, rather than explicitly designed, since there are few aids beyond generic project management tools. The human intellectual capital perspective highlights the importance of human knowledge and ingenuity in systems development

2.4.3 Staff ICT skills and expertise

Competence is viewed as demonstrating the knowledge, skills, experience and attributes necessary to carry out a defined function effectively. It is the acquisition of knowledge, skills and abilities at a level of expertise sufficient to perform appropriately in a given task in a work place. The UK Cultural Heritage National Training Organisation (CHNTO, 2014) refers competence to mean a test to the ability of an individual to do a job or work to nationally agreed standards.

Competence is seen as having dimensions of quality and scope. The desired quality of performance should be encapsulated into the performance criteria, whereas the scope of the competence can be found in the range statements which describe the different situations in which someone is expected to be able to work. According to

Onasanya (2010),competence refers to specialized knowledge, skills, and attitudes which are necessary for effective performance in a position. It means the ability to carry out a given task effectively. According to Wojtezak (2000), such knowledge and skills are necessary to perform

tasks that reflect the scope of professional practices; however, he warns that those competencies only are not equal to formal professional qualification.

Similarly, Larzen (2006) agrees that it is a combination of theoretical knowledge, skills and practical experience that make an individual able to take the right action in the daily working environment. Regardless of training, competency would grow through experience and the extent of an individual to learn and adapt

Highly skilled physicians, nurses, administrators, and ancillary staff are critical to producing high-quality outcomes and effective quality improvement hence hospital growth (Argote, 2010). There is need for selective hiring of qualified staff. Successful recruitment and retention of staff is tied to empowerment of staff that must be treated as full partners in the hospital operation and given opportunities for advancement (Brown and Duguid, 2013). The hospitals need to place great emphasis on recruiting and retaining top-level physicians and nurses, accompanied by an effort to encourage these professionals to form working teams, including case managers, pharmacists, social workers, and others, to promote quality (Brown and Duguid, 2013). To facilitate service quality and growth, hospitals must implement effective human resource strategies involving selective hiring, and retention of physicians and nurses (Cohen and Levinthal, 2011); monitoring of doctors on staff (or with privileges) and ensuring that they must continue to meet certain performance and practice standards to retain credentials (Crewson, 2004). To improve efficiency in service delivery, public sector hospitals must build the capacity to o attract and employ an adequate number of high-quality nurses (Argote and Ingram, 2000) suggests that the key to service delivery is to adapt to circumstances that are constantly changing and that the long-term winners are the best adapters, but are not necessarily the winners of today‟s race for market share. Hospitals quality of service often fails because of the sum total of

seemingly inconsequential events arising from employees lack of capacity as in itself service delivery requires specific skill levels and experience which must be continuously learned (Cohen and Levinthal, 2011).

nformation technology has permanently altered traditional librarianship and the duties of librarians and support staff. Before the advent of information and communication technology (ICT), academic libraries were the sole custodians of information, which was mostly in print (Annunobi 2008). Information technologies have also had an impact on healthcare workers. The Internet brings access and communication on an unprecedented scale (Masys 2005). Sources of information are increasing exponentially, reflected in the steady growth in the use of information technology in teaching and learning. The nature of medical knowledge and technology requires everyone in the health care sector have computer skills (Trivedi 2008).

The paradigm shift from traditional to multidisciplinary librarianship through ICT has increased the quantity of information passing through the staff must keep up with these changes. Health care is an information-intensive sector and ICT is important in the health care delivery. ICT offers opportunities for developing countries like Kenya to narrow the development gap (Ajuwon and Rhine 2008). Librarians and library support staff require the skills to serve the health sector optimally (Walton &Edwards 1999). Librarians often handle queries from patrons, while support staff may find themselves providing technical assistance. All staff providing direct or indirect assistance to library users need increased technical skills (Ashcroft and Watts 2005)

Walton and Edwards (1999) found a significant information management skills gap amongst information professionals. The research suggested collaboration and strategic management of resources as way of alleviating problems. Staff training or retraining becomes imperative, because without training, the vast amount of electronic health information resources will be

underused. Studies have shown that the provision of electronic information in the health sector does not match that of the academic sector (Goulding, 2010).

ICT competency acquisition programmes are necessary for medical staff in the hospital if they are to work effectively using ICT‟s. The technology is constantly growing rapidly and updates come up every now and then. The staff need to move along with the growing trend by constantly developing and updating their competencies in the use of these technologies. Cole (2002), asserts that any learning activity which is directed towards the acquisition of specific knowledge and skills for the purpose of an occupation or task is referred to as training. He further categorized training in to two broad methods: These are On the job and Off-the job methods. On the job method includes Job instruction, learning from experienced workmates, coaching/counseling, delegation, secondment while Of the job method includes lecture/talks, classroom instruction, programmed instructions, case study analysis and stimulation exercise. Through training, skills are thought and competencies are developed It is the process through which library staff develop new competencies that will transform them from the state of not being efficient to being able to do the do effectively (Ugwu and Ekere 2010).

Many writers have emphasized the need for continuous professional development of hospital staff in the area of Information and Communication Technology. Nwakamma (2003) and Marmwin (2006), therefore advice that staff must develop expertise in and establish programme of knowledge search and management in support of clienteles need. The staff must be trained and re-trained in the use of the technologies. This could be through formal or informal methods. Koneru (2006) opines that training is inevitable to bridge knowledge and skill gaps, so as to meet state of efficiency. An informed and better equipped staff guarantees efficient services to users, ultimately promoting a good l image. It is ICT training that enables academic staff not only to be

better equipped with competencies set desired but also to render information services effectively. Training in ICT helps the staff in building confidence; understanding ICT; exploiting the developments; and comprehending the capabilities and implications of new technologies. Aguolu and Aguolu (2002) opines that no professional would be able to meet his responsibility if he does not take trouble to keep up with current literature in the field, develop himself through seminars, conferences, workshops, refreshers courses and through a conscious study of new developments in the field. He further recommends on the job training which according him is the employers responsibility to provide on the job training to their new employees as part of their orientation programme.

Ekoja (2007) notes that staff especially those that were trained in the traditional schools must demonstrate that they are willing to be trained and be retrained in ICT skills if they are not to become irrelevant in the ICT age. Formal education is only one means staff can acquire skills and develop competencies in the use of ICT facilities. The concept of "work place learning" signifies the inclusion of different kinds of development activities, both formal and less formalized and includes such activities as work-based mentoring (Valerie, 2009).

In their own view, Beckett and Hager (2002) and Babu (2007) outline some ways staff can acquire and develop their ICT competencies. These methods are: through formal continuing education such as Masters programme, informal education (distance learning), education through colleagues, self study (learning by doing), training by suppliers, attending IT programmes, participation courses, workshops and conferences. Competency acquisition programmes can be internally, that is organized within the workplace, or externally, outside the workplace. Larsen (2006) acknowledges that all the different methods are good.

The outcome of participation in formal continuing education is quite simple to measure – a new degree. The outcome of training courses, conferences and seminars might be of very high value for the individuals, but the organizational training course organized locally or internally for the entire staff or a department was shown to have a measurable impact to stimulate new activities. Also participation in external networks for knowledge exchanges and conducting projects with colleagues from other libraries seem to be a very valuable method of developing competencies. Asadu (2010), explains that attending workshop and conferences both at local, national and international levels also provides training opportunities for professional, especially by donor agencies, software and hardware vendors like UNESCO, EBSCOHOST , HINARY, AGORA, DARE etc vendors.

Mentoring has been discovered to be another effective method staff can develop their skills. It is a method of pairing the older, experienced and successful academic with the less experienced ones. In this way, the less experienced staff can learn the from the experiences of the older one. Adenuga and Eleojo, (2010), conceive the idea as a deliberate attachment of a junior or young librarian to an experienced, senior role model who instructs, guides, influences and brings up the former in training similar to apprenticeship.

Findings by Makara (2002), and Ugboma (2006) identified lack of fund as one of the constraining factors to acquisition of skills and competency development in ICT for staff in the organizations. The number of staff sent on training at a particular time is limited by the resources available as most universities decry the issue of under-funding in their functions, which equally affects the funding of the libraries. The yearly budget allocation of university libraries is small and this is compounded largely by poor financial provision for staff training and development as well as the fact that some of the employers and superior officers in the profession are morally

less supportive to their subordinates for active participation in long programmes. (Balarabe 2005).

Jordan (2013) attributes the barrier towards adequate ICT competency acquisition in developing countries to both lack of IT literacy and the fact that many local schools fail to integrate ICTs into their curriculum. Many curriculum designers of the local schools are not literate in ICT, therefore cannot incorporate ICT related progammes in the curriculum.

According to Balarabe (2005) and Minish-Majanja (2007), Curriculum developments have shown considerable studies in infusing ICT competency programmes as most library schools have developed relevant ICT modules and/or emerged relevant ICT knowledge in traditional modules. However, LIS schools teach these modules theoretically because they have inadequate quantities and quality of computers and poor internet access. He also acknowledges that the facilities which could enhance effectivevteaching and acquisition of necessary competencies are grossly lacking virtually in all the universities.

Anunobi (2004) summarizes the constraints to competency acquisition in to three groups. These according to her are: Personal Problems: These are problems inherent in the staff. The fear that he/she may not succeed in the training; lack of fund to pay their way or purchase computers for personal practice and also lack of time, they also spend most of their time working in the office and therefore have no time to enroll in computer programmes.

Institutional Problem: Lack of motivation and encouragement from the institution; absence of sponsorship to attend workshops and seminars and also lack of ICT facilities in their institutions. Most organizations also do not have adequate funds to acquire and maintain ICT facilities.

2.5 Service Delivery

The delivery of service in government departments has been and continues to draw attention from the external and internal environment. Service delivery is affected by various factors such as remuneration of its workforce, training, promotional procedures, and culture of the systems and among other factors (Budhiraja, 2005). However it is important to note that Service delivery in government ministries his highly depended on information-technology and the skills and knowledge of the employees who work in those ministries. Despite the existence of these ministries, the service deliveries they offer are questionable. Budhiraja (2005) notes that there is lack of transparency, efficiency, and unsecure delivery of services.

In the public services, different guiding principles, such as equitable treatment and the allocation of resources according to need, pervade the processes of decision making, management and provision. As a result, financial subventions may be given to the service providers (like in transport) to ensure that such services are maintained, albeit at a reduced level, outside peak times and in less densely populated rural areas. Murphy (2007) captures this issue extremely well wants to stress that the principles of fairness and equity are most important when we come to examine the concept of quality in public administration. Of course efficiency and cost effectiveness are key elements, but unlike his/her counterpart in the private sector, the public service customer or client seldom has the choice of an alternative competitive supplier. Equality of treatment is, therefore, very important and should not be lost sight of when efficiency measures, including, for example, contracting out of public services are being implemented

Fairness and equity are not normally indicative of the private sector. Within a commercial, market led context, private sector companies would not normally be obliged, because of their

primary obligations to provide financial returns to their shareholders, to maintain nonviable services to geographically or financially disadvantaged groups.

Within the public service system, a different culture also prevails internally. This can place demands upon the management of public service delivery systems which are not characteristic of the private sector. For example, public service managers often have to balance the needs of the general public as users, with accountability to their elected representatives. In addition, the demands of the mass media acting in the 'public interest' have to be managed. All these factors operate within an entirely different financial framework, and often industrial relations climate, from that which prevails in the private sector. Compared with their private sector equivalents, another key aspect of the organisational climate within which the public service operates has been described by

Murray (2010) in the following manner, 'I remain convinced that in assessing the confidence rating of the civil service, account must be taken of the political culture in which it operates. Most commentators agree that the dominating feature of that culture in Ireland is clientalism' Public and private bodies also differ significantly in their service relationships with external customers (O'Shea, 2012).

The availability of I.C.T and skilled workforce with good capacity for learning is essential for E-information, along with other factors like leadership, regulatory frameworks, financial resources, organizational conditions, and Information and Technology infrastructure (Lau, 2003). They span: Leadership, Technology Management, Information Management, Performance Assessment, Project Management and Information Technology. These skills are targeted at both specific categories of government employees like managers, IT specialists as well as public officers in general. Settles (2005) notes that the process of implementing E-information solutions

requires new managerial and technical skills to plan, evaluate, manage, finance and integrate information systems as part of government operations.

According to Adegboyega, Tomasz, Elsa and Irshad (2007), Information Technology (IT) skills are technical skills necessary to implement E-information in order to facilitate smooth service delivery through improved information management. These may include basic IT literacy for all employees, and technical skills for IT specialists to design and implement technical elements: hardware, software and communication of E-information initiatives. Specific IT-skills may include: Strategy and Planning, System Development, System Implementation and Maintenance, and Service and User Support.

2.6 Benefits of Information application

ICT applications are useful in facilitating the development of various aspects of society. They can be used in fields like public administration where they enhance the social, economic and political developments of the citizenry in general. They can also be used for rural and urban development; the establishment of tele centres in rural communities, for example, facilitates economic empowerment, while mobile telephone improves communications, enabling rural entrepreneurs to keep tabs with markets that are outside their communities. ICT applications are also useful in the field of transport where they improve road, air and rail transportation. They are especially invaluable in air transport control and the monitoring of freight and day to day transport systems. In this category, smart cards in developed countries help facilitate the smooth operation of the transport system (payment for parking meters, identification of authorised parking space occupants, etc.) (Mansel & When, 1998).

Technology has a positive impact on the economy and productivity of organizations in the for-profit sector. A report by McKinsey Global Institute reveals that, although it is complex and varies across industries, IT enables and contributes to economic growth (2002). Technology gains have allowed for-profits to keep a competitive edge over their rivals, develop new products and services, realize substantial increases in output and productivity (Brynjolfsson & Hitt, 2000), and ultimately provide fiscal savings.

IT helps increase output and productivity. The correlation between implementation of IT and increased productivity and efficiency in for-profits has been well documented (Aral & Weill, 2006; Brynjolfsson & Hitt, 2000; McKinsey Global Institute, 2002; Stirob, 2002). Successful IT projects have increased profits, making it possible for many for- profits to realize improved stock market value. Based on this and other research, this thesis will first describe the "triangle of investment" needed for success with IT implementations in for-profits: infrastructure, human capital and planning.

First, in relation to the investment in infrastructure, research has shown that it increases profitability and organizational performance in the long term but carries high up-front costs (Aral & Weill, 2006). Moreover, when organizations commit to IT infrastructure, they must be ready for the added costs, not just in the short term, but also for the long term. The need to update, upgrade and change the infrastructure is imperative to keeping the machines running smoothly.

Secondly, regarding the investment in human capital, the importance of matching organization staffs ability with the technology capabilities is illustrated by a case study of "MacroMed", a medical parts manufacturer. Their IT system fell short because line workers retained many elements of the obsolete work practices, which were time-intensive. These individuals were unable to let go of inherited patterns of behavior. The company needed to invest in re-training

staff to achieve the desired results. This organizational learning and investment in human capital was crucial to the success of IT projects (Brynjolfsson & Hitt, 2000). Finally, in relation to investment in planning, success of IT projects relies on alignment of the organizational and IT strategic plans. IT projects fail because they donot align with the organization's requirements as outlined in their organizational plan (Brynjolfsson & Hitt, 2000). Clearly, investments in infrastructure, human capital and strategic planning are central to the success of the IT implementation.

It would therefore be natural that a company would thoroughly evaluate whether or not the IS has brought about some financial development or other improvement. But Hallikainen (2003) reports that about one third of the organizations he has interviewed, do not have any formal methods for evaluating IS investments. Hallikainen further reports that there is only a small portion of advanced companies that systematically evaluate IS project success in different stages of the system's life cycle. And lastly, Hallikainen's findings indicate that most companies use ad hoc and informal methods to evaluate the success of an IS investment. Similarly Shereret al (2003) as well as Seddon et al (2002) conclude that indeed, measuring the payoff from IT investments is still a challenge for companies. A recent investigation done by IT Service Management Forum Finland (2008) include a similar conclusion as it shows that Finnish companies feel that measuring IS success is problematic - partly because measures are lacking. The companies call for more research on the area and concrete and straight- forward ways to evaluate especially the financial benefits of IT investments. (IT Service Management Forum Finland 2008)

Day and Grewan (2013) posit that ICTs can also be used to deliver instructions interactively to people with input processing output capabilities, which can be used to improve computer tutorials that support the reading and understanding of text.

They further state that in Africa, there are ICT technologies emerging, such as human language technology, which use speech recognition software that can process input from different users with very little training. Other technologies, such as text to speech technology, can read text from emails, web pages or typed text (Day & Grewan, 2013). Megan lists a few uses of ICTs in society as follows:

Delivering Services

Services that are currently delivered by ICTs are much improved. For instance, many library users can now renew their books and pay their fines online or over the telephone. Hence ICTs facilitate access to services, allowing, for example, Internet users to search for jobs on the Internet.

Sharing Innovation

Through the Internet, users are able to share and exchange information free of charge. Most of this is due to the open source (OS) platform, which allows organisations to get information and mix and expand it so that it can meet the needs of their clients or users. Good and bad practices are therefore shared, preventing organisations from using resources to ‘reinvent the wheel.’

Back office Processes

Mobile technologies, such as mobile phones and laptops, can be used to deliver services in remote areas through mobile workers who stay in contact with the main office and allow staff to access and record information when needed.

Collaborative Working

In order for any organisation to be successful, there must be collaboration between and within various departments or sections within an organisation for efficiency and joint services. ICTs can play a big role in making the communication and sharing of information possible, not just between public service providers, but also with users.

Reaching Users

It is the right of every citizen to receive proper public services. The Internet provides access to 'hard to reach' individuals by transgressing geographical boundaries to bring together individuals with niche interests, thus giving them a stronger voice. With the usage of ICTs a lot could be done much easier than it has been the case in the old days for example, long time ago it took 3-4 months to communicate with a person abroad, but now with the introduction of emails it can only take seconds to communicate with that person (Day and Grewan (2013)

2.7 Review of Previous Studies

In his study on Computer Technology adoption in Saudi Arabia, Al-Ghatani (2003) carried out a Survey of 1200 Saudi managers and government officials. The study validated Rogers‟ (1995) five perceived attributes of technology namely relative advantage, complexity, trial ability, compatibility and observability as predictors of technology adoption in a non-Western cultural context.

Nyandiere (2006), surveyed 17 managers in his study on the increasing role of Information Systems in the Management of Higher Educational Institutions (HEIs) in Kenya. The study found out that ICT as a tool should be at all basic functions at Strathmore University and that ICT should help organize and improve on Strathmore's efficiency especially management of admissions, finance, examinations and library resources. The study further established that ICT is a tool for operations and management support, User departments were not happy with quality, reliability and accuracy of information provided by the current systems and that systems are poor in the areas of integration, security features. The study recommended that Strathmore University invests in an integrated academic management systems to facilitate management of academic processes-registration, progression, lecturer management, fees payments and examinations.

Matovu (2009), did a study on availability, accessibility and use of Information and communication technology in management of students‟ academic affairs in Makerere University. The objective of the study was to establish how ICT affected management of students‟ academic affairs .The study noted that despite technological advancements that had advanced in the university, there was still the mismanagement of students‟ academic records. Data were collected using semi-structured survey questionnaires and interviews from a sample size of 311 respondents. Correlations were used to determine the extent to which ICT was related to management of student's ‟academic affairs.

The findings indicated that internet facilities, computers, management information systems, electronic databases all were available and accessible to administrators, lecturers and students though with restricted access for viewing results, record keeping, setting and marking exams. ICT for registration was used for tracking students‟ registration progress by administrators and

academic progressing. It was concluded that ICT facilities such as computers, Management Information Systems and the internet were the most common in use for examination management and they were mainly applied for processing examination results, tracking students' academic progress, grading of students according to their performance, communication between lecturers and heads of department, communication to students via emails. It was again noted that ICT was accessed for communication between administrators and other teaching staff members in the University, for returning results to students online. The study further noted that in Makerere University students did not have enough computer skills to utilize such tool. Secondly, ICT facilities were not adequate to support online transactions. For example participants disclosed that the internet was not reliable, computers were not enough and on top of it users‟ capacity to use ICT tools was daunting. The study recommended that the University authorities should adequately train and acquaint users with ICT skills such as database management, typing and printing, online examination management, skills in management information systems and internet and facilitate them with ICT facilities. Secondly, University authorities should make it a policy for lecturers to use ICT facilities for examination management, train administrators and provide more ICT facilities with the required ICT facilities like computers, computer software, internet facilities and reliable databases to effectively use ICT at all levels and to put place formal procedure to be followed to enforce strict use of ICT structures like MIS.

In her study on Institutional management and integration of ICT in teaching and learning in Kenya, Kidombo (2011) selected 10 schools, 1 teachers college, 5 secondary schools and 4 primary schools. The objectives of the study were to identify the influence of ICT integration plan on ICT integration in teaching and learning. To establish the influence of ICT maintenance and renewal plan on ICT integration in teaching and learning and to find out how community

access to ICTs influences the integration of ICT in teaching and learning. She observed that 50% of institutions had an ICT integration plan which emphasized on Increasing the number of computers, Installing learning software, Security, Training of teachers and students and strategies for maintaining and renewing ICT equipment. 0.2% of institutions were sharing computer facilities with the community. 0.8% head teachers have some training in ICT, 0.2% schools have not integrated ICT in teaching and learning at all while 8 are between 25 and100 percent. The study recommended that effective leadership be put in place in order to facilitiate access to ICT by teachers and students, building renovations, electrical installations, air equipment maintenance, training of personnel to do the maintenance rather than depend on commercial technicians, professional development, effective supervision of computer labs, administrative efficiency where classroom teachers should improve their skills in simple programs like Excel, for simple tasks and to learn by practice -practice how to use ICT.

2.7 Knowledge Gap

Even as health is an increasingly information-intensive sector where ICT implementation can significantly contribute to enhanced quality of service, accessibility and efficiency there seems to be small consistency on how these aspects affect ICT implementation particularly in African countries and specifically in the health sector in Kenya. This observation supports the argument of Iacovou et al., (2005) and that of Fallon and Moran's (2010) that there is an obvious t lack of empirically rigorous data and focused research on this topic. There seems to be little studies that have examined the influence of ICT adoption on provision of medical services in Kenyan hospitals. The study attempted to reduce the gap in existing literature by considering the fact that less developed countries are not alike and there was need to investigate the effects of ICT on medical service delivery at Moi Teaching and Referral Hospital.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter outlines the methodology and procedures used to obtain research data. It outlines research design, location of the study population, sample size, sampling design, sampling procedure, the instruments of data collection, validity and reliability of the study and method of collecting data.

3.2 Study Design

The study adopted a descriptive survey research design. Mugenda and Mugenda (2003) describes descriptive research design as a systematic, empirical inquiring into which the researcher does not have a direct control of independent variable as their manifestation has already occurred or because the inherently cannot be manipulated. The research design was chosen because of its ability to create a profile about a phenomenon. Descriptive research design is concerned with finding out about the how, who, when and where of a phenomenon so as to build a profile (Mugenda and Mugenda, 2003).

3.3 Location of the study

Moi Teaching and Referral Hospital is the second National Referral Hospital in Kenya. The Hospital is located along Nandi Road in Eldoret town, Uasin Gishu District, in the Rift Valley Province of Kenya. It started in 1917 as a cottage hospital with a bed capacity of 60 to cater for the health needs of Africans. An outpatient department with an x-ray unit was built in October 1952. At that time the staff quarters were grass thatched. An additional outpatient department building was put up in 1962 with the staff population at the time at 55 members. By 1963 the bed establishment was 125 with an amenity ward already established.

The Hospital has since grown and is now a fully-fledged referral facility with 800-bed capacity. MTRH uses state-of-the-art facilities in the provision of its services and aims to be a centre of excellence in all specialties. MTRH incorporates the Academic Model Providing Access to Healthcare (AMPATH), the Regional Blood Transfusion Centre (RBTC), Moi University's School of Medicine and the School of Public Health and the Alcoholic Drug Abuse (ADA) Unit. The Hospital receives patients from the entire Western Kenya, parts of Eastern Uganda and the Southern Sudan. Moi Teaching and Referral facility status was accorded by Legal Notice No. 78 of 12 June 1998 under the State Corporations Act (Cap 446) and its first Board of Management was gazetted on 29 June 1999.

3.4 Target Population

The study targeted employees' of MTRH. The population was composed of divisional chairpersons, heads of departments, administrators, divisional accountants, health workers and other support staff at the Hospital. This enhanced reliable and relevant data collection. This population was selected for this study because they are directly involved in the implementation and sustenance of performance contracts at the Hospital.

Table 3.1 Target Population

Division	Target Population
Directors	46
Deputy Director Clinical Services	137
Administration	616
Clinical Support	120
Diagnostics	156
Medicine	121
Surgery	285
Mental Health and Rehabilitative Services	116
Pediatrics	146
Reproductive Health	321
Private Wing 1	115
Private Wing 2	139
Cafeteria	37
Training Centre	41
Mortuary	22
Chief Nurse	726
TOTAL	**3144**

(Source: MTRH, 2015)

3.4. Sample size

Cluster sampling promotes representation of marginalised groups and it caters for all groups in the study (Strauss, 2002). Proportionate sampling method was then used to select a representative sample from these clusters (departments) since they comprise of different population sizes. Simple random sampling was then used to ascertain department respondents who administered the questionnaire.

3.4.1 Sample Size determination

The sample size was calculated using the Yamane Model (2004) at 92.5% level of confidence (α = 7.5%).

Thus,

$$n = \frac{N}{[1 + N(\alpha 2)]}$$

Where n is the required sample size

N is the target population size

A is the sample significance level. Given that N = 3144 and α = 7.5%

n = 3144/ [1 + 3144 (0.0752)]

Therefore sample size = 175 respondents

Table 3.2: Sampling frame

Sample unit	Target population	Proportion	Total
Directors	46	1.5 % of 175	3
Deputy Director Clinical Services	137	4.4 % of 175	8
Administration	616	19.6 % of 175	34
Clinical Support	120	3.8 % of 175	7
Diagnostics	156	5 % of 175	9
Medicine	121	3.8 % of 175	7
Surgery	285	9.1 % of 175	15
Mental Health and Rehabilitative Services	116	3.7 % of 175	7
Pediatrics	146	4.6 % of 175	8
Reproductive Health	321	10.2 % of 175	17
Private Wing 1	115	3.7 % of 175	7
Private Wing 2	139	4.4 % of 175	8
Cafeteria	37	1.2 % of 175	2
Training Centre	41	1.3 % of 175	2
Chief Nurse	726	23.1 % of 175	40
Mortuary	22	0.7 % of 175	1
TOTAL			**175**

3.5 Research instruments

Primary data was collected using a questionnaire. The questionnaire comprised of open and closed ended questions. The close-ended questions provided more structured responses to facilitate tangible recommendations. The open-ended questions provided additional information that could not be captured in the close-ended questions. The questionnaires were carefully designed and tested with a few members of the population together with the supervisor for further improvements. This was done in order to enhance its validity and accuracy of data to be collected for the study. The questionnaires were administered using a drop and pick later method. The questionnaire was prepared on a five point likert scale ranging from strongly agree to strongly disagree. This assisted in measuring the respondent's level of agreement with each statement which helped in interpretation on how E-information had affected provision of medical service in the hospital.

3.6 Data Collection Procedure

Relevant authorization from both the National Commission for Science, Technology and Innovation (NACOSTI) and Kisii University-Department of Computing Sciences was sought for clearance prior to data collection. The questionnaire was then distributed through drop and pick method. The respondents were given a period of one week to answer the questions after which the questionnaires were picked from the respondents.

3.7 Data Validity and Reliability

Validity and reliability was done to establish the standardization of the research instruments that were be used in the study. Validity was tested through expert judgment of research supervisors and statisticians. To ensure reliability, piloting was carried out on a population that has similar homogeneous characteristics; the pilot study included 50 (fifty) staff in Uasin Gishu district

hospital. The pilot study helped in modifying various items in order to rephrase, clarify and clear up any ambiguities in the questionnaire

3.7.1 Construct Reliability Tests

Construct reliability tests were conducted on the electronic information as well as provinsion of medical services constructs using Chronbach alpha coefficient test. This was aimed at establishing internal consistency of the items. The values of this test usually lie between 0 and 1(Jooste and Fourie, 2009).

According to Hair *et al* (2006), a Chronbach alpha value of 1.0 is indicative of perfect reliability, that of above 0.70 is regarded as being indicative of good reliability while that of below 0.70 may be considered as being low. A summary of the Cronbach alpha tests are shown on Table 3.3

Table 3.3 Summary of Reliability test results

Constructs	**No. of cases**	**No. of items**	**Chronbach's alpha coefficient**
Infrastructure facilities	50	4	0.870
Social structure	50	6	0.880
Skill and expertise	50	11	0.768
Provision of medical services	50	5	0.882

Source: Research study, 2015

The results indicate that all the constructs were reliable since they all had Chronbach alpha values of above 0.70. These indicate the items have a high level of internal consistency.

Overall model

Reliability Statistics	
Cronbach's Alpha	N of Items
.835	26

3.8 Data Analysis

The questionnaires were first edited and coded to ensure completeness and accuracy. The data were analyzed through the use of descriptive statistics such as mean, median, standard deviation, frequency tables and percentages. The computer application package for social sciences SPSS (Statistical Package for Social Sciences) version 21.0 was used to aid in the analysis. Inferential statistics was also used in the analysis where multiple regression analysis was used. The multiple regression model used was as follows:

$$Ý=\beta_0+\beta_1 X_1+\beta_2 X_2+ \beta_3 X_3+\Sigma ij$$

Where:

Ý= is the dependent variable (provision of medical services)

X_1, X_2, X_3 are independent variables

X_1= Infrastructure facilities

X_2=Social structure

X_3=Skills and expertise

β_0, β_1, β_2, β_3 are the regression coefficients

And

Σij is the error component with the mean Zero.

Data have been presented using Tables and figure graphs, frequency tables and bar charts.

3.9 Ethical Considerations

Measures were taken to ensure informed consent of respondents. In order to protect the rights and privacy of all respondents, they were approached with an introductory letter. Research was also done in such a manner that respondents were assured of their anonymity and the confidentiality of their responses. Research respondents were further guaranteed that their individual identities will not be disclosed.

CHAPTER FOUR

PRESENTATION OF RESULTS AND ANALYSIS

4.1 Introduction

This chapter reports the results of data analysis pertaining to the objectives of this study. The reporting of statistical results in this chapter follows a fairly consistent pattern, after which the pertinent descriptive statistics and appropriate conclusions are presented. In analyzing the data, the responses to the items in the questionnaire the researcher assigned each response a number Data was collected using questionnaires, drop and pick later method of questionnaire administration. The quantitative analysis is based on the data collected through the questionnaires and administered on selected respondents in the hospital. Out of 175 questionnaires issued to employees, 164 questionnaires were filled and returned, representing a 93.7 % response rate. Eleven (11) respondents withdrew from the study, resulting to 164 respondents.

4.2 Data Preparation and Screening

The data was prepared for analysis by ensuring it met the minimum requirements for qualitative and quantitative analysis. The questionnaires were therefore checked for missing values and unfilled parts as well as for normality of the distribution. The questionnaires data was coded and entered into the SPSS Version 21 computer programme and subjected to further quantitative and qualitative analysis. The dependent, independent and moderating variables were measured on Likert Scales of 1 to 5 ranging from 5:– Strongly Agree to 1:- Strongly Disagree. This was done for all items measuring those variables. Each respondents score on each item was then aggregated into a composite score for each independent variable and dependent variable (provision of medical services)

4.3 Demographic profile of the Respondents

The demographic profiles of respondents were analyzed using four aspects namely the gender of the respondent, age, length of service and education level.

4.3.1 Gender of the respondents

The results on the gender of the respondents are presented on table 4.1. This was important as masculinity and feminity affects respondent's perception of issues in relation to the effectiveness of Electronic Information on Provision of Medical Services. It was also meant to determine whether Moi Teaching and Referral Hospital accords equal opportunities to both men and women

Table 4.1: Gender of the respondents

Gender	**Frequency**	**Percent**
Male	110	66.8
Female	54	33.2
Total	**164**	**100.0**

Source: Research study, 2015

The results reported that 110 respondents or 66.8% were male and 54 respondents or 33.2% were female, this means those males are the majority of the sampled respondents. The gender difference in the organization was not high. This is facilitated by the work environment as most of the job description in the organization needs active and productive workers. Both genders do play a vital role in the organization as pertains individual performance hence the overall organization performance.

4.3.2 Age Categories

The results on the age categories of the respondents are presented in Table 4.2. Age plays a critical role in understanding effects of Electronic Information on Provision of Medical Services, to larger extent older employees are more experienced and are likely to relate issues more directly than relatively younger employees.

Table 4.2: Age of the respondents

Age categories	Frequency	Percent
18-24 years	4	2.3
25-34 years	91	55.2
35-44 years	58	35.2
45-54 years	12	7.3
Total	164	100.0

Source: Research study, 2015

The findings showed that 2.3% or (4) of respondents between 18-24 years old, 35.2% or (58) of respondents are between 35-44 years old while 55.2% or (91) respondents are between 25-34 years old. This indicates that majority of the respondents are above 30 years. This means they are at their prime age and so still have many expectations in life. It will be interesting to see how age factor has affected the objectives of the research. Different age groups think differently hence the query to the management differs. The younger a person is the higher the dreams and expectations.

4.3.3 Respondents Level of education

The results on education level of the respondents are presented on Fig. 4.1. Academic qualification determines how efficiently and effectively an employee delivers in the organization and also helps to verify on employees understanding of their right of work and whether the employees do know what is expected of them by the organization.

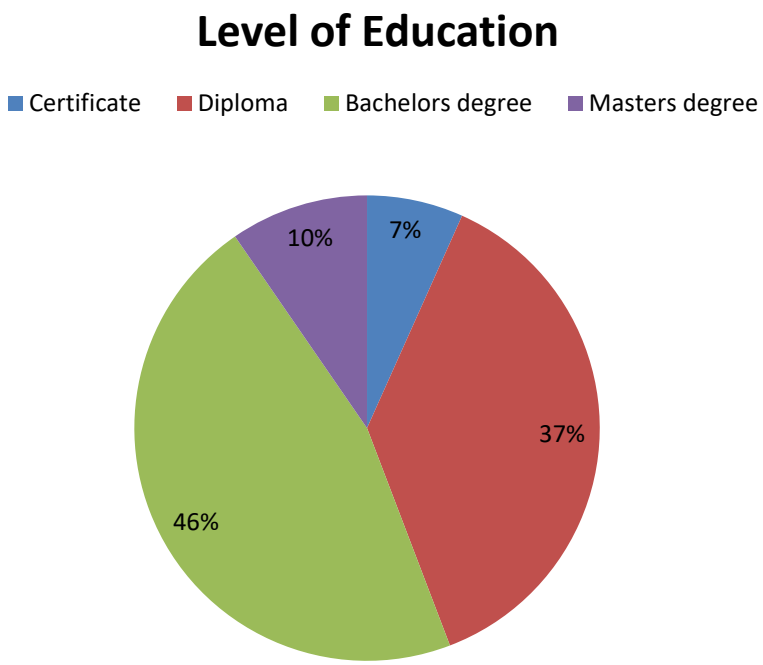

Fig 4.1 Level of Education

Source: Research study, 2015

It was reported that 46.2% or 76 are Bachelor's degree holders. The result shows that majority of the employees are well educated. This implies that most of the employees do understand what is expected of them. This also implies that less funds will be devoted to training and developing the competences of the staff members.

4.3.4 Working experience of the respondents

Employees with longer period of service are more experienced and can explain the relationship between Electronic Information and Provision of Medical Services in the organization. work experience can better be understood by looking at the learning curve. The researchers therefore set out to determine how long the respondents have worked or been in the organization. The findings are presented in the Fig 4.2

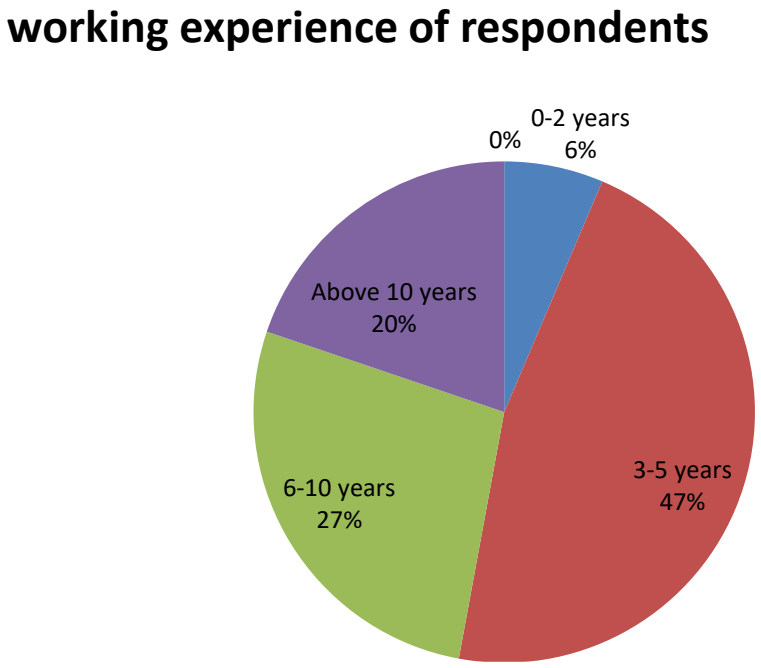

Fig 4.2 Working experience of the respondents

Source: Research study, 2015

The results from the findings that 46.5% or 76 respondents have worked 3-5 years, 27.3% or 45 respondents have worked 6-10 years while 19.8% or 32 respondents have worked for above 10 years. The highest numbers of respondents have a good working experience as they have worked with the organization for more than 3 years which shows that they are more exposed on performance contracting and its benefits.

4.4 Infrastructure Facilities

The first research objective sought to assess the infrastructure facilities at Moi Teaching and Referral Hospital. This is because, For people working within the physical infrastructure of the organization, the right place to place information may be on the organization network. The considerations of both security and accessibility must always be taken into account in making data placement decisions. Database integration techniques were introduced to make use of data across multiple databases. Data warehousing provided powerful tools for understanding trends by enabling multi-dimensional analysis of data collected from the numerous operational databases in an organization. Data mining and knowledge discovery techniques enhanced these analyses. Responses were sought from the staff of the organization. The results are summarized in Tables below.

4.4.1 Facilities in place to ensure effective E-Information

When respondents were asked on facilities in place to ensure effective E-Information Succeeds, it is evident from table 4.3 that MTRH has put in place most of the relevant facilities to enable effective use of information systems.

Table 4.3: Facilities in place to ensure effective E-Information

Response	Frequency	Percentage
Computer lab	108	66
Fibre optic	20	12
Wireless internet	23	14
Cyber café	13	8
Total	**164**	**100**

Source: Research study, 2015

Computer laboratory leads with many respondents (108) who felt that facilities have been put in place to facilitate the use of E-information. Wireless internet which is expected to offer connectivity between many service stations is not fully implemented with 23 of the respondents supporting this fact

4.5 Social structure

The third research objective sought to find out the social structure of staff towards electronic information at Moi Teaching and Referral Hospital. This is because the effectiveness and success of E-information is very vital to the performance of the organization. The results are summarized in Tables below.

4.5.1 Social structure on E-information in the institution

Table 4.4 Social structure on E-information in the institution

Influence	SA	A	U	D	SD	Variance	Std Dev
	F (%)	F (%)	F (%)	F (%)	F (%)		
E-Information will ease our work.	102 (62)	40 (24.67)	12 (7.33)	3 (2.00)	7 (4.00)	1.742	1.320
E-Information will interfere with my job security	16 (10)	25 (14.67)	16 (10)	71 (43.33)	36 (22)	1.924	1.387
E-Information will improve the image of our institution	95 (58)	54 (32.67)	7 (4)	5 (3.33)	3 (2)	2.024	1.423
All employees see the importance of E-information	66 (40.33)	60 (36.33)	9 (5.33)	9 (5.33)	20 (12.68)	1.200	1.095
E-Information is flexible to interact with	70 (42.67)	62 (38)	8 (4.67)	11 (6.67)	13 (8)	7.364	2.714
E-information is often frustrating	9 (5.33)	22 (13.33)	22 (13.33)	79 (48)	33 (20)	1.718	1.311

Source: Research study, 2015

Table 4.4 shows the distribution of respondents in regard to the social structure of staff towards electronic information in at Moi Teaching and Referral Hospital. From table 4.4, it is evident that majority of the respondents felt that E-information ease their work. 102 (62.00%) strongly agreed while 40 (24.67%) agreed. On the other hand few respondents were of the opinion that E-information don't ease their work. 3 (2.00%) and 7 (4.00%) disagreed and strongly disagreed respectively while 12 (7.33%) were undecided.

When asked whether information system will interfere with job security, minority indicated that it will interfere while majority were of the contrary opinion. 16 (10.00%) and 25 (14.67%) strongly agreed and agreed respectively that it will interfere with their job security whereas 71 (43.33%) and 36 (22.00%) disagreed and strongly disagreed respectively. 16(10.00%) were still undecided.

When asked whether E-Information will improve the image of our institution, majority felt that it will improve as evidenced by 95 (58.00%) and 54 (32.67%) of the respondents who strongly agreed and agreed respectively whereas 5 (3.33%) and 3(2.00%) disagreed and strongly disagreed and 7(4.00%) were undecided.

Employees were further asked whether they saw the importance of E-information, 66 (40.33%) and 60 (36.33%) strongly agreed and agreed respectively whereas 20 (12.68%) and 9 (5.33%) disagreed and strongly disagreed respectively while 9(5.33%) were undecided.

Majority of the respondents were of the opinion that E-information systems is flexible to interact with. 70(42.67%) strongly agreed and 62 (38.00%) agreed whereas 11 (6.67%) and 13 (8.0%) disagreed and strongly disagreed respectively while 8(4.67%) were undecided. From the table it is evident that respondents were of the opinion that interacting with E-information is often

frustrating. When asked so, 9 (5.33%) and 22 (13.33%) strongly agreed and agreed respectively that E-information use is frustrating whereas 79 (48.00%) and 33 (20.00%) disagreed and strongly disagreed respectively while 22 (13.33%) were undecided

4.6 Skills and Expertise

The sought to find out the level of agreement with the aspects with regard to skills and expertise on Electronic information in your institution. Data on the findings were presented below

Table 4.5 Skills and Expertise

	SA	A	U	D	SD	Variance	Std Dev
	F (%)	F (%)	F (%)	F (%)	F (%)		
Organization's policies favor information systems	42 (25.33)	92 (56.00)	9 (5.33)	14 (8.67)	7 (4.67)	1.112	1.055
There is sufficient ICT infrastructure in the institution	16 (10.00)	26 (16.00)	39 (23.34)	71 (43.33)	12 (7.33)	1.125	1.061
The administration is fully supporting the implementation of e-information	41 (24.67)	75 (46.00)	14 (8.67)	15 (9.33)	19 (11.33)	0.59	0.768
There are qualified ICT personnel in our institution	69 (42.00)	61 (37.33)	11 (6.67)	10 (6.00)	13 (8.00)	0.783	0.885
E-information will consume much of our resources.	19 (12.00)	27 (16.66)	31 (18.67)	56 (34.00)	31 (18.67)	1.742	1.320
There are other projects to invest in than invest in E-information.	14 (8.67)	7 (4.67)	5 (3.32)	73 (44.67)	63 (38.67)	1.924	1.387

Source Survey: Data, 2015

Table 4.5, shows the distribution of respondents in regards to skills and Expertise. From the table, it is evident that majority of the respondent believed that organization's policies favor

information systems. 42 (25.33%) and 92 (56.0%) strongly agreed and agreed respectively. Minority 14 (8.67%) and 7 (4.67%) disagreed and strongly disagreed respectively that organization's policies favor E-information. A small proportion of respondents 9 (5.33%) were undecided. From the findings, it is evident that MTRH has policies that guides the implementation and use of E-information.

When asked whether there is sufficient ICT infrastructure in the institution, 16 (10.0%) strongly disagreed while 26 (16.0%) agreed. 71 (43.33%) disagreed and 12 (7.33%) strongly disagreed. 39 (23.34%) of the respondents were undecided. From the findings, it is evident that there is insufficient infrastructure in the institution. When asked whether the administration is fully supporting the implementation of E-information, 75 (46.00%) agreed while 41 (24.67%) strongly agreed. On the other hand 15 (9.33%) and 19 (11.33%) disagreed and strongly disagreed respectively while 14 (8.67%) were undecided.

It is clear that MTRH administration fully support the implementation of E-information. 69 (42.00%) and 51 (37.33%) strongly agreed and agreed respectively on the availability of qualified ICT personnel in the institution whereas 10 (6.00%) and 13 (8.0%) disagreed and strongly disagreed respectively while 11 (6.67%) were undecided. This is a clear indication that the institution has qualified personnel as far as ICT is concerned.

When asked on whether E-information will consume much of our resources, 56 (34.00%) and 31 (18.67%) disagreed and strongly disagreed respectively while 31 (18.67%) were undecided. It is evident that most employees believe that E-information do not consume much of the organization resources. 56 (34.00%) and 31 (18.67%) disagreed and strongly disagreed when asked if there are other projects to invest in other than E-information whereas 14 (8.67%) and 7 (4.67%) strongly agreed and agreed respectively while minority at 5(3.33%) were undecided.

Most of the staff members do not believe that there are other important projects to invest in other than in E-information. This indicates that they see E-information as a very important investment.

4.7 Provision of Medical Services

The sought to know the effect of E-information on provision of medical services, this is because to embrace information and communication technologies to deal with the problem of access, quality of information in healthcare. This will accelerate knowledge diffusion and increase faster access to health information while attending the hospital. Since, Service delivery involves a comparison of expectations with performance. The quality of service is a measure of how well a delivered service matches the customer's expectations. The determinants of service delivery include tangibles, reliability, responsiveness, an assurance and empathy. Data is summarized below

4.7.1 E-information on provision of medical services

Table 4.6 E-information on provision of medical services

	SA	A	U	D	SD	Variance	Std Dev
	F (%)	F (%)	F (%)	F (%)	F (%)		
Providing services at the promised time	14 (4.8)	49 (30.1)	43 (26.3)	51 (30.8)	7 (4.5)	1.112	1.055
Maintaining error free records	12 (7.4)	68 (41.7)	49 (29.8)	20 (11.9)	15 (9)	1.125	1.061
Ability to perform the promised service accurately and dependably	2 (1)	23 (13.8)	89 (54.4)	42 (25.6)	8 (4.8)	0.59	0.768
Prompt service to clients	6 (3.8)	36 (21.8)	77 (46.8)	37 (22.8)	8 (4.8)	0.783	0.885
Readiness of staff to respond to clients requests	31 (18.6)	51 (31.4)	18 (11.2)	31 (18.6)	33 (20.2)	2.024	1.423

Source Survey: Data, 2015

On the statement that It Provide services at the promised time 14 (8.3%) of the respondent strongly agreed with it, 49 (30.1%) were in agreement with the same, 43 (26.3%) were uncertain, 51 (30.8%) disagreed and 7 (4.5%) strongly disagree with the statement.

Maintaining error free records strongly agreed by 12 (7.4%) of the respondents, 68 (41.7%) agreed with the same, 49 (29.8%) remained uncertain, 20 (11.9%) were in disagreement and 15 (9%) strongly disagreed with the statement.

It has Ability to perform the promised service accurately and dependably the study indicated that 2 (1.0%) said strongly agree, 23 (13.8%) said they agree, 89 (54.4%) stated undecided, 42 (25.6%) said they disagree and 8 (4.8%) said they strongly disagree. E-information gives prompt service to clients the study indicated that 6 (3.8%) said strongly agree, 36 (21.8%) said they agree, 77 (46.8%) stated undecided, 37 (22.8%) said they disagree and 8 (4.8%) said they strongly disagree. Finally, It gives Readiness of staff to respond to clients requests the study indicated that 31 (18.6%) said strongly agree, 51 (31.4%) said they agree, 18 (11.2%) stated undecided, 31 (18.6%) said they disagree and 33 (20.2%) said they strongly disagree.

4.8 Multiple Regression Analysis.

Besides using descriptive statistics, the researcher was interested to ascertain whether there was any relationship between dependent and independent variables. Thus multiple regression analysis was employed not only to establish the existence of relationships between the variables but also to determine the strength of causal relationships between dependent and independent variables.

The multiple regression model used was as follows:

$\acute{Y}=\beta_0+\beta_1 X_1+\beta_2 X_2+ \beta_3 X_3+\Sigma ij$

Where:

$\acute{Y}$= is the dependent variable (provision of medical services)

$X_1, X_2, X_3,$ are independent variables

X_1= Infrastructure facilities

X_2= social structure

X_3=Skills and expertise

β_0, β_1, β_2, β_3 are the regression coefficients

β_0 (α): variable factors held constant in the study e.g staff motivation, working environment; hospital policy

And

Σij is the error component with the mean Zero.

The data was analyzed using SPSS program version 21.0. After running the statistical test mentioned above, the findings yielded the multiple regressions results as shown in table 4.7

Model Summary

Model	R	R Squared	Adjusted R Square	Std. Error of the Estimate
	.725(a)	.525	.515	.42782

Source: Research study, 2015

The table signifies that there is a strong positive non-linear correlation between the dependent variable Y and independent variables. R2 is a measure of how much of the variability in outcome is accounted for by the predictors. In Table 4.7, the value of R2 has increased to 0.525 or 52.50% of variation in Adoption.

Table 4.8: Regression coefficients

Coefficients [a]

Model	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1 (Constant)	3.511	.378		9.278	.000
Infrastructure facilities	.195	.043	.261	4.526	.000
Social structure	.320	.087	.216	3.661	.000
Skills and expertise	.165	.064	.157	2.555	.011

a. Dependent Variable: provision of medical services

Source: Research study, 2015

Stepwise selection method was adopted in the analysis where each independent variable was entered in sequence and its value assessed. This method was based on the criteria that if adding the independent variable contributes to the model then it is retained, but all other variables in the model were again re-tested to see if they were still contributing to the success of the model and if found not to contribute significantly they were removed. Thus, this method was to ensure that the end result was the smallest possible set of predictor variables included in the model. In this case, all the three independent variables contributed to the success of the model.

Hence, after the computation, the multiple regression model mentioned above yielded the multiple regression equation shown below:

$Y = \beta_0$ + Infrastructure facilities (0.261) + Social structure (0.216) + Skills and expertise (0.157) + Σ (5%)

β_0 (α): variable factors held constant in the study e.g staff motivation, working environment; hospital policy

Infrastructure facilities predicts medical services (0.261x100=26.1%)

Social structure predicts medical services (0.216x100=21.6%)

Skills and expertise predicts medical services (0.157x100=15.7%)

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

The study revealed that the aspects of infrastructure facilities that affects provision of medical services in Moi Teaching and Referral Hospital to a great extent are application servers, networking and operating systems. The study established that that the aspects of support systems that affect provision of medical services in the hospital to a great extent are people familiarity with the IS application domain, degrees of task specialization among the IT staff, staff flexibility for the task at hand and human intellectual capital perspective. The study further established that aspects of skills and expertise affect provision of medical service in the hospital to a great extent include provision of the desired functionalities and operationalization of non-functional requirements hence there is need to have executable code and budgets and schedules for constant training of staff

5.2 Conclusions

From the findings the study concludes that the infrastructure management affects provision of medical services. From the findings it was evident that the aspects of infrastructure management including operating systems, network security and network storage influenced the provision of medical services. The study also concludes that maintenance and evolution, verification and validation, operations, requirements elicitation and planning, analysis and specification affect the service delivery in the hospital.

The study further indicated that the provision of medical services in the hospital is affected by the support systems that include the human resource. On the same the study concludes that the aspects of staff attitude that affect provision of medical services include familiarity with the IS

application domain, degrees of task specialization among the IT staff, staff flexibility for the task at hand, human intellectual capital perspective, knowledge and ingenuity in systems development and knowledge about specific technologies and platforms/ personnel capabilities.

Finally, the study concluded that skills and expertise influence the provision of medical services in the hospital. The study concludes that the aspects of skills that influence provision of medical services include operationalization of non-functional requirements, optimizing organizational strategies and IT investments, provision of the desired functionalities, synergistic and conflicting interactions results feeding back into new initiatives, usability and accuracy.

5.3 Recommendations

Based on the research findings and conclusions the study recommends that Moi Teaching and Referral Hospital Should:

i. Aim at improving their infrastructure by employing effective infrastructure management strategies to improve the service delivery.

ii. Ensure that their systems are up to date with the current systems in the markets and they are regularly updated. This is because old systems are prone to security threats since they can be manipulated by people with bad intentions like hackers which can compromise the security of vital information.

iii. Ensure that they award appropriate salaries and allowances to the human resource. This will be a source of motivation to the employees who are a crucial determinant of the quality of provision of medical service in the hospital.

iv. Work to maintain quality systems that are reliable and effective. This will ensure that there are no delays due to unexpected breakdowns or system failure. In addition, the

hospital should work with experts who will identify system hitches appropriately and advice accordingly in advance. Posting of most of information and services on the internet or shared database needs to be considered so that members of staff can be updating themselves on new technologies in IT.

v. Ensure smooth implementation, the training should engage the services of an IT company with the necessary technical capacity at the initial stages of implementation so as to develop a comprehensive MIS system.

vi. Ensure that their informational products are regularly updated to give current and actual information. This is crucial to avoid miscommunication that can be brought about by out dated information.

vii. The underlying system issues that members of the medical staff noted would require to be addressed comprehensively. Network stabilization is necessary to ensure minimal interruptions during utilization of these EMRs. These network fluctuations not only affect the system speed and thus staff speed, but may also be the underlying factor behind other issues arising such as difficulty accessing patient benefits and stock related issues. EMRs may be used to solve the problem created by the numerous numbers of medical records generated by different health facilities, as they grow. The space required to store the ever increasing number of records for larger institutions can be minimized with a fully EMR systems integrated to other systems such as Radiology Information Systems that are able to store radiological images electronically.

viii. The turnaround time of record retrieval can be greatly reduced by computerizing records to ensure medical records are retrieved in a timely manner to ensure faster clinician

decision. This has been clearly evidenced by the sentiments collected by AAR HCWs concerning the turnaround time of accessing patient records, accessing lab results as well as making orders and prescriptions. Loss of records, as well as manipulation of medical records are problems unlikely to occur with EMRs since most systems have electronic signatures and cannot be edited once saved. This is the case with the Compu Care system, whereby once saved, records cannot be edited in the future. This must be a consideration of all future EMRs to ensure accuracy,

5.4 Suggestions for Further Studies

The study suggests further research on:

i. The study was purely cross sectional. The study recommends a longitudinal study in the same so as to establish long term relationship between the variable.

ii. Influence of Information Communication Technology in middle level institutions.

iii. Automation in other areas of Information Communication Technology affecting information usage.

iv. New emerging technologies which affect Information management.

v. How Cloud Computing can be incorporated in the management of middle level training institutions.

REFERENCES

Adegboyega, O. Tomasz. J., Elsa. E., and Irshad, K. K. (2007), *Human Capacity Development for e-Government* .UNU-IIST Report No. 362.

Al-Qallaf, C. & Al-Azmi, H., (2012), *Information Technology in Public Libraries in Kuwait*: A First Study. International Information and Library Review, Vol. 34, No. 4, 289-308.

Beynon-Davies, P.,(2002), *Information Systems*; an Introduction to Informatics in Organizations. Bath: Bath Press.

Bhuiyan, S. (2009), *E-information in Kazakhstan: Challenges and Its Role to Development*. Public Organization Review (2010) 10:31-47.

Boamah, A. C. (2010), *Challenges of e-information Project Implementation in a South African Context.* The Electronic Journal Information Systems Evaluation Volume 13 Issue 2 2010, 153 - 164.

Borins, S. (2012), *On the frontiers of electronic governance*: A report on the United States and Canada, International Review of Administrative Sciences, 68, pp 199-211.

Braa, J., Monteiro, E. and Sahay, S. (2014), Networks of action: Sustainable health information systems across developing countries, MIS Quarterly, 28 (3) pp 337-362.

Brown, S. A., and Venkatesh, V. (2005), *Model of adoption of technology in households*: A baseline model test and extension incorporating household life cycle. MIS Quarterly, 29(3), 399-426.

Budhiraja, R. (2005), *Role of Standards and Architecture for e-information Projects*, The Eighth National Conference on e-governance, Bhubaneswar.

Ciborra, C. (2005), *Interpreting e-information and development efficiency, transparency or governance at a distance?* Information technology and people, Vol 18, No.3, pp 269-279.

Dada, D. (2006), *The failure of e-Government in developing countries*: a literature review, Electronic Journal of Information Systems in Developing Countries, Vol 26, No.7, pp 1-10.

E-Government. (2014), *E-Government Strategy: The strategic framework, Administrative Structure, Training Requirements and Standardization Framework.* Nairobi, Kenya: Republic of Kenya.

Evans, D., & Yen, D. C. (2006), *E-information: Evolving relationship of citizens and government, domestic, and international development. Government Information* Quarterly, Vol. 23, 207-235.

Farelo, M., and Morris, C. (2006), *The status of E-information in South Africa*, Research Paper, ST Africa Conference, Pretoria, South Africa.

George, J. F. (2004), *The theory of planned behavior and internet purchasing*. Internet Research, 14(3), 198-212.

Grant, R.M. (2002), *Contemporary Strategy Analysis*: Concepts, Techniques, Applications, Blackwell, Oxford.

Gupta, M. P. and Jana D. (2003), *E-Government evaluation*: a framework and case study, Government Information Quarterly, Vol 20, No.4, pp 365-387.

Heeks, R. (2013), *Most e-information- for-Development Projects Fail*: How Can Risks be reduced? E-Government Working Paper Series, paper number 14, IDPM, University of Manchester, UK.

Hsu, M., & Chiu, C. (2014), *Internet self-efficacy and electronic service acceptance*. Decision Support Systems, 38(3), 369-381.

Jaeger, P. and Thompson, K. (2013), *E-Government around the world: Lessons, challenges, and future directions*", Government Information Quarterly, Vol 20, No.4, pp 389-394.

Kitaw, Y. (2006), *E-Government in Africa Prospects challenges and practices*. Retrieved from http://people.itu.int/~kitaw/egov/paper/EGovernment_in_Africa.pdf.

Kumar, R., & Best, M. L. (2006), *Impact and sustainability of e-government services in developing countries:* Lessons learned from tamilnadu, india. The Information Society, Vol. 22, No. 1, 1-12.

Lau, E., (2013), *Challenges for e-information development*, 5th global forum reinventing government, Mexico City, 5th November 2003, OECD e-Government project.

Layne, K., & Lee, J. (2011), *Developing fully functional E-government*: A four Stage Model. Journal of Enterprise Information Management, Government Information Quarterly, No 18 , 122-136.

Maranga, K. J. (2012), *Strategic Interventions to enhance adoption of Open Source Applications and Creative commons licensed Open Content in the Kenyan Government*. Unpublished MBA thesis, University of Nairobi.

Matavire, R., and Brown, I. (2008), *Investigating the use of "Grounded Theory" in Information Systems Research.*, In Proceedings of the 2008 annual research conference of the South African Institute of Computer Scientists and Information Technologists.

Mutinda, T. (2004), *Roadmap to e-Government*, Unpublished MBA thesis, University of Nairobi.

Ndou, V. (2004), *E-Government for developing countries; Opportunities and Challenges,* The Electronic Journal on Information Systems in Developing Countries, Vol. 18, No. 1, 2004, 1-24.

Njuru, J. W. (2011), *Implications of E-information on Public Policy and Challenges of Adopting Technology*: The case of Kenya. Journal of Global Affairs and Public Policy. 1: (1): 276-311.

Reffat, R. M. (2006), *Developing a Successful e-information. Key Center of design computing and cognition,* University of Sydney, NSW, 2006 Australia.

Reijswoud, V (2008), *E-Governance in the Developing World in Action*, Journal of community informatics, 4 (2).

Settles, A., (2005), *What skills are needed in an e-world: e-Government skills and training programs for the public sector. Practicing e-Government: a global perspective.* Edited by Mehdi Khosrow-pour. OECD e-Government project.

Sharma, S. (2007), *Exploring Best Practices in Public-Private Partnership (PPP) in e-Government through Select Asian Case Studies*. The International Information and Library Review 39: 203- 210.

Stanforth, C. (2007), *Analysing e-Government implementation in developing countries using Actor-Network theory*, e-Government working paper series, Paper number 17.

Thompson, H. (2007), *Crafting and Executing Strategy: Text and Readings.15th* edition, McGraw Hill Companies, New York.

United Nations, (2013).*World Public Sector Report 2013: E-Information at the Crossroads. United Nations,* Department of Economic and Social Affairs, New York.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003), *User acceptance of information technology*: Toward a unified view. MIS Quarterly, 27(3), 425-478.

Were, A. P. (2010), *Strategies adopted by the Kenyan government in introducing E-governance*. Unpublished MBA thesis, University of Nairobi.

Wheeler, D. (2003), *Egypt: Building an Information Society for International Development,* Review of African Political Economy, Vol 30, No.98, pp 627-642.

World Bank (2014), A definition of e-information, available at: www1.worldbank.org/ public sector/egov/definition.ht

APPENDICES

APPENDIX I: QUESTIONNAIRE

I am a student at Kisii University, carrying out a research on the Effects of Electronic Information on Provision of Medical Services: A Case Study of Moi Teaching and Referral Hospital. You have been selected to participate in this study to establish your perceptions on Electronic Information. The information provided will be treated confidentially. Do not write your name in this questionnaire.

SECTION A: DEMOGRAPHIC INFORMATION

Respond to the questions below by filling in the spaces provided and tick where it is appropriate.

1. Designation ……

2. Gender

Male ☐

Female ☐

3. Age category

18-24 years ☐

25-34 years ☐

35-44 years ☐

45-54 years ☐

55 years and above ☐

4. Level of education

Certificate ☐

Diploma ☐

Bachelors Degree ☐

Masters Degree ☐

Others (Specify)…….

5. How long have your worked for this institution?

0-2 Years ☐

3-5 Years ☐

6-10 Years ☐

Above 10 years ☐

SECTION B: INFRASTRUCTURE FACILITIES

6. Which facilities has your organization put in place to ensure effective E-Information Succeeds?

Computer labs ☐

Cyber cafe ☐

Fibre Optic ☐

Wireless Internet ☐

SECTION C: SOCIAL STRUCTURE

7. On a scale of 1-5, indicate your level of agreement or disagreement with the following statements with regard to social structure on E-information in the institution. (Please tick appropriately)

	Strongly disagree	**Disagree**	**Uncertain**	**Agree**	**Strongly agree**
E-Information will ease our work.					
E-Information will interfere with my job security.					
E-Information will improve the image of our institution					
All employees see the importance of E-information.					
E-Information is flexible to interact with.					
E-information is often frustrating.					

8. What do you think is unique about E-information in your institution?

……

SECTION D: SKILLS AND EXPERTISE

9. On a scale of 1-5 rate indicate your level of agreement with the following statements with regard to skills and expertise on Electronic information in your institution. (Please tick)

	Strongly disagree	**Disagree**	**Uncertain**	**Agree**	**Strongly agree**
Organisation`s policies favor information systems					
There is sufficient ICT infrastructure in the institution					
The administration is fully supporting the implementation of e-information					
There are qualified ICT personnel in our institution					
E-information will consume much of our resources.					
There are other projects to invest in than invest in E-information.					

10.How would you rate your level of awareness/skill for the following applications/services?

Application	**Good**	**poor**	**Don't use**	**Don't know**
Operating system Windows				
Manage electronic resources				
Installation and customization of software				
System Administration &Maintenance				
Development of institutional repository				

SECTION E: PROVISION OF MEDICAL SERVICES

11. On a scale of 1-5 rate indicate your level of agreement with the following statements with regard to E-information on provision of medical services in your institution. (Please tick)

	Strongly disagree	**Disagree**	**Uncertain**	**Agree**	**Strongly agree**
Providing services at the promised time					
Maintaining error free records					
Ability to perform the promised service accurately and dependably					
Prompt service to clients					
Readiness of staff to respond to clients requests					

APPENDIX II: RESEARCH PERMIT

CONDITIONS

1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit
2. Government Officers will not be interviewed without prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2) hard copies and one(1) soft copy of your final report.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice

REPUBLIC OF KENYA

NACOSTI

National Commission for Science, Technology and Innovation

RESEARCH CLEARANCE PERMIT

Serial No. A 27008

CONDITIONS: see back page

THIS IS TO CERTIFY THAT:
MS. MARTHA FRED NDESO
of KISII UNIVERSITY, 0-30100
Eldoret,has been permitted to conduct research in *Uasin-Gishu County*

on the topic: *EFFECTS OF ELECTRONIC INFORMATION ON PROVISION OF MEDICAL SERVICES: A CASE STUDY OF MOI TEACHING AND REFERRAL HOSPITAL*

for the period ending:
19th December,2014

Permit No : NACOSTI/P/14/3409/3522
Date Of Issue : 24th October,2014
Fee Recieved :Ksh 1,000

.....
Applicant's Signature

.....
Secretary
National Commission for Science, Technology & Innovation

APPENDIX III: RESEARCH AUTHORIZATION

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,
2241349, 310571, 2219420
Fax: +254-20-318245, 318249
Email: secretary@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No.

Date:
24th October, 2014

NACOSTI/P/14/3409/3522

Martha Fred Ndeso
Kisii University
P.O. Box 402-40800
KISII.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Effects of electronic information on provision of medical services: A case study of Moi Teaching and Referral Hospital,"*** I am pleased to inform you that you have been authorized to undertake research in **Uasin-Gishu County** for a period ending **19th December, 2014.**

You are advised to report to **the Medical Superintendent, Moi Teaching and Referral Hospital, the County Commissioner and the County Director of Education, Uasin-Gishu County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

DR. S. K. LANGAT, OGW
FOR: SECRETARY/CEO

Copy to:

The Medical Superintendent
Moi Teaching and Referral Hospital.

The County Commissioner
The County Director of Education
Uasin-Gishu County.