

**A FRAMEWORK FOR E-HEALTH IMPLEMENTATION IN THE
HEALTH CARE SECTOR IN KENYA: A GROUNDED THEORY
APPROACH**

CAROLINE BOORE

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DECLARATION

I, the undersigned, declare that this Thesis is my original work and has not been submitted to any other college, institution or university other than the University of Nairobi for academic credit.

Signature

Date.....

Caroline Boore

D80/72843/2012

Department of Management Science

School of Business

University of Nairobi

This thesis has been submitted with our approval as university supervisors

Signature.....

Date.....

Prof James Njihia

Department of Management Science

School of Business

University of Nairobi

Signature.....

Date.....

Dr. X.N Iraki

Department of Management Science

School of Business

University of Nairobi

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DEDICATION

This thesis is dedicated to my dad who passed on during the process of completing the study. *“Dad, you always reminded me that growth happens in the valleys as well, so never give up and there lay my strength to hold on. Am forever grateful.”*

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ABBREVIATION AND ACRONYMS

AU	African Union
ANT	Actor Network Theory
CHI	Consumer Health Informatics
DOI	Diffusion of Innovation
DHIS	District Health Information Software
EMR	Electronic Medical Record
E-health	Electronic Health
EHR	Electronic Health Record
EHI	Electronic Health Information
ET	Emergence Theory
EU	European Union
EPSOS	European Patient Smart Open Systems
GT	Grounded Theory
GTM	Grounded Theory Methodology
GDP	Gross Domestic Product
HIS	Health Information Systems
HKM	Health Knowledge Management
HMIS	Health Management Information Systems
ICT	Information Communication & Technology
IS	Information System
ISD	Information System Development
IPPD	Integrated Payroll and Personnel Database
ISMS	Information Security Management System

IFMIS	Integrated Financial Management Information System
IT	Information Technology
ITU	International Telecommunication Union
KCAA	Kenya Communications Act
MDG	Millennium Development Goals
MOH	Ministry of Health
MPESA	Mobile Pesa
NGO	Non-Governmental Organization
OSI	Open Systems Interconnection
PC	Personal Computer
SDG	Sustainable Development Goal
TOE	Technology Organization Environment
USA	United States of America
WHO	World Health Organization

ABSTRACT

Information and Communication Technology (ICT) has turned into a key enabling tool in the enhanced healthcare delivery and has impacted how we live and see the world. The implementation of Information Technology (IT) and particularly e-health is, seen as a potential tool in enhancing healthcare delivery. The purpose of this thesis was to develop a holistic framework that addresses e-health implementation in developing countries. The existing frameworks for e-health implementation in developing countries are not holistic and only address few aspects of e-health implementation. Basically the frameworks that are in place may not work in the context for many developing countries for the implementation of e-health systems. Moreover the frameworks have also been developed mainly using secondary data. In addition they have been developed based on positivist approach that forces certain preconceptions unlike grounded theory approach that allows for theory to emerge from data. The inadequacy of the existing frameworks necessitated a different approach towards healthcare research. Thus there was a case for developing a holistic framework that is grounded from empirical data. This was addressed by using grounded theory approach to develop a data driven framework for implementation of e-health systems in the healthcare sector in Kenya. The study used a paradigmatic stance of pragmatism and grounded theory methodology. Theoretical sampling was used to interview a total number of 30 respondents. NVivo software version 11 was used for the analysis of the data. The data analysis was done using three levels of coding namely open, axial and selective. Thirteen categories emerged from the three stages of coding. The thirteen categories were further combined to form five main categories. The findings of the study generated a data driven framework that explains implementation of e-health in Kenya consisting of five categories namely political e-readiness, managerial practices, IS Capability, societal e-readiness and regulatory framework. The implications of the study were that it developed a data driven theory rather than testing theory. The theory presented was done from theory building approach with a pragmatism paradigm. This is a major departure from the common practise of theory testing and surveys in IS research. Therefore this can be used as a point of reference for Kenyan researchers that may wish to utilise theory building approach. The theory developed is a substantive theory for e-health implementation which can be in future developed into a formal theory. In addition for developing countries such an approach would be preferable due to the complex context and nature of problems. A reductionist approach cannot effectively address such complex contexts. The model is holistic and presents categories that the Government may find helpful in addressing the e-health implementation challenges as well as improve on the national e-health strategy. Similarly the IS professionals can use the findings to improve their professional practise in healthcare research. In conclusion the study generated three other new themes not addressed in the existing frameworks. Thus there is a need to change focus from the current technological bias in e-health implementation and address other non technological issues.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Presently the rates of implementation of Information and Communication Technology (ICT) have become important pointers to economic development. Several developing countries have put technological innovation on top of their national growth agenda and invested greatly into ICT. For example in the healthcare sector the application of ICT commonly referred to as E-health is discerned as the main driving power in the unfolding healthcare reforms in many developed and developing countries. E-Health apparently seems to provide a remedy for expediting the required transformation for healthcare sector (Korpela, 2012 & Kiura, 2012). According to Eysenbach (2007) e-Health is the utilization of ICT, particularly the Internet, to enhance superior healthcare management. E-Health consists of applications that boost disease prevention, timely patient diagnosis, and enhanced patient management. Primarily these applications include electronic Medical Records (EMRs), Telemedicine, Health Knowledge Management, Consumer Health Informatics (CHI), M-Health and Healthcare Information Systems (HIS). WHO (2013) observed that the utilization of ICT applications in healthcare is merely not just about innovation, but rather a means to attain a progression of better outcomes, for instance, health workers settling on superior treatment choices and doctor's facilitated to give higher quality and more secure care.

The healthcare environment is intricate and multifaceted thus to fully understand it conceptually required grappling with many intertwined and overlapping strategic issues. Such issues among others include: e-Health standards; ICT and health policies; e-legislation; e-Health infrastructure; ICT competence (Mugo, 2014; Korpela, 2013; Lazaro, 2013; Juma et al., 2012; Mbarika, 2011). There are several frameworks that exist for e-health

implementation but none have captured the essence of e-health implementation in developing countries. The existing frameworks are not holistic and only address few aspects of e-health implementation. Basically they mainly focus on implementation from a technological deterministic perspective while silent on other non- technological perspective (Braa, 2007, Xiangzhu et al., 2013; Fanta, 2015). Similarly the frameworks that are in place may not show the real context for many developing countries for the implementation of e-health systems. Moreover the frameworks have also been developed mainly using secondary data. There was need for developing a holistic framework that is grounded from empirical data (Korpela, 2013). Therefore this study was data driven aimed at developing a holistic framework for e-health implementation using Grounded Theory approach.

Theories of information systems such as Technology Organization Environment Model and Actor Network Theory are used to explain IS research in healthcare (Braa, 2007). However they possess certain limitations as they force a certain preconceptions unlike Grounded Theory (GT) approach that was adopted for this study. In contrast GT allows open exploration depicting development of concepts and showing their relationships thereby coming up with a substantive theory that may better elucidate the phenomenon (Charmaz 2014). GT is generally offered as an inductive approach. It allows the researcher to develop theories right from the raw data. The data collection and analysis is done logically to keep the data grounded without forcing it to fit with current theories (Glaser and Strauss, 1967; Fernández & Lehnmanm, 2005).

The healthcare sector in Kenya is transiting towards a new paradigm shift where services are now devolved to the counties. Thus this requires new ways of thinking and managing the sector to enhance service delivery. The health care sector in Kenya is documented as having trailed behind other industries, for example the financial sector, in the usage and

implementation of innovative information technologies (Juma et al., 2012). According to WHO (2013), the sector has several hurdles, amongst them the ever-increasing cost, an elderly population and demand for superiority healthcare services. This therefore requires the healthcare sector to urgently find and implement solutions to effectively improve healthcare delivery. This can be realized by putting in place strategies and incorporate ICT in delivery of healthcare service for improved results. E-Health is a worldwide ideal method in transforming the healthcare sector in regard to improved delivery of services and better outcomes for long term benefits and sustainability (Xiangzhu et al., 2013). Thus there was need for a strategic approach for e-health and its implementation in Kenya which was the primary motivation for this study.

1.1.1 Strategic Issues in E-health Implementation

Literature review on e-health implementation is quite immense but the most strategic concerns addressed in the articles are recognized as falling into five significant areas. Namely: e-Health standards; ICT and health policies; e-legislation; e-Health infrastructure; ICT competence (Xiangzhu et al., 2013; Mugo, 2014; Lazaro, 2013; Juma et al., 2012; Korpela, 2013; Murray, 2010; Mbarika, 2011; Oladosu, 2009b ; Braa, 2007; Jennet & Siedlecki, 2001).

The first concern that is dominant to e-health implementation is ICT and e-health policies. A policy is defined as “a set of statements, directives, regulations, laws and judicial interpretations that direct and manage the life cycle of e-health” (Murray, 2010, p.3). According to the WHO, (2011) policies in an organization help in developing a vision for the future. They act as reference for short, medium and long-term objectives. In addition they guide in setting out priorities, delegating roles and defining action to be taken in the

organisation. Policy and decision producers in the larger healthcare system should view e-health as a key player in provision of improved health service. In Kenya for example the government in corroboration with the private sector has made vital steps towards ways and techniques for the up take of e-health. For instance the Strategic Plan for Health Information Systems (HIS) (2009-2014) and the Kenya ICT policy (2006).

E-Legislation is a key concern for the attainment of e-health. The integration of ICT in healthcare service provision brings the difference between the traditional face-to-face healthcare delivery and the e-health. Many e-health articles have suggested the necessity to come up with policies on standards and security in delivery of healthcare but developing countries have given less attention to confidentiality, standards, and security (Mugo, 2014; Xiangzhu et al.,2013; Treurnicht, 2009). Insufficient electronic legislation for instance has adversely affected e-Health implementation in Kenya (Juma, 2012). The Kenya Communications (Amendment) Act, 2009 for instance does not address all facets of e-transactions, such as confidentiality of data and ethics in e-health.

Standard policies are crucial in achieving interoperability in order to share information. However, the e-health standard area is burdened with difficulties arising from the vast numbers of current standards, some of them contending and overlapping, while some even contradicting each other (Juma, 2012; Mbarika, 2011). Typically a standard is a set out guideline agreed upon and appropriate way of doing things. According to Braa, (2007) a standard could be formal, proprietary or open. Notwithstanding, satisfactory standards for medical imaging, interoperability, programming, communication framework design, therapeutic informatics, and bioinformatics are yet to be established in developing countries

(Juma et al., 2012; Braa, 2007). Indeed the ISO 27001 standard frequently referred to as Information Security Management System (ISMS) does not address the e-health privacy issues. On the other hand Kenya for example has made unlimited efforts towards developing e-health standards with the publication of the Standards and Guidelines for Electronic Medical Records (EMR) in Kenya (2010). However the standards do not address Medical record portability, privacy and ownership which are key concerns for e-health implementation (Juma et al., 2012).

By and large a country requires a firm ICT platform to support e-health implementation (Mbarika, 2004). As indicated by WHO (2013) an ICT platform is a physical arrangement of broadcast communications pathways and associations that transmit voice, video and information including a web of media communications, data and computing technology. Lazaro et al., (2013) refers to the internet as the interconnection of a number of networks utilizing a standard packet switching protocol for communications. The lack of telecommunication infrastructure in developing countries poses a big challenge in transfer of e-health. In many of the developing countries, implementing healthcare information technology based solutions becomes a challenge due to insufficient funding, inadequate resources and weak health care infrastructure platform (Qureshi et al., 2013; Jennett et al., 2001). In the last decade, Kenya has experienced significant growth in ICT infrastructure (National Broadband Strategy, 2013). Indeed since 2000, the sector has outpaced all others in the Kenyan economy, growing on average by approximately 20% annually (World Bank Economic Update, 2014).

Lack of computer training among healthcare workers is cited as an important determinant of e-health implementation (Mbarika, 2011). Mishra (2007) emphasizes that computer training are essential to sustain positive attitudes about electronic clinical data which translates to better reception and implementation of e-health. Kiura (2012) relates low usage of e-Health in many developing nations to absence of computer competence among the clinical workers. In nations that have upheld computer training for clinical workers, appreciation of e-Health and real utilization is generally high (Korpela, 2013; Mbarika, 2012). Training improves mindfulness and certainty level as users can overcome technophobia while relating usage to expected advantages (Kimaro, 2005). Additionally Lazaro et al. (2013) suggests that ideal utilization of IT towards the transformation of healthcare services requires IT know-how among the healthcare workers. The relationship between computer skills and usage of e-Health is likewise discussed by Juma et. al. (2012) who emphasizes that deficient IT competence in the healthcare sector in Kenya clarifies the little implementation of e-Health. In addition without reasonable IT competence, user participation in decision and advancement of the innovation ends up plainly troublesome which may prompt having e-Health advances that are not comprehensively acknowledged or utilized satisfactorily (Murray, 2010 and Kaye, 2010).

1.1.2 Healthcare Sector in Kenya

The healthcare sector encompasses the public healthcare system, with the main group being the Ministry of Health and government parastatal organizations. The private healthcare sector includes private for-profit, NGO, and faith based facilities. Generally the healthcare services are delivered through a network of over 4,700 health facilities countrywide, with the public health sector system accounting for about 51 percent of these facilities (Ministry of Health, 2013).

Currently the public healthcare sector is one of the devolved functions in the constitution. The sector comprises of the accompanying levels of health offices: national referral hospitals (level 6), county hospitals (level 5), sub-county hospitals (level 4), health centres (level 3), and dispensaries (level 2). National referral hospitals (level 6) are at the top of the health care system, giving those services that are not available in other levels due to lack of enough expertise. The two national referral hospitals are Kenyatta National Hospital in Nairobi and Moi Referral and Teaching Hospital in Eldoret (Ministry of Health, 2013).

County hospitals (level 5) act as referral hospitals at the county level while sub county hospitals (level 4) focus on the conveyance of healthcare services at sub county level. The network of health centres (level 3) provides many of the ambulatory health services. They generally offer preventive and curative services, generally tailored to meet the local needs of the people. Dispensaries (level 2) are intended to be the framework's first level of contact with patients, at the ward level. The government healthcare service is supplemented by private owned hospitals, private owned healthcare centres and religious based hospitals, which collectively give between 30 and 40 percent of the hospitals beds in Kenya (Ministry of Health, 2013).

The health care sector is facing numerous challenges, among them high disease burden of both communicable and non-communicable diseases, rising cost of healthcare, an elderly population and demand for excellent healthcare services (WHO, 2013). In addition there is a prolonged shortage of medical personnel. Like most countries in Africa, the scarcity of healthcare workers is a major problem in Kenya. WHO mentioned Kenya as a country with less healthcare workers as compared to the set minimum threshold of 23 doctors, nurses and midwives per population of 10,000 for quality and effective service delivery (WHO, 2013).

Kenya's most recent ratio stands at 1 per 26, 438 (Ministry of Health, 2013). This shortage is markedly worse in the rural areas where, as noted in a study by Transparency International (2012), under-staffing levels of between 50 and 80 percent were documented at county and rural health facilities. This therefore calls for an urgent need to work on strategies that will improve healthcare delivery. This can be achieved by harnessing ICT to close the healthcare service delivery.

Financial services are predominantly well represented with regards to computerisation of procedures using ICT. Kenya is said to have an upper hand in financial service delivery. A good example is the M-PESA mobile money transfer, which has successfully seen 20 million Kenyans benefit with the service via a mobile phone particularly to the unbanked. The IPPD system provides accurate and consistent personnel data in the Public Service while the IFMIS system enhances efficiency in planning, budgeting, procurement, expenditure management and reporting in the National and County Governments in Kenya (Mugo et al., 2014). By contrast, Kenya's healthcare players have not embraced technology to improve their service delivery. The Kenyan healthcare system has had challenges especially in handling the rising cost and the high demand for excellent health care services. This is in the midst of the shortage of skilled health care professional despite the fact that it was allocated KSh 60.3bn in 2016/17 to enhance access and quality of health services. Over the three years, government financing as a percentage of GDP has been consistent at slightly above four percent which is considered low according to the recommendation of African Union (National Treasury, 2016). In April 2001, the countries that are members of the African Union met and vowed to set a target of allocating at least 15% of their yearly budget

to enhance the healthcare sector. Years later, only one African country reached this target. Twenty-six countries had increased the percentage of government expenses allocated to health and 11 had reduced it. In the remaining nine countries Kenya included, there was no obvious trend up or down (WHO, 2013).

E-Health frameworks in Kenya are at their initial stages, though the prospective for its growth is enormous (Juma et al., 2012 and Mugo et al., 2014). Thus Oladosu et al (2009) and Mbarika et al. (2012) urge that attainable solutions need to be customized towards existing success stories and local setting where the e-health is being established and that systems such as e-health require contextual considerations in implementation and sustainability. In contrast, developed countries like Canada and the Netherlands amongst others have encompassed the utilization of information communications (ICT) applications within the hospitals and health clinics. In this regard some of the examples of the utilization of ICT applications in these health facilities include: automation of health records, electronic preparation for appointments, telemedicine, usage of the Internet for the purposes of communication and the use of magnetic cards (Eysenbach et al., 2007; Korpela, 2013).

This notwithstanding some electronic medical records systems have been moderately implemented in Kenya such as level- 4, level -5 hospitals and the District Health Information System (DHIS). DHIS is a health information system, whose primary purpose is to expedite health data collection and reporting. DHIS does not automate vital business processes at the health department administrative level, and work processes at health facilities. The system does not capture essential health encounter information. Service delivery and data collection are two separate activities. The DHIS does not handle all aspects of a healthcare information system which includes scheduling and inventory

management of doctors and equipment, billing, electronic medical records, disease tracking, reporting/auditing, regulatory compliance, and security access control (Ministry of health, 2013). Therefore there is need for a more comprehensive strategic level to e-health implementation approach for developing countries like Kenya.

1.2 Research Problem

In the healthcare sector, increasing costs and new sorts of medical issues bring about ever increasing weight on the healthcare frameworks, and kindle new ways for promoting access and decreasing healthcare expense (Bhatia, 2014). Basically e-health frameworks symbolize potential solutions for enhanced healthcare openness and quality, timely decision making, containing costs, and providing enhanced excellence care. The need for effective e-health implementation is inexorable and more so by the healthcare sector today especially in developing countries. Although the hurdles faced in the implementation of these systems are numerous, hospitals today are being forced into the implementation of information systems for their continued existence. The existing frameworks for implementation of e-health systems are vague, weak and fragmented. They neither address people centered nor holistically contextual issues affecting the systems (Korpela, 2013).

The healthcare sector in Kenya is acknowledged as having trailed behind other industries, for example the financial sector, in the usage and implementation of new information technologies. The sector is characterized by many and fragmented applications which lack data sharing mechanisms. Manual processes represent a substantial part of the processes. These systems suffer from lack of data ownership, poor data quality, poor data security and backup procedures and consequently rarely used for decision-making. Thus this poses challenges when reporting what is really happening in the health care to support disease

surveillance, planning, clinician and strategic decision making (Juma et al., 2012; Kiura, 2012; Mugo et al. 2014). Presently there is no e-health framework that has been developed using a theory building approach in Kenya. Hence there is need for a different approach towards exploring implementation of e-health technologies in the healthcare sector.

Generally only a limited number of empirical studies have concentrated on e-health outside developed countries. Various studies done on factors affecting implementation of e-health in developing countries found out that the most repulsive challenges were lack of ICT competence, e-health policies, e-infrastructure and resistance to change by healthcare workers (Mbarika et al., 2012, 2011). Further to this Lazaro (2013) identified inadequate infrastructure resources as a big barrier for e-health sustainability. Mugo et al. (2014) and Treurnicht (2009) examined the factors that affect Electronic Medical Records implementation. The study found that implementation of EMR is greatly influenced by attitudes of healthcare workers and ICT competence. Moreover Xiangzhu et al. (2013) had identified e-legislation as a big problem to EMR implementation. Juma et al. (2012) examined the current status of e-health in Kenya and he cited e-standards and e-infrastructure as the barriers to its success. These findings were in line with Braa's (2007) findings that e-standards are a prerequisite for implementation of e-health. Likewise Kaye, (2010) examined the barriers to e-health sustainability and the findings were cited as lack of ICT competence and cultural factors. Similarly Qureshi et al. (2013) sought to find out the e-health drivers and challenges. The findings were in agreement with other researchers as they included ICT competence and clinician resistance. Although Korpela (2013) suggested a holistic approach to information system implementation in healthcare in Finland that addresses the domains of both healthcare specialists and common citizens, it may not be applicable in a developing country context like Kenya that is faced with a myriad of challenges hence the need for a new framework.

These studies discussed above indicate that e-Health implementation in healthcare sector is a crucial issue yet to be appropriately addressed. Most of the studies (Mugo et al., 2014; Lazaro et al., 2013; Mbarika et al., 2012; Kaye, 2010; Kimaro, 2007) have focused on IT implementation in healthcare that supports operational level decision making where e-health is equated to information systems which support operational activities of the hospital. In this case it is seen as a support rather than a component of the strategy realization process which should constitute part of the national e-health strategy. The review indicates that most of the findings are addressed in discrete bits and pieces and there is no comprehensive approach that is suggested on how these factors relate to one another to form one comprehensive framework. The frameworks are not holistic and they just address few aspects of e-health implementation. Moreover they focus on implementation from a technological deterministic perspective while silent on other non- technological perspective (Braa, 2007, Xiangzhu et al., 2013; Fanta, 2015). In addition the frameworks have also been developed mainly using secondary data. Thus there was need for a primary data driven approach for an e-health implementation framework suited to Kenya's healthcare system that has been devolved in the new constitution dispensation. Furthermore, the existing frameworks have been developed based on positivist approach that forces certain preconceptions unlike grounded theory approach that allows for theory to emerge from data.

It is against this background that the researcher was motivated to come up with a comprehensive e-health framework that guides the process of its implementation in developing countries and Kenya in particular. Therefore, this study sought to answer the following research question. What are the factors that contribute to successful e-health implementation in Kenya's healthcare sector and how are they inter related?

1.3 Objective of the Study

To identify factors relevant to, and develop a model for e-health implementation framework for Kenya's healthcare sector.

1.4 Value of the Study

The study steps out of the traditional paradigms to Pragmatism. A framework was developed that is grounded from primary data explaining the factors that are necessary for the successful implementation of e-health systems in a developing country context. This can be used by future scholars as the baseline of future studies in this field of study. This has added into the work of Korpela (2013) and Braa (2007) frameworks on healthcare information systems.

The findings of the study will assist information system professionals and consultants improve on their professional practice especially in the area of healthcare research. These professionals can use the findings of the study to enhance their understanding of the healthcare sector.

The findings of the study will offer assistance to the Government of Kenya and developing countries in identifying gaps that need to be filled so that successful implementation of e-health systems in the country can be realised. This is supported by the fact that healthcare is one of the most fundamental needs in developing countries such as Kenya thus its successful implementation would go along way to benefit the citizens (Kiura, 2012).

The study will assist Ministry of Health and WHO in the effective e-Health policy implementation, monitoring and evaluation. Research indicates that medical mistakes are a substantial cause of mortality in developing countries. Generally such medical errors are not

due to incompetence of physician but rather the lack of infrastructure to support timely decision making in treatment of patients. Alternatively e-health is one of the methodologies that can be adopted to enhance the superiority of healthcare services (Anwar et al, 2012).

1.5 Thesis Outline

This thesis will have six chapters, with the following contents:

Chapter 1; Introduction: This chapter contains the introduction for the study and background information. An introductory literature review of the healthcare sector and e-health in particular is analysed. It is followed by the research problem, objectives and significance of the study.

Chapter 2; Literature Review: This chapter evaluates the literature on e-health and the issues that underlie its implementation performance in many parts of the world. Both theoretical and empirical literatures are reviewed. From the review the gaps are identified to inform a general model for the study.

Chapter 3; In this chapter the research philosophy, design, sampling procedure, target population are discussed. Data collection procedure and data analysis and methods undertaken to resolve the problem area are explained in detail.

Chapter 4; This chapter discusses data analysis, and interpretation. The review of the various thematic analysis and categories from each unit of analysis are described showing a brief overview of all categories in each unit of analysis. Each category is described with all its attributes showing how it emerged.

Chapter 5; This chapter offers discussions about the phenomenon being studied and the final framework that is grounded from data. The framework explains the issues that need to be addressed for successful implementation of e-health in the healthcare sector today.

Chapter 6; This chapter provides the summary, conclusion, recommendations, contributions and limitation of the study.

1.6 Chapter Summary

This chapter has dealt with the introduction of study. A brief introduction of the healthcare sector in Kenya was discussed. The strategic issues that emerge from literature review were discussed in brief. The research problem was discussed bringing out the conceptual, contextual, empirical and methodological gap. Finally, the research objective and significance of the study were explained. The analysis in this chapter shows that the healthcare sector in Kenya is facing challenges when it comes to implementation of technologies unlike other sectors like the financial sector. Thus it was justified to explore this field further to try and understand the underlying issues that affect the implementation of e-health systems and hence the motivation for this study. Grounded theory approach was used for the study. The final outcome of this methodology was to develop a substantive theory that was supported by empirical data that explains the issue of e-health implementation in Kenya in detail.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter evaluates the literature on e-health and the issues that underlie its implementation performance in several parts of the world. Both theoretical and empirical studies are reviewed. From the review the gaps were identified to inform a general model for the study. A conclusion on the review is drawn at end of chapter.

2.2 Definitions of e-health

Following the flare-up of the internet in the 1990s and the emergence of words such as e-Business, e-Solutions and e-Commerce, the term e-health was introduced to represent the promise of ICT to improve health care services (Eysenbach, 2001). Despite the lack of consensus on a clear definition of e-health, there is an implicit understanding of its meaning and the term is extensively used by industries, educational institutions, funding agencies, professional bodies and many individuals.

“E-health is an emerging arena at the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related tools to improve health care”
(Eysenbach, 2001, p.1).

An appropriate definition and the scope of e-Health may vary, but the most important aspect is the perceived benefit attached to advanced technology use to improve healthcare sector (Avgerou, 2008). The World Health Organization (WHO, 2012, p.6) defines e-Health “as the cost-effective and secure use of ICT in support of health and health-related fields, including health care services, health surveillance, health literature, and health education, knowledge and research”.

These technologies are applied in the healthcare field to enhance the access, productivity, efficacy and enhanced quality of patient care. In the support of this narration Alvarez (2003, P.3) equally defines e-Health “as a consumer-centered model of health care where stakeholders collaborate, utilizing ICTs, together with Internet technologies to manage health, arrange, deliver and account for care, and manage the health care system”.

Moreover Pagliari et al. (2005) refers to e-Health as the usage of emerging information and communications technology, especially the internet, to advance or enhance healthcare management. These technologies are meant to improve quality healthcare outcomes. Furthermore Ekeland et al (2010, p.2) adapts Elysenbach’s (2007) definition and describes e- Health

“as an evolving field of medical informatics, referring to the organization and delivery of health services and information using the Internet and related technologies. In a broader sense, the term symbolises not only a technical development, but also a new mode of working, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology”.

With regards to this study, e-Health is assumed as a wide variety of medical information and communication applications for enhanced healthcare service delivery, together with distribution of health related data. In addition they support clinical data storage and exchange of medical information, between interpersonal communication, computerized based support, patient-provider communication, education, health service, health community and telemedicine, amongst other functions (WHO, 2013).

As evident from various definitions and research perspective, the central goal of e-health is its contribution to quality healthcare and effective performance of the healthcare system. Furthermore Korpela (2013) notes that e-Health could give power to patients and help in exceeding information asymmetry between principle partners while guaranteeing that dependable and suitable clinical data is accessible for operational and key basic leadership. In addition e-Health frameworks together with organizational changes and improvement of new skills can turn as key empowering instruments to encouraging critical upgrade in access to quality of care, and additionally proficiency and efficiency of the health care systems framework. On the other hand the implementation of e-health systems may contribute to achievement of vision 2030 social pillar goal that is to ensure there is equitable and accessible healthcare to all citizens. As well as attaining the sustainable development goal number 3(SDG) on ensuring good health and well being for all citizens.

By and large Bhatia (2014) concludes that the utilization of ICTs in the healthcare sector tends to concentrate on three general classes: (i) enhancing the working of healthcare frameworks through enhancing data accessibility; (ii) enhancing the conveyance of health care services through better diagnosis and improved treatment; (iii) improving communication about general health, amongst healthcare workers and the general society. Moreover e-Health systems are seen as having the likelihood to improve efficiency, reduce administrative costs, expedite communication, and enhance patient care (Mishra, 2007; Avgerou, 2008).

2.2.1 Forms of e-health

E-Health comprises of various applications that underpin patient management and care. These applications include electronic Medical Records (EMRs), Telemedicine, Health Knowledge Management, Consumer Health Informatics (CHI), M-Health and Healthcare Information Systems (HIS). Telemedicine is the sharing of medical data between two groups situated at various geological locales by means of a media transmission link (WHO, 2012). Telemedicine includes video conferencing, where data exchange between health workers and patients is done via a video link (Berler, 2006). In the same context Bhatia, (2014) refers to telemedicine as the application of ICT innovations to triumph over barriers such as physical and time constraints in treatment of specific conditions.

Mbarika (2012) asserts that used astutely, telemedicine can be an economical method in competence building in the health care frameworks of several countries. Health Information systems also referred to as health management information systems (HMIS) on the other hand are systems used to gather, analyze, maintain, retrieve and evaluate health information (Alvarez, 2003). In addition WHO, (2011) notes that a health management information system integrates all data and makes it available for use to improve and protect population health. According to Lazaro, (2013) the objective of Health Management Information System is to consistently check on quality of service through comparing set standards and perception of service delivered. Avgerou, (2008) refers to Mobile health as the use of mobile communications in order to improve healthcare service delivery. Furthermore Mishra, (2007) suggests that the usage of the internet and mobile devices has created new possibilities for health promotion and management. Moreover these tools may be used to enhance access to various sources of knowledge for all parties including patients, health care providers, and the general population.

Electronic Medical Records (EMR) also commonly referred to as Electronic Health Records (EHR) are applications that are used to keep patient's clinical history and support medical activities by healthcare specialists. They include information such as laboratory results, treatment and general patient medical history. Thus electronic health records provide the storage, and facilitate communication of patient information among different healthcare specialists. Moreover the care givers can access the patient information electronically through use of certain authorization (Anwar, 2012).

Eysenbach, (2007,p.5) defines Consumer Health Informatics (CHI) “as a health informatics that analyzes customer’s needs for information, studies and implements approaches of making information accessible to consumers, models and integrates consumer’s preferences into medical information systems”. Consumer Health Informatics (CHI) provides information to the general public which ultimately promote self-care, informed decision making, peer information exchange and promotes healthy behaviours (Hedström, 2012). On the other hand Health Knowledge Management tools provide great support to exploit the huge health knowledge and information resources. In addition while assisting today’s healthcare organizations to strengthen healthcare service effectiveness. Similarly they provide an overview of up-to-date medical journals, finest practice guidelines or epidemiological tracking of trends and management of diseases. Some of these examples include physician resources such as Medscape and MDLine (Juma, 2012). In general all these applications are intended to improve the patient's diagnosis and treatment while increasing organizational productivity at minimal costs (Boonstra et al., 2014).

2.3 Issues in E-health Implementation

According to Gichioya (2005) obstacles to ICT implementation include inadequate infrastructure, scarce funding, weak data systems and incompatibility coupled with unskilled workforce. In addition leadership styles, negative organisational culture, and bureaucratic procedures are a major hindrance. In Kenya for instance these barriers among others include insufficient funding and poor leadership styles (Kukali, 2013). Literature review on e-health implementation is quite extensive but the most strategic issues addressed in the articles are acknowledged as falling into five significance areas. They include namely: e-Health standards; ICT and health policies; e-legislation; e-Health infrastructure; ICT competence (Xiangzhu et al., 2013; Mugo, 2014; Lazaro, 2013; Juma et al., 2012; Korpela, 2013; Murray, 2010; Mbarika, 2011; Braa, 2007; Oladosu, 2009b ; Jennet & Siedlecki, 2001).

2.3.1 ICT and Health Policies

The literature on e-health policy and strategies, in general, is fairly current, and scarce. The existing articles mainly focus on the need to address the e-health policy issue at both national and international levels. However, most governments in both developed and developing countries have made an initiative of establishing ICT policies for healthcare (WHO, 2011). Oladosu, 2009 & Mbarika, 2012 notes that the objectives and goals of the various institutions are rather similar. Nevertheless, the level of defining the policies and transforming them into projects and programs differs from country to country. Murray (2010, p.2) defined “e-health policy as a set of statements, directives, regulations, laws and judicial interpretations that direct and manage the life cycle of e-health”. According to the WHO, (2011) policies in an organization help in developing a vision for the future. Equally they act as reference for short, medium and long-term objectives. In addition they assist when setting out priorities, delegating roles and defining action to be taken in the

organisation. Moreover policy and decision producers in the larger health system must see e-health as a key player in provision of improved healthcare service. In that regard ITU (2015) encourages ministries of health to work together to develop an integrated e-health policy that is standardised across all countries.

In addition, Korpela (2012) recommends that e-health policy needs to be integrated into the existing healthcare system policy in a practicable manner. Basically, numerous e-health assignments in developing nations, especially in less developed nations, are executed and assessed as stand-alone (pilot) initiatives. Murray (2010) attests that a significant part of the supplication of e-health stays instinctive, and is based on fragmented rather than experimental research. A few papers talk about the real requirement for a policy in e-health (Lazaro, 2013; Oladosu, 2009 and Murray, 2010). Privacy and confidentiality have appeared as significant policy issues for e-health implementation. Nevertheless, policy development severely slows e-health enhancement. Thus Korpela (2013) stresses that setting up a policy or an approach in developing e-health projects is the answer to the realization. The WHO contends vivaciously for informatics rules that are, in a nationwide setting, carefully built in across all sectors, institutionalized, and thoughtful to local and regional interests (WHO, 2013).

In Kenya, for example the Government in affiliation with the private sector has made significant steps towards making approaches and techniques for the uptake of e-health. For instance, the Strategic Plan for Health Information Systems (HIS) (2009-2014) and the Kenya ICT policy (2006). Thus the Kenya Health Policy, (2012 – 2030) offers captions to guarantee impressive change health status in Kenya in accordance with the country long term development agenda, Vision 2030, the Constitution of Kenya. Moreover there is a

national e-Health play. This play shows a plan that the healthcare sector will use to achieve an effective and efficient healthcare system. One noteworthy challenge to the effective implementation of e-Health in Kenya is the lack of an e-Health Policy set up (Ministry of Health, 2013).

2.3.2 E-legislation

The utilization of ICT networks strategies is the major difference between e-health and the traditional face-to-face healthcare delivery. Consequently, privacy, confidentiality and security are significant issues related with e- health implementation. Furthermore the utilization of the internet for transmitting patient's data online is an issue of disquiet. Subsequently privacy, discretion and safety issues arise when patient care is passed over a distance or by means of a network (Mugo, 2014). In that regard the web is considered to likely assume a critical part in e-health administration. Thus Xiangzhu et al., (2013) highlights protection, security and confidentiality as key issues influencing the implementation of e-health in the sector.

Without a doubt many developing countries are inadequately prepared to keep up sufficient levels of patient's data protection. It is very much acknowledged that the act of e-health is to a great degree data sensitive. For most clinicians the necessity that patient related data ought to be kept private, is a center component of guaranteeing that the trust the patient places in the clinician by sharing personal data is not damaged (Mugo et al. 2014). Ideally clinical treatment, depend significantly on hearty, precise, proper, and opportune data and that the data is a fundamental segment of e-health frameworks. Some type of record keeping of experiences between the clinician and patient has been key to enhancement of patient care.

Therefore a fully incorporated, available, secure, and searchable electronic health information is both a vehicle for tremendously required change in healthcare sector. This additionally represents a noteworthy potential danger to security in e-healthcare systems, and accordingly it is critical to create moral and legal structures for the assurance of protection of patient's data particularly where care is being offered over a distance for instance through telemedicine (Lazaro, 2013; Mishra, 2007).

Typically issues of information framework security emerge as an issue of enthusiasm for the e-health administration. Information framework security is alluded to as the safeguarding of information frameworks against illegal access to, or adjustment of, data whether away, preparing or transit and against the renunciation of service to approved clients or allowing access of service to unapproved clients (Oladosu, 2009; Ronen et al., 2011). A few e-health periodicals tackle the need to create security and standard policies, however not very many articles address the issue of protection, privacy, standards, and security in developing countries. Security and confidentiality articles are relatively recent and moderately few in developing countries (Bossen, 2013). Without a doubt the larger part of the available articles has pinched from spotlights on the ICT administration in general, and the encounters of the developed nations (Bhatia, 2014).

The ITU and WHO have delivered some reviews that look at the impacts of security and confidentiality issues in developing nations (ITU, 2012). In developing nations, e-health innovations are associated with issues about protection, security, and discretion for an extended period, more than security issues in different segments (Murray, 2010 and Xiangzhu et al., 2013). Largely these issues require initiating a procedure to address risks particularly connected with their application to e-health frameworks. Subsequently, the key

issues of e-health security frameworks are identified with the safeguarding of discretion, reliability, accessibility, and liability of the frameworks. Typically security and secrecy of electronic health transactions over networks offers real concerns to all e-health suppliers, patients, and different partners (WHO, 2013).

Basically lack of electronic enactment for a case in point has undesirably influenced e-Health implementation in Kenya. The ICT regulatory sector in Kenya is represented by different legal instruments including the National ICT policy 2005, the Kenya Communications Act 1998; the Kenya Communications Regulations 2001 and Kenya Communications Amendment Act (KCAA, 2009). The Kenya Communications (Amendment) Act, 2009 in any case, does not address all parts of e-exchanges, e.g discretion of data and ethics. Generally users of e-health frameworks need to be assured about privacy of the patient's data online. Currently the Health bill 2015 is at present undergoing review. The bill is an ACT of Parliament to set up a combined healthcare framework, to synchronise the inter relationship between the national government and county government health frameworks. In addition provide regulation to healthcare management and healthcare workers, products and healthcare innovations for connected purposes (Health Bill, 2015).

2.3.3 E-Health Standards

One of the real impediments to e-health implementation is the incapability of health data frameworks (HISs) to interoperate with a specific end goal to share data. A standard is viewed as indispensable to attaining interoperability. Even so, the e-health Standards field is stacked with numerous difficulties, the key of which is the immense number of accessible standards, with a large portion of them contending and overlapping, while others

controverting each other (Braa, 2007 and Juma, 2012). A standard is a settled upon, repeatable method for accomplishing something. Fundamentally it is viewed as the key to accomplishing interoperability of e-health data frameworks. A standard could be formal, exclusive or open (Braa, 2007). Standards are amongst the most noteworthy issues for the effective advancement and success of e-health frameworks. This is on the grounds that a significant number of the standards are created autonomously of the organisation initially setting up the standard. In addition many issues concerning policy forming and basic leadership about the implementation of e-health frameworks are connected with the working of an open standardised setting (Fanta et al, 2015).

The capacity of standards in e-health need be found in the setting of healthcare institutions, the innovation drive, and the diverse interests of the distinctive performers. Any distinct association or venture required in e-health applications needs to settle on its own choices concerning official standards, real models, and proprietary solutions (Korpela, 2014 and Juma, 2012). For all e-health framework clients, the Open Systems Interconnection (OSI) principles address many functions, for example capacity, transmission rates, protocols, and security. Similarly e-health data frameworks security standards are basic for guaranteeing the privacy and reliability of patient data. Notwithstanding, e-health is not the same as different technologies regarding both stability and standards. Thus considering the extensive variety of innovations and applications utilized, standards should be produced for the management of e-health frameworks particularly (Braa, 2007 & Murray, 2010). Consequently continuity is required for the provision of a dependable, proficient, secure and superiority level of patient care. In addition a solid telecommunication lines and electrical power framework is necessary.

However, existing publications on embracing of e-health standards revealed that the moderate pace of the acceptance of standards both by developed and developing countries is as a result of a few elements. These categories incorporate the expansive number of standards that are being created by the different nations. Without a doubt this is aggravated by the way that e-health standards do not tackle one bound area of innovation (Korpela, 2013). Furthermore there is presence of contradictory and overlying guidelines. Additionally there is the problem of consolidating standards from various nations as well as the increased cost of changing over to new standard-based solutions (Braa, 2007). Moreover, adequate guidelines for diagnostic imaging, interoperability, programming, transmission, infrastructure, engineering, health informatics, and bioinformatics are yet to be defined in developing nations (Juma et al., 2012). Nevertheless, Kenya has made great strides towards developing e-health standards with the release of the Standards and Guidelines for Electronic Medical Records (EMR) in Kenya (2010). However the standards do not address Medical record portability, privacy and ownership which are major concerns for e-health implementation (Juma et al., 2012). Indeed the ISO27001 standard ISMS (Information Security Management System) does not address the e-health privacy related issues.

2.3.4 E-Health Infrastructure

Typically a country needs a solid ICT infrastructure to provide a platform for e-health systems (Mbarika, 2012, 2013). The ICT platform primarily includes phone lines, fiber trunks, submarine cables, T1, T3, OC-xx, ISDN (integrated services digital network), DSL (digital subscriber line), and other high-speed services used by businesses, as well as satellites, earth stations, and teleports. A well-defined infrastructure platform is an essential ingredient for any country to realize the success of e-health frameworks. Such platforms ought to likewise incorporate telecommunications, electricity, access to computers, Internet

hosts, ISPs (Internet service providers), and available bandwidth and broadband access (Qureshi et al., 2013). Generally organisations would need high bandwidth in order to provide high-quality multimedia content and thus provide a rich e-health experience. Subsequently ICT infrastructure is without a doubt a significant requirement in e-health implementation. Equally networks are now a significant element to enable healthcare institutions to share and exchange health information. Thus the internet is one of the useful and inexpensive ways when searching patient's information online by the healthcare professionals (Anwar, 2012).

Internet refers to the interconnection of computer networks using a standard packet switching protocol for communications (Korpela, 2013). Although the internet has significantly affected the processes of healthcare delivery, it is only one of the tools used in “digitizing” and enhancing the management of healthcare information. Generally a large amount of the research about e-health technologies has taken place in developed countries than developing countries. Furthermore these countries have a relatively appropriate infrastructure platform already in place, and extending and increasing the existing health and telecommunications infrastructure have facilitated rollout (Odedra et al., 1993 & Korpela et al., 2014). Hence for developing countries without a developed telecommunication infrastructure platform, the transfer of e-health presents precise problems. Moreover in many of these developing countries, implementers of healthcare applications based applications are faced with intricate hurdles such as insufficient funding, inadequate resources and fragile healthcare infrastructure. In addition, some countries may have just an elementary application level of healthcare technology (Boonstra et al., 2014).

One of the leading countries in launching a complete and robust e-health infrastructure is Singapore. By and large, Kenya has made extraordinary stride in the last decade. Basically it has experienced substantial improvement in ICT infrastructure (National Broadband Strategy, 2013). Since 2000, the division has outpaced all other in the Kenyan economy, developing largely by around 20% every year (World Bank Economic Update, 2014). This has been principally due to the major advancements in infrastructure, favourable government policy, as well as an active and innovative private sector. Significantly numerous Kenyans are presently interacting effectively with innovations as far as developing and advancing of technology is concerned. According to Kenya's communications regulator in their Quarterly Sector Statistics Report (June 2016-2017), Kenya has a mobile penetration of 86% (ITU, 2016). This figure is significantly higher than the African average of 80.8%. Noticeably Kenya has also increased its internet usage with 82 out of every 100 persons having access to the net (ITU, 2016). Currently several telecommunication companies are competing in laying out the fiber optic cable to interconnect all major towns in the country. Basically the government has played a major role in this improvement by lowering import taxes on ICT equipment and liberalizing the telecommunication sector.

Furthermore the Kenya Government Communication Act (1998) was a precursor for opening up competition in the ICT industry. Thus to ensure equity in access to broadband, the Kenya government has formulated a strategy to ensure that all Kenyans have access to broadband by year 2017 (The National Broadband strategy for Kenya, 2013). The main purpose of the National Broadband Strategy (2013) is to provide quality broadband services to all citizens. In regards to the benefits of broadband, the National Broadband Strategy cites e-health as one of the benefits of broadband. This kind of connectivity would create an enabling environment for the uptake of e-health.

2.3.5 ICT Competence

Training on use of technologies among healthcare workers is cited as a critical contributing factor to success of e-health implementation (Bossen, 2013). According to Mishra (2007) training staff on use of technologies is a necessity in fostering positive attitudes about electronic patient data management which in turn translates to greater acceptance and implementation of e-health. Kiura (2012) attributes low implementation of e-Health among developing countries to lack of IT know-how amongst the healthcare workers. Fundamentally countries that have espoused training on use of technologies for healthcare workers, acceptance of e-Health and utilization is relatively high (Korpela, 2012). This is because training increases understanding and raises confidence level as users are able to prevail over technophobia while relating utilization to expected benefits (Kimaro, 2005). Likewise Lazaro et al. (2013) add their voice by arguing that optimal utilization of IT towards the improvement of healthcare requires IT know-how across the healthcare field.

The association between training on technologies and implementation of e-Health is also discussed by Juma et al. (2012) who observes that insufficient computer skills in the health sector in Kenya elucidates the little implementation of e-Health. Qureshi et al. (2013) and Murray, (2010) are of the view that those healthcare professionals who lack the IT know how of processing the online health data end up spending too much time on the same. Furthermore without sufficient computer skills, user participation in selection and development of technologies becomes difficult which might lead to having e-Health technologies that are not extensively accepted or used adequately (Murray, 2010 & Kaye, 2010). Additionally there is a chronic scarcity of clinical personnel in developing countries.

Besides, Kenya is one of the countries identified by the WHO as having a “critical shortage” of healthcare workers. Undeniably Kenya’s healthcare infrastructure suffers from inadequate clinical personnel. Namely Doctors 1:26,438 Dentists 1:236,686 Pharmacists 1:141,343 Clinical Officers 1:19,011 Nurses 1:2,465 Other Health Personnel 1:4,115 Non Health Personnel 1:7,124 (Ministry of Health, 2013).

Moreover Kenya’s low physician density demands new solutions for improving doctor communication and maximizing available human resource capacity. Thus e-health would be the solution to this problem as many elements of medical practice can today be accomplished even when the patient and health care provider are geographically separated (Ministry of Health, 2013). In addition there is lack of computer training in health professionals curricula and e-health leadership. Ideally in today’s highly dynamic environments, organizational leaders need to rapidly adapt existing approaches to digital transformation. Furthermore, without a common mindset between information system and institution leaders, it is difficult to adopt new methodologies in reaction to changes in the competitive technology landscape. Moreover e-health leadership would give guidance in the design, selection, implementation and sustainability of e-health systems (Qureshi et al., 2013; Ronen et al., 2011 & Juma et al., 2012).

2.4 E-health Frameworks

A number of frameworks for evaluating the factors that affect e-health implementation have been proposed. Korpela (2013) used activity theory and secondary data to develop a framework that is holistic towards information systems development (ISD) approach. This all-encompassing methodology depends on combining hypothetical premise, for co-building clinical data frameworks, work and general data frameworks in health care services. The

approach plans to be concerted in nature that addresses the domains of both clinicians and normal individuals. While traversing the primary investigation and configuration undertakings of socio-specialized data frameworks development from necessities evaluation through needs setting to practical architectural solutions. However this framework does not address contextual issues that are necessary for e-health implementation success.

Based on DeLone and McLean model on IS success, Bossen (2013) developed a framework that integrated organizational, contextual and social factors as issues that affect electronic medical records implementation. However the model only focuses on electronic medical records application leaving out other e-health applications. Largely the framework is critiqued of having left out technology as an aspect that influences implementation. Sobowale et al.,(2011) developed a model for Computerized Health Management Information Systems in Nigeria. The framework came up with three issues mainly financial, political and cultural. Nevertheless it is critiqued for only focusing on electronic medical records and leaving out other applications of e-health such as telemedicine and m-health. Furthermore it does not address all factors that may affect electronic medical records implementation such as technological and organizational as suggested by Qureshi (2013).

Later Blavin et al., (2013) modified and refined an existing conceptual model to guide the review of selected published and gray literatures about the implementation and optimization of e-health. This element of the framework is borrowed from the multiple perspectives model as adopted by Ash et al. (2012). Specifically, they joined the multiple perspectives of a systems-based theoretical model for understanding complex organizational systems, with a hospital-focused framework on the stages associated with electronic medical records

implementation and use. This framework incorporated organizational, specialized groups, and technological perspectives issues that must be considered at each successive phase of implementation. In essence this model essentially looked at e-health from electronic medical records point of view while neglecting other forms of e-health.

Similarly Mugo (2014); Mbarika (2012); Akanbi (2011) focused mainly on electronic records implementation while leaving out other forms of e-health applications. Braa (2007) used complexity science theory and came up with a framework for standards for e-health implementation that can adapt to a changing healthcare setting. This model neglected other key issues that are significant to e-health implementation and only focuses on standards alone. Connor et al., (2015) developed a framework that has three factors financial, technical and human as issues affecting healthcare. This model only focused on one application of e-health that is m-health while silent on other applications. Ouma's (2008) case study examined the factors affecting e-health in rural areas. They developed a framework that included infrastructure, expertise and government policies. However this model is critiqued of having left other significant issues such organizational factors as suggested by Alvarez (2003) on the importance of having an integrated framework that is explicit and links the implementation process with the wider organization context. This framework is applied to a substantive case to integrate relevant organizational levels and distinct activity domains.

Lazaro (2013) investigated the challenges facing the implementation of e-health. The framework included low ICT budgets, poor infrastructure, and unreliable electricity supply. This model generally looks at e-health from an operation point of view and not a strategic perspective. Moreover the model tends to ignore the institutional factors within which e-

health innovations are developed and implemented. All these frameworks tend to look at e-health systems in terms of technological perspective and fail to capture the non-technological perspective including critical interactions of significant stakeholders such as providers and patients.

2.5 Theories of E-Health Implementation

In order to ground further understanding of e-health implementation in a developing country context, three information system theories: Technology Organization Environment Model (TOE) and Actor network theory (ANT) are evaluated in addition Grounded Theory (GT) approach was reviewed as alternative to traditional IS theories.

2.5.1 Technology Organization Environment Model (TOE)

The Technology Organization and Environment (TOE) model was produced by Tornatzky and Fleischer (1990). The structure recognizes three perspectives that impact the procedure of institutions implementation of innovations: technological setting, organizational setting, and environmental context. Technological setting looks at both the interior and exterior innovations applicable to the institution. These incorporate existing innovations and practices inside the institution, and in addition the pool of accessible advances in the market. Organizational setting alludes to distinct measures about the institution, for example, degree, estimate, and administrative structure and interior assets, accessibility of slack assets. Environmental setting is the field in which a firm directs its business, its industry, competition, and dealings with the government (Tornatzky and Fleischer, 1990).

TOE model is predictable with the DOI model, in which Rogers (1995) underscored singular qualities, and both the interior and outside elements of the institution, as affecting hierarchical imaginativeness. These are similar to the technology and organization setting of the TOE system, yet the TOE structure additionally incorporates another vital segment, environment setting. As indicated by Tornatsky and Fleischer (1990), TOE settings of a firm can impact the implementation process. Subsequently, Rogers' model of DOI jointly with TOE structure would give a helpful hypothetical model to clarify the institution implementation of IS.

The technological setting of an institution is critical in modelling the implementation of e-health (Chau, 2001). Information on the utilization of existing technologies can be utilized to boost the presentation of innovations and learning of new innovation can highlight the openings accessible for the institutions to be creative. Additionally, researchers have joined parts of DOI with TOE to build comprehension of organizational IT implementation (Iacovou et al., 1995). Particularly they proposed that the technological setting in TOE incorporates the information of development components from DOI. Factors such as technology preparedness are connected with the implementation choice of e-health. Generally when institutions have some basic knowledge on starting and implementation of e-health systems, can draw on their experience on technological preparedness to booster the implementation of new innovation. For instance, Lu, (2005) found that health institutions with lower technological preparedness had poorer chances of e-health systems implementation. Similarly technology preparedness is observed to be identified with enthusiasm of the management to novel innovation. For instance, Lluch (2011) noticed that the senior management's preparedness to change influenced their eagerness to implement e-health frameworks.

Organizational factors in healthcare sector stresses the function resources and capabilities play in affecting e-health implementation decisions. For instance, Chau, (2001) noticed that having sufficient resources is a significant determinant for implementation of electronic medical records systems. This likewise incorporates having adequate technological awareness. Other than having adequate resources, organizational capabilities such as information processing ability and project team ability may be significant in the implementation decision of e-health. Environmental elements particularly recognizable for the hospitals are government contribution through policies. This can impact the choice to execute new frameworks. Indeed external vendor affiliation is also critical for implementation of healthcare IT innovations, especially when the organization is unfamiliar with the technology (Iacovou et al., 1995; Chau, 2001). Moreover, business rivalry is found to rekindle IT development implementation as health sector attempts to recruit more customers to increase revenue by reducing inefficiency. TOE has been criticized as being too general and not a good model of explaining complex issues such as e-health implementation.

2.5.2 Actor Network Theory (ANT)

ANT is a model for examining how technical artefacts come into being. It generally evaluates the function of technology in social situations and the processes by which it affects or is affected by social elements in a setting over time. Mainly it concentrates on actors and their endeavors to secure their interests by forming and reinforcing alliances in actor networks which, in turn, generate technical artifacts for instance universal e-health application. As the actor networks that generate these artifacts become stabilized, the technical artifacts are said to be taken for granted or ‘irreversible’. Actors can be either

human or non-human entities that can make their presence independently felt by other actors. ANT offers a balanced treatment between the technical and the social aspects of technology, in that both human and non-human actors are treated similar. Fundamentally technical artifacts are dealt with as good actors. Whereas they might be quite recently only physical, specialized ancient rarities constitute a dynamic epitome of actor's subjectivities, together with their thought processes, expectations, interests and partialities (Cresswell et al., 2010).

Essentially utilizing ANT can be beneficial mostly to investigate the improvement of intricate technology such as e-health. Subterranean ANT permits examination to be centered on an actor networks as a portrayal of multifaceted social connections comprising of entrepreneurial political actions and transactions that happen keeping with the end goal of selecting supporting actors or partners. Effective enrolment in a system shows the arrangement of the generally various interests of its actors. In this manner there are two vital ideas supporting ANT, inscription and translation. Inscription means that actors that come up with an artifact try to engrave their interests into it. When these interests are engraved they may be demonstrated as precise anticipations and limitations regarding future utilization trends of the artifact. The artifact, thus, becomes a real actor that has the capability to enforce the engraved interest onto other actors, i.e. the users of the artefact (Latour, 2005).

By and large ANT gives a valuable medium to apprehend actors connection in the improvement of pervasive e-health applications for some reasons. To begin with, by concentrating on actor networks as the major building block for creating omnipresent e-health arrangements, ANT looks at the relationships between actors as obscure social

interactions comprising entrepreneurial and political activities and negotiations. That is it inspects the way in which actors shape, fortify, and keep up systems of actors collusions in connection to universal e-health arrangements, and how their goals are locked into patterns of connections and in processes of on-going arrangement of different benefits. By focusing on the developing procedure of their building, as opposed to concentrating on pre-defined or fixed elements, insight can be produced regarding the usefulness of the functions of e-health applications and the form that they will (or will not) take in addition to drawing concerns to both anticipated and unanticipated outcome of their usage in health care situations (Wickramasinghe and Schaffer, 2005).

Consequently ANT permits looking at such inquiries as how and why omnipresent e-health arrangements “come into being and how users and other actors conform, ignore, modify, or usurp the original designers’ interests” (Cresswell, 2010, pp. 4-5). In doing as such, ANT can assist examine the variability of the healthcare reality and the primary obscure actor exchanges as they unfold. Various reviews have been found where ANT has been viably used to explore various issues in health sector segment. For instance, ANT has been utilized to analyze the implementation of electronic patient data, the improvement of indoor smoke-free rules in relation to tobacco utilization policy, advancement of quality mental health care management, development of information frameworks in psychiatry treatment, and the improvement of diagnostic testing innovations. However ANT is critiqued for its intrinsic limitations in providing empirically provable evidence by presenting a rich terminology. Similarly the model is too descriptive and fails to provide comprehensive suggestions of how actors ought be seen, and their actions investigated and translated especially in healthcare sector (Cresswell *et al.*, 2010).

2.5.3 Grounded Theory (GT)

Given the intricacy and the fast-moving ever-changing field of the healthcare field and its distinctive occupational dynamics, a single theory in itself, may not be an appropriate methodology for explaining e-health implementation, hence it was useful to adopt a theory building approach in order to explore this phenomenon in detail. This gave the researcher a lucid and more precise picture into the key area of healthcare operations. Fernández and Lehnmanm (2005, p.2) maintained that for research to remain significance in the evolving fields such as healthcare, researchers needs to come up with new methodological alternatives “a new methodological alternative: grounded theory building research, where the emerging theory helps explain, in conceptual terms, what is going on in the substantive field of research”.

Several other approaches may have the effect to force preconception through the transfer of erroneous theoretical suppositions on the area of study. The Grounded Theory approach overcame these problems by providing a window that does not bias surface with a priori suppositions and does not push towards a choice of predetermined theories from which the researcher must elucidate the socio technical phenomena (Walsham, 2006). GT concept is offered as an inductive approach, whose focus is to come up with theories of an intricate nature based on observed evidence. Grounded theory was presented by two American sociologists, known as Barney Glaser and Anselm Strauss in their book the Discovery of Grounded Theory in 1967. It was dependent on both nursing and sociology disciplines. Glaser’s definition of grounded theory is “a general methodology of analysis linked with data collection that uses a systematically applied set of methods to generate an inductive theory about a substantive area” (Glaser, 1992, p. 16). Besides Grounded theory has proven

to be a more preferred qualitative approach for several researchers in many fields of study. In the recent past decade, the utilization of GT approach has seen a rising interest among IS researchers (Orlikowski, 1993; Bryant, 2000; Lehmann, 2010). For instance, Orlikowski (1993), who got MIS quarterly's top paper award for 1993. The researcher utilized GT to come up with a model for implementation and utilization of computer-aided software engineering (CASE) tools in distinctive institutions. The notification for the significance of the approach is that it permits looking at the contextual and well-organized pieces on the one hand. In addition it permits concentrating on the activity of primary actors related with the components of organizational change that are frequently not addressed to in IS research.

Ideally GT varies from various other qualitative approaches, as it permits the development of theories straight from the unprocessed data. Typically in this method data gathering and analysis is done in a consistent way, and keeps the data to be original, instead of compelling data to fit with existing theories. Besides, the theory does not look out to devise and test hypothesis based on earlier exploration, but ideally seeks to make the research questions general, open and flexible. In addendum GT approach, and through what is recognized as theory sensitivity, gives the researcher a chance to conduct a cross examination of empirical data gathered with the objective of finding resemblance and divergence between the categories and its properties in an endeavour to look for universal trends in the data. This is known as theoretical fundamentals of a theory (Corbin & Strauss, 2015).

However, similar analysis of the data that is gathered will proceed with until disclosure of all potential categories, those inconceivability for discovering new subjects in the data, furthermore a large portion importantly, validation of the theory. This is known as theoretical saturation, whereas the process by which the data gathering and sampling is done is called theoretical sampling (Kearney, 2007). As stated by Bryant, (2009) there may be an

acceptable contrast between the vocabulary of statistical or random sampling and theoretical sampling. This contrast might have been additionally affirmed by (Strauss, 1967, p. 24) who suggested that “the purpose of theoretical sampling is not to get a random sample or a representative of the population, but to identify groups of people that have certain characteristics or conditions such as those that surround the social phenomenon to be studied”.

Generally the principle about grounded theory procedure concentrates on coding and categorisation, the place the researcher will be skilled about seeing that gradual improvement of the theory. In other words, the theory is steadily evolving from empirical data through the continuous comparison method to analyse the data. Glaser and Strauss (1967) in their study states that those stages of the steady analysis stages take

“first by comparing incidents applicable to each category, second, integrating categories and their properties as the coding continues, the constant comparative units change from comparison of incident with incident to comparison of incident with properties of the category that resulted from initial comparisons of incidents, third, delimiting the theory, and finally writing theory” (1967: p. 105).

Equally Glaser and Strauss (1967) stressed the importance of gathering memos for every one possible categories, as it gives a reference point by examining issues identified with the developing theory, “the researcher can formulate hypotheses about relations between categories and their properties through collecting memos”(p.92). Virtually, this will assist the researcher to distinguish that data behind the hypothesis, while filling the gap that exist in the evolving theory, alternately with data gathering, give descriptions around those concerning the developing theory. Over time GT methodology developed prompting a division between Glaser and Strauss on the type of each style and how best it is applied.

Charmaz (2014) highlights the differences between the two styles. Glaserian style emphasizes the benefit for control to preserve restraint, reliability and independence of the approach, which permits for the problem being researched to produce the theory. On the other hand the Straussian style emphasizes on the vigorous involvement of the researcher in the problem being studied, as well as the investigation and utilization of all probabilities in the data gathered. Nonetheless in spite of the contrasts between the two styles, there are similar issues. The similarity is seen in wording and the method used between the two styles, namely; the theoretical sampling, continuous comparative analysis, theoretical sensitivity, memo writing, recognition of a core category, and theoretical saturation. Bryant, (2009) emphasises that coding is of great importance in the appearance of theories. There are various types of coding, namely the open, axial and selective. Open coding intends to scrutinize the information gathered line by line or word by word, and in this way investigate as many classifications or categories as could be expected under the circumstances. Axial coding is intended to define the core category, which represents most of the variation in a pattern of behaviour (Wolfswinkel et. al, 2011), or other categories and properties that directly relate to the core category. However, the core category can lead the researcher to gather more data. Axial coding was presented by Strauss, 1987 (p.79), “axial coding refers to the process of re-organising the data broken in new ways by building links between the categories and subcategories to them”.

Furthermore Strauss and Corbin (1990) add that the selective coding should be focused on the use of coding paradigm, containing the setting, environment, and work/interactive strategies and consequences. Selective coding focuses on finding the link between codes or categories and their related properties, which are generally created from the axial coding. These associations lead to the building of hypothesis, which are later integrated into the

theory. Moreover lack of utilizing the coding paradigm may weaken the up coming theory. In contrast, Glaser (1992) argues that probing more of preconceived facts and considerable issues during the analysis of the data frequently end up forcing rather than freely letting the development of the theory. Additionally he notes that Strauss and Corbin are no longer using grounded theory, but rather a new approach. Furthermore this is seen as an endeavour to present a realistic directive to experienced researchers, not only on the foundation of the grounded theory approach but also on other qualitative research approaches.

2.5.3.1 Differences between Glaserian Version and Straussian Version

The following table 2.1 shows the differences between the two approaches (Goulding, 2009).

Table 2.1 Differences between Glaserian and Straussian versions

Dimension	Glaserian version	Straussian version
Development and researcher distance	Everything arises in a grounded theory – nothing is forced or predetermined. Researchers are aloof and unknowing as they approach the data, with only the world under study shaping the theorizing.	The investigator adopts a more active and stimulating influence over the data, using amassed knowledge and experience to enhance sensitivity. Logical elaboration, and defined tools and techniques can be employed to shape the theorizing.
Development of model	The goal is to generate a conceptual model that accounts for a pattern of conduct which is pertinent and problematic for those involved.	Conceptually solid, integrated theory development is the only legitimate product. Grounded theory can also be used for evolving non-theory (conceptual ordering or elaborate description).
Specific, non-optional procedures	The technique includes clear, expansive, thorough methods and a set of crucial procedures that must be taken into account.	GT incorporates various discrete strategies that must be done. Researchers can browse from a variety table, from which they can pick, dismiss, or disregard.
Core grouping	The hypothetical definition that focuses the steady settling of the fundamental concerns of the contributors.	The fundamental subject of a prearranged phenomenon which joins the various categories and clarifies the different actions and connections that are meant for dealing with the important incidents or happening
Coding	Open, selective and theoretical	Open, axial and selective,

Nevertheless Fernández, (2005) observes that the choice of the suitable style of grounded theory is based on the following points: 1) philosophical perspectives, paradigm of inquiry and methodological positions, 2) intended outcomes, 3) theoretical and methodological underpinnings, and 4) dual crises of representation (write-up of the theory) and legitimation (rigour of the study). However Bryant and Charmaz, (2006) concludes that as such there is no ideal approach to attempt grounded theory study, as it has no standardized and plainly obvious clarification. Additionally Charmaz, (2011) highlights the advantages presented by GT methodology for IS research are the technique's ability to translate perplexing phenomenon, its accommodation of societal issues (Glaser and Strauss, 1967), its suitability for socially constructed capabilities (Charmaz, 2003; Goulding, 1998), its imperative for appearance (Goulding, 1999), its absence from the constraints of a priori knowledge (Bryant, 2007), and the approach's ability to work with diverse types of researchers.

The method utilized by grounded philosophers to gather exhaustive data is an additional benefit that is significant (Charmaz, 2006). Exhaustive data will make the “world appear anew” (Charmaz, 2006, p. 14) “because the richness of the data will provide the researcher with concrete and dense fabric to construct a thorough analysis of the data in addition to aiding the researcher to go beneath the surface of the participants social and subjective life” (Charmaz, 2006, p.14). Indeed Charmaz (2006) contended that the research exploration begins with “finding data” (p. 14). As such data will expose the setting and structure of the respondent's lives in addition to “divulging their feelings, views, intentions and actions” (Charmaz, 2006, p.14). Thus in order to gather extensive data, researchers are required to search through thick descriptions through writing “extensive field notes of observation” (Charmaz, 2006, p. 15). GT method provides the necessary apparatus for “making sense of the data” (p. 15) and “refining it to generate insight into the phenomenon under study” (p.16).

2.5.3.2 Criteria for Evaluating Quality of GT Research Process

In spite of the way that grounded theory approach, has been displayed as a substantial and significant technique to IS research, it is generally unusual for discoveries from any subjective study to be judged for neglecting to attain certain benchmarks of legitimacy, reliability and quality. Bryant and Charmaz, (2006) raise their concerns that frequently researchers misconstrue grounded theory approach, not considering the thorough procedure included. In essence Klein and Myers (1999) gave a system for assessment of qualitative studies in IS. The purpose of the framework is to evaluate the meticulousness of the GT research inquiry. They espoused a number of seven associated ideologies for the “conduct and evaluation of the studies” (Klein and Myers, 1999: p. 70) that can be utilized for post hoc assessments, ideally as it applied particularly for this study.

The researcher assessed the GT research inquiry by utilizing each of the ideologies, and found that generally, the conduct of the study was sound. Moreover it is significant to note that the gathered data was diverse and rich and may at present be liable to various elucidations. According to Fernandez (2005: p.9) “what we have to do is recognise what it is we who create and suggest that others test our generalisations and our conclusions based on their own sense of meaning”.

Table 2.2 Criteria for Evaluating Quality of Grounded Theory Research Process

Principal	Evaluation in this study
1.The hermeneutic circle	Data interpretations were routinely scanned for themes clarifying factors of e-health implementation from various angles. Interviewees were contacted to clarify encounters as narrated during the sessions. The research kept on going over between the interview sessions and the actual day to day experiences to establish the complete picture of e-health implementation in Kenya. Extensive literature review was done concurrently with data gathering to explicate the observed issues on e-health implementation
2.Contextualisation	The data was gathered in natural environment where users had right to use their records and tools utilised in e-health implementation. personal encounters had a strong case on the direction to which activities were portrayed and the essential factors were highlighted
3.Interaction between the researcher and the respondents	Respondents were encouraged to air their views with no limitations on the issues they felt were most significant. The researcher focused understanding specifically the issues that affect e-health implementation in Kenya, while politely requesting for additional substantiation where need be. The researcher as well enticed the interviewee's to share views unreservedly on what they thought were the barriers to e-health success or failure in the real life situation.
4.Abstraction and generalisation	The data gathered was coded and examined for likeness and resemblance which was essential in having a picture on the general elements for e-health implementation in less empowered countries in general and Kenya in specific. The process of coding assisted in the analysis of the problem under study and provided a theoretical framework of e-health implementation, and other issues around resolving the implementation issues.
5.Dialogical reasoning	The preliminary comprehension of e-health implementation factors was founded on the general IS implementation frameworks explained in the IS literature. However, the researcher found divergences of common methodological approaches from practice. The researcher thus resorted to use a data driven model as opposed to adopt the constructs used in IS literature. The collected data showed that stakeholders are not merely apprehensive with the technical factors of implementation, but other parts related to the settings of the implementation.
6.Multiple interpretations	Stakeholders from various backgrounds revealed common problems influencing e-health implementation in Kenya. However, e-health stakeholders gave their contributions on how to handle every single problem. By utilizing code generalisation, the researcher combined the explanations and findings of the problem under study into a framework for comprehending the elements that influence the successful e-health implementation in Kenya.
7. Suspicion	The researcher comprehends that data gathered may have had certain level of bias. Thus this was solved by triangulating interviews where a number of people were interviewed about the same issue. To avoid bias during coding and interpretations Iterative data gathering and examination was consequently useful to permit any such miscomprehension to be recognized and then greatly reduced in the process.

GTM was criticized as being very intricate and laborious methodology owing to the tiresome coding process and memo writing as part of the analysis (Charmaz, 2006; Fernández, 2005). This was made easier by use of specialized software like NVivo to help speed up coding and analysis of data.

2.6 Empirical Studies on Strategic E-Health Issues

By and large studies on E-health are numerous and diverse as described below. Mbarika et al. (2012, 2011) study on factors affecting implementation of e-health in developing countries found out that the most gruesome challenges for e-health implementation and sustainability were lack ICT competence, e-health policy, e- infrastructure and resistance by clinicians. All these responses are inline with works by, Kaye (2010) who decried lack of ICT competence, e- infrastructure and management support for implementing e-health. They identified e-health policy as a significant factor for sustainable e-health systems. Further to this Lazaro (2013) had recognized inadequate resources as a big problem for e-health sustainability. The researcher proposed a further study be carried out to develop a framework for e-health implementation in developing countries context.

Correspondingly Fanta et al. (2015) evaluated e-health implementation frameworks in South Africa. They came up with a framework that integrates environmental, social and economic factors. Equally, Kimaro and Nhampossa, et al. (2007) qualitative study examined barriers to e-health implementation and sustainability. The findings were lack of ICT competence, e-legislation coupled with unfriendly interfaces. The researcher recommended that a further research is done to find out the most significant factors that affect implementation of e-health. Mugo et al. (2014) used secondary data in order to examine the determinants' of EMR implementation: The findings were that there was user resistance and

unpreparedness coupled with lack of ICT competence and e-legislation. Moreover the EMR was not compatible with the way the family practitioners liked to practice as was oftentimes seen as an intrusion in the examining room, in the patient-physician interaction. In addition Xiangzhu et al. (2013) & Treurnicht (2009) had identified privacy concerns as a big problem to EMR implementation. The researcher recommended that further research to be carried on other forms of e-health applications in hospitals and find out if there is a correlation of factors found in the above study.

Qureshi et al. (2013) cross sectional survey sought to find out the key factors that affect the success of e-health implementation in developing countries. The findings were lack of ICT competence, clinician resistance, lack of e-health policy and e- infrastructure. The researcher proposes a further study to be carried in other settings to find out the correlation of these factors. Indeed all these responses are inline with the five strategic issues discussed earlier that affect successful e-health implementation by (Korpela, 2012; Mbarika, 2011). On the other hand Braa (2007) came up with an approach that standardizes e-health implementation however this approach left out other factors that are equally significant to its success. Although Korpela, (2013) suggested a holistic approach to information system implementation in healthcare it may contextually not be appropriate for developing countries considering the underlying challenges. Juma et al. (2012) examined the current status of e-health in Kenya. He used secondary data sources to review the study. The findings were that there was lack proper e- infrastructure and e-standards in place to support e-health. He recommended a further study to be done to determine the most significant factors necessary for successful implementation of e-health in hospitals in Kenya.

2.6.1 Summary of Literature Review and Research Gaps

The empirical review above has highlighted certain areas that need attention. However these issues are addressed from an operational point of view, whereby information systems are perceived to be useful at operational level management. In this case e-health is equated to information systems which support operational activities of healthcare. The review indicates that most of the findings are addressed in discrete bits and pieces and there is no comprehensive approach that is suggested on how these factors relate to one another to form one comprehensive framework. The existing frameworks are not holistic as they only address few aspects of e-health implementation. The frameworks have also been developed mainly using secondary data. In addition the existing frameworks has been developed based on positivist approach that forces certain prejudices unlike GT approach that allows for theory to develop from data. Thus there is a need to come up with a comprehensive e-health strategy implementation framework that would explain the phenomena. The table below shows a list of gaps identified and it is suggested that these are the things that need to be addressed to increase strategic understanding of e-health. The following is a summary of research gaps that this paper has identified

Table 2.3: Summary of Research Gaps

Author	Subject	Methodology and Theory	Findings	Gap	How it will be addressed
Mugo et al (2014)	EMR implementation in Kenya	Secondary data	User resistance ICT competence e-legislation ICT unpreparedness	Domain knowledge: focus is on Electronic Medical Records leaving other forms of e-Health applications	Focus on other forms of e-health
Lazaro et al (2013)	Underlying Challenges of E-Health Adoption in Tanzania	Secondary data	User resistance ICT competence e- infrastructure inadequate resources	Methodology: secondary sources may be limited in unearthing the problem as the focus may not reflect the real situation on the ground	Use Grounded Theory methodology to explore primary data sources
Kimaro (2007)	Implementation of e-health in Mozambique	Qualitative Case study Interpretive Technology Acceptance Model	ICT competence Non user friendly systems Clinician resistance e-legislation	Methodology: currently looks at e-Health from adoption from operational point of view and not strategic	Use grounded methodology to explore into the factors that are relevant to the successful implementation of e-health
Mbarika et al (2012, 2011)	Implementation and sustainability of e-health in Uganda and Ethiopia	Case study, quantitative qualitative UTAUT and Theory of Reasoned Action	ICT competence Lack of e-health policy Resistance by clinicians e- infrastructure	Methodology and knowledge: currently looks at e-Health from adoption from operational point of view and not strategic	Come up with a e-health implementation framework from a strategic perspective with Grounded Theory methodology
Xiangzhu et al (2013).	EMR implementation in Australia	Secondary data	Framework for EMR implementation that integrates e-legislation ICT competence	Domain knowledge: focus is on Electronic Medical Records leaving other forms of e-Health applications	Focus on other forms of e-health
Bossen et al.(2013)	Evaluation of a comprehensive EMR based on the Delone and Mclean model for IS success in Denmark	Case study DeLone and McLean model	DeLone and McLean model that integrates organizational, contextual and social factors	Domain knowledge and context; main focus is on EMR leaving out other forms of e-health	Use grounded methodology to explore other forms of e-health
Braa (2007)	Developing health information systems in developing countries: the flexible standards strategy in South Africa	Complexity Science theory Secondary data	A framework for standards that can adapt to a changing health care environment, and that are sensitive to local context	Context and methodology; This framework may not be contextually appropriate locally. The framework does not incorporate other issues that are significant to e-health implementation	Use Grounded Theory methodology to explore various factors that are key to the implementation of the systems in Kenya

Author	Subject	Methodology and Theory	Findings	Gap	How it will be addressed
Kaye (2010)	Barriers and success factors in health information technology in Israel	Secondary data	Structural factors e- infrastructure Cultural factors ICT competence	Context and methodology: study uses secondary data	Use Grounded Theory methodology. Israel is way advanced in healthcare as compared to Kenya
Fanta 2015	An evaluation of e-health systems implementation frameworks for Sustainability in South Africa	Secondary data	Framework that integrates environmental, social and economic factors	Context: the framework has left out a key technology issues. The factors are not integrated to show any relationship This framework may not contextually apply in Kenya	There is need to use grounded theory to come up with framework from data, including technology & other factors that may arise
Qureshi et al (2013)	e-health barriers in Pakistan	Cross sectional survey Actor Network theory	ICT competence Clinician resistance Lack of e-health policy e- infrastructure	Context: the factors may not be same as what is happening locally. These factors are not integrated to form a comprehensive framework	Use Grounded Theory methodology to focus on what is happening in Kenya and come up with a comprehensive framework
Ronen R et al (2011).	Implementation of information technology in healthcare in Canada	Qualitative Case study	Framework that integrates technological, ethical and economic factors	Context: the framework may not be applicable locally because of contextual issues	Use Grounded Theory methodology to come up with theory from data that will build a framework that suits the local situation
Juma et al (2012)	Current status of e-health in Kenya	Secondary data	e-infrastructure e-standards	Methodology: secondary sources may be limited in unearthing the problem as the focus may not reflect the real situation on the ground	Use Grounded Theory to look at primary data sources to explore other factors not captured.
Korpela et al (2013)	How to develop services work and information systems in healthcare in Finland	Action research Activity theory	Came up with a holistic ISD framework which is collaborative between the users, system analysts & organization	Context: the framework may not be applicable locally because of contextual issues.	Use Grounded Theory methodology to come up with theory from data that will build a framework that suits the local situation

2.7 Research Approach

The healthcare sector is intricate and multifaceted (Geri and Geri, 2011; Skyrius and Bujauskas, 2010). A total reasonable comprehension of it needs the grappling of countless entwined and converging issues and subjects (Bryant, 2002; Fernández and Lehmann, 2005; Walsham, 1995). Grounded Theory study can provide to the researcher a thick description, that assists untangle the issue being explored. This will offer some incentive to the individuals who will benefit from the end product by giving important developing ideas (Charmaz, 2006; Wolfswinkel, 2011). This research embraced the Straussian style of grounded theory due to its prescriptive edicts than the Glaserian style which is more emergent in nature. The Glaserian version approaches the study with an empty mind while the Straussain style allows the researcher to begin with carrying out some literature review. Thus the five issues (e-Health standards; ICT and health policies and strategies; e-legislation; e-Health infrastructure; ICT competence) from the literature review formed a starting point for exploration. Grounded theory allows open investigation depicting emergence of concepts and showing their relationships. Concepts and relations are emergent from data and cannot be predicted in advance.

The research approach that was followed is illustrated in the figure below.

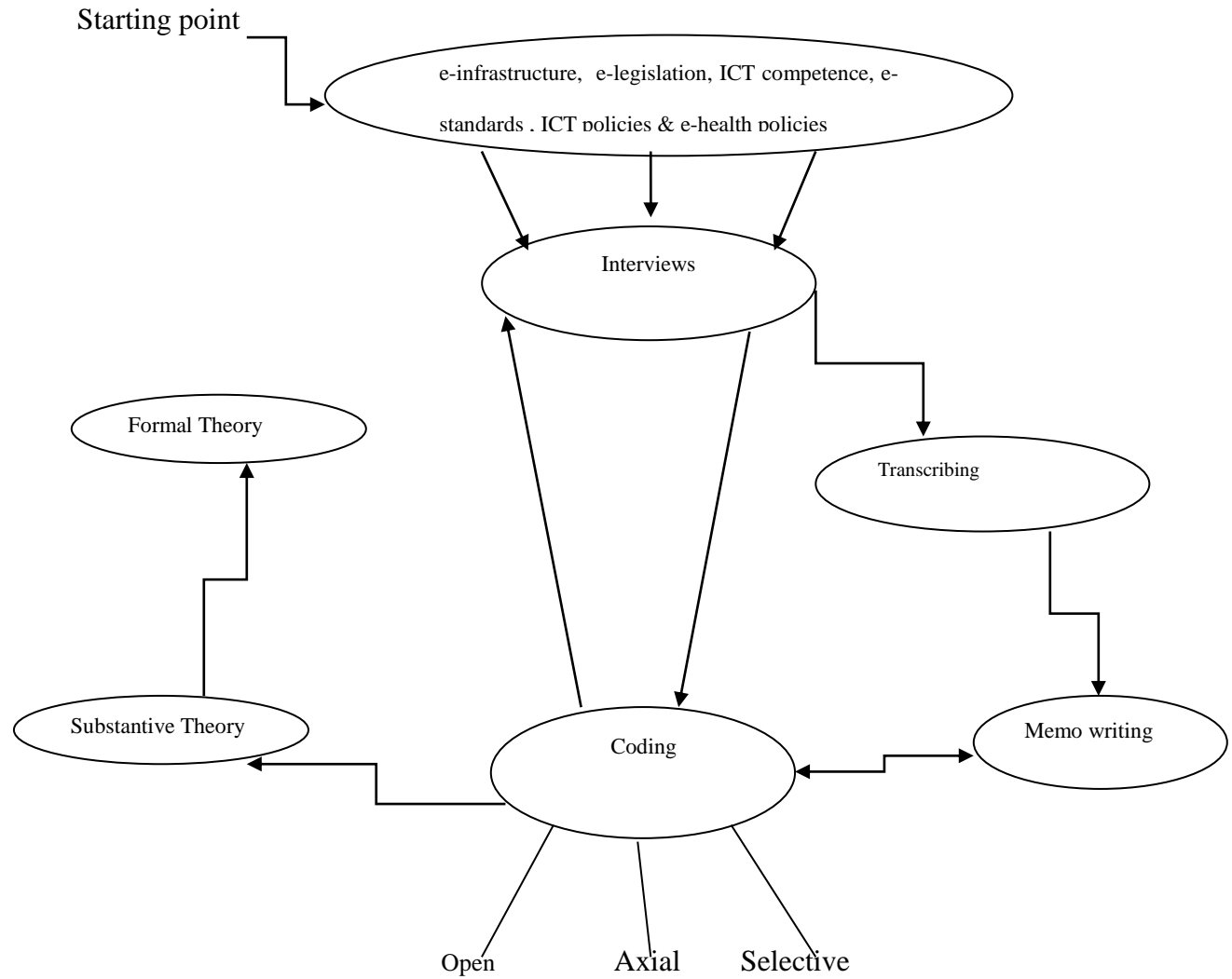


Figure 2.1: Research Approach (adapted from Charmaz, 2013)

2.8 Chapter Summary

In this chapter the applicable scholarly literature has been exhibited and fundamentally explored. The area of e-Health has been discussed in detail. The primary conclusions that emerge are that the e-health sector is not fully explored and implementation is still a challenge especially in developing countries. Nonetheless, it is regularly acknowledged e-health has a likelihood of reducing the cost and enhancing the quality of life of patients. The information systems theoretical foundations were explored. Grounded theory approach that was used for the study was discussed and critically reviewed. Previous researches in the area of e-health were examined which showed lack of an integrated framework that fundamentally explains how e-health can be well implemented in developing countries. The factors are addressed as discrete bits and pieces therefore, this study generated a data driven framework that explains how e-health can be implemented in the health care sector in developing countries.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter the research philosophy, design, sampling procedure, target population, data gathering procedure, data analysis and methods undertaken to resolve the problem area have been discussed.

3.2 Research Paradigm

Philosophical discussions looking into how to do information systems research has been the focal point of a great part of researcher's attention (Mingers, 2001; Weber, 2004). Among around those imperative phases in the course of research design will be the thought of the fundamental customs on how we see the world, and reinforced by group of practitioners (Denzin & Lincoln, 2011). Typically, the convictions held by the researcher influence the possibility to get to which the research will be designed, data will be gathered, analysed and the findings of the study presented. Therefore, the perception of these suppositions by the researchers, especially at the stage preceding the selection of research approach, is a vital step that will widen the horizon for the perception of knowledge and acquiring it on the one hand, and define the role of researcher in the research process, find the real course of research and differentiate it from other research tracks on the other hand.

Weber (2004) emphasises that the comprehension of these suppositions, if overt or implied role in playing a dynamic role in guiding the course in the IS research, and thus showed in the research outputs in a positive way. Moreover Denzin and Lincoln (2011) emphasise that in practice, these suppositions represent at a philosophical level; fundamental convictions about the world people live in, that consists of the social level; rules on the best way to

direct research and the technical level; methods and techniques used to complete studies, thus the emergence of the word paradigm. The word paradigm 'was first presented by Thomas Khun in his book, *The Structure of Scientific Revolutions* in 1970. Neuman, (1991, p. 57) give a helpful meaning of a paradigm as a

“framework or a set of suppositions that explain how the world is seemingly where, the paradigm of a science includes its basic suppositions, the important questions to be answered or puzzles to be solved, the research techniques to be used, and examples of what scientific research looks like”.

Kuhn (1970) to begin with utilized paradigms in perspective of a model to comprehend research. He perceives paradigms as

“a set of beliefs and practices which is accepted by members of a scientific community, which act as a guide or plan, dictating the kinds of problems scientists should address and the types of explanations that are agreeable to them”(Kuhn, 1970, p. 175).

Denzin and lincoln (2011) laid down a framework of the different suppositions underlying the social science research. This outline has been utilized to establish the theoretical and philosophical supposition fundamental to and supporting this study. The schema has been introduced on the structure of a grid comprising from claiming two measurements or sets of presumptions around social science and the society. Furthermore, the social sciences extent will be in view of a subjective/objective aspect. This incorporates four presumptions identified with the social science study, in particular ontological, epistemological, methodological suppositions, and presumptions regarding free will.

According to Bryman (2001) ontological presumptions are concerned with the type of the planet and on individual persons in the social setting. There are numerous beliefs on how we see the world generally. In positivist paradigms, however, ontology concentrates on the autonomy of the social happening of different elements. Thus the world is one and there is no other recognition. While the accentuation of interpretive paradigms is that the world has distinctive implications regarding societal phenomena. This implies the adjustment in one variable may influence the adjustment in the social setting itself, and along these lines distinctive exploration can achieve diverse conclusions from the similar observation. On the other hand Critical theory paradigms essentially perceive the world as something that has to be changed. It involves the critique and altering social happening based on the interrogations of the social happenings and individuals alike. In pragmatism, paradigms are not perceived as “abstract entities with timeless characteristics” but rather, “paradigms are perceived as ever changing belief systems” (Morgan, 2007, p.12).

Epistemological suppositions would be concerned with those approaches that recognize and obtain knowledge (Bryman, 2001). In positivist paradigms, knowledge is the way to look at the social world as one of the natural sciences. Theories are tried through experimental methodologies. Theories would be objective through exploratory techniques. Results ought to be unbiased through logical techniques. Generally the knowledge for interpretive paradigms examines the phenomenon from multiple points of view. Additionally given that the social setting is not the same as the natural sciences, the examination of social phenomena can produce numerous elucidation. While in critical paradigms models, knowledge is the consequence of practice. They are methods for doing research, as opposed to methods for characterizing the ontology and epistemology underpinning research in this case in the healthcare sector. This study used the paradigmatic stance of pragmatism as reasoned out below.

3.2.1 Positivist Paradigm

Positivist paradigm concerns researchers who are attempting to look for or test the all-inclusive laws about social phenomena. Supporters of this paradigm trust that the social world is a world of natural phenomena. It believes that social reality, consisting attitudes, convictions, practices and fulfilment can be measured equitably by utilizing traditional scientific methods by impartial researchers. This paradigm utilizes the quantitative approach and statistical analysis. Orlikowski and Baroudi (1991) suggest that for IS research to be classified as positivist “there is evidence of formal propositions, quantifiable measures of variables, hypothesis testing, and the drawing of inferences about a phenomenon from the sample to a stated population” (p.5).

3.2.2 Interpretive Paradigm

Interpretive paradigm concerns researchers who are attempting to comprehend social happening through individuals’ own experience and the meaning assigned thereafter (Myers, 1997; Klein and Myers, 1999) such as language, consciousness, common experiences, publications, tools, and other artefacts (Walsham, 1995). Generally, the paradigm tries “to understand the inter subjective meanings embedded in social life and hence to explain why people act the way they do” (Gibbons, 1987: p. 3).

Crusaders of this paradigm contend that there is no earlier meaning of the independent and dependent variables; however the attention is on the multifaceted nature of human sense making as the situation rises (Kaplan and Maxwell, 1994). However, data is subjective and therefore its clarification is fundamental. As such, the interpretive researchers are basically using qualitative research approach to give a comprehension of the social and organizational settings, based on building a complex, holistic picture, formed with texts, reporting detailed views of respondents, and conducted in a natural setting (Creswell, 2013).

3.2.3 Pragmatism Paradigm

Pragmatism deserts the old-fashioned perception that ontology and epistemology are fundamentals upon which social scientific investigation should be based, because the concepts of ontology and epistemology themselves have been empirically conceptualised (Morgan, 2007). For pragmatists, the existence of so many types of ontologies (such as realism, idealism and dualism) and epistemologies (such as interpretive, constructivist and subjectivist) is evidence that they are ideals rather than objectively true concepts (Scott and Briggs, 2004). Therefore, in pragmatism, paradigms are not seen as “abstract entities with timeless characteristics” (Morgan, 2007, p.61). Rather, paradigms are perceived as ever changing belief systems. They are means of doing research, rather than means of defining the ontology and epistemology underpinning research in this case in the healthcare sector (Kuhn, 1996; Morgan, 2007).

Methodologies are therefore not controlled by ontologies and epistemologies, so qualitative, quantitative or mixed methodologies are allowed because all act as tools for empirical inquiry. The pragmatic approach hence moves away from the theoretical starting point for research. It instead endorses the utilization of the methodologies that are the most appropriate for answering the research questions and addressing the phenomenon under study. The focus is on generating knowledge for problem solving, and whether the knowledge generated is useful for practice (Corbin and Strauss, 2008).

An ideology rejected by pragmatists is that of an Archimedean platform, that is an objective or context free claim to scientific ‘truth’ (Dewey, 1917). Similarly, the ‘spectator theory of knowledge’, which suggests there is a world ready to be discovered by a passive observer, is not accepted. Pragmatists therefore argue that absolute objectivity and certainty cannot be

attained in research. Rather, ‘truth’ is what is known at the time as provisional consensus that is developed about the research topic, which later evidence could show is flawed or wrong (Maxcy, 2003; Scott and Briggs, 2009). Related to the rejection of certainty, pragmatism also postulates that everything that is known is affected by a certain level of subjectivity. Knowledge discovered through empirical inquiry is inextricably connected to the construction of knowledge in the human mind (Bryant, 2009).

However, pragmatist understanding of reality entails two theoretically and methodologically significant consequences: not only is pragmatism one among a number of ‘philosophies of the flux’ (Dewey, 1917) but it also defines reality as being made by and experienced only through human activity. Concisely: reality is nowhere else but inactive experience, i.e. in action. “Reality in itself, or in its uninterpreted nakedness, is a pragmatically meaningless notion, for it is a notion” (Dewey, 1917.p.22). Additionally Dimitri Shalin provides us a notable picture of the pragmatist perspective on reality as

“Pragmatist philosophy conveys an image of the world brimming with indeterminacy, pregnant with possibilities, waiting to be completed and rationalized. The fact that the world out there is ‘still’ in the making does not augur its final completion at some future point: the state of indeterminacy endemic to reality cannot be terminated once and for all. It can be alleviated only partially, in concrete situations, and with the help of a thinking agent. The latter has the power to carve out an object, to convert an indeterminate situation into a determinate one, because he is an active being” (Shalin, 1986: 10).

Critics of pragmatism may say that one cannot distinguish beliefs that are useful but true from those that are useful but false, because there is no suggested way of knowing absolute truth. Scott and Briggs (2009) argue that it is immaterial whether something is true or false because if a community trust something to be 'true', this will govern their behaviour irrespective of how it compares to an inaccessible objective truth. The belief that is seized and acted upon by people is much more important, and this is what may be found via pragmatic inquiry. Brewer and Hunter, (1989) observes that pragmatist research emphasis on whatever works to meet the particular needs of the researcher instead of restricting the researcher to explicit methods in answering the inquiry question. It allows the researcher to use the most suitable method (multiple methods) to understand the problem being investigated. In addition Glaser (2001) emphasizes that a method's choice is to be guided by the needs of the research, rather than by any one paradigmatic bias "My bias is clear, but this does not mean I rubber stamp 'ok' or indite any method. The difference in perspectives will just help any one researcher decide what method to use that suits his/her needs within the research context and its goals for research" (p. 2).

3.2.4 Grounded Theory and Pragmatism

Straussian Grounded Theory style was selected over other investigative methodologies (Corbin and Strauss, 2008). The researcher used GTM to explore issues that influence implementation of e-health in the healthcare sector in Kenya. With GTM, the purpose was to develop a theory that has real-world application (Denzin, 2007). The reason behind GTM begins from pragmatism and typical interactionism, a school of believers that imagines that an individual does not respond to someone else's deeds, but rather the meanings they

themselves ascribe to the other individual's behaviour. Strauss and Corbin (1998) also advocate that qualitative and quantitative approaches are only instruments in creating valuable theories, and that one mode does not have pre-eminence over the other. They express that “researchers in human and social sciences are operational pragmatists. The more flexibly scientists work or are allowed to work, the more creative their research is apt to be” (p.30).

Grounded Theory was selected principally in light of its intuitive plea. To begin this contention it is basic to note that GT is not confined to any particular area, discipline or any type of data (Bryant, 2009). GT has educated differing zones and has exhibited a broad cluster of appropriateness (Morse, 2009). By and large Myers (2009) contended that GT has an “intuitive appeal” (p. 111) for researchers since it licenses them to get “drenched” (p. 111) “deeply within the data”. This drenching is demonstrated for all intents and purposes in the constant comparison, coding and memoing ways to deal with data processing. Charmaz (2006) upheld this idea and attests that GT furnishes new researchers with the required doctrines and “heuristic gadgets” to “get started, stay involved, and finish the project” (p. 2). Charmaz (2006) concluded that while other qualitative methodologies allow researchers to regard data as they wish without clear headings on the most proficient method to continue, GT gives “explicit guidelines” (p. 3) which guide researchers about how to carry out their study. For several pragmatic researchers, GT is very beneficial in answering their questions Bryant, (2007), enlightening their thoughts and for providing them with guarantee when hesitations arise during the exploration process in this instance exploring e-health implementation issues in the health care sector in less empowered countries.

Besides GT has the ability to conceptualize. GT is special in its capacity to create ideas by utilization of the rationale of steady analysis and regular memo writing (Bryant, 2009). This particular way to deal with theory development is coming about because of the incessant interplay amid data collection and analysis (Myers, 1997). Strauss & Corbin (1994, p. 39) contended that “ideas have widening power” and are “simpler to recollect” as they include “a myriad of incidents, which facilitates the transferability of these concepts into unfamiliar contexts”. Moreover, Strauss & Corbin (1994) included that there is “much incentive in the conceptualizing and conceptual ordering of research data” (p. 39). Remotely Strauss & Corbin (1998) emphasized a comparative position reflected in their announcement, “by far the most exciting use of GT over the last ten years is its legitimation of concept generation” (p. 133). In any case Strauss and Corbin (1994, p. 274) recognized that “the major difference between this methodology GT and other approaches to qualitative research was its emphasis on theory development”.

Finally GT has a systematic style to data analysis. A noteworthy benefit of the GT method is in its organized approach to data analysis. Stern, (1994) defined GT as “systematic generating of theory from data that itself is systematically obtained from social research” (p. 2). Strauss and Corbin (1998) reflected this definition in their statement that GT is “a qualitative research method that uses a systematized set of procedures to develop and inductively derive GT about a phenomenon” (p. 24). Other qualitative research methods “frequently depend on the use of broad principles rather than the systematic approach, leading to difficulty in their application and interpretation” (Myers, 2009, p.9). This logical approach of analyzing data is helpful in judging, generalizing and comparing the results of GT research (Bryant, 2009). They contend that this logical approach to data analysis provides for rigor and ensures credibility in the evolving theory. The theory, which is

grounded in the data, therefore forms a beginning for further research to extend current knowledge, allowing substantive theories to become more formal theories, meaning they can be useful to wider population. A supposition about the world made by Clarke (2009) is that it involves a multitude of elements that intermingle in complex and unexpected ways.

Charmaz (2006) reinforced this argument by distinguishing between accidental discovery (serendipity) and systematic investigation that is based on the epistemological and ontological assumptions of the researcher. The latter is sustainable as it is a “broad-ranging, purposive, systematic, pre- arranged undertaking” (p. 4), during which researchers enthusiastically and purposefully place themselves in a position to look for “discoveries” (p. 4) instead of “continuing their usual research and waiting for the aha moments or serendipity to strike” (Charmaz 2006, p.4). Furthermore Charmaz (2006) emphasised that logical procedures such as simultaneous gathering and examination of data and the constant comparative logic and theory that arises from data provide GT with rigor that is not available in other qualitative methodologies. Additionally, Myers (2009), observes that “being systematic provides the researchers with enough evidence to support their findings” (p. 111).

Goulding, (1999) stretched this thought further by directing the researcher to check for the relevance, fit, workability and modifiability of the discovered GT which enticed researchers and kept them engaged. Moreover Charmaz (2006) added that “by adopting GT methods you can direct, manage, and streamline your data collection and, moreover, construct an original analysis of your data” (p.2). Besides, Corbin & Strauss (2015) notes that “method facilitates the generation of theories of process, sequence, and change pertaining to organizations, technology, positions, and social” (p. 27).

3.3 Research Design

Research designs are typically grouped as either quantitative or qualitative (Creswell, 2013). According to Neuman (2011) the quantitative approach is referred to as the scientific empirical tradition technique, while the qualitative approach is alluded to as the naturalistic phenomenological technique. Thus given that the focus is unlike, the use of these two methodologies depends to a greater degree on the research paradigm, the underlying assumption of the researcher and the type of the issue being contemplated (Gelo et al., 2008). In other words, the qualitative approach generally tries to describe the scope of study, the advancement of a measurement tool and develop hypothesis applicable to it, whereas the quantitative approach typically tries to test the measurement tool and hypotheses. This study espoused an exploratory case study with grounded theory methodology to examine elements that are pertinent to successful implementation of e-health systems in the healthcare sector as justified below.

3.3.1 Qualitative Approach

The qualitative approach concentrates on the compilation and analysis of non-numerical data. In any case, the quality of this approach originates from its open-ended and regularly its subjective nature, particularly with regards to analysis (Maxwell, 2010). Largely, this approach endeavours to construct and widen further comprehension of the views, encounters, and feelings of people or groups that may take part in specific practices inside the natural setting in which it happens.

Normally, this approach has a tendency to be natural as opposed to being numerical, where it covers the understanding of social phenomenon in its genuine settings of where to concentrate on the implications given by people or gatherings about it (Denzin and Lincoln, 2011). Similarly, Creswell (2013) depicts a qualitative approach as “an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem. The researcher builds a complex, holistic picture, analyzes words, reports detailed views of information, and conducts the study in a natural setting” (p.15).

In spite of the fact that this approach is associated to few members (e.g. people, gatherings or associations), it gives an insight and comprehensive understanding of complex phenomenon, for example, implementation of e-health in the healthcare sector through a mix of different techniques to get data, for example, in-depth interviews and document analysis. The results of this approach generally appear in narrative form. Case studies, action research and grounded theory, among others, are typical qualitative research methods. There has been a general tendency for researchers to utilize qualitative approach rather than the quantitative approach particularly in IS research (Orlikowski, 1993; Korpela, 2011; Neuman, 2011). This argument has been further supported by Mintzberg, (1979),

“measuring in real organizational terms means first of all getting out, into real organizations. Questionnaires often won’t do. Nor will laboratory simulations. The qualitative research designs, on the other hand, permit the researcher to get close to the data, to know well all the individuals involved and record what they do and say” (p. 586).

In practice, IS research is not restricted just to address the technological aspect, but rather goes past that to incorporate relationship with the organization, individuals or group who are assisted by such systems (Avgerou, 2001). This argument is consistent with Neuman, (2011), who demonstrates that Information System is comprised of a technological sub-system and other behavioral sub-system. Additionally he adds that the relation between these two sub-frameworks is the cause of what is referred to as IS phenomenon, thus qualitative approach is best appropriate for IS research and specifically appropriate for this study of exploring e-health implementation issues in the healthcare sector. Heath and Cowley (2004) observes that qualitative research utilizing GT is a “cognitive process and that each individual has a different cognitive style. A person’s way of thinking, and explanation of analysis, may seem crystal clear to someone with a similar cognitive style and very confusing to another person whose approach is different” (p.149).

Howell (2013) observes that the choice of the research design is always a complex task for the researcher who must be aware of “what is the relationship between the world thought the researcher, the researched and the issue under investigation?” (p.14). Thus the research design used for this study was a qualitative approach focusing on grounded theory approach methodology. This is because of its capability of conceptual thinking and theory building rather than theory or hypothesis testing (Charmaz, 2011), which is typically done in quantitative research approach.

3.3.2 Quantitative Approach

In contrast to qualitative approach, quantitative approach is a logical methodology in light of the collection and analysis of data in numerical format. Positivist and objectivist suppositions are the explanation behind researchers who utilize such an approach. This approach is appropriate for research which intends to answer questions how much', what

number of', how routinely', and to what extent' (Masters, 2006), and what's more looking at frequencies and rates of answers. By definition, the quantitative approach is apprehensive with the gathering and analysis of numerical data, and frequently offered in diagrams, charts or tables. However, such data can be analysed using statistical methods. Notwithstanding the above, such an approach requires sufficiently enormous samples to be illustrative of the whole populace, so that the outcomes can be duplicated, generalised or used in a comparative way (Gelo et al., 2008).

In practice, the approach is concerned with giving quantitative depiction of the factors of the research, where the researcher decides the relations between the factors of importance for the study, and after that plans and tests hypothesis generated from theories which may along these lines be evaluated either for approval or dismissal in light of a similar and measurable analysis. Subsequently, the quantitative approach has a tendency to have deductive thinking tendency. Interestingly, numerous researchers perceive that the utilization of quantitative approaches adversely influences the capacity of individuals to think, articulate opinions, clarify their encounters, and to react to the changes around them (Yin, 2014). Besides unlike qualitative approach, the quantitative approach may disregard detail and profundity in individuals' conduct, attitudes and motives.

3.3.3 Grounded Theory Methodology

GT methodology permits researchers to produce theories from the empirical data. Hence this suggests as opposed to sourcing the data on the problem being studied through the previously established inclinations of the researchers, which are frequently not far reaching, the approach was able to gather the data straight from the natural setting of the problem under study (Bryant, 2002; Fernández, 2005). Accordingly, the researcher decided to utilize

the approach to investigate the issues that influence the e-health implementation in healthcare sector in Kenya. Moreover, encoding as one of the styles that symbolize this approach assisted the researcher to manage the intricacy of the distinctive unstructured social settings (Bryman, 2001), and thus, helped the researcher to tackle the enormous data gathered, theoretically and methodically formulate the theory.

GT contrasts from other qualitative approaches, as it permits the “development of theories directly from the raw data, data collection and analysis in a systematic manner, and maintains the data to be grounded, rather than forcing data to fit with current theories thus fostering creativity” (Chamaz, 2014, p. 8). GT does not start with testing an existing hypothesis, but utilizes the empirical data to produce concepts and theories (Fernandez et al, 2013). Typically, not bias emergence the theory with a priori assumptions. To determine this development, researchers are urged to keep away from “preconceived hypothetical data” (Myers 2009, p. 108), a suggestion that can be viewed as leverage to improve innovativeness and activate the improvement of new thoughts. Besides, GT urges the researchers to progress through a procedure of disclosure whereby themes and clarifications actually rise out of the data. In essence, GT permits the researcher to get significance from the data and analysis utilizing imaginative, inductive procedures. This permits for the appearance of original findings from the data (Charmaz, 2006). Strauss and Corbin (1994) recognized that “the major difference between this methodology GT and other approaches to qualitative research was its emphasis on theory development” (p.278).

Furthermore GT has an inexhaustible data profundity and fortune. The approach utilized by grounded scholars to gather abundant data is another advantage (Charmaz, 2006). Plentiful data will make the “world appear anew” (Charmaz, 2006, p. 14) on the grounds that the

abundance of the data will furnish the researcher with tangible and thick texture to build an orderly analysis of the data notwithstanding helping the researcher to go underneath the surface of the respondents' social and subjective life (Charmaz, 2006). Similarly Geertz, (1973) adds that GT helps with collecting “rich, thick data” (p.10). Charmaz (2006) suggests that the exploration experience begins with “finding data” (p. 14). Data will uncover the unique situation and structure of the respondent's lives notwithstanding disclosing their sentiments, perspectives, aims and activities (Charmaz, 2006). The specific end goal is to acquire rich data, researchers are relied upon to look for thick descriptions (Corbin and Strauss (2008) through scripting “extensive field notes of observation” (Charmaz, 2006, p. 14), “gathering thorough narratives from interviews” (p. 14).

GT approaches give the tools for “making sense of the data” (p. 15) and refining it to “generate insight” into the phenomenon. Rich data will give the analyst adequate foundation about the phenomenon under review. In addition, rich data will “reveal what lies beneath the surface” (p. 19) and uncover any progressions after some time. Moreover, rich information will empower the examiner to create analytic categories that encourages the examination of data so as to permeate new thoughts. Indeed Charmaz (2006) espoused that GT can be developed with various types of data relying upon the investigation theme and inquiries. The researchers point is to enter the respondents' lives to see it from inside which in the long run illuminates the “unobtainable views” (Charmaz, 2006, p. 24) that outsiders usually assume about the world. Using the rationale of GT strengths makes the researcher to backpedal to the data and forward into analysis to accumulate immense data and to refine the “emerging theoretical framework” (p. 23) which provides the researcher a “fresh look and creating novel categories and concepts” (p. 33). The inductive approach depends on the researcher methodically “collecting, coding, categorizing and analyzing data” (p.19) to determine the

theory that clarifies the phenomenon in this instance implementation of e-health in the healthcare sector in Kenya. This study used Straussian style of grounded theory due to its prescriptive edicts than the Glaserian style which is more emergent in nature.

3.4 Population and Sampling

The target population represents the sample elements that a researcher is interested in and the group about which conclusions are drawn (Cooper et al, 2002). Neuman (2011, p. 240) defines a sample as “a small set of cases a researcher selects from a large pool and generalizes to the population”. The target population constituted key stakeholders from the healthcare sector who are involved in the implementation of e-health systems.

Qualitative researchers have endorsed sample sizes ranging from as few as six respondents to as many as 30 for a grounded theory study (Creswell, 2014). Sample design refers to selecting respondents from the entire target population of the study. This is a well selected group that represents the target population. GT utilises a form of purposive sampling, known as theoretical sampling, where respondents chosen have the capability to provide the researcher with abundant information on the issue being explored. Theoretical sampling is a vital part of the grounded theory approach as it guides the researcher what to gather next (Charmaz, 2006).

Glaser and Strauss (1967, p.45) defines theoretical sampling as “the process of data collection for generating theory whereby the analyst jointly collects, codes, and analyses his data and decides what data to collect next and where to find them, in order to develop his theory as it emerges”. Similar definition of theoretical sampling has been reported by Strauss and Corbin (1998, p. 202) as

“theoretical sampling rather than being predetermined before beginning the research, evolves during the process. It is based on concepts that emerged from analysis and that appear to have relevance to the evolving theory. The aim of theoretical sampling is to maximize opportunities to compare events, incidents, or happenings to determine how a category varies in terms of its properties and dimensions”.

Fundamentally adequate theoretical sampling is significant for production of diverse and extensive range of theory. Furthermore inadequate theoretical sampling can result to theory development process that is weak, thin and not well integrated base of theory (Amsteus, 2014).

Likewise the significance of theoretical sampling is further elaborated by (Charmaz, 2014) that it plays a vital role in gathering pertinent data that is important in the process of development of the theory. Additionally it plays a vital role in refining theory development process and the theory by itself by directing the researcher towards pertinent data and this data gathering process continues until and unless new data stop appearing. This was initiated by interviewing significant individuals in the healthcare docket. This included key stakeholders from healthcare industry who are directly involved in ICT implementation in the sector. These individuals were drawn from the government, NGO's, donors and private sector. Additional participants were selected as the study progressed, emerging concepts, relationships and theoretical relevance guided the researcher's inquiry into additional data sources based on whether they allow development or comparison of concepts (Goulding, 1999). The reader can take note that most of the respondents at the county, sub county and

faith based hospitals were mainly system analysts. This was because the IT department in these various institutions is headed by systems analyst. In addition the IT department falls under administrative service which is a unit and not autonomous department on its own.

3.5 Data Collection

Data collection instruments and procedures refer to a process in which the tools of data collection are identified (Creswell, 2014). This study used both primary and secondary data sources. Thus to obtain primary data the researcher used open ended interviews. Primary data collection began with interviewing key stakeholders in the healthcare sector that are mainly concerned with the implementation of the systems. Open ended in-depth interviews were used to collect data about the factors that affect implementation of e-health systems. As Glaser (1992) pointed out, that grounded theory is “a general methodology of analysis linked with data collection that uses a systematically applied set of methods to generate an inductive theory about a substantive area” (p. 16). The GT approach can use any type of data. Mostly it is up to the researcher to figure out what data to gather. All kinds of data can be the building blocks of GTM such as field notes, interviews, audio recordings, observations, and secondary sources. The kind of data the researcher pursues depends on the topic and accessible available data as Strauss& Corbin (2000) summarises it in a few words “all is data” (p. 276).

Accordingly, the researcher resorted to the utilization of open ended in depths interviews to be able to collect “rich, thick data” (Geertz, 1973, p. 10) on the problem being studied in a style that allows inductively develop theory to elucidate the problem itself (Charmaz, 2000). Yin (2014) describes the interview as the most important source of evidence in exploratory studies research. This is supported by Bryman (2001) who describes the benefits of open

ended interviews that they provide a unique opportunity to uncover rich and complex information from an individual. In this particular study of exploring e-health implementation issues in the healthcare sector in Kenya, thus it was appropriate as the main source of evidence backed up by secondary sources. The line of questioning was rather fluid pursuing a conversational rather than structured questioning. Although the researcher prepared an interview guide, the questions were asked from the consistent line of inquiry with a fluid rather than rigid stream of questions. This unstructured method of questioning permitted the respondents to narrate the story that elaborates their experiences.

The interviews were then recorded and transcribed. Secondary sources used included government documents, journal articles on e-health and sessional papers presented in conferences. In GT data gathering and analysis occurred in parallel. The transcripts and the documents were keyed into NVivo version 11 software for analysis. The data collection builded around the emerging and narrowing scope of the study until theoretical saturation was achieved where no new data changes the emergent constructs (Charmaz 2000, 2006). Corbin & Strauss (2015) indicate that theoretical saturation means “that no additional data are being found whereby the researcher can develop the properties of the category” (p.61). Theoretical saturation was attained by the constant comparison of occurrences in the data to elicit the properties and facets of each category or code. Indeed Riley (1996) noted that majority of the studies attain saturation with between eight and 24 interviews, depending on the topic under exploration. In this particular study saturation was attained with 22 interviews. However the researcher went further to interview 8 other respondents to total to 30 respondents. The researcher was hoping that new data concepts would emerge but the findings were just a replication of what the previous 22 respondents had said.

3.6 Reliability

Reliability refers to the internal consistency of a scale, which looks at the degree to which items are homogeneous. Typically it refers to the degree to which measurements are accurate and repeatable. It is mainly concerned with the interrelationship among items in the scale for all who answer the item (Fernández et al., 2013). In this instance the researcher followed rigorous and relevant research practices, one can draw on several qualitative strategies to ensure trustworthiness of a study. Reliability was tested using triangulation strategy (Denzin, 2007). Triangulation was embedded into grounded theory and in this study particularly. It was used by conducting interviews across the multiple participants regarding the same issue and also by comparing emerging concepts and categories with existing concepts and categories in the literature (Mays & Pope, 1995).

3.7 Validity

Validity in a grounded theory study was guided by four indicators: fit, relevance, work and modifiability (Strauss & Corbin, 1998; Cresswell, 2001; Charmaz, 2001). Fit looks at whether the theory fits the substantive area in which it will be utilized. The researcher was exceptionally quick to generate concepts and categories from the gathered data. The researcher considered the theory suitable for IS field, particularly e-health frameworks, as the empirical data gathered amid this review was the principle basis for the advancement of a complete comprehension of the elements that influence the implementation of e-health frameworks in the healthcare segment in Kenya.

Pertinence or relevance, addresses issues concerned whether non-experts that are concerned with the substantive field comprehend the theory (Mays and Pope, 2000). The researcher was extremely quick to present the theory in a lucid and comprehensible way, particularly for those individuals in a similar field of IT implementation in general and e-health systems

implementation specifically. Moreover, the researcher was cautious throughout the analysis procedure to accomplish the following: 1) the concepts and categories rising ought to show some relationship, 2) the conceptual connections among concepts and categories ought to be properly developed to the point of formation of the theory 3) there ought to be a thickness and saturation of the concepts and categories emanating from the research process (Fernández et al., 2013). The researcher was dedicated to see that the theory and the outcomes are satisfactory and mirror the level of profundity and completeness of the study.

Work in terms of the demonstrative ability of the theory to explain how the problem is solved, that is the theory works when it can interpret, explicate and envisage what is happening in the substantive field. Furthermore can the theory be applied to a wide variety of settings in the substantive area of study, in this case all e-health applications (Guba & Lincoln, 1989). Modifiability looks at the theory's capability of permitting the user some degree of control over the structure and process of daily situations as they change through the study. For instance does the theory allow the user some control as Glaser and Strauss, (1967) puts it that does the "structure and process of daily situations as they change through time?" (p.237). Moreover if the theory can be changed when new pertinent data is compared to existing data. The research process was scrutinised to ensure new relevant data was accommodated and managed to explain the phenomenon being studied. This was done by allowing categories to emerge and constant comparison of categories (Charmaz, 2006).

3.8 Data Analysis

Data analysis involves analysing text, developing themes and finally stating the meaning of the findings, a result that this study achieved with regard to analyzing the interviews and developing concepts and categories. Strauss suggests that “the focus of data analysis is not merely collecting or ordering a mass of data, but organizing many ideas which have emerged from analysis of the data” (1987, pp. 22). Grounded theory coding technique that includes open, axial and selective coding was employed.

Glaser defines coding as “conceptualizing data by constant comparison of incident with incident, and incident with concept” (1992, p.38). Fundamentally coding is the process of separating data into particular units of significance for analysis and from that point deliberately re-assessing them for their connections enabling the researcher to move the data to a more elevated amount of abstraction. Open coding gave a good starting point to recognize initial phenomenon.

Open coding depicted the explanatory process through which ideas are recognized and their properties and dimensions are found in data. It is the piece of analysis that relates particularly to the naming and categorising of issue under exploration through close analysis of the data. Throughout open coding the data are separated into discrete parts, closely examined, and analyzed for similarities and differences, and questions are asked about the problem under study as reflected in the data (Corbin and Strauss, 2000). The researcher matched occurrence to occurrence with the aim of building up the fundamental consistency and its varying conditions (Allan, 2003). Occasions, happenings, objects and actions/interactions that were observed to be reasonably comparative in nature or related in significance were assembled under more unique concepts termed "categories" (Suddaby, 2006).

The second phase is axial coding and it aims to add depth and structure to existing categories. Axial coding reassembled the data that has been broken into separate codes by open coding. Axial coding includes re-assembling the data in new styles by building up connections amongst categories and their subcategories. It is named "axial" on the grounds that coding happens around the hub of a category, connecting categories at the level of properties and dimensions (Strauss and Corbin, 2000). Axial codes more often correspond to categories that depict the open codes. The researcher keeps on coding and compares the concept to more occurrences (Goulding, 1999). The process led to discovery of patterns and themes in the data, showing the how the factors are related and their significance to the study. This guided in coming up with a model for e-health implementation in the healthcare sector in Kenya (Denzin, 2007).

The last coding stage is more dynamic than axial coding referred to as selective coding. The purpose of selective coding is to coordinate and refine the classes into a theory, which represents the problem being examined (Bryant, 2007) and validates the statements of associations among concepts, and fills in any categories in need of further enhancement. In selective coding the researcher lessens data from many cases into concepts and sets of relational statements that can be utilized to clarify, in a general sense, what is happening in the field of e-health implementation in Kenya (Simmons, 2011).

There are various software's that are used for analysis of unstructured data. They include MAXQDA, QDA miner, ATLAS, NVivo, CAQDAS among others. NVivo software version 11 was used to analyse the data. The purpose of NVivo software was to help the researcher uncover and systematically analyze complex phenomena hidden in unstructured data. The software allowed the researcher to group, sort and organize data; look at connections in the

data; and combine analysis with linking, shaping, searching and modelling. It allowed the researcher recognize patterns and interrogate data in a number of ways by utilizing its web crawler and query functions. NVivo software has been utilized for detailed analysis in the previous decade, among IS researchers (Orlikowski, 1993; Bryant, 2002; Njihia and Merali, 2013; Charmaz, 2014). The research objectives for the study were addressed by identifying factors and their relationship that were relevant to successful implementation of e-health systems thereby developed a comprehensive e-health implementation framework for Kenya.

3.9 Ethical Considerations

There was a critical necessity to discover general principles of ethics when carrying out research on people. However, according to Trochim (2006), the way towards discovering basic ethical principles to suit every study is greatly complex on the premise that there is a specific setting for each study, which contrasts from other studies. With regards to this study, for instance, a number of ethical principles were applied, for example, guaranteeing the discretion of data, giving the respondents the opportunity to choose to be part of or not part of the study, and show the data as it is with no change or misrepresentation. There was additionally an elucidation of the goals to be accomplished in the study, and how the healthcare segment can benefit from the outcome of this research. Likewise, individual differences among the respondents were considered by providing a chance for all to take part at different potentials and capabilities in the research (Mauthner et. al, 2002).

The researcher was cautious not to exert undue pressure on respondents to respond to questions, yet turned to giving respondents the opportunity to answer inquiries for which they wish to reply, and leave those they would prefer not to answer them. The researcher additionally decided not to burden the respondents, in turn, there was a schedule for each

meeting to be settled upon ahead of time with every respondent separately (Bryman et. al, 2011). The researcher was cautious not to put the respondents in humiliating circumstances, for instance, the researcher avoided presenting subjects with content that might be sensitive to the respondents. Additionally an atmosphere of trust was created from the starting point between the researcher and the respondents in order to accomplish the desired goals of this study.

3.10 Chapter Summary

This chapter has dealt with the research approach of this thesis. A brief introduction of the research philosophy was discussed. Quantitative and qualitative methods have been presented, paying particular attention to grounded theory methodology. The data collection methods, sampling, and target population were discussed. Finally, the data analysis method is presented. Grounded theory methodology was found to be most suitable for this study as the researcher was able to dig deeper into the issues that hinder e-health implementation in detail. This would not have been accomplished if the researcher had adopted a deductive style of theory testing as many of these theories force a certain preconceptions unlike GT that allows theory to emerge from data. GT utilises a meticulously applied set of methods to generate an inductive theory about the substantive area. Thus it provided the researcher with a deeper understanding of the healthcare sector in developing countries and as such provided a basis for future scholars. The theory emerged gradually from the data collected and the researcher was able to develop a data driven framework that was grounded from data explaining e-health implementation issues.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter discusses data analysis, and interpretation. The review of the various thematic analysis and categories from each unit of analysis are described showing a brief overview of all categories in each unit of analysis. The findings from the various data sources are integrated throughout during the development of codes and the categories. A comprehensive discussion of the findings is commenced in the next chapter. A total number of 30 respondents were interviewed. These were the key stakeholders in the healthcare sector that deal with e-health implementation in Kenya.

4.2 The Data Analysis Process

Before advancing to the coding and analysis of the data, all the audiotaped interviews were transcribed. Each interview script had an edge to allow the researcher to scribble analytical notes. These transcripts were then keyed in to Nvivo software version 11 for analysis. Consequently this was followed by coding of the data. This is changing patterns from a group of experimental markers into data contents. From the speculative associations between conceptual codes (their classes and properties) came from the data, an abstraction of theoretical type was done, supported by data (Strauss, & Corbin, 2015). The procedure started with preparatory analysis of the research context. This was followed by open coding, where the researcher inspects the data in each conceivable way, examining the content line-by-line and attempting to recognize noteworthy codes (occurrences) with a receptive outlook, expecting to create categories and their properties from a cautious examination of the constituent occurrences of the data. The texts of the interviews were completely

examined, line by line and broken into sections or occurrences. At the point when the texts were perused, inquiries were asked: Does this data allude to the issue under review? What does this occurrence illustrate? What is going on? What did the interviewees mean? The codes were then sorted consistently as per their properties, similarities and contrasts, at levels signifying facets they are associated with.

Consequently the codes were assembled into components, components into subcategories and subcategories into classes or categories. To improve the developing classes or categories that were entirely identified with e-health implementation, the procedure of open coding was delimited. Axial coding constrained the researcher to code just the events that related fundamentally to the central category, so that the theory can be concocted (Kearney, 2007). The process of delineating occurred at two levels: axial and selective. Alterations, amendments of logical order, elaboration of property points of interest, eradication of unessential properties, and joining of properties were altogether performed for this study. In the meantime, a procedure of diminishment was done, since there was a level of consistency among the original categories, allowing the development of the theory with several concepts. At the second and third level of description, a decrease in the list of the components and subcategories was established to be important to complete data gathering and coding (Bryant, 2009). Axial coding shapes new associations and translates them into important ideas and defines the first character of the theory (Denzin, 2007). The axial codes were chosen as they arose from the data and were viewed as significant and valuable to incorporate the components, subcategories and categories; and subsequently, to expand the evolving theory.

Likewise memo writing throughout data gathering is essential in theory development. These are the documents of thoughts, through composed records, about codes and their relations, taking concepts that originated from the data examination to the utmost level of simplification (Strauss & Corbin, 2007). Thus when the researcher expounds memos,

“they raise the data to conceptual levels, develop the properties of each category, elaborate relations about connections between categories and their properties, begin to integrate these connections in category groups and relate the emerging theory with other potentially relevant theories” (Glaser, 2009. p.91).

Undoubtedly the orderly construction of memos together with analytic ideas that were assembled and found (Clarke, 2009), made it less difficult to articulate the theory and attach the properties of the substantial codes through theoretical codes. Once theoretical saturation of the categories was achieved, processes of adjustment, arrangement and amalgamation of the memos related to the categories followed. Generally the content of the memos make up the rationale of GT methodology, (Bryant, 2009) their arrangement is the key to explain the theory for a textual demonstration.

In GTM, literature is thought to be another source of data the researcher can utilize to and fuse into the theory, through the comparative analysis method (Martin, 2006). An expansive literature review was done as the exploration was being done, intending to conform to the needs of data analysis from the interviews. The literature additionally assisted in creation of the framework, separating properties of categories, and in the definition of the codes (Amsteus, 2014). The explanation of these developing categories, as a whole and in their connections, exposed the category that was central to all other subcategories in this instance the implementation of e-health systems. This core category is equal to what is referred as the

basic social process, a demonstration of associations among the numerous categories of analysis (Kelle, 2007). According to Strauss & Corbin, (1990) core category is “the central phenomenon around which all the other categories are related” (p.116). This argument is further elaborated by Glaser, (2009 p. 33) “the core category has the prime function of integrating the theory and rendering the theory dense and saturated as the relationships increase” (p. 33).

The core category fused 13 different subcategories that characterized the factors that affect e-health implementation. These categories originated from the data. The model was developed and its constituent components represented by the 13 interrelated explanatory subcategories and central category. The structuring foundations of the theoretical model were considered as questions supported each category of analysis. This was a lead to venture into the field of e-health implementation in the healthcare sector in developing countries, particularly Kenya, and they additionally add to the building and addition of studies about e-health implementation in the healthcare sector in developing countries.

4.2.1 Open Coding

The researcher started analysis of the interviews using open coding. Charmaz (2006, p.19) contends that “openness in the initial coding helps researchers to explore and allow new ideas to emerge”. At this stage, the interviews were analysed and coded using the segments word by word and line by line. These sections of the analysis were later called the occurrences (Matavire, 2011). Normally, the occurrences can be derived from the slogan, sentence, or more, but irregularly in as many words as paragraph (Clarke, 2009). The occurrences were contrasted with different occurrences in the data to be gathered keeping in mind the end goal was to get the codes. The researcher was trying to recognize activity verbs

for each bit of the data, and afterwards gave it the code utilizing words to demonstrate these activity verbs (Charmaz, 2014). For instance, in this occurrence the respondent expressed that "concern is to have e-health system that can offer improved healthcare services, saves time, cuts costs, are reliable and available all the time" (C7).

This occurrence incorporates these activity verbs: "having", "offering", "improving", "saving-time" and "cost cutting". Subsequently this was then followed by analysis of codes and gathering those related with related subjects jointly to give high order similarities known as concepts (Lings, 2005). Afterwards these concepts were assembled to give higher order similarities called categories. Nevertheless, these categories targeted to decrease the number of concepts that will be utilized in successive analysis, as well as availing a fairly powerful conceptual foundation of the subjects developed (Fernandez, 2013).

Consequently initial categories started to appear after several interviews. As indicated by Urquhart, (2013), this procedure is alluded to as the constant comparison, which is a significant component of the GT approach. The initial concepts and categories were equated with other segments of the data to establish their theoretical relevance (Goulding, 1999; Strauss, & Corbin, 2007; Charmaz, 2012). Consequently, the researcher exhibited a few cases of the coding process and how initial codes, concepts and categories were created from the respondents' transcripts and were embraced as the reason for the successive analysis. The following table shows an example of some key points which were obtained from the interviews as well as occurrences that were distinguished and given a code in this instance quality of e-health systems. The reader may take note that the researcher has used the category of quality of e-health systems as an example of demonstrating how the other 12 categories were developed throughout the document.

Table 4.1 Quality of e-health Systems

ID	Incidents
C3	I hope the e-health systems can be available 24 hours
C1	It important that the systems are easily accessible from any institution
C4	In addition the service response time is necessary
C2	I hope that e-health systems allows us to track all the patients history
C15	There is need develop more organisation context focused system
C6	There is a necessity to provide immediate online support to system users
C7	It is important to ensure that there is security of the information assured over the network
C11	I hope the systems are scalable to accommodate future growth and diverse data processing needs
C27	It is important for the systems to support communication among all the stakeholders
C13	I hope the system will be reliable at all times when there is need to consult
These occurrences were given the code: quality of e-health systems regularly prompts changes in attitudes towards e-health implementation	

The above incidents were assigned the code called quality of e-health systems. Quality of the e-health systems influences user's attitudes towards the usage which directly affects implementation of the e-health. This may lead to user's acceptance or rejection of the e-health systems. Memos were written immediately after and continuously throughout data collection so that they may perhaps be reviewed at any stage of this study. The researcher, for instance, gave the conceptual name for the memo below as quality of e-health systems. Accordingly, the memos were recorded as follows (Appendix III):

Box 5.1 memo 1

Quality of e-health systems

There is an urgent need to improve healthcare services provided to all healthcare institutions in the country. This can only be possible by harnessing ICT as a key enabler in enhancing healthcare delivery. This consists of development of systems that the healthcare stakeholders can interact with without problems. The system should be operable and user friendly at the same time accessible, reliable, available and timely. However the implementation of such systems in the healthcare sector is a tall order and requires the involvement of every stakeholder in the process. The stakeholders have a certain minimum expectations of the quality of the e-health systems that they would meet their needs accordingly.

At first, 158 concepts were generated in the research. Each of the concepts were coded by sub-categories and their properties. These were then polished by an iterative correlation analysis procedure of combining and marking, identifying similarities and contrasts amongst them and further combining them into initial categories. The following is an illustration to summarise the procedure of identifying and coding occurrences from the interviews for one category, namely the quality of e-health systems. The Interviewees were allocated letter C and numbers (1, 2, 3, and so forth..) referring to the number of each of the respondents. For example, C3 implies respondent number 3 and what they said in connection to the nature of quality of e-health systems category. Table 4.2 demonstrates the procedure of recognising and coding occurrences from the interviews for one category for instance, namely the quality of e-health systems.

Table 4.2: Process Summary of Key Points, Incidents and Codes for the Quality of e-Health Systems

ID	Key points	Open code
C3	I hope the e-health systems can be available 24 hours	Availability of e-health systems and applications
C1	Am hopeful that the systems can be easily accessible from any institution	Accessibility of e-health systems and applications
C4	Also, service response time is important.	Responsiveness of e-health systems and applications
C2	I hope that e-health systems allows us to track all the patients history	Traceability of patients information
C15	There is need develop more organisation context focused system	Customised and contextualised systems to meet the needs of the institution
C6	There is a necessity to provide immediate online support to users of the systems	Services with immediate Online support when necessary
C17	Is the security of the information assured over the network	Ensure the data security and confidentiality is assured
C2	Is there adequate infrastructure for everyone	Have adequate infrastructure in place
C9	Are the systems user friendly. How easy is it for any user to interact with the system without difficulty	User friendly systems with ease to use interfaces
C18	Are we able to share data with other institution for better patients management	Different institutions are able to Share data across the platform
C24	I hope the systems can be interoperable	The modules need to be allow for integration and Interoperability
C29	Are the systems well defined and documentation attached for definition of terms	Detailed services and Well defined supported by documentation
C10	Is there backup for the data	Back up mechanism to guard against data loss
C11	I hope the systems are scalable to accommodate future growth and diverse data processing needs	Ability to accommodate for future growth-scalability
C27	Its important for the systems to support communication among all the stakeholders	Interactive services to enable different stakeholders to communicate easily
C23	I hope the system will be reliable at all times when there is need to consult	The system should be available and produce accurate results to enhance decision making- reliability

The researcher applied a similar procedure to generate other categories throughout the document. Table 4.3 demonstrates the way concepts were created from labelled codes for the quality of e-health systems category as an example.

Table 4.3: Diagrammatically the Emergence of the Quality of e-health Systems

Category

Labelled Codes	Concepts
Availability of e-health systems , having e-health frameworks 24 hours a day, offering of e-health systems across various departments without confinements, to provide all healthcare institutions with e-health applications, experience appropriate e-health services as prompt as you need them	Availability of e-health systems
Accessing e-health services, access to patients reports, prompt access to patients data and integrated modules, guarantee important access to e-health services frameworks, guarantee simpler reach to e-health frameworks, stakeholders access to all e-health applications with ease, ease in mining of the patients data	Accessibility of system
Quick reaction to e-health systems, willingness to help patients and patient's care givers, providing prompt service, prompt responsiveness , prompt response to query searches and feedback	Responsive system
Follow up of e-health services, checking before a transaction is done and after, track our patients data over the network without difficulty, to see exactly the service rendered, follow up mechanism and continuity of care	Traceability of services
To fit the specific health institution's needs, adapting to changes in stakeholders needs, increment patients' qualities, focus on specific request, contextualise to particular healthcare institution, conveyed in light of patient's needs, giving more context centered services, reflecting desires of different stakeholders.	Context -focused systems
Offering online support to various e-health stakeholders, give operational support, specialized online e-health services, keep up with latest online e-health services, high quality and level of on-line quality e-health services for transmission of patients data.	Online service support

Labelled Codes	Concepts
Security of the data over the network, availability of controls and passwords, accuracy of the data, confidentiality of the data, ethical values, electronic signatures, encryption of data, malware protection, issues of cyber crime	Security of the data
Interoperability of the systems, integration of various modules in the institutions, sharing of data among many health institutions. Have a standard that guides the sharing of data among institutions	Interoperability and sharability
Organisation needs growth, data requirements grows, needs of stakeholders change often. Inclusion of new modules to cater for the growth, flexible modules	Scalability
critical to distinguish and depict adequate terms of e-health system, portraying the meaning of the e-health frameworks, contain subtle elements of how service are doing, a point by point portrayal of the e-health services, comprehension of e-health services, offering direction on the essential standards of e-health frameworks	Well-defined services
Empowering better correspondence with every one of the stakeholders and users, access to criticism without limitations, encourage Knowledge sharing among different stakeholders, provide for feedback mechanism	Interactive services
Its important for the e-health systems to be easy to use and learn, user friendly interface, easy to manipulate, easy to navigate, has help button to assist users,	User friendly service
Every user needs to have the right hardware and software to use, availability of the internet and connectivity, updated software, obsolete hardware, bandwidth, communication gadgets	Adequate infrastructure
Back up of the data is necessary to guard against losses, what measure are put in place to back up the data for availability and future use, cloud services, secondary back up, external drives virtualization, primary and secondary back ups	Back up mechanism to protect the data from loss
The system needs to meet the needs of users at all times without experiencing major disruptions. The e-health systems need to be reliable, meet the specific user requirements at all times	Reliability

As the researcher familiarised herself with the area, data was gathered selectively and it concentrated on the developing classifications or categories. Taking after Corbin and Strauss (2015) theoretical sampling was embraced where data was collected to elucidate the classifications or categories, which when complete mirrored the interviewees 'encounters and produced a comprehension of the phenomenon of e-health implementation.

A word tree showing the development of the quality of e-health systems category is shown on Figure 4.1 as an example. Word trees are used in NVivo to search for words and phrases in the document then visualize results in a tree like diagram. They show the context surrounding categories from across the data and discover recurring themes and phrases that surround a category of interest. The researcher used the same procedure throughout the document to generate other word trees for other categories and formulate explore diagrams.

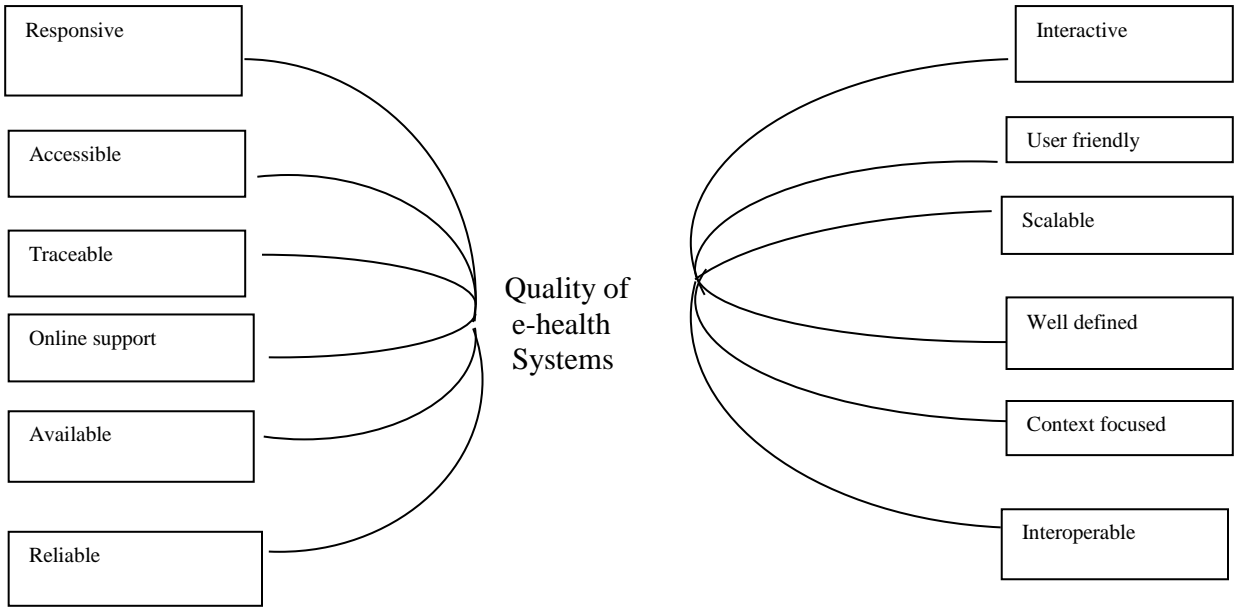


Figure 4.1: Word Tree on Quality of e-health Systems

The following explore diagram (Figure 4.2) shows the diagrammatical development of quality of e-health systems category for instance. The explore diagram lets the researcher explore the connections between the concepts visually and how they relate to the central category. In addition they are used to quickly and easily discover the relations that are forming in the data as the researcher moves through the analysis. The researcher used the same procedure to generate other explore diagrams for other categories throughout the document.

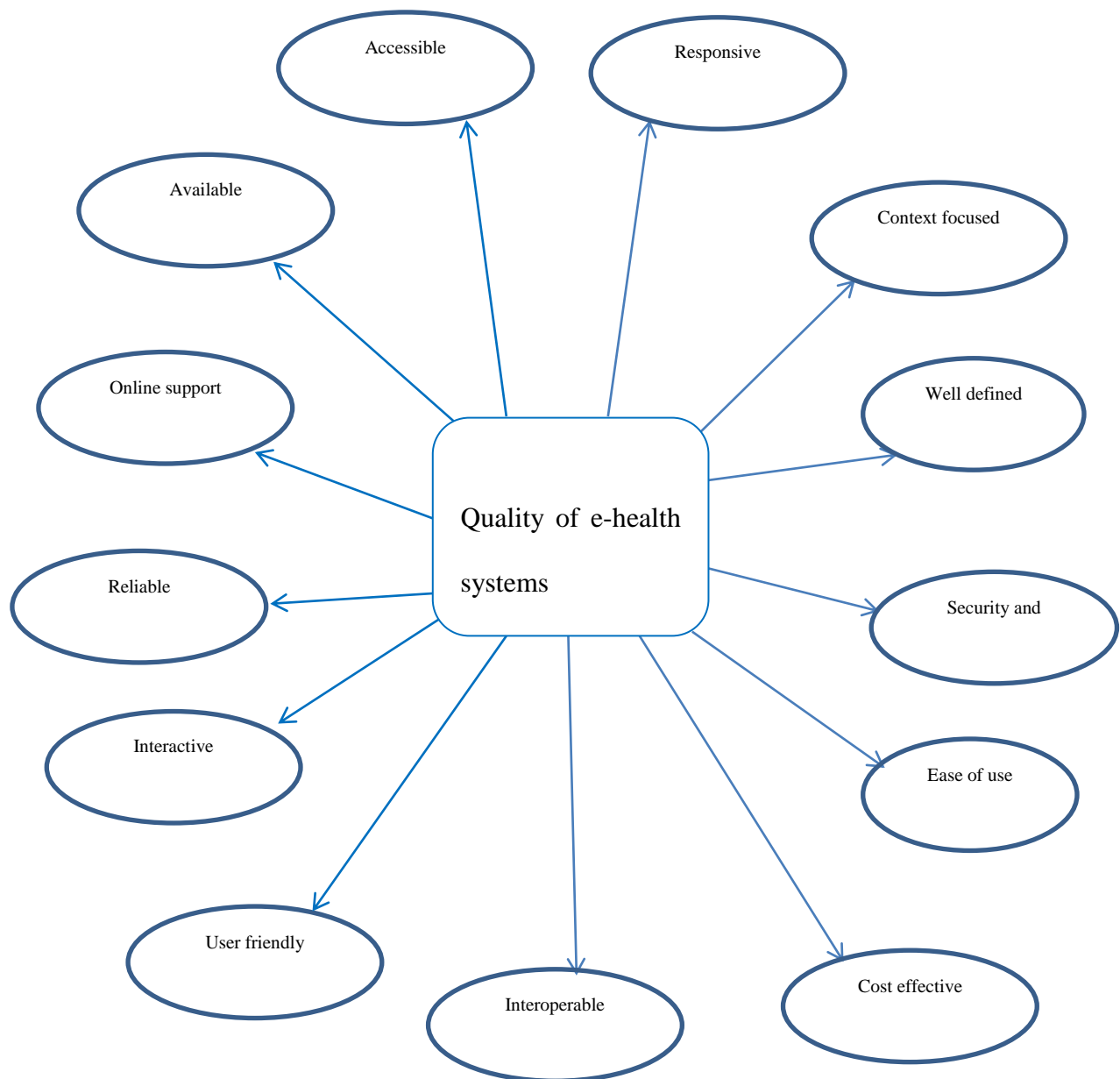


Figure 4.2: Diagrammatical Emergence of the Quality of e-health Systems Category

Consequently following Bryant, (2007) when the second phase of axial coding was accomplished, using selective coding, the association between categories and their properties were evaluated further in order to build up the theory. All the thirteen categories were named and are introduced in Table 4.4 which were coded into the emergent categories and their properties.

All emergent categories and their properties are summarised in Table 4.4

Table 4.4: Emergent Categories and their Properties

Emergent Category and the properties		
Quality of e-health systems	Benefits of e-health systems	Macro political environment
superior and improved services, available 24 hours a day, service responsive time, more patients focused services, provide immediate support when necessary, reliability, user friendly, interactive, interoperable, scalability, well structured, well defined, accessibility, security, comprehensive services, service improvement, prevail over the problem of interaction, data sharing and integration, back up, save money, interactive	accurate diagnoses, accessibility, interoperability expert diagnosis, Increases timeliness of treatment , supports real-time treatment , National planning for the population ,Empowered citizens, Increased productivity, efficiency and minimized costs, Governments becomes more responsive to health needs, Equitable and accessible healthcare to all citizens	Poor history of IT implementation in the healthcare sector, societal and economic development , foreign donor funds ,poor partnership with private sector and public sector, lack of constant funding, low political good will in sector, insufficient knowledge about e-health, embedded corruption, ROI is lower in healthcare
Systems integration	Legal environment	Socioeconomic environment
Lack of proper coordination between national and county government hospitals , incompatibility, reengineering of organisational operational procedures, absence of standards to share data, interoperability problems, lack of synchronisation between systems, lack of integration of donor funded systems and local systems	Lack of an enabling legal environment for e-transactions, obsolete set of laws, weak legislations, absence of laws and rules concerning online sharing of patients data, inadequate e-laws for online transactions, lack of patient data security laws, lack of enforcement of the existing laws, penalties lacking, lack of accountability, liability	Purchasing power, increased population growth, growing digital divide, uneven distribution of resources, generation gap, high poverty levels, low literacy levels, ROI, demographic characteristics, low income rate, sustainability. Equity and access

Change process management	Organisational efficiency	Online safety and security
Absence of commitment for change process, negative perception of employees to process, weak change procedure planning, lack of participation in change management procedure, inadequate resources for facilitating the process, resistance to the process, absence of campaigners and advocates in the institutions to actualize the process, lack of continuity plans, lack of stakeholders involvement in the design and development of the system, complacent management, Disconnect between policy and implementation, lack of IS leadership champion	Lack of senior management backing, poor innovative orientation, absence of accountability in the organisation, lack of public private partnership, interdepartmental conflict, organisational bureaucracy, foreign donor projects, bureaucracy in the supply chain, Strategic orientation of key stakeholders in the project, unrealistic expectation ,Lack of clarity regarding specific costs, trust issues, Conflict of interests, organisational politics, self interests, management complacency,	Privacy and security, absence or weak system authorization, ICT security sensitization, inadequate training, alertness of Internet security, absence of intrusion detection systems, discretion of patients data, poor system audit, poor identification of users and authentication, lack of access control measures , information safety, risk assessment, data security, network protection, management complacency, lack of tight security procedures.
Technology factors	ICT competence	Social Cultural factors
Interruption of internet, cost of electronic services, inadequate human capacity for information processing, poor national telecommunication platform, connectivity issues, inadequate hardware and software. Presence of out-dated technology, back up facilities, lack of standard, poor definition of users role, clients have poor definition of specifications, lack of clear e-health policies in implementation	Shortage of clinicians, Lack of qualified technical team ,Shortage of computer skills in health informatics among health professionals , Lack of computer training in health professional curriculum, high turnover of ICT personnel, technically inadequate expertise.	Lack of goodwill, fear ,depersonalise healthcare, threat to patient privacy, potential tool for interference, unemployment rate, poor e-culture, tendency to self-negotiation and face to face communication, inclination to antisocial behaviour, resistance, sabotage, staff ignorant , corruption
e-Standards		
lack of available standards, no legislation exists, standards do not address one unified area of technology, conflicting and overlapping standards, limited participation in standards, lack of importance of standards,		

4.2.2 Writing Memos

Essentially writing memos is a significant process for the researcher during the study. This is where the researcher writes the notes and the ideas linked to the codes and their associations which appear during the coding process (Martin, 2006). According to Charmaz (2000: p. 517), memo writing is

“the intermediate step between coding and writing the first draft of the analysis, however, it helps to define leads for collecting data- both for further initial coding and later theoretical sampling. Through memo writing, we elaborate processes, assumptions, and actions that are subsumed under our codes”.

Glaser (2001) accentuates the significance of the process by stating that “ignoring this process through the transition to coding in order to sort or write may not be considered as grounded theory” (p.83). Furthermore Glaser refers to memo writing as “the core stage in the process of generating theory, the bedrock of theory generation” (p. 83). Primarily, the use of the coding process for more than once led to overlapping and conflicting ideas that were formed by the researcher on the issue being explored. This is consistent with the one referred to by Strauss and Corbin (1990) that carrying out the coding process for more than once may “generate conflict between the ideas”(p.27), thus the memos that were written assisted in trailing ideas and concepts, and thus minimised the conflicts that may have occurred during data gathering. Moreover, writing memos coincided with open coding of data. This assisted the researcher to write down notes on the developing categories and associations between them. Furthermore memo writing is critical as it facilitates reflection,

comprehension, and analytical insight of developing data and evolving theory of e-health implementation. In this regard Charmaz (2006) pointed out on the importance of allowing a free mind in memo writing “let your mind rove freely in, around, and from a category” (p. 81) until the theory emerges.

4.2.3 Axial Coding

The focus of open-coding was generating categories and their properties and determining how the categories vary dimensionally. Axial-coding focuses on relating categories to their subcategories at the level of properties and dimensions (Fernandez et.al, 2013) and noting the dynamic interrelationships between categories to form the basis for theory building (Goulding, 2009). Strauss and Corbin (2008) refer to axial coding “as a set of procedures whereby data are put back together in new ways after open coding, by making connections between categories” (p.26). The researcher accomplished this by the data gathering and analysis, and memos that were made on an on-going basis amidst the study. In essence Denzin (2007) notes that axial coding inspects the saturated categories and gives systematic criteria to the researcher to aid in the improvement of connections between the categories, properties and their significance to the literature.

At this stage the researcher sorted the data, weaving the broken pieces back together to conceptualise associations between the suppositions derived through open coding (Bryant, 2007). In addition with the help of the literature and responses from the interviewees, the researcher categorized the codes under more abstract higher-order concepts based on their power to elucidate as well as reduce the number of units to work on while increasing the analytic power (Clarke, 2009). Consequently once the researcher identified the concepts,

their attributes were explored in depth, and their characteristics dimensionalised in terms of their strength or weakness. The researcher laid out the properties of each category and their facets. Thereafter the core category was then linked to its subcategories (Kearney, 2007). Through statements about the nature of relationships among the various categories and their subcategories, the researcher was able to form accurate and inclusive explanations. The concepts under each category became its properties or explanatory descriptors. Further cues in the data were searched to denote how major categories might relate to each other (Martin, 2006). Finally the data was subsumed into a core category which the researcher justified as the basis for the emergent theory. Strauss & Corbin, (1990) refers to the core category as “the central phenomenon around which all the other categories are related” (p.116). A core category unites all the elements in order to provide an explanation of the behaviour under study (Goulding, 1999).

At this level thirteen subcategories were generated from the open and axial coding process. In addition, a single core category was reported frequently from the open and axial coding process. The core category constitutes the connection to the emerging 13 sub-categories, and consequently the reason for the phenomenon being explored. In this case the core category was implementation of e-health systems in Kenya. Suddaby (2006) contends that the categories rising up out of the initial phases of data gathering are preparatory and not conclusive, while the later phase relies on upon more purposeful data to enhance and reinforce the categories rising up out of the initial stage. Hence, the researcher familiarised herself more with the research topic where she was able to decide if the data was significant or not.

The thirteen subcategories included the following: benefits of e-health systems, quality of e-health systems, macro political environment, sociocultural environment, online safety and security, e-standards, ICT competence, technology factors, change process management, systems integration, organisational efficiency, legal and socioeconomic environment, while the results of the axial coding improved and strengthened the categories. Consequently the interviews were done until the researcher achieved the theoretical saturation point. As indicated by Charmaz (2006: p. 95), theoretical saturation refers to “comparative analysis of the data that is collected will continue until disclosure of all potential categories, the impossibility of finding new themes in the data, and most importantly, validation of the theory”. The table is a case delineating a part of the applicable occurrences that originated from findings. It shows some of the occurrences that came from the category of quality of e-health systems as an example. The same was applied to generate other categories in the document.

Table 4.5: Occurrences arising for the Quality of e-health Systems

ID	Occurrences
C3	I hope the e-health systems can be available 24 hours
C1	It is necessary that the systems are easily accessible from any institution
C4	In addition service response time is essential
C2	I hope that e-health systems allows us to track all the patients history
C5	There is need develop more organisation context focused system
C6	There is a necessity to provide immediate online support to users of the system
C17	It is important to ensure that there is security of the information assured over the network
C11	I hope the systems are scalable to accommodate future growth and diverse data processing needs
C12	It is important for the systems to support communication among all the stakeholders
C23	I hope the system will be reliable at all times when there is need to consult
These occurrences were assigned the code: quality of e-health systems often leads to influencing users perception regarding e-health implementation	

Data gathering and analysis was done simultaneously which prompted a few changes to the underlying categories. For instance, some underlying categories were changed to become more distinctive, and additionally the emergence of new categories not alluded to initially.

Table 4.6 Changes made to the Initial Categories

Initial categories	Final categories
Characteristics of e-health systems	Quality of e-health systems
Importance of e-health systems	Benefits of e-health systems
Political challenges	Micro political environment
Social cultural challenges	Social cultural environment
Social economic challenges	Social economic environment
Security	Online safety and security
Organisational change management	Change process management
System integration challenges	System integration
Organisational challenges	Organisational efficiency
Laws and regulations	Legal environment
Standards	E-standards
IT capacity challenges	ICT competence
Technological challenges	Technological environment
Implementation of e-health systems	Implementation of e-health systems

4.2.4 Selective Coding

Selective-coding is the process of integrating categories to build a theory and to refine the theory (Urquhart, 2007). Its purpose is to relate categories found in axial-coding to a core category which represents the main theme of research. Strauss & Corbin, (1990) explains selective coding “as the process of selecting the central or core category, systematically relating it to other categories, validating those relationships, and filling in categories that need further refinement and development”(p.116). At this stage the researcher sought to

integrate and develop the theory by creating relationship among the categories. Thus it was necessary to create a conditional and consequential framework as supported by Denzin, (2007) “analytic device to stimulate analysts thinking about relationships between micro and macro conditions both to each other and to the process” (p. 461). The framework helped the researcher to tell the story as narrated by the respondents showing the categories and their attributes and how they relate to the core category and how they affect the implementation of e-health systems.

The researcher used explore diagrams, word trees and review of memos to discover the central category and its relationship with the other sub categories. The process started after some categories had been discovered in axial-coding and continued with modification and refinement until a theoretical saturation was achieved (Matavire, 2011; Fernandez, 2013). After each step of coding (open-axial-selective), the researcher developed the multiple layers of categorized theoretical statements that became hypotheses for gathering data related to the statements. This was done during the subsequent step (Charmaz, 2011). This helped the researcher to decide the data that will be the focal point of conversation in the consequent interview, so the emphasis was on the researcher to identify appropriate respondents for giving such data significance to the theory that will be produced. This incursive process only stopped when no further modification was done and the theory was validated (Amsteus, 2014). The process continued by trimming off excess and filling in poorly developed categories until they were saturated. This was done through further theoretical sampling where the researcher was able to come up with well thought-out propositions for a theory on the comprehension process of implementation of e-health frameworks in Kenya.

From this discussion, the researcher was in quest to build up an applied model for understanding the implementation of e-health frameworks from various viewpoints in the healthcare arena. In spite of the accessibility of several options that can add in giving helpful information about this issue being explored, the researcher was cautious to select the most suitable and best able to supply information about concepts and categories rising from axial coding process, together with suggestions made by interviewees to the researcher to do so (Simmons, 2011; Charmaz, 2014). At this stage the thirteen sub categories generated in open and axial coding were assembled into 5 key points of view, in particular the political e-readiness, managerial practices, IS Capability, societal e-readiness and regulatory framework viewpoint, as the amalgamation of these viewpoints affects the achievement of implementation of e-health frameworks in Kenya.

The thirteen sub-categories that were recognized from the analysis of transcripts of the interviews are described in detail in the 13 subsections below. However the reader can take note that some responses are repeated severally, which contributed to the surfacing of other categories. The purpose behind this was that some of the reactions included more than one denotation and thus being considered would help the researcher get to more detailed exploration on the issue being explored that is implementation of e-health systems in Kenya.

The results were presented by giving instances of the reactions of those who were interviewed, where the reader can see how the evolving categories and concepts were grounded in the data and how they were a replication of the data that was gathered. The categories, including key concepts or attributes, were highlighted in detail regarding the interrelationships between them to conclude with the research model for this study.

Similarly the reader can take note that there is a variation in the distribution of the number of attributes defining each category. These variations emanated from the responses of the interviewees where the researcher had no control over the respondents narrations about certain matters as pertaining to e-health implementation.

4.3 Quality of e-health Systems

Various concepts identified with the quality of e-health systems were recognized from the reactions. These include: availability, accessibility, responsiveness, traceability, context - focused, well-defined, interoperable, online support, user friendly, reliable, security, well-structured, and interactivity. These ideas are depicted in Figure 4.3, where the shape of a rectangle stands for the name of the category, while the oval shape stands for the concepts or attributes that were gathered from the data with the end goal of generating this category. In addition, the direction of the arrow indicates the direction of the relationship between cause and effect, as this category has an effect on the decision to implement e-health systems. The rectangle figure stands for the core category, which is the objective related with the issue that was being explored that is implementation of e-health systems. The same was used to generate and elucidate other categories throughout the document.

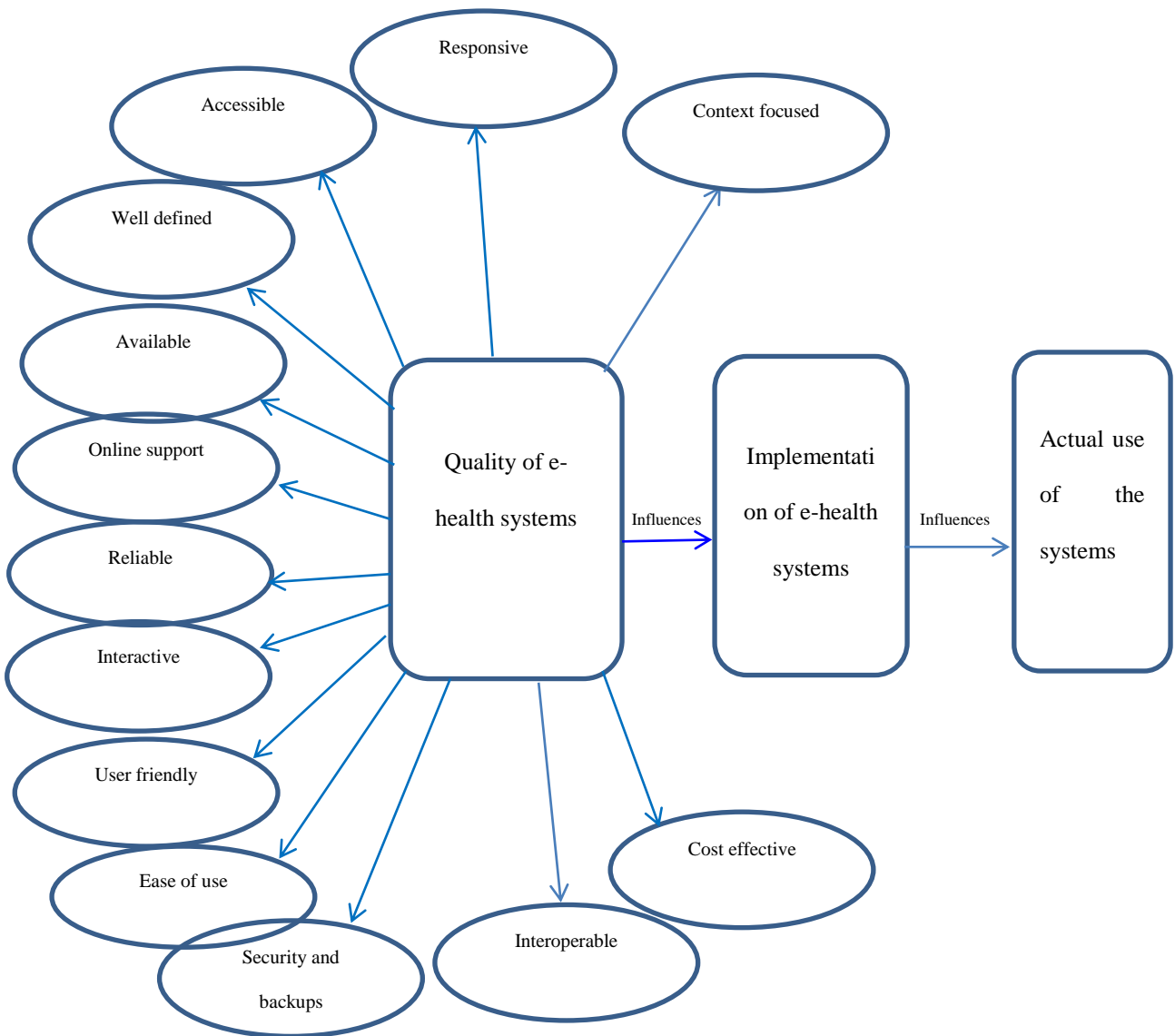


Figure 4.3: Quality of e-health Systems Category has an influence on the Implementation of e-health systems

The concepts that were identified demonstrated the quality elements of e-health systems. The reactions came from those interviewed reflecting the degree of awareness about the significance of making sure the quality of systems is a requirement for the successful implementation e-health systems. The concepts, namely, availability, accessibility, responsiveness, traceability, context -focused, well-defined, interoperable, online support,

user friendly, reliable, security, well-structured, and interactivity presented a helpful model to assist to describe, examine, and assess the extent to which they are meeting expected quality standards for maximum utilisation of e-health systems. In addition the framework is also a tool to establish whether the e-health systems achieve the most favourable utilisation as a result of the designs. For instance, some respondents stated that the e-health systems suffer from the lack of the concept of quality in the design of the systems which in turn affect their usage as well as the implementation of e-health systems. The following are extracts from the respondents in support of this argument:

“We are well aware that the quality of e-health services are not up to the level of the dream of every user , but innovativeness may make the dream come true” (C13).

“I believe that the starting point should be by seeking for alternatives to existing policies to provide Kenyans with better and improved healthcare services. However if the e-health system were to be operational they need to be easily accessible and available at all times of need” (C2).

“Also, service response time is important for us especially in matters of dealing with peoples lives” (C1).

“Despite the presence of a few systems in the institution we are yet to experience a fully functioning e-health system. The expectations would be that the systems would have be interoperable and well structured. This would go a long way in the supporting data sharing among institutions” (C8).

“Security is paramount when we talk about passing data over a network. Thus there is need to have systems that protect the patient’s information so that confidentiality is maintained as well as addressing issues of emerging security solutions. Furthermore backup mechanism goes hand in hand with protection of the data” (C9).

“Communication amongst various stakeholders is very key in enhancing decision making. The systems need to be interactive to support this aspect” (C5).

“Meeting user requirements are key to any success of the system. Thus it should be customised to suit the particular context of the organisations need. In most cases things are done the way round and in this case the system would be bound to fail”(C6).

“The system should have its sufficient documentation to facilitate ease of use” (C15).

“There should be online support that assists users in solving problems when needed to do so. This helps in technical support during use of the systems” (C7).

In the same context, other respondents were having mixed views about whether the quality of e-health systems will affect implementation of e-health systems or not:

“we should not be discussing quality of the e-health systems first since these systems do not exist in the first place as they exist in theory but not in practise. Thus I feel that quality may not be a key issue to implementation of the systems in this case” (C4).

“I am not sure how quality of e-health systems would be related to its implementation however the system needs to have user friendly interfaces for easy navigation” (C3).

Essentially it was observable that there was an agreement on the significance of considering the element of quality in the expected e-health systems to be used in every organisation. Thus the researcher noted that the quality of e-health systems was among the success indicators that may contribute towards effective implementation of e-health systems in Kenya.

4.4 Benefits of e-health Systems

A number of concepts linked with the benefits of e-health systems were identified. These include increased productivity, more accurate diagnosis, cost reduction, assists in national planning, accessible and equitable healthcare, time saving, enhanced decision making, efficiency and effectiveness, empowered citizens, and a responsive government. These concepts are described in Figure 4.4.

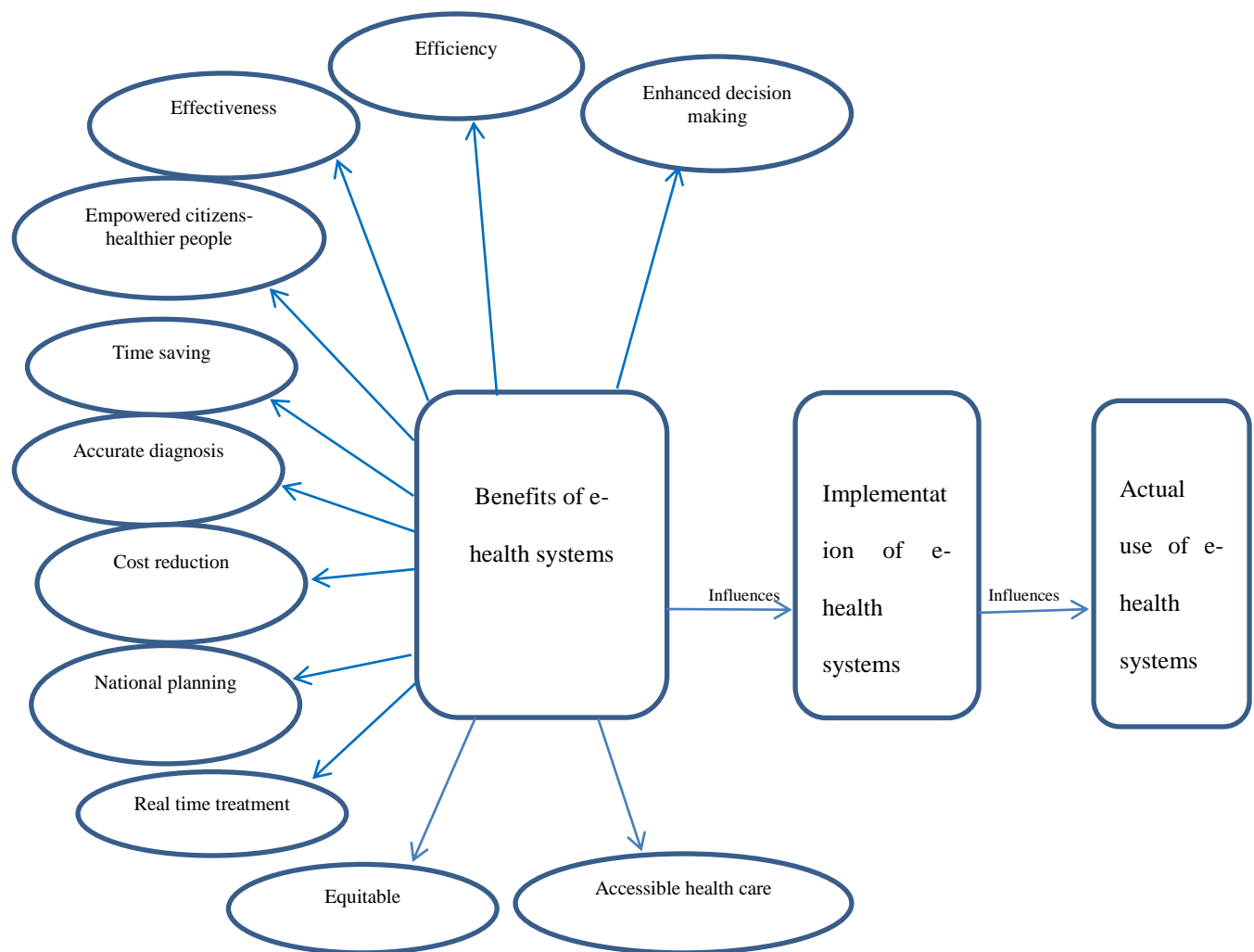


Figure 4.4: Benefits of e-health Systems has an influence on the Users Perception about e-health Systems thus on the Implementation of the Systems

The concepts that were identified revealed the benefits of e-health systems which is crucial in persuading users in accepting the e-health systems. Perceived usefulness among the users plays a key role towards dealing with resistance of e-health systems. The reactions came from those interviewed revealed the level of understanding about the benefits of e-health systems. Acknowledging that they are aware of the benefits then this shows that they have an idea of what hinders the effective implementation of e-health frameworks. Furthermore this demonstrates that they appreciate what technology can do in improving healthcare

management. The concepts, namely increased productivity, more accurate diagnosis, cost reduction, assists in national planning, equitable healthcare, time saving, enhanced decision making, efficiency and effectiveness, empowered citizens, provided a helpful model to aid in describing, examining, and assessing the extent to which these benefits are directly or indirectly affecting the utilisation of e-health systems and improving healthcare service delivery. Additionally the model is a tool to establish whether the e-health systems are of any significance to the organisation or a mere cost spending venture. Indeed the respondents were in agreement that the e-health systems are more beneficial than manual systems thus were eager to have working systems. The following are extracts from the respondents in support of this argument:

“E-health is primarily application of ICT applications in healthcare delivery. This would provide greater, and faster, access to a patient’s medical history, reducing poor response to courses of treatment. This would result to a healthier population” (C11).

“They would facilitate earlier - and more accurate - diagnoses. This would reduce the morbidity and mortality patterns across the nation” (C1).

“It would improve interoperability between systems and data sharing among institutions. This would help the government in planning for trends and patterns of diseases” (C22).

“Allows rural residents to receive expert diagnosis and treatment from distant medical centers especially through telemedicine” (C7).

“Though the initial outlay is high on the other hand it Increases timeliness of treatment while reducing medical costs” (C8).

“Sharing of data across institutions would support real-time treatment” (C10).

“The data available from the systems would support the government in National planning for the population on trends and patterns of diseases” (C25).

“Since the patient websites will be available to the patients at large. That would lead to a more empowered citizen managing their personal health” (C3).

“There will be increased productivity, efficiency while minimizing costs at the same time” (C15).

“Governments will be tasked to become more responsive to health needs of the population”(C6).

“It would lead to a more equitable and accessible healthcare to all citizens” (C4).

“I feel that the use of health systems will save our money and time for both care givers and the patients as well the organisation at large”(C29).

“Often I find it difficult to consult with my colleagues about management of difficult cases along the practise but telemedicine for instance this would be made much easier” (C14).

“Let me say am so tired with seeing the way manual processes dominate our health facilities yet the financial institutions are almost paperless. Why can't the same happen in health surely” (C21).

“I strongly feel e-health is the way to go in this era of improved patient care”(C21).

Nonetheless it was apparent that there was an agreement on the significance of implementing e-health systems in Kenya. Fundamentally the responses above demonstrate that the stakeholders appreciate the immense potential e-health systems have towards improvement of healthcare delivery in the sector thus its usage is highly desirable. The respondents were then asked about their experiences in e-health systems in their organisation. The concept's associated with this category included start up, minimal, read it on paper, initial stages, more theoretical than practical. These were critical to helping the researcher understand the level of implementation of e-health systems in the country. These sentiments were echoed by a number of respondents in the following narrations

“The only contact I have had with e-health applications is only the use DHIS which is a reporting tool for the organisation data” (C1).

“To be honest i have read very good papers about the benefits of e-health on the internet but in this particular institution but the closed that we practise is manual systems” (C9).

“E-health is not a new terminology as have been involved in the design of the policies and strategies that are to be used” (C27).

“Yes I have interacted with electronic records management application for management of patient's records at the outpatient level” (C5).

“We have a donor funded system that is used to capture biodata for the patients and used for compilation of statistics” (C21).

“No idea of how e-health works practically just in theory from books” (C2).

“Its true we still at start up and dealing with many implementation challenges” (C8).

“Most of the systems are still manual but attempts are being made to automate patient’s records. So I would say we are at start up essentially but the journey has begun” (C13).

“We are fairly advanced in technology with most of these e-health applications being used in the institution however we do not share data with other health facilities” (C23).

“let me be frank there too much talk about e-health systems and practically no real application. Let our facilities get a little serious for once” (C24).

Thus it was clear that there was an agreement that the implementation of ICT in the healthcare it’s still at start up with many of the respondents indicating that most processes are still manual. Generally this is more prevalent in the case of public sector and faith based institutions. This argument was supported by respondent (C13) in this category. In contrast, there was a variation in the responses when it comes to the private sector that has interacted with various applications of e-health in management of their patients. However these private sector institutions do not have interoperable systems that can share data across all health facilities in the country as indicated by respondent (C23). Typically they maintain their own fragmented discrete systems that are not integrated with other healthcare institutions. This demonstrates that e-health implementation is still a work in progress in the wider healthcare sector today in Kenya.

4.5 Macro Political Environment

A number of concepts related with the macro political environment were recognized from the responses. These include: poor history of IT implementation in the healthcare sector, social and economic development, foreign donor investments, poor collaboration with both private and public sector, insufficient funding, conflicts of interest, low political goodwill in sector, inadequate knowledge about e-health frameworks in the region, embedded corruption, ROI is lower in healthcare than other sectors therefore entrepreneurs are reluctant to invest in the sector. These concepts are described in Figure 4.5.

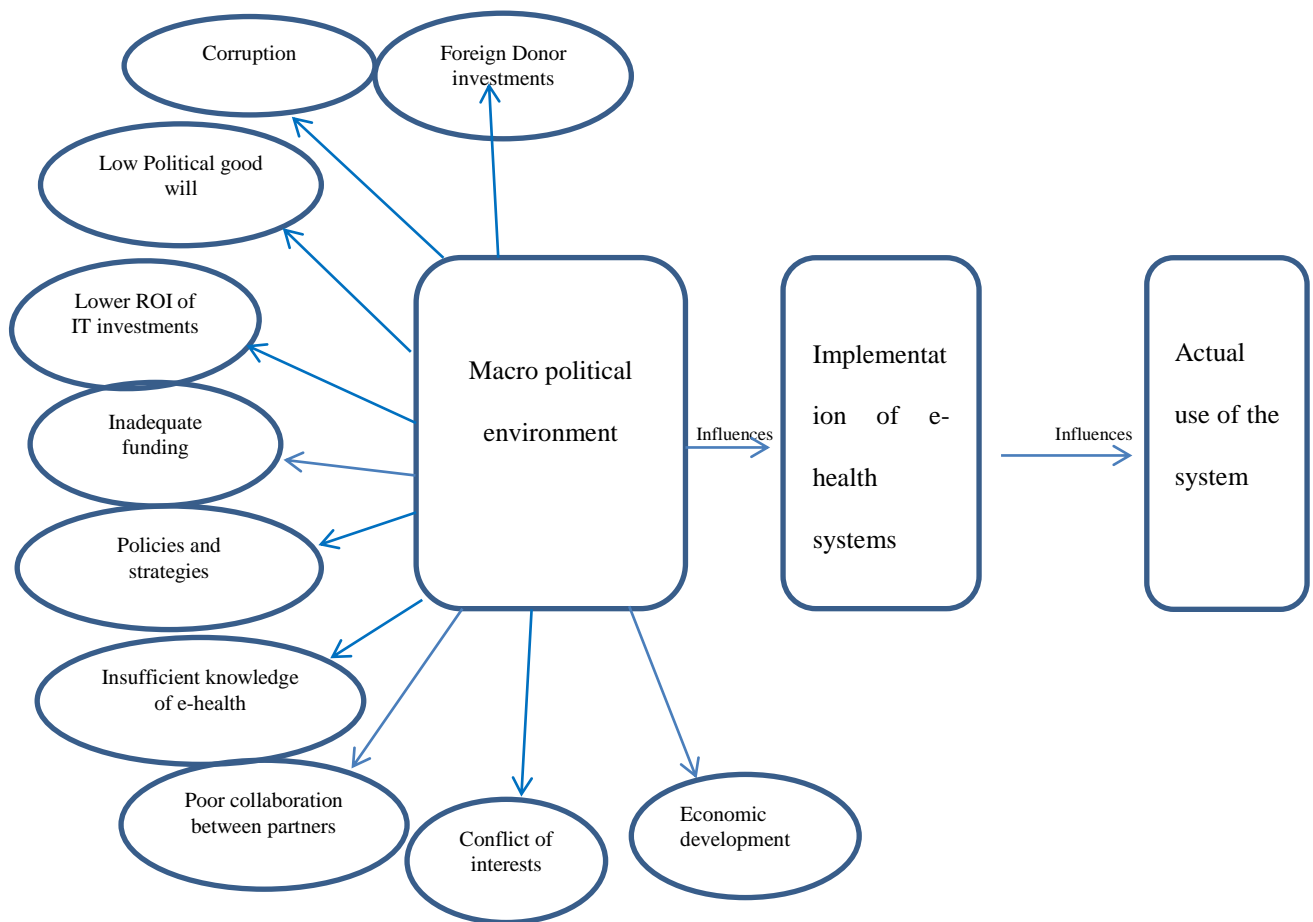


Figure 4.5: Macro Political Environment Category has an influence on the Implementation of e-health Systems

Largely these ideas that were generated mirrored the macro political impact that may have an effect on the implementation of e-health frameworks. The reactions originated from those met mirroring the level of mindfulness about the requirement for changes in the political arena as a necessity for the effective implementation of e-health frameworks. The ideas, specifically poor history of IT implementation in the healthcare sector, social and economic development, foreign donor investments, poor collaboration with both the private and public sector, inadequate funding, low political goodwill in sector, conflicts of interests, insufficient knowledge about e-health systems in the region, embedded corruption, ROI is lower in healthcare thus investors are hesitant to put resources into the segment gives a valuable structure to help with distinguishing, investigating and assessing the development of an enabling political environment where public and private organisations would cooperate to booster e-health implementation frameworks. In addition the structure is additionally a tool to decide if the macro political issues are sufficient enough to booster the implementation of e-health systems, or not as well as assess if political goodwill would support the implementation of e-health systems. For instance, some respondents stated that the political stability is a key to implementation of IT, in healthcare sector. The following are extracts from the respondents in support of this argument:

“However, political stability attracts foreign direct investments, particularly investments in information technology” (C22).

“I agree that political stability has contributed greatly to the attracting foreign investments in the country though little is felt in the healthcare sector” (C26).

“Let me say that this bickering by the politician’s is not too good for the country. The foreign investors are very cautious on investing in the country especially in healthcare” (C11).

“No investor would be comfortable in investing in a country that has riots now and then. The risks would be very high” (C8).

This may be attributed to among other things lack of solid economic impact of e-health in the country. This is because the return on investment is lower in healthcare than other sectors therefore entrepreneurs are very reluctant in investing in e-health systems.

“There is lack of clarity regarding specific cost benefit of e-health systems to all stakeholders” (C13).

“Generally there is a perception of IT being viewed as a cost centre rather than a strategic enabler” (C6).

“Let me say there are no direct benefits in investing in healthcare as opposed to other sectors therefore the politicians would be reluctant in supporting health project” (C3).

Some respondents stated that one of significant challenges facing the implementation of IT, in healthcare is the lack of good political will. This is demonstrated by lack of commitment to the project by the political environment.

“Low political good will make the implementation of information technology harder and harder” (C30).

“There is no political goodwill to support the project which leads to poor governance and leadership” (C25).

“It is not easy for politicians, wherever they are to break the bureaucratic barriers because they think they will lose a lot of the tasks entrusted to them” (C12).

“I agree with politicians it is about self gain first then the country gains later, e-health may not give them a mileage that may translate into votes thus they may have slackness in supporting the e-health project per se” (C4).

“Unless something is benefitting the politicians directly then counting on their support is expecting too much” (C16).

Similarly in the same perspective, others attributed the differences in political interests and alignments to the unequal distribution of resources. In addition the politicians IT orientation was cited as a barrier too. The respondents felt that these differences affected the political goodwill to implement e-health systems in the sector:

“Not all politicians are eager to facilitate the implementation of information technology in the healthcare sector; each one has a different agenda seeking to it” (C27).

“Different agendas of politicians may be affected by their educational background” (C4).

“Some of them have little knowledge on how technology can be applied in healthcare therefore may be reluctant to support the e-health project” (C8).

“Few of them fully understand how IS can be beneficial in healthcare” (C20).

“Differences in the political interests has an effect in resource allocation especially when it is about electronic resources” (C3).

“The issue of resources allocation is among the factors that affect the decisions of politicians in policy making” (C6).

Besides others felt there is an element of corruption where by the personal interest override the public interest thus affecting implementation of the systems:

“There is an element of corruption where by there too many interested parties” (C28).

“Most leaders are not motivated by the public gain but personal interest from the project” (C5).

“Personal gain overrides the project gain” (C25).

“Many of them would be pushing for the tenders to be given to their preferred affiliates thus may choose to sabotage the project especially where the friends are not lucky in being awarded the tenders” (C25).

“I cannot agree more our leaders are guided by self gain what is in it for me. How do I benefit first. Unfortunately in healthcare the benefits are minimal as it does not translate into votes” (C18).

Consequently there was a consensus that the budgetary resources granted were not adequate to ensure the implementation of the e-health in the sector and as such the sector has to rely on donor funded projects on one hand. These projects come with their own conditional clauses thus integration of these systems with various institutions becomes difficult;

“let me admit there are budgetary constraints, the government is willing but not able. The available funds are given to priority areas whereas e-health is considered a luxury than a necessity” (C6).

“The government relies on donor funded projects in the sector. These donors are conditional projects that are meant to serve the needs of mother countries. So most of these donors funded systems are unwilling to integrate with the local systems to share data or even share their infrastructure with the local institutions” (C14).

“There is poor coordination from development partners which results to many fragmented systems that exist that are meant to serve certain donor driven needs. Resources used to set up these systems would be helpful if there was cooperation and coordination in the design and implementation of these fragmented systems thereby reducing costs of infrastructure” (C2).

“The government lacks leverage when dealing with development partners which leads to fragmented system. Because of financial reliance on the donors the government is compelled to accept the donor conditions. The donors are very reluctant to integrate their systems with the existing systems” (C7).

“Most NGO’s’s are unwilling to work together or even share infrastructure resources and funding because of the policies from mother countries” (C1).

“Since the government is constrained finance wise they have no option but invite in donors who come up with conditional grant”(C9).

Whereas others felt there is poor coordination between national and county institutions which creates a barrier in implementation of the systems

“There is poor coordination between National and county healthcare institutions. As a result there is poor system mapping at both level of governance” (C9).

“Most county healthcare facilities are unwilling to liase with the national health facilities” (C11).

“The devolved structure has created mapping of countys which results in poor coordination between the county health facilities and national hospitals as well. This would affect system integration among all healthcare facilities” (C10).

“The devolved structure has resulted in minimal consultations among the different tiers of government thus even sharing of data or expertise would be difficult” (C7).

Lack of proper trust and cooperation between public and private institutions to share data also featured significantly as a barrier to implementation of the systems;

“I think there is lack of proper trust and cooperation between public and private institutions to share data” (C6).

“There is need of setting up systems that can share data. for example in the United States private hospitals such as John Hopkins Medical School reports their workload to CDC unlike in Kenya where the private hospitals do not report their data”(C6).

“The DHIS currently does not capture data from private hospitals which leads to under reporting, poor interventions and policy formulation” (C11).

“This is because of absence of a law that exists to compel the institutions to report the data or any penalty spelt in the law” (C4).

“I believe private hospitals are not special in any way. Why don’t they report their data? Who should compel them to do so? In that case how can we achieve system integration between all private and public healthcare facilities? Is this achievable really, I truly doubt” (C23).

Accordingly it was observable that there was an agreement on the significance of having an enabling political environment and political goodwill as a necessity for the successful implementation of e-health frameworks. For instance, the majority of the responses expressed that guaranteeing an enabling political environment is related with the following concepts: political stability, support, willingness, goodwill, and evenly resource allocation. Fundamentally based on the reactions, the researcher noticed that the improvement of conducive macro political environment is amongst the important indicators for the implementation of e-health frameworks in Kenya.

4.6 Socio Cultural Environment

A number of concepts linked to the socio cultural environment were recognized from the responses. They include corruption, lack of goodwill among the clinicians, they view IT as time consuming, they fear it will depersonalise healthcare, view that it is a threat to patient privacy and a potential tool for interference in their practise, increased unemployment, lack of e-culture, IT illiteracy, corruption, tendency to self negotiation and face to face communication, inclination to antisocial behavior, tendency to resist and sabotage the process, staff ignorance of what they want. These concepts are described in Figure 4.6.

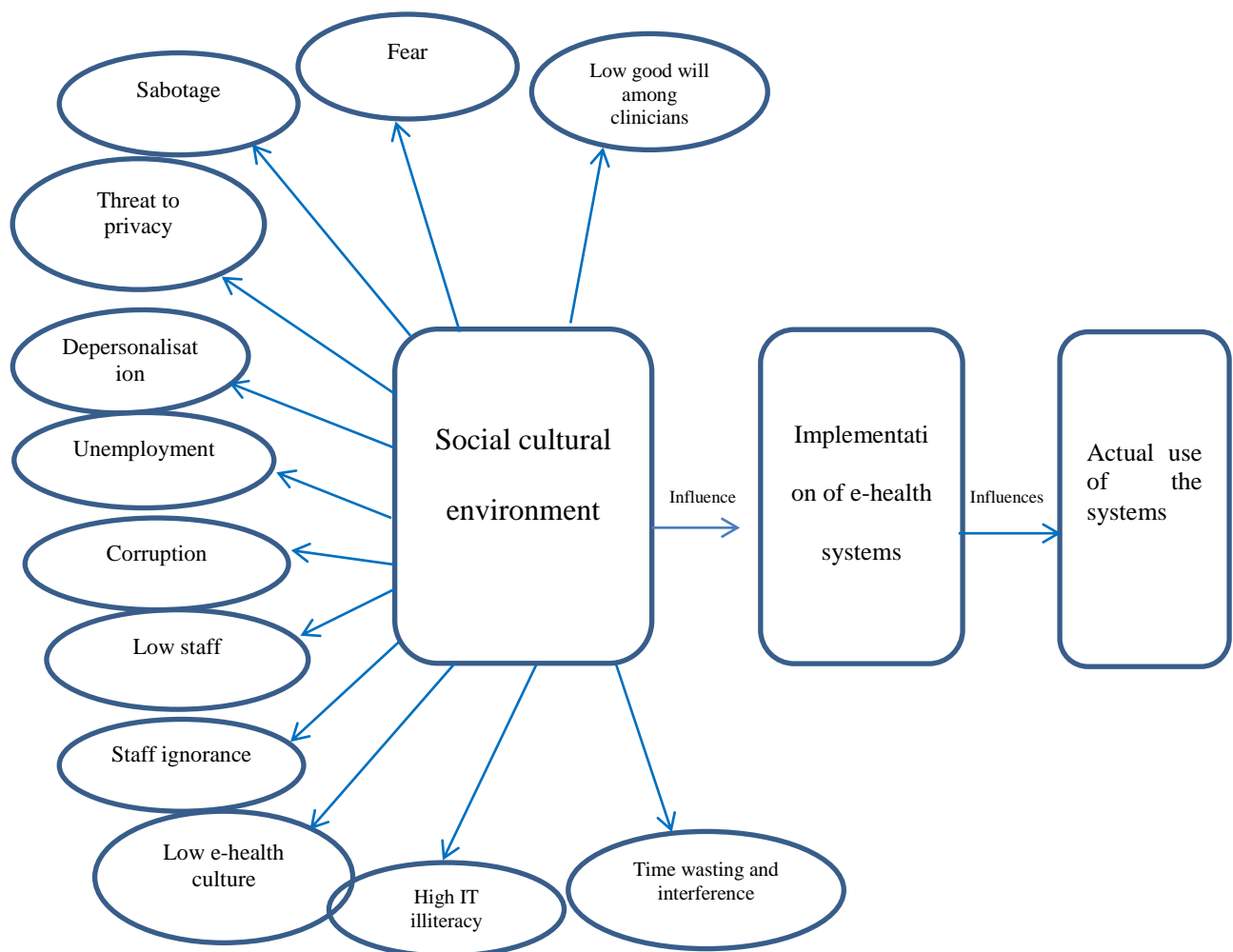


Figure 4.6: Social Cultural Environment Category has an influence on the Implementation of e-health Systems

The ideas that were acknowledged mirrored the social cultural factors that may affect the implementation of e-health frameworks. The reactions originated from those interviewed mirroring the level of mindfulness about the requirement for changes in the socio cultural conditions as a prerequisite for the fruitful implementation of e-health frameworks. The ideas generated specifically: corruption, lack of goodwill among the clinicians, they view IT as time consuming, they fear it will depersonalise healthcare, a threat to patient privacy and a potential tool for interference in their practise, increased unemployment rate, poor e-culture , tendency to self negotiation and face to face communication, inclination to antisocial behavior, tendency to resist and sabotage the process, staff ignorance gave a helpful structure to help with distinguishing, breaking down and assessing the socio cultural conditions that may influence e-health implementation. Furthermore the model is additionally a tool to decide if the socio cultural setting is sufficient enough to affect the implementation of e-health, or not. For example, some interviewees indicated that there was presence of corruption in the institution, and e-health will just facilitate the problem further. The following are extracts from the respondents in support of this argument:

“Even with e-health corruption will remain or probably increase because it has become a culture nothing else in this society” (C29).

“Despite all the calls to eliminate the rampant corruption in the country, solutions such e-health might be exploited to increase corruption and not enhance patient management” (C9).

“I do not deny the existence of corruption in our institutions even with the manual system so IT can only enhance it” (C3).

“I have major concerns that there a likelihood that technology might just be used to promote corruption instead of helping the patient” (C3).

Additionally others respondents said that they were afraid that technology would make them loose social contact with their patients in the management of illness;

“I have my own reservations that technology will depersonalise healthcare and more specifically will interfere with the rapport with the patient” (C16).

“Despite the benefits of e-health it has a likely hood of denying the caregiver the social touch with the patients” (C8).

“I do not disagree that e-health is likely to make us disconnect socially with the patient” (C4).

“I believe technology will make us loose social contact with our patients which is very critical to their healing” (C29).

“Let me say patients care is holistic and social contact is primarily one aspect of promoting faster and better care. Now with introduction of technology this particular aspect might be obstructed. Most patients actually get better immediately if they have one on one with the care giver” (C27).

A few others viewed e-health as an interference to their busy working life and therefore are too busy to deal with it;

“I view e-health as being time consuming and an interruption in our busy schedule” (C29).

“It is generally a threat to patient privacy and confidentiality”(C25).

“It’s a potential tool for interfering with our practise” (C30).

“E-health may just be a waste of our practising time” (C29).

*“In most cases these systems are always down thus wasting too much time”
(C3).*

“Its easier to write on the manual file than the screen” (C23).

*“I think it is good to concentrate on treating patients and not managing
technology which is our core mandate” (C2).*

*“I believe we do not have extra time to learn how to use technology as well as
treat patients”(C28).*

Many agreed that there was fear of change which resulted in resistance to the technology as they were afraid that IT would take over their jobs;

“Most people fear the interaction of technology” (C29).

“People do not feel comfortable in accepting change” (C5).

*“I feel uncomfortable voicing disagreement about technology so I may just
sabotage it” (C4).*

“People fear that technology may take over their jobs” (C3).

“We have always done things manually so how will technology help us” (C14).

“I do not disagree that I have fear about what change portends to the institution” (C14).

“Many agree that technology may replace their jobs so they might be hesitant to support it” (C4).

In addition others indicated that the users expectations are not well defined thus meet their expectations

“Users expectations are not always met which leads to resistance or sabotage” (C20).

“We are not sure of what we want as users” (C28).

“The few applications that we have interacted with do not fully meet our needs therefore we not sure how this could be addressed if e-health was to be functional” (C28).

Besides others stated that they did not have the right training and skills to operate the e-health system which might act as a barrier towards technology implementation;

“Most of us do not have an idea on how to go about navigating the systems” (C27).

“I do not have the basic skills to operate the systems and so are my colleagues” (C28).

“Most of us lack training in informatics as this was not embedded in the curricula in college” (C7).

“I believe we do not have all the time on earth to start learning new things other than medicine”(C29).

“For instance how do I enrol for an IT course at this level now? It’s almost impossible to be honest. Therefore the skills to operate the systems are lacking and time for training is a factor” (C29).

Past experiences regarding the implementation of technology was mentioned as a hindrance to the implementation as some respondents did not want a repeat of the previous experiences.

“Previous attempts to automate the hospital failed, so I do not trust any attempts of the same type” (C5).

“Lack of organisation commitment to real change was behind the failure of all previous attempts” (C4).

“This may never work here in Kenya just in theory” (C7).

“I think the concern of the stakeholders should be how to make treatment available to all and now introducing complicated technologies to us that may never work” (C19).

“Is it another cash cow for eating some money” (C16).

Majority of the respondents were of the opinion that the implementation of e-health would increase the proportion of unemployed people in Kenya. This argument is supported by the following narration.

“With technology we could easily be retrenched, and this is not fun” (C5).

“I think that the use of IT threatens opportunities for employment” (C7).

“Technology and unemployment are two sides of same coin” (C3).

Others viewed e-health as a threat to patient privacy thus expressed their reservations about using it. This may be a barrier to implementation of e-health systems;

“How safe is the patient data over the network” (C24).

“Will confidentiality of the data be assured as we use these systems” (C17).

*“I feel that the e-health will infringe on the privacy of the patient greatly”
(C22).*

“Who is liable for the breach of confidentiality of the information?” (C2).

*“I think use of e-health is good but security of data online needs to be guaranteed”
(C2).*

“Have you addressed the emerging technologies and security of data” (C8).

*“I believe for health to be successful the stakeholders need to address issues of
cyber crime and security of patients data on the network. Without which users
will remain adamant on utilising the technology” (C8).*

A number of the respondents indicated lack of goodwill among some stakeholders. In the same context they said they can only agree to use the systems if they are assured that they are working perfectly;

“We are not sure that these systems will work best for the interests of the patients” (C10).

“I think we can only use the system if we are assured that they will work perfect” (C1).

“I do not disagree that the system can only be effective if they work well for us” (C6).

“I strongly feel that there is no good will among the top management in rolling out the health systems. Thus it might be difficult for the junior staff to completely accept the project if their seniors are reluctant towards its implementation” (C17).

Necessity of having pilot programs for e-health was emphasised. These can be utilized to impact skills to the users on the utilization of e-health systems:

“Why, then, can’t users have the opportunity to pilot the e-health systems before it’s rolled out on a larger scale” (C12).

“Pilot projects would be the only way to buy users into accepting the implementation of the system” (C12).

“Pilot projects would go along way in meeting the defined user’s needs thus reducing the chances of sabotage from the users” (C4).

“Pilot services may enhance the knowledge of users of the new system and thereby increase the confidence towards the implementation and use of e-health systems” (C1).

Subsequently there was an agreement on the significance of the socio cultural conditions in affecting the implementation of e-health frameworks. According to majority of those interviewed, socio cultural values, practices and norms influence the attitudes towards the implementation of e-health systems. For example, the reactions concentrated on perceiving technology as an interruption and a hindrance towards effective patient’s management. Consequently based on the respondent’s reactions, the researcher noticed that the improvement of sociocultural elements is among the significant indicators for the implementation of e-health systems in Kenya.

4.7 Online Safety and Security

Various ideas related with the online safety and security was recognized from the reactions. This included: privacy and protection, system authorization, security training, awareness of Internet safety, intrusion detection, and confidentiality of patient’s data, system audit, identification and authentication, access control, information security, risk assessment, information assurance, internet safety, tight security procedures, management complacency. These concepts are described in Figure 4.7.

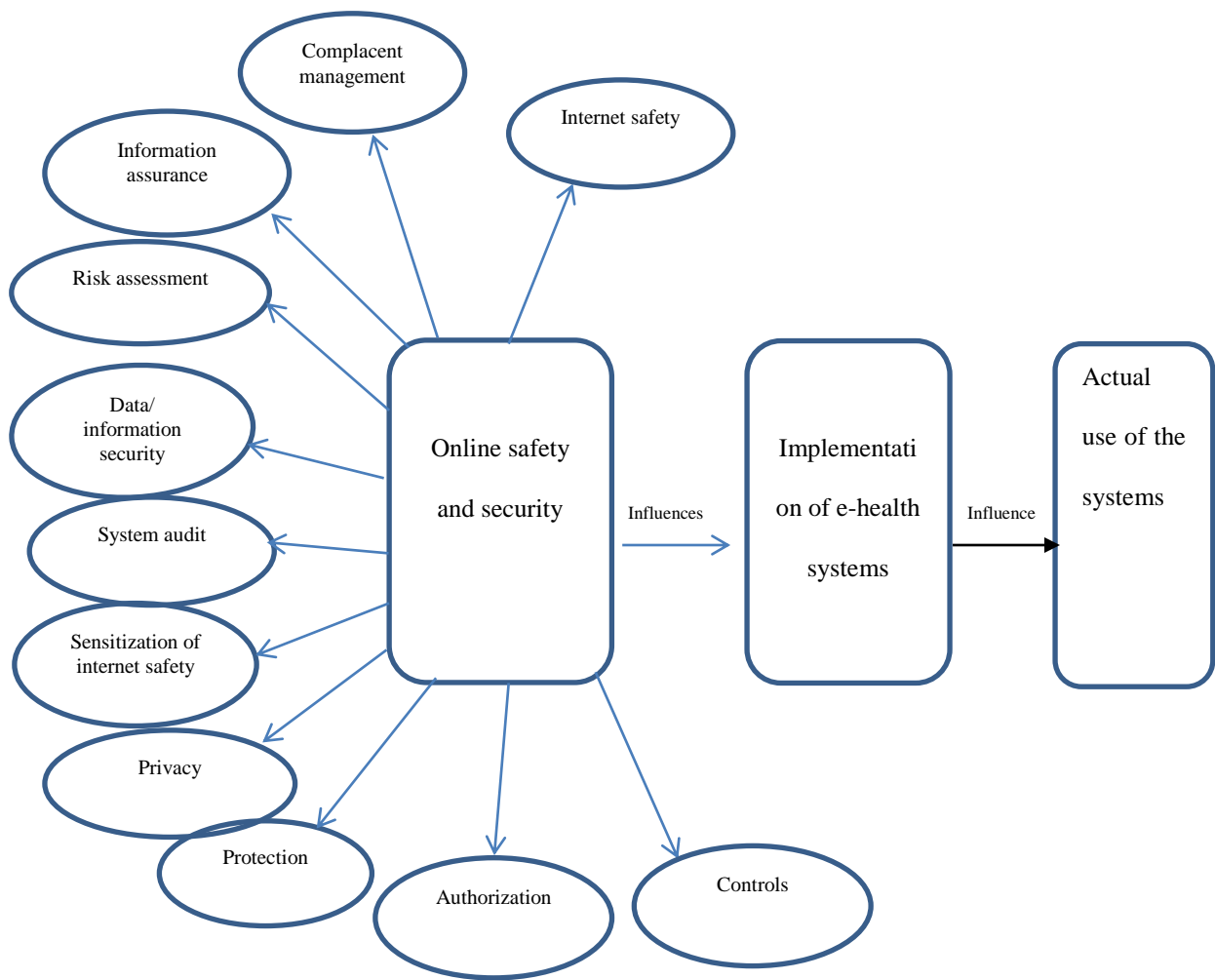


Figure 4.7 Online safety and Security Category has an influence on the Implementation of e-health Systems

Generally the ideas that were recognized mirrored the measures to guarantee the protection and security of the patient's data over the network. The reactions originated from those interviewed mirroring the level of mindfulness about the significance of guaranteeing the protection and security of the network as a prerequisite for the fruitful implementation of e-health frameworks. The ideas, in particular the privacy and protection, system authorization, security training, awareness of Internet safety, intrusion detection, confidentiality of personal information, system audit, identification and authentication, access control, information security, risk assessment, information assurance, internet safety, tight security

procedures, management complacency on investing on security systems provided a helpful model to assist recognize, examine and assess the safety and security of the e-health systems.

Likewise the e-framework is a tool to establish whether the e-health systems provide safety and security measures for the patient information as well as protecting the users of the system. For instance, interviewees expressed that the achievement of e-health relies fundamentally on the dedication to execute protection measures and security of patient's data and exchanges over the network. The following are extracts from the respondents in support of this argument:

“However, the Internet does not contain enough safeguards to make me feel comfortable when using it” (C4).

“However, the failure to ensure security and safety of the Internet will impact the successful implementation and use of e-health at all levels” (C8).

“The first thing that comes to the minds of the users is whether the e-health systems are secure or not” (C1).

“Thus the organisation needs to adopt tight security procedures to safeguard the patient's data on the network” (C7).

“There is need to apply the latest security techniques to ensure comfort of the users of e-health systems” (C29).

“How is the confidentiality of data assured online?”(C1).

“Who is liable for its breach? Supposed the information is leaked to unauthorised persons along the network. Who is liable?”(C15).

“There should be policies in place to protect patient’s data on the network otherwise users will be hesitant to use the systems” (C24).

“In addition there should be penalties attached for breach of confidentiality of data over the network” (C11).

“I think cyber crime is an emerging concern when it comes to transmission of data over the network. This would need to be addressed if the e-health systems were to be successful” (C1).

Some respondents highlighted the issue of the safety and security of e-health systems as one of the elements of inculcating trust in use of e-health systems on the users on one hand and the healthcare institutions on the other.

“Ensure the protection of online information guarantees the users trust in e-health systems” (C11).

“Ensuring that online information and transactions are secure is important for me to do so” (C2).

“Security and trust are two sides of one coin, whenever stated confidence, security must be present” (C10).

“Are there any safeguards put in place to ensure protection of users of the e-health systems” (C10).

The notion of guaranteeing the security of the data especially when sharing information was highlighted. This is in instance where some had negative encounters with some few institutions;

“Hoping that there is a commitment from the institutions not to use the data for other purposes without prior permission” (C13).

“My experience with some institutions makes me afraid to be clear enough to accept utilising the e-health systems” (C4).

“There must be specific controls on what information can flow among other institutions” (C6).

“Also we believe that a policy outlining how the patient data will be used and stored would make me comfortable utilising the system” (C28).

Whereas different respondents indicated the requirement for a strategy to guarantee threat management as far as risk identification and evaluation thereby create a plan to deter future risks;

“Thus, the institution should adopt tight security procedures to ensure the protection of patient’s information over the network” (C7).

“Risk reduction is one of the priorities of e-health to increase public confidence in the utilisation of the systems” (C8).

“The institution has taken all the ways and means to ensure the management of new systems where identified and assessed the potential risks through the plans and strategies at all levels for successful implementation” (C19).

“The institution seeks to apply the latest security techniques to ensure the comfort of users in utilising the e-health systems” (C24).

“There is need to create awareness and training about the risks required for all users of the e-health systems” (C2).

“Symbols summarising what technical security measures are embedded in the system would make me more comfortable utilising the systems” (C16).

Even so other respondents pointed on the issue of increasing the awareness and sensitization of users about the security and protection measures when utilising the e-health systems:

“Therefore, it is important to train users on the Internet threats to avoid failure in implementing e-health systems” (C8).

“Most of the security breaches resulting from the ignorance of users in the basics of information security, thus training is very key” (C3).

“There is need to create passwords for users and sensitize them on the importance of changing passwords regularly” (C12).

“There is need to have abide information security standard ISO 27001 so that it can protect the patients information on the network” (C9).

Ultimately there was a consensus on the significance of guaranteeing the protection and security of the data while using e-health frameworks. Majority of the respondents interviewed expressed their concerns on the protection measures and safety of patient's data over the Internet which may sway the confidence of users of e-health frameworks, and subsequently influence the attitude towards the implementation of e-health frameworks. Fundamentally the reactions were mainly on aspects of privacy, awareness and protection of patient information on the network. Subsequently based on the respondent's reactions, the researcher noticed that guaranteeing the safety and security of the patient's data on the network and internet are key elements that are significant indicators for the implementation of e-health systems in Kenya.

4.8 Technological Environment

Various ideas related with the improvement of ICT-related platform were recognized from the reactions in particular: disruption of Internet service from time to time, cost of e- health transactions, inadequate capacity for patient data processing, poor national ICT platform, connectivity issues, lack of adequate hardware and software. Presence of out-dated technology that may be non functional, back up facilities are lacking or obsolete, lack of standard to guide implementation, poor definition of users role, clients have poor definition of what hardware and software specifications they require, lack of clear e-health policies in implementation. These concepts are described in Figure 4.8.

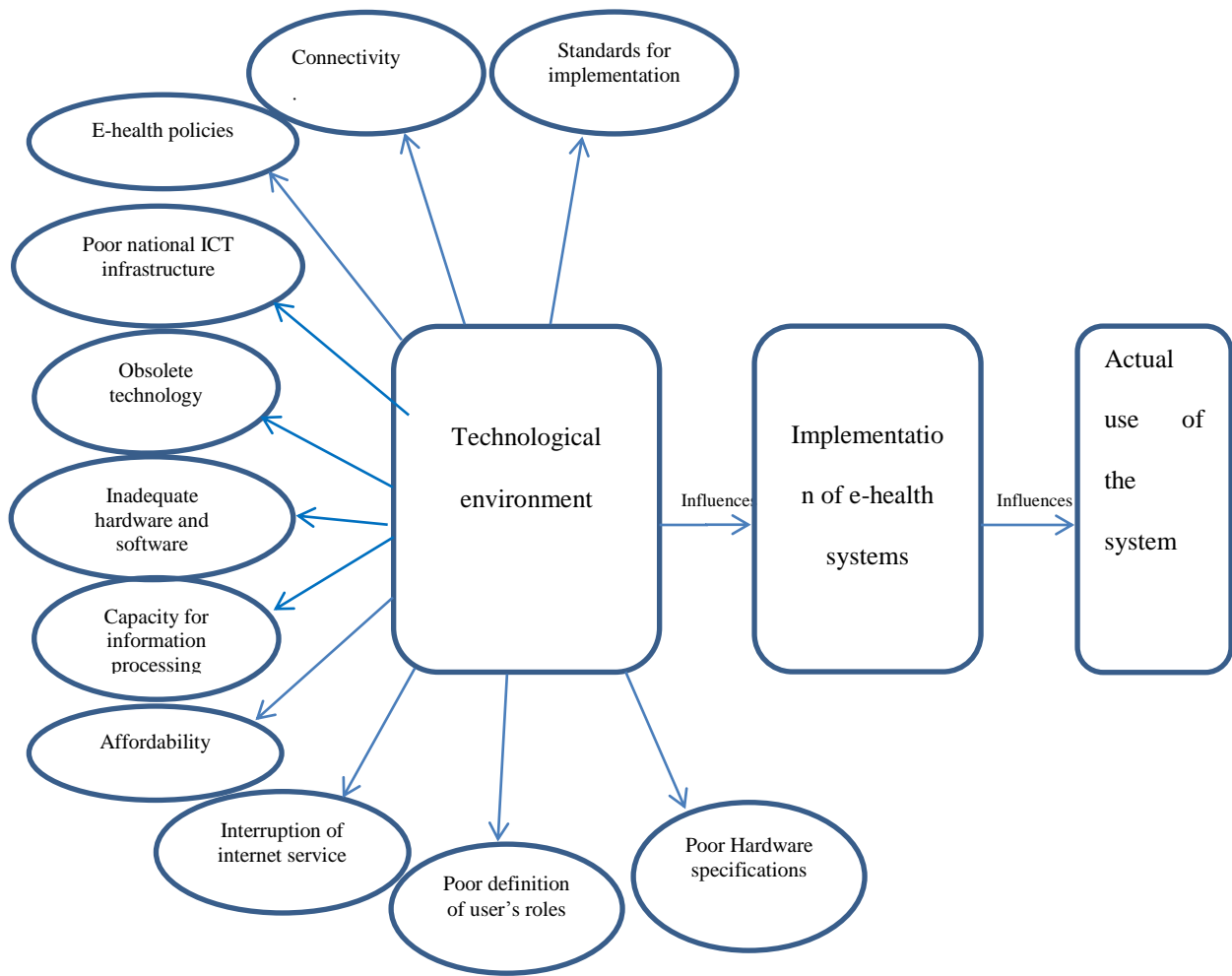


Figure 4.8: Technological Environment Category has an influence on the Implementation of e-health Systems

The concepts that were acknowledged demonstrated aspects of the improvement of ICT-related framework that affect the fruitful implementation of e-health frameworks. The reactions originated from those met mirroring the level of mindfulness about the significance of creating an enabling ICT platform in the implementation e-health frameworks. The concepts namely disruption of Internet service over time, costs of e-health transactions, inadequate capacity for information processing, poor national ICT platform, connectivity issues, lack of adequate hardware and software. Presence of out-dated technology may be non functional, back up facilities are lacking or obsolete, lack of standard to guide implementation, poor definition of users role, clients have poor definition

of what hardware and software specifications they require, lack of clear e-health they want gave a helpful structure to help with distinguishing, breaking down and assessing the technological factors that may influence e-health implementation. Ideally the model is a tool to decide if an enabling ICT-platform is sufficient enough to support the implementation of e-health, or not. For instance, respondents expressed that the improvement of ICT-related platform positively affects the trust of the clients in the implementation of technological resources, especially e-health systems. The following are extracts from the respondents in support of this argument:

“Inadequate ICT infrastructure makes me not excited about the idea of e-health” (C3).

“Lack of advanced ICT infrastructure hampers the ability to utilise e-health systems” (C8).

“No one denies the importance of ICT infrastructure in the successful implementation and use of e-health systems, but is it available” (C4).

“The clients are not sure of the specifications of hardware and software needed to run the systems” (C6).

In addition some said that the technology available is obsolete which may be non-functional and unevenly distributed.

“Most of the hardware that we have is both outdated and malfunctional” (C8).

“If the computers are too slow to process basic ms office software what about the e-health systems” (C2).

“There is unequal distribution of the infrastructure generally. Compare the rural facilities and the urban facilities” (C30).

“Some facilities especially in the rural set up do not have computers” (C21).

“Many of the ups are not functioning” (C21).

“The back up mechanism available is either lacking or obsolete” (C4).

“Though there is poor uptake of IT in healthcare even when it happens it becomes obsolete very fast” (C9).

Equally other respondents highlighted that digital divide was a hindrance to implementation of e-health where a few people have access to digital resources while others did not have. This coupled with some having the knowledge to utilize the system while other people did not have the basic knowledge to utilize the systems.

“alot of initiatives is needed to overcome the digital divide in this country)” (C7).

“Compare the rural versus urban set up. The urban set up is more enlightened and advantaged” (C7).

“The urban population are more advantaged when it comes to access and equity of digital resources unlike the rural set up”(C8).

“More access points would be a good idea to solve accessibility problems in the rural areas” (C8).

Connectivity issues especially in the rural areas were cited as a hindrance to implementation.

“Faster Internet access speed is important for me to implement e-health systems” (C19).

“Low penetration of broadband Internet access in the rural areas makes e-health implementation difficult” (C19).

“There is a tendency to have frequent interruption of the internet connections even in the urban areas” (C14).

“Whereas the connection charges are not cheap either. In a country where we spend less than one dollar a day, it might be expensive for common citizens to utilise the internet” (C14).

“Is internet affordable to all Kenyans who principally form the population of our patients? Majority can only afford to provide for basic needs therefore spending on the internet charges will be a tall order”(C10).

The issues of absence of clear policies that guide implementation emerged from some respondents.

“There is an absence of clear guidelines to on how to implement e-health systems” (C1).

“What guidelines are there for implementation of e-health” (C25).

“There are no policies in place to guide in the implementation of e-health systems” (C8).

*“And even they exist are all the stakeholders aware or are they really followed.
I doubt very much” (C8).*

Some respondents indicated there was a problem of performance and reliability of the ICT platform, which affect the implementation of e-health systems:

“Interruption of internet services from time to time is normal and this shows the lack of commitment by providers to facilitate the, implementation and use of e-health systems” (C12).

“The government lacks the continued implementation of programs to upgrade the ICT infrastructure to ensure flexibility, reliability and availability of e-health systems” (C12).

“So that it can be argued that the quality of Internet services in the urban setup may not be the level of those in urban setting” (C1).

“As usual, people who live in the towns, have a good coverage of the network and therefore better services” (C1).

“I hope the government is working to develop the ICT infrastructure to cover all parts of the region equitably” (C9).

Lack of the necessary ICT platform was cited as affecting the availability of the medical equipment as affordability was an issue which may affect the implementation of e-health systems,

“Most citizens find it difficult to acquire computer resources (hardware, software and network services) necessary for utilizing the m-health which is an application in e-health” (C23).

“Limited number of Internet providers reduces competition and keeps prices high” (C17).

“High bundle or internet charges may not support e-health use” (C17).

Similarly others cited conflicts between users and implementers of the system

“Users are not aware what the new system will benefit them” (C6).

“Many of them are not electronically prepared to utilise the system” (C7).

Whereas some respondents expressed concerns that confidence in local solutions is lacking.

There is a tendency to rely on foreign solutions that may not necessary work locally,

“There is a tendency of hiring of foreign consultants with no experience in systems implementation practically, they are more theory oriented” (C14).

“This often leads to poor design and analysis by the consultants where actual needs of users are not met” (C1).

“The foreign consultants tend to be more preferred than local solutions; often these solutions do not meet the needs of the local institution” (C17).

“The foreign are perceived to be more superior than our local solutions which is not the case at most times” (C23).

“There is a tendency of our local institutions of trusting what comes from the west as being much better than what our local consultants can offer. Which is a wrong notion as these foreign consultants almost always get it wrong” (C23).

There are poor system mapping at both national and county hospitals

“let me say most of the county staff have no clear definition of what specification they expect from e-health systems” (C12).

“They are guided by the boundaries of the regions thus even sharing resources is quite difficult” (C11).

“Telemedicine would be difficult for example as the counties do not share expertise with other counties as well” (C26).

Therefore there was an agreement on the significance of building up a robust ICT platform that provides the stage for supporting e-health frameworks. Majority of the respondents acknowledged that the presence of a stable ICT platform affects the availability, access and utilization of the e-health applications. Thus the researcher noticed that the improvement of a stable ICT platform is amongst the key indicators for the implementation of e-health systems in Kenya.

4.9 Change Process Management

Various ideas related with the change process management were acknowledged from the reactions, in particular; commitment for change, attitude of employees for change, change process management, champion to implement change, involvement for change, resources for change, resistance to change, absence of advocates and supporters in the institutions to make

the change, lack of continuity plans, lack of stakeholders involvement in the design and development of the system, complacent management, lack of IS leadership champion. These concepts are described in Figure 4.9.

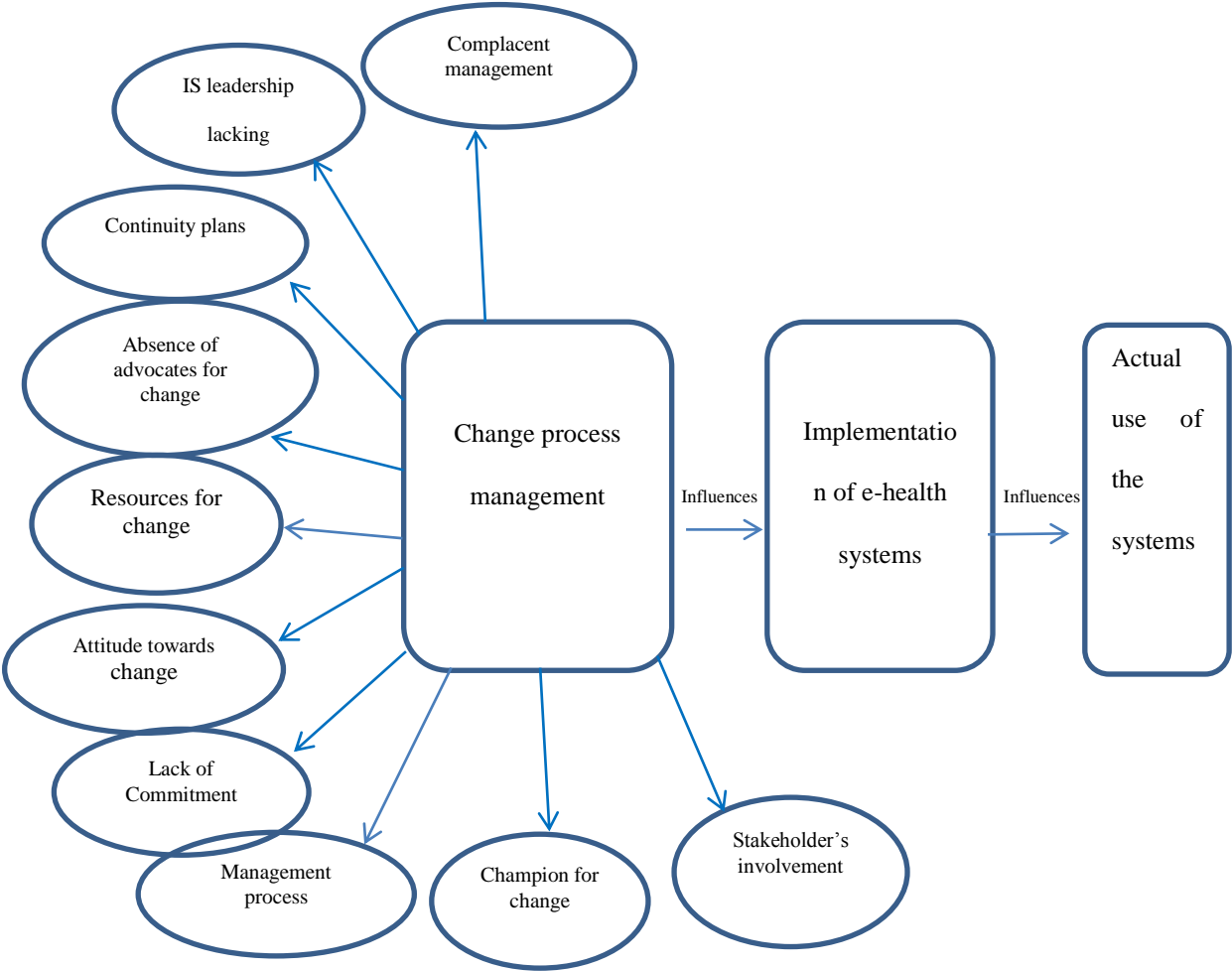


Figure 4.9: Change Process Management Category has an influence on the Implementation of e-health Systems

Evidently the ideas that were acknowledged mirrored the organisational aspects of the change process management towards the implementation of e-health frameworks. The reactions originated from those met mirroring the level of mindfulness about the significance of dealing with the change process management at all levels to guarantee the achievement of the implementation of e-health frameworks. The ideas commitment for change, attitude of employees for change, change process management, champion to

implement change, involvement for change, resources for change, resistance to change, absence of advocates and supporters in the institutions to make the change, lack of continuity plans, lack of stakeholders involvement in the design and development of the system, complacent management, lack of IS leadership give a valuable system to help recognize, break down and assess the parts of change process management, particularly e-health in Kenya. Furthermore the structure is a tool to decide if the change process management on the e-health frameworks is adequate to build confidence and thereafter the effective implementation of e-health, or not. For instance, interviewees expressed that there is thin connection between guaranteeing change process management towards e-health systems and users trust, which converts into a positive attitude towards implementation of e-health frameworks. The following are extracts from the respondents in support of this argument:

“Change management is essential to restore the trust of users in utilising e-health systems which translates into successful implementation of the same”
(C3).

“Change must begin from the institution, not from users” (C11).

“I do not blame the users if they do not accept the change towards e-health, since the institution itself is reluctant to accept the idea of change” (C12).

“Commitment by senior management officials increases the confidence of users and thus to influences implementation of e-health systems” (C5).

“I have made an observation that senior managements are not committed to change process management. They are very unenthusiastic to the process”
(C16).

Some expressed that the processes of change management meet resistance, especially in the initial phases. Much of this resistance is usually more prevalent amongst the elderly as it is much more difficult for them to learn and adjust to new e-frameworks, for example, e-health frameworks:

“There is resistance by the elderly for change within most organisations. May it be clinical or administrative staff” (C12).

“Not necessarily, but we can change if we feel that there is prudent management to take into account all the needs of all users in the process of change” (C12).

“There is a tendency to resist change among the older users in the institution”
(C6).

Whereas other respondents were of the opinion that accomplishment of the change process towards e-health implementation requires the support of everyone on the organisation especially top management:

“Change must begin from the top management,” (C3).

“Change must begin from the organisations senior managers not users” (C3).

“The absence of advocates and supporters in the institution to make the change could adversely affect the implementation of e-health systems” (C19).

A few respondents said that the achievement of the change process is associated with the presence of viable approaches for correspondence between the different stakeholders, in order to encourage the change towards accomplishing the implementation of e-health systems;

“The institution does not involve users in decision-making related to the change which negatively affects the trust of users and thus, implementation and use of e-health systems” (C6).

“What we lack is the existence of effective communication between the management and users to implement the policy change towards e-health” (C12).

“Management in most times does not involve all the stakeholders in the change process management” (C17).

Besides, others expressed concerns that there was no commitment for change process in the institution. In essence there was no one championing for IS leadership

“The management is lethargic towards supporting the change process management” (C3).

“There is no one in the institution to champion for the e-health project. Its neither here nor there” (C5).

“I believe that there are no resources set aside for supporting the process towards e-health implementation” (C7).

“There is an absence of advocates and supporters in the institutions to make the change towards implementation of e-health” (C29).

Whereas a few said that the processes should go together with several training modules of e-health systems so that various stakeholders can learn how to adapt and use the new technology.

“People need to be trained to cope with the new system to deal with the patients” (C11).

“Employees in most departments need adequate training to lead the change towards e-health” (C14).

“My worry would be is the institution committed towards allocating resources to support the process” (C27).

“I believe that management might be disinclined to allocate resources to support the change process management” (C19).

Equally others were of the opinion that there is an absence of continuity plans of initiated projects thus the project die at start up or immediately the initiator of the project is exits. This then affects the success of the implementation;

“There is lack of continuity plans in place for initiated projects like e-health systems” (C13).

“No proper plans are put in place to take over projects” (C22).

“A champion of the e-health project is lacking to give leadership” (C18).

Accordingly it was clear there was an understanding among the respondents on the significance of dealing with the change process management towards e-health, which positively affects the perception users have about e-health systems that in turn has an impact on the implementation of e-health frameworks. Consequently the researcher noticed that change process management is among the significant factors that may affect the implementation of e-health systems in Kenya.

4.10 Systems Integration

A number of concepts related to the integration of systems were acknowledged from the reactions. These included lack integration between national and county hospitals, incompatibility, reengineering of organisation's internal processes to support integration of systems, lack of standardisation to share data, interoperability problems in systems, lack of synchronisation between systems, lack of integration of donor funded systems and local systems. These concepts are described in Figure 4.10

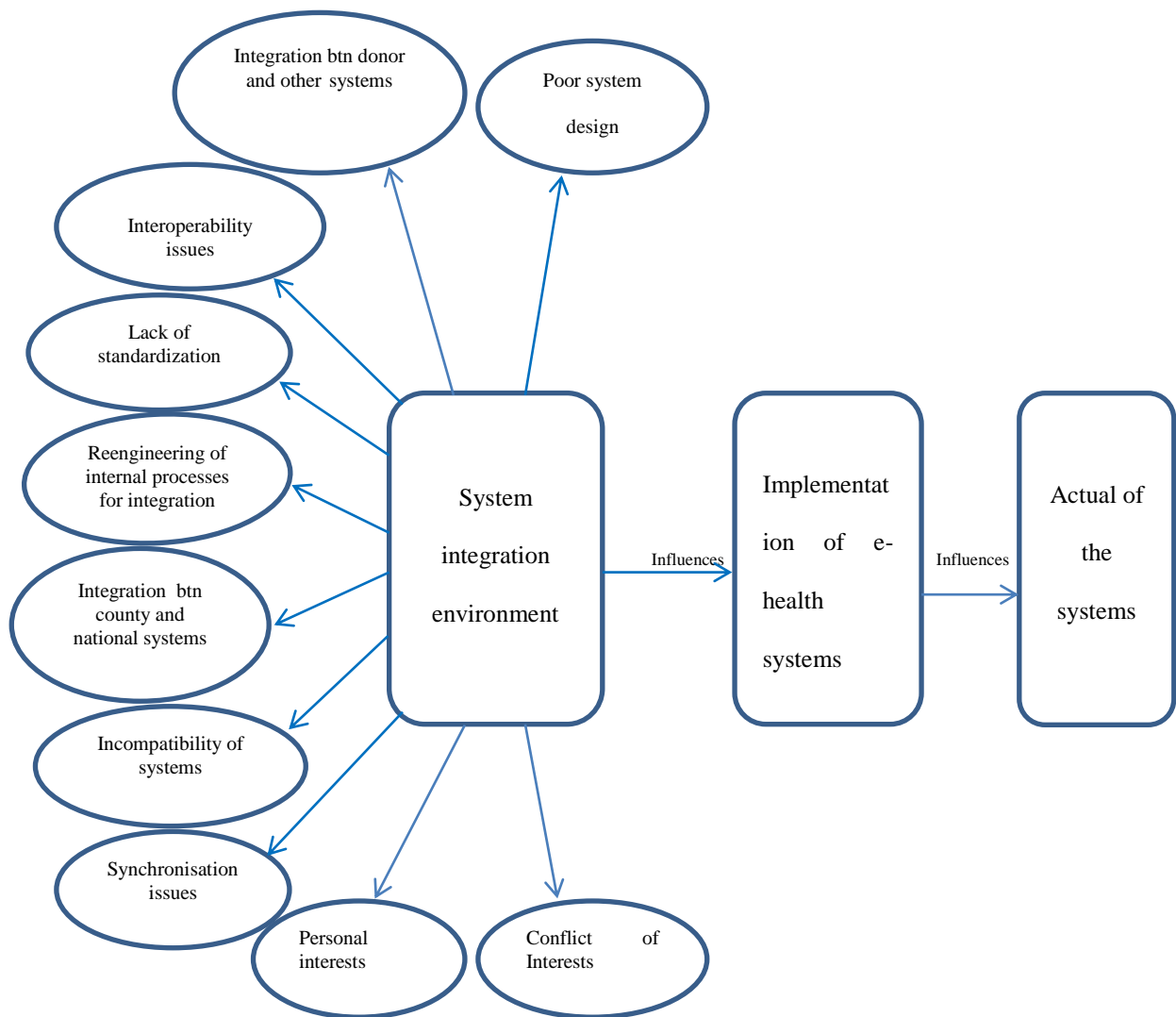


Figure 4.10: System Integration Category has an influence on the Implementation of e-Health Systems

Largely the ideas that were acknowledged reflected aspects of integration of e-health frameworks as crucial to e-health implementation. The reactions originated from those met mirroring the level of mindfulness about the significance of amalgamation of health data frameworks at all levels to guarantee the fruitful implementation of e-health frameworks. The ideas, namely lack of integration between national and county hospitals, incompatibility, reengineering of organisation's internal processes to support integration, lack of standardisation to exchange data, interoperability problems in systems, lack of synchronisation between systems, lack of integration of donor funded systems and local

systems give a valuable structure to help recognize, examine and assess parts of the integration of e-health systems in the sector. Basically the structure is necessary in deciding if the frameworks are significant in the successful implementation of e-health, or not. For instance, respondents expressed that there is absence of standardization to share information amongst private and public organisation, which makes it rather hard to implement e-health systems as private hospitals are not compelled to share data with public hospitals. These sentiments were echoed by a number of respondents in the following narrations:

“There is no law that exists that compels the public and private sector to share information” (C15).

“The private sectors are profit driven while the public sectors are service driven” (C7).

“There are no policies that exist that guide on how institution can integrate and share data” (C22).

“The private sector does not trust the public sector with sharing of their data” (C23).

In addition others cited interoperability problems and compatibility issues among the existing systems

“Its difficult to integrate modules within this institution” (C15).

“Most times the system are not compatible and integration is difficult” (C18).

“The users are reluctant to integrate the systems too” (C2).

“I think there are generic differences between the designers of the systems and the users thus this makes interoperability difficult” (C6).

A number of the respondents said that there was need of having an explicit methodology of how data is shared among institutions to promote trust-building among the players thus facilitate successful implementation of e-health systems;

“I do not know how I can trust the e-health systems in the absence of a clear methodology for the exchange of information” (C21).

“Despite all the claims of change, the methodology followed by some institutions to manage the various information systems is still subject to restrictions and not clear enough to ensure trust in the new system”(C3).

While some cited that there is lack of synchronisation between systems and clinical workflow,

“Let me say that at times the systems are not synchronised with the clinical workflow hence implementation may be difficult” (C30).

“The systems are not well designed to follow the clinician workflow hence resistance creeps in” (C2).

“The systems and the clinical workflow do not speak the same” (C6).

Majority were of the consensus that there is lack of integration of donor funded systems and local systems. This creates a big barrier towards implementation of e-health;

“The donor funded systems are not willing to integrate their systems with the locally available systems. This would save the organisation time and money even in sharing resources” (C3).

“The donor systems are there to meet specific needs of the donor thus very unwilling to integrate their systems with the local ones” (C29).

“Donors have specific terms of operation and no law exist to compel them to integrate their systems with local ones” (C16).

A few were of the opinion that there was a lack of coordination between national and county government hospitals in integration of systems,

“The county hospitals and national hospitals have issues of trust when it comes to sharing of information” (C22).

“Each institution tends to hoard their data for its own gain than share it thus implementation of e-health might be a tall order” (C25).

“Most of these facilities will upload the workload data on the DHIS but not share it among facilities” (C25)

Finally, some stated that before addressing the issue of integration of e-health systems, the organisations should restructure their internal operations. This would ensure there is a comprehensive and practical framework that supports effective e-health systems implementation. Such a framework would promote sharing, processing and collection of data across the healthcare field:

“There is a need for the institution to restructure internal government processes before e-health is implemented” (C28).

“The current structures are complex and not clearly defined so it is difficult for us to reform health sector without real restructuring of the internal processes and procedures” (C16).

Consequently there was an agreement on the significance of integration of e-health frameworks for effective e-health implementation. Majority of the interviewees acknowledged integration of e-health systems among various institutions was very significant in successful implementation of the systems. By and large the researcher noticed that guaranteeing the integration of e-health frameworks is among the significant components for implementation of e-health systems. Therefore the researcher observed that absence of integration of e-health frameworks is among the significant issues that may hinder the implementation of e-health systems in Kenya.

4.11 Organizational Efficiency

Various concepts related to organisational efficiency were recognized from the reactions. They specifically include; senior management support, lack of innovative orientation, lack of accountability within the organisation, lack of public private partnership, bureaucracy, strategic orientation, organisational politics, self interests, lack of IS leadership, unrealistic expectation, trust issues, conflict of interests.. These concepts are described in Figure 4.11;

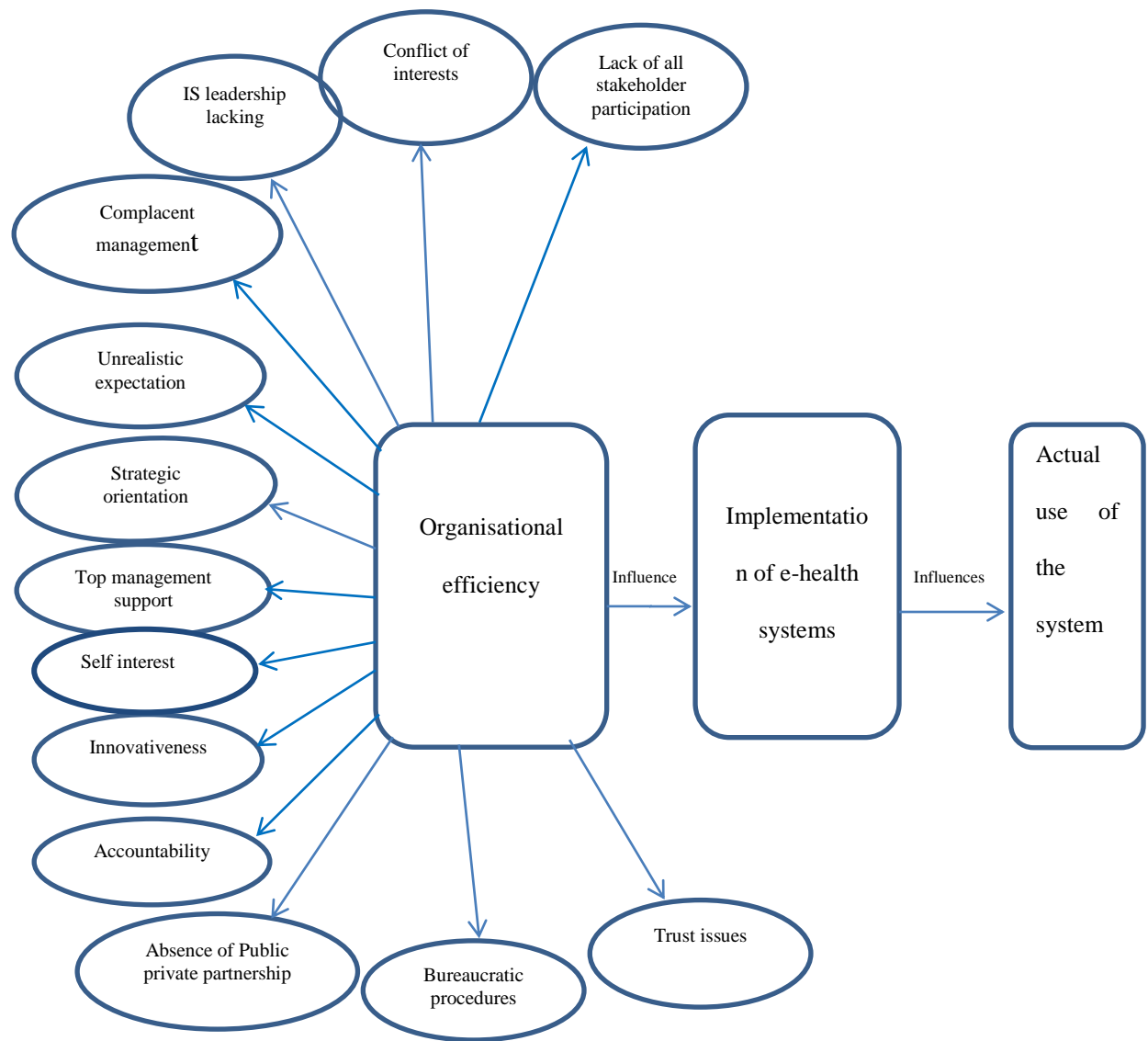


Figure 4.11: Organisational Efficiency Category has an influence on the Implementation of e-health Systems

Primarily the concepts that were generated reflected aspects of organisational efficiency needed to boost implementation of e-health frameworks. The reactions originated from those met mirroring the level of mindfulness about the significance of guaranteeing the effective organisational practices and procedures that guarantee the fruitful implementation of e-health frameworks. The concepts include: senior management support, lack of innovative orientation, lack of accountability within public, lack of public private partnership, bureaucracy, politics, Strategic orientation, unrealistic expectation, trust issues, lack of

stakeholders participation, lack of IS leadership, conflict of interests, self- interests present a helpful model to assist recognize, examine and assess the viability of elements of organizational efficiency towards e-health implementation in Kenya.

Basically the structure is important in deciding if the organisational efficiency is sufficiently viable to build trust among the clients, and along these lines the fruitful implementation of e-health, or not. For example, some interviewees expressed that the absence of adequate support from senior management in the organisation may not provide an official status of e-health systems and consequently this may adversely influence the user's perception towards the implementation of e-health systems. These sentiments were echoed by a number of respondents in the following narrations:

“Senior managers pretend that they are demonstrating support for the new system, but in fact they are not” (C10).

“Lack of support at various administrative levels adversely affects the implementation of ehealth” (C11).

“There are many ways to make the e-health work, among those means government support for the program at the national level” (C1).

“I cannot trust the management unless I see a radical change to help me to do so” (C13).

“The existence of top management support is an important indicator for us to trust the e-health systems” (C5).

“We did not take adequate encouragement from the senior management to adopt and use new systems” (C3).

“Top management is hesitant to allocate resources for e-health implementation as they do not buy in to the idea” (C14).

“Generally let me say that there is lack of good will among the top management in supporting implementation of e-health systems”(C14).

“I believe organisational politics take the centre stage when it comes to implementing e-health systems” (C8).

A number of the respondents were of the opinion that the presence of a national vision regarding the implementation of technology would be a crucial tool that can support the successful implementation of e-health systems in Kenya.

“I think there is a need for a common national vision between all health institutions on the way forward towards e-health implementation” (C13).

“It is noted that different visions of health institutions affect the implementation of e-health systems” (C22).

“I do not think that the government's vision is clear on the implementation of information technology, especially in the healthcare sector” (C16).

“There is need to have a clear government vision on implementation of e-health in the country” (C16).

Whereas others cited that there was lack of innovativeness orientation in the organisation that cripples the implementation

“The management does not encourage innovativeness” (C6).

“Top management is not keen on new ideas and emerging fields. They are very complacent towards innovation” (C11).

“Top managers do not reward creativity and innovation, this creates a demotivated workforce not interested in exploring new systems. Essentially they kill creativity” (C3).

Majority of the respondent's agreed that there are inter departmental conflicts existing that affect implementation of e-health systems. This is coupled with conflicts of interests among the stakeholders, where by personal interest over ride the organisation's interest;

“There is no goodwill among the stakeholders” (C1).

“Conflict among various stakeholders in the organisation is quite eminent thus the message gets lost in between” (C12).

“Personal gains override the organisation gain” (C14).

“I do not disagree that there are very many interested parties along the chain thus the message gets lost somewhere” (C1).

“There is simply too much organisational politics that suppresses progress of implementation of e-health systems” (C6).

Lack of key stakeholder's involvement in the decision of design and implementation of the systems was mentioned as an issue that affects its implementation.

“We are not aware about the existence of the systems” (C25).

“We were not consulted when decisions were being made on development of the systems” (C2).

“None of us were incorporated in the system implementation team” (C7).

“The top management is reluctant to involve all the stakeholders in the e-health project” (C18).

In addition sometimes clinicians act as consultants yet they are not technically qualified system programmers due to lack of training in medical informatics that helps them understand implementation.

“Have seen my colleagues acting as the lead consultants in the system implementation yet they have no idea how systems are developed” (C28).

“At times my colleagues are called upon to lead the implementation team yet have very little IT skills in general” (C4).

“Sometimes wrong people are put to spearhead the project which definitely leads to high failure rate” (C16).

Unrealistic expectation of benefits on investment from the systems was highlighted. In this regard meaning there is lack of clarity concerning specific cost benefits to all stakeholders, thus management are lethargic about supporting the project which affects implementation of e-health system.

“There is solid absence of economic impact of e-health to the organisation”
(C13).

“Coupled with lack of clarity regarding specific cost versus benefits to all stakeholders” (C10).

“The perception IT is seen as a cost centre rather than a strategic enabler”
(C9).

“I think the management does not stand to benefit directly from investing in e-health” (C23).

Majority cited bureaucratic procedures and structures existing in the organisation as a barrier to e-health implementation. This is felt in the supply chain processes that leads to unnecessary delays and ends up being expensive and time wasting;

“Red tape bureaucracy is the characteristic of most institutions; this however leads to a lot of time wasting and energy” (C1).

“Its impossible to get things done quickly in organisation because of the existing bureaucracy” (C2).

“Even small things have to be subjected to a lot of bureaucratic procedures thus this can be a barrier to e-health implementation” (C6).

“How will we get ever get rid of this bureaucracy in the institutions. It really stifles progress” (C1).

Lack of IS leadership is lacking in the organisation as there are no champions for e-health project in general leading to implementation.

“There is no one to champion the project in the organisation”(C7).

“Management is hesitant nominating a champion to spear head the e-heath project” (C6).

“No one is courageous enough to champion the e-health project” (C4).

“Often the e-health project lacks leadership thus the message gets lost in between” (C2).

Despite the existence of ICT policies in the organisation, more often than not the policies exist but they are never followed. This directly affects implementation of e-health

“ICT Policies are made but not followed” (C12).

“Policies are there but there is no follow up to ensure they are implemented” (C12).

“There is a clear disconnect between policy formulation and implementation as the latter is not done” (C3).

“There is no monitoring and evaluation done to ensure the policies are implemented” (C2).

A few of the respondents stressed the importance of partnership with public private partnership sector institutions, in the implementation e-health systems

“Without working hand in hand with the private sector, the public sector cannot implement e-health alone” (C13).

“For example, the public sector needs to tap into private sector expertise in the field of training of latest technologies” (C6).

“The public sector would benefit from the experience of the private sector in implementation of information technology” (C2).

“As partners from the private sector, we face difficulty in dealing with some public sector employees” (C21).

A number of other respondents said there was need to have a monitoring committee made up of stakeholders with a range of experience from both the public and private sectors to oversee the implementation of e-health systems. This would in the long run promote trust between the two sectors and create a positive effect on the implementation of e-health systems.

“I suggest there should be a committee for managing the e-health project that must be completely independent and has its own budget otherwise things will remain the same” (C2).

“There are several difficulties, including lack of an advisory committee to follow up the implementation of e-health systems” (C6).

There is lack of proper trust and cooperation between public and private institutions to set up systems that can share data. Trust issues among the various stakeholders were cited as a barrier to implementation as many organisations had their own reservations on sharing of data among each other.

“The public and private institutions do not trust each other enough in order to share data” (C10).

“Organisations need to work towards being trusted if they were to share data among each other” (C2).

“Will the data be used to source for more funding?” (C2).

“We are not sure for what purpose our data will be used for in case we agreed to share” (C7).

“Organisations need come up with policies that protect the sharing of the data among various entities” (C28).

“There is lack of goodwill among the healthcare players to set up mechanism to share data” (C1).

“We cannot trust our partners in this aspect of interoperability” (C24).

“Who is likely to benefit from sharing of the data” (C14).

“Do we have measures in place that support interoperability” (C2).

Others cited the conflict of interest in the health insurance plan among the various stakeholders. This is because of the conflict of interest among the parties thus they may not agree to have one comprehensive plan that can cater for the costs of all the patients no matter which facility they are being attended to equitably which in turn affects e-health implementation;

“We are opposed to the proposed health insurance plan” (C13).

“The proposed health insurance plan does not meet our interests” (C24).

“Is the government willing to sustain a healthcare sector plan for all citizens” (C13).

“The capitations are too low for our facility thus does not meet our institution needs” (C6).

Additionally some pointed out on the need for the Government of Kenya and more so the Ministry of Health to try and gain some experience from other countries where e-health had been a success. Netherlands and Finland for example, can be considered a model that can be used to benchmark against;

“I believe that there is a need for the government to review such e-health projects in countries that have successfully rolled it out” (C13).

“Why can’t the government borrow aspects of success from the developed countries” (C22).

“I think the main question we ask here are our stakeholders willing to borrow a leaf from developed countries or we are locked up in negativity”(C22).

“Why doesn’t the government stand to benefit from the experiences of countries that have advanced in the ranks of the world rankings in areas of e-health implementation?” (C4).

Consequently it was observed that there was a consensus on the significance of effective organisational efficiency concerning e-health implementation. Largely majority of the respondents expressed their concern that organisational efficiency positively affects the key processes that support the implementation of e-health frameworks. Thus the researcher noticed that the absence of an effective organisational efficiency is among the significant factors that may hinder the implementation of e-health systems in Kenya.

4.12 Legal Environment

Various ideas related with the legal setting were recognized from the reactions of the respondents. These included: lack of legal environment for e-health transactions, absence of e-laws for online patients data transactions, out-dated set of legislations, lack of patient data protection laws, lack of enforcement of the existing law. These ideas are portrayed in Figure 4.12.

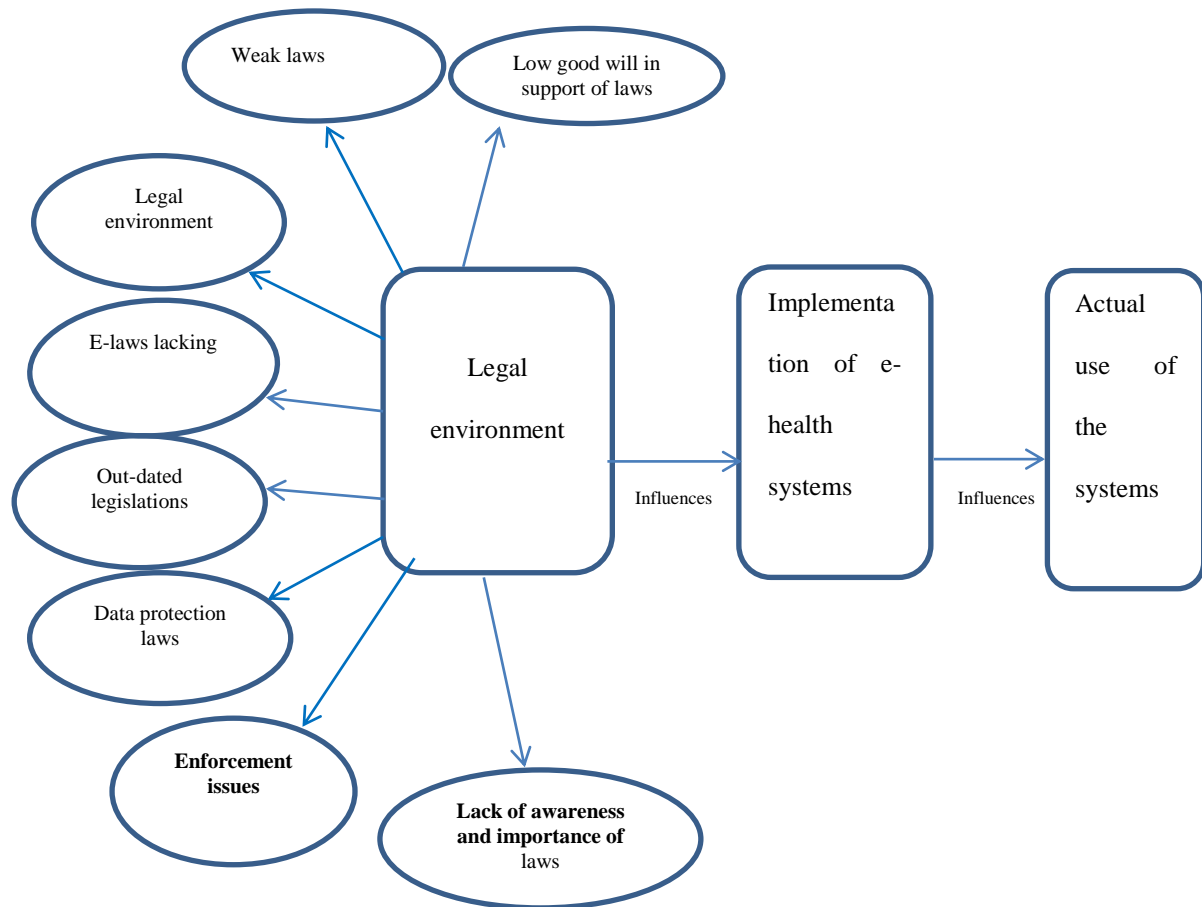


Figure 4.12: Legal Environment Category has an influence on the Implementation of e-health Systems

A number of concepts were acknowledged mirroring on the qualities of the legal setting as important in implementation of e-health frameworks. The reactions originated from those met mirroring the level of mindfulness about the significance of legal setting characterised by the need of having efficient and effective laws that to ensure protection of patient's data online. For instance, some respondents pointed out that the current laws and regulations that guard patient data are obsolete, and don't keep pace with current patterns. The revising of such laws particularly those identified with e-health will positively affect its implementation.

These sentiments were echoed by a number of respondents in the following narrations:

“The laws and regulations existing are out dated so they should be revised to cover all e-health transactions” (C12).

“The existence of laws, increases users trust in the use of IT, particularly e-health systems” (C7).

Some respondents felt that the laws are lacking to protect patients data online which affect implementation

“There are no laws that protect confidentiality of patient’s data online” (C1).

“No law exists that guides on ethical issues of patients data online” (C4).

“The laws existing do not address medical record portability for instance” (C25).

“We are concerned about the security of our patients data over the network as there no laws in place to protect it” (C1).

Whereas others were of the opinion that there are no laws and penalties existing to guide or compel all health institutions in sharing of patient’s data thus it will be difficult to achieve interoperability of the systems

“there is no law that exists to compel all healthcare institutions to share data” (C20).

“Private hospitals are unwilling to share data with other institutions” (C20).

“The donor funded system projects are unwilling to share their data with other institutions as there is no law that exists to compel to do so” (C4).

“Institution hoard their information as no regulation exists compelling them to share” (C4).

A few indicated that even where the law exists but it is not enforced and often ignored which affects interoperability of systems thus it is difficult to know what is exactly happening in the healthcare sector;

“There are laws entrenched in the constitution like the public health act which compels all health facilities to report their data, even then some facilities do not report the data to the relevant authority” (C11).

“There are no penalties set for those who do not report their data to the relevant authority” (C11).

“There is no proper follow up or penalties stipulated in the law for those that do not report the data” (C2).

In addition others felt that there are no laws that exist compelling the private hospitals to report their workload on the District Health Information System (DHIS). Therefore the District Health Information System (DHIS) only contains workload from public healthcare sector.

“Currently DHIS does not capture data from private hospitals” (C5).

“This may lead to under reporting and poor interventions” (C9).

“This may affect planning and policy formulation” (C4).

Many were of the opinion that there was the crucial issue of having efficiency in the legal environment. This calls for the need to have full commitment in the implementation and enforcement of laws and regulations to protect patient data online. Thus this would boost the users trust in the utilisation of the system and implementation.

“There is insufficient legal framework in place to protect e-health users” (C5).

“I wouldn’t expect the any institution to support me legally in the case of a serious online security breach” (C2).

“The absence of laws, decreases users trust in the use of e-health systems” (C7).

Others were of the opinion that there was the crucial issue of having effectiveness in the legal environment. This calls for the need to have full commitment in the implementation and enforcement of laws and regulations to protect patient data online. Thus this would boost the users trust in the utilisation of the system and implementation.

“We are concerned that these laws reduce the potential risks and ensure the protection of the patient’s data online” (C12).

“The absence of laws, decreases users trust in the use of e-health systems” (C14).

Thus it was observed that there was an agreement on the significance of an effective legal environment in the successful implementation of e-health implementation. By and large many of the respondents were of the consensus that effective laws regarding e-health systems would have an effect on the implementation of e-health systems. Accordingly the researcher noticed that the presence of an efficient and effective legal environment is among the significant factors that may hinder the implementation of e-health systems in Kenya.

4.13 Socioeconomic Environment

A number of concepts associated to the socioeconomic environment were recognized from the reactions of the respondents. These include: purchasing power, population growth, digital divide, distribution of resources, generation gap, poverty levels, literacy, demographic characteristics, low income rate, sustainability, ROI, Equity and access. These concepts are described in Figure 4.13.

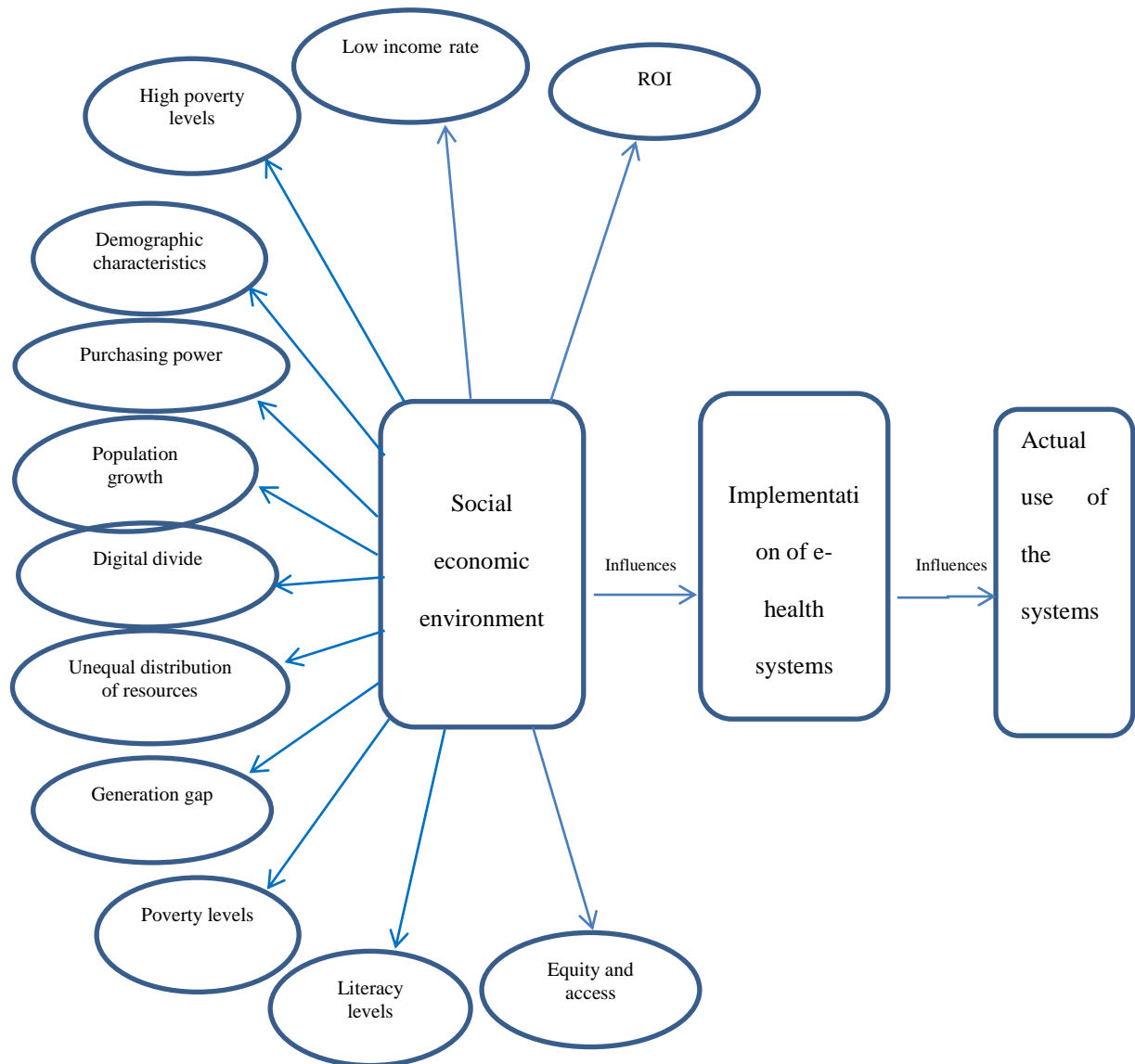


Figure 4.13: Social Economic Environment Category has an influence on the Implementation of e-health Systems

The concepts that were acknowledged mirrored socioeconomic aspects that would affect the implementation of e-health frameworks. The reactions originated from those met mirroring the level of mindfulness about the significance of socioeconomic forces in affecting user attitudes regarding implementation of e-health systems. The concepts, namely purchasing power, population growth, digital divide, distribution of resources, generation gap, poverty levels, literacy, demographic characteristics, low income rate, sustainability, ROI, Equity and access have an effect towards implementation of e-health systems.

Some respondents pointed to elements of instability (e.g. prices of computers and accessories, connectivity) in the local markets as potential threat to the IT platform thus influencing the economic power of the users. Most of the users may not be economically empowered to afford the electronic gadgets to use. These sentiments were echoed by a number of respondents in the following narrations:

“I am not able to afford monthly subscription for Internet services” (C16).

“I am not able to afford the prices of computers and accessories” (C16).

“Most of us cannot afford to use the m-health as it is very costly” (C5).

In the same context there are high levels of poverty levels coupled with low income rate. Majority of Kenyans live below a dollar a day. Much of what is generated goes to food clothing and shelter thus pushing them to e-health would not be affordable. This is regarded as a luxury and a preserve for the rich persons. Thus they would rather stick to the traditional healthcare methods that they are used to rather than use technology.

“We hardly make too much than the need for basic needs” (C21).

“E-health may be regarded as a luxury not a basic need” (C21).

“The current healthcare is meeting my needs so I do not see why use technology” (C11).

“I believe most citizens would not be convinced to incur extra cost on internet bundles because of the prevailing economic situation” (C18).

“Are we going to buy food or is it bundles now” (C18).

A number of the respondents cited barriers such as poor electricity availability and connectivity issues especially in the rural areas which affects access to the e-health applications

“Most of the rural areas are not connected to electricity so using electronic gadgets might be difficult” (C9).

“I agree the rural areas are worst hit when it comes to connectivity issues” (C9).

“Internet connection is stronger in urban areas than rural areas” (C1).

“Sometimes we have to take the phones to the nearest market for charging as electricity is not available in the households”(C7).

In addition there is the issue of digital divide especially among the rural and urban population. This refers to people who have the skills to use the technology and those without the skills. Thus m-health which is an application of e-health may not be successful. A sizeable number of people in the rural areas have no competency on how to navigate the e-

health systems. There is an element of high IT illiteracy among the rural population. Thus this would hinder them from utilising the technology properly.

“There are many people who have no idea how to operate electronic gadgets in the rural areas yet m-health would be transmitted through this platform” (C6).

“They use mobile phones for calling and texting only how then would they use m-health which is part of e-health” (C6).

“I believe the rural folk have little idea on how they can access healthcare through their mobiles. They may be lacking the knowledge or are ignorant” (C28).

“I think people in the rural areas need to be trained on what e-health is and how they can use various devices to benefit from the technology” (C29).

“Majority of the people in the rural areas do not know how to manipulate information systems” (C2).

“Most of the rural residents have other pressing problems than just thinking about accessing healthcare on the phone” (C3).

Whereas others were keen to highlight the importance of demographic factors such as age, literacy levels in influencing attitudes towards the implementation of e-health systems. This is more prevalent in the rural areas where literacy levels are extremely low as compared to the urban folk.

“Younger people would be more likely to adopt the technology than the elderly” (C13).

“We expect people who live in urban areas to be more likely to utilise e-health than those in rural areas” (C13).

“People with higher education would be more likely to utilise technology” (C2).

“People with less education are less likely to utilise technology” (C2).

“Illiteracy coupled with advanced age is a big problem in the society, so when it comes to introduction of technology resistance could be high” (C2).

A few of the respondents alluded to the fact that there is unequal distribution of resources especially between the rural and the urban population. The urban folk are more advantaged when it comes to interaction with the recent technology unlike the rural folk who most of the times get absolute devices.

“There is a tendency to lack electronic devices in the rural areas” (C21).

“We do not have access to the recent technologies” (C21).

“Technological resources are more concentrated in the urban areas than the rural areas thus the urban institutions are at a better advantage” (C18).

“Even where there are available there are beyond the costs of most of us” (C2).

“Sometimes what we have at our disposal is obsolete technology that may not be compatible with e-health systems” (C24).

Accordingly there was consensus of the significance of social economic elements in the implementation of e-health frameworks. The respondents acknowledged that the presence of effective social economic elements positively affects the implementation of e-health frameworks. The researcher noticed that guaranteeing the improvement of the social economic factors is among the significant elements for the implementation of e-health frameworks. As a result the researcher noticed that the absence of effective social economic factors was among the significant factors that may hinder the implementation of e-health systems in Kenya.

4.14 ICT Competence Environment

A number of concepts associated with ICT competence were recognized from the responses, namely; shortage of clinicians, lack of qualified technical team, shortage of skills in health informatics among health professionals, lack of ICT in health professional curriculum, high turnover of ICT personnel, technically inadequate expertise. These concepts are described in Figure 4.14.

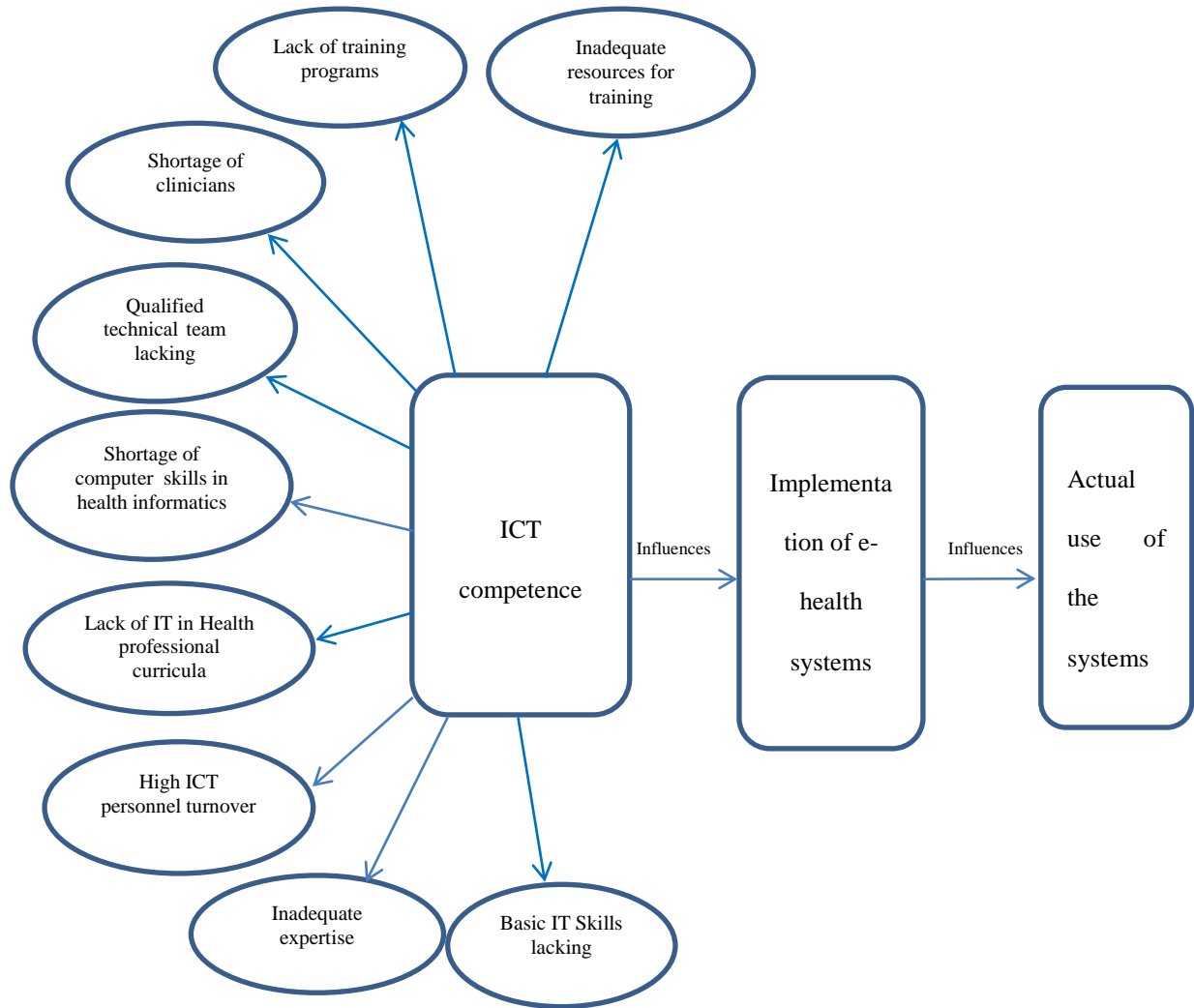


Figure 4.1: ICT Competence Environment Category has an influence on the Implementation of e-health Systems

Generally the concepts that were acknowledged revealed the description of the ICT competence that is necessary to support implementation of e-health systems. The reactions came from those interviewed showing the level of responsiveness about the significance of ICT competence in support and maintenance of the systems. For example, some respondents pointed out that there was a shortage of healthcare workers in general. This made it difficult for them to create time to learn new technology. Majority considered the technology as an intrusion in their busy working life.

These sentiments were echoed by a number of respondents in the following narrations:

“We are suffering from chronic shortage of health workers” (C15).

“The clinicians are few and the patients are increasing each day therefore we concentrate on the core business which is treatment of patients not learning how to use technology” (C23).

“The number of patient keeps on growing so we don’t have time to accept gadgets that might interrupt our work” (C21).

“We do not have enough time to learn new technologies” (C23).

In the same context there is lack of skills in health informatics among health professional coupled with lack of ICT in health professional curriculum. This poses a challenge in implementation of e-health as most healthcare workers have no skills on how to use the system;

“We have no skills in health informatics” (C13).

“We are trained to treat and not use electronic devices” (C17).

“I have no idea how I would mine data from the system” (C20).

“I accept iam not sensitised on how to use e-health systems” (C19).

“This was not part of our curricula in medical school” (C22).

Moreover there is high ICT personnel turnover in the organisation. The ICT personnel are on always on the look out for greener pastures hence when this happens the institution is usually left with no option than to hire others. The process of recruitment is

both expensive and time consuming. Thus this may affect the implementation of e-health systems;

“We are constantly having the IT officers leaving the institution” (C1).

“We work as a team and cannot perform without the assistance of IT officers” (C11).

“The turnover rate of our IT is alarming” (C4).

“I see new faces of IT officers each month” (C8).

“Believe you me that we have highly qualified IT officers in the country but the facility cannot afford to pay them” (C20).

“The IT officers are on high demand out there so containing them here is difficult” (C14).

In the same context the organisation relies on inadequate expertise which leads to poor system analysis. When this happens the user requirements are not met which might lead to sabotage and resistance on the part of users. This then affects implementation of the e-health systems.

“We rely on technically inadequate expertise for advise” (C3).

“In most cases the project is headed by staff who are politically correct to the management but not technically correct thus the projects failure rate is so high”(C8).

“I agree the team spearheading the implementation are not technically qualified” (C9).

“The confusion lies on who is technically qualified to head implementation”
(C14).

“Organisational politics plays a key role in assigning technically inadequate staff to spearhead the project. As a result the project is bound to fail” (C6).

Lack of a qualified team to provide support and assistance in the implementation was cited. In this regard the organisation may attribute this to cost of hiring the skilled IT officers and is forced to rely on interns;

“We do not have qualified technical team to support the process” (C27).

“We rely on interns for provision of IT service and as such not qualified to support the implementation” (C5).

“There are very few qualified IT officers in the organisation thus IT support is a real problem” (C16).

“Its costly to hire qualified IT officers” (C29).

“The organisation finds it hard to remunerate the IT officers well thus there is a high turnover for greener pastures” (C26).

Accordingly it was clear that there was an agreement on the significance of ICT competence in the implementation of e-health systems. The respondents were of the opinion that the presence of an efficient ICT competence had a positive effect on the implementation of e-health systems. Thus the researcher noted that ensuring the availability of an effective ICT competence is among the success elements required for the implementation of e-health systems.

4.15 E-Standards Environment

A number of concepts linked with e-standards were identified from the responses, lack of available standards, no legislation exists, standards do not address one unified area of technology, conflicting and overlapping standards, limited participation in standards, lack of importance of standards. These concepts are described in Figure 4.15.

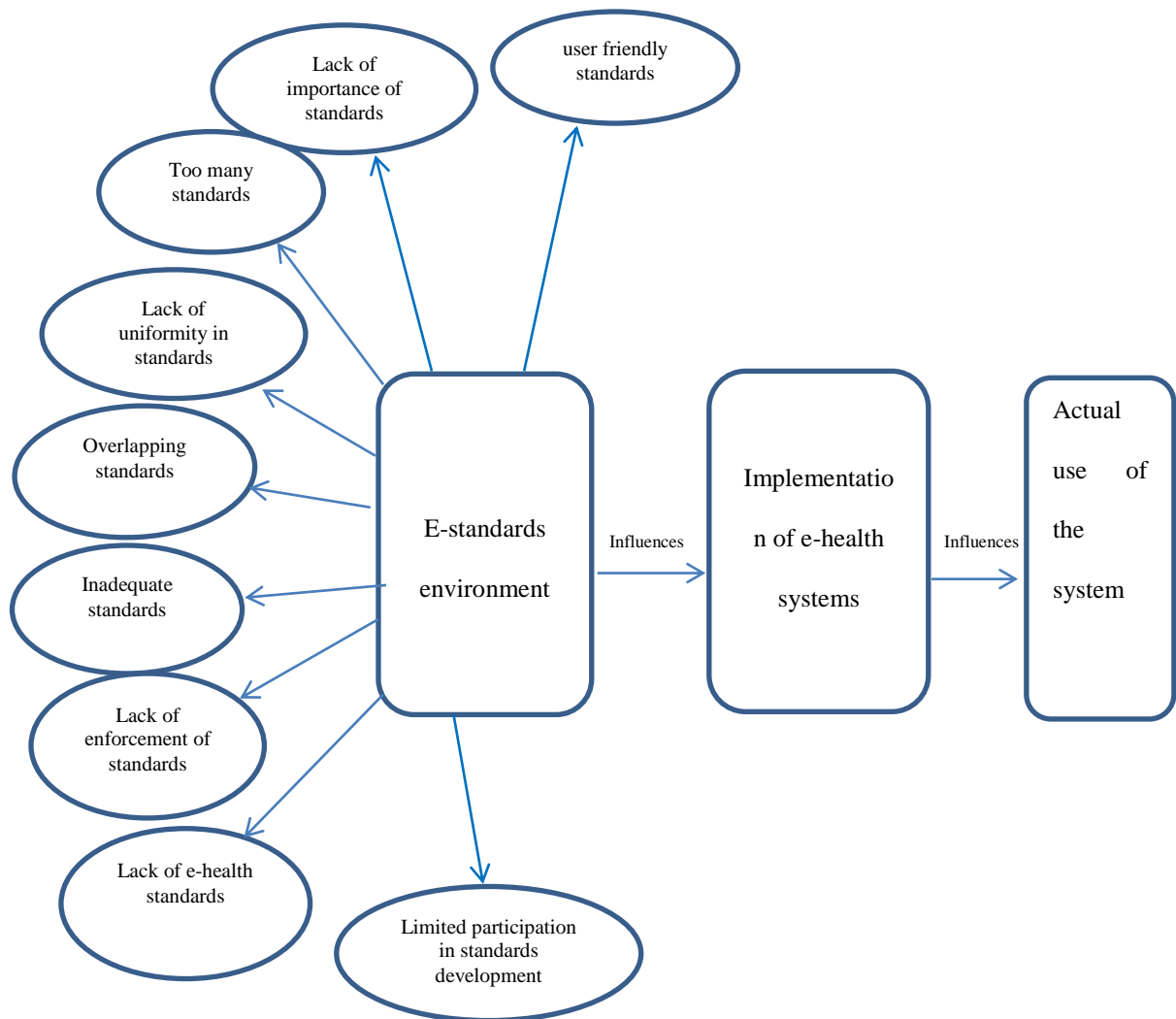


Figure 4.15: E-standards Environment Category has an influence on the Implementation of e-health Systems

Certainly the concepts that were recognized demonstrated the importance of e-standards that are necessary to support implementation of e-health systems. The reactions came from those interviewed showing the level of responsiveness about the significance of e-standards in implementation of the e-health systems. For example, some interviewees pointed out that there was lack of e-standards to share data. These sentiments were echoed by a number of respondents in the following narrations:

“There are no available standard on how the public and private health care sector can share data” (C7).

“No standards exist on how healthcare facilities can share data across the platform” (C2).

In the same context there was lack of standardization and certification of e-health resulting in lack of system and data interoperability

“The healthcare facilities do not share data as there is no agreed standard for interoperability” (C17).

“Interoperability is difficult to achieve because of lack of standards” (C2).

“How then do we achieve system integration without an existence of relevant standards” (C22).

A contributing factor to the lack of standard is the lack of incentive for data sharing among the healthcare institutions.

“There are no incentives offered for data exchange” (C10).

“We are unwilling to share the data” (C17).

“Incentives are lacking for data sharing” (C28).

A number of the respondents purported that the available standards do not focus on one unified area of technology. Thus there are many overlapping and conflicting standards

“What we have in general is many standards that do not address one area of technology application” (C19).

“There are many existing some conflicting and overlapping as well” (C10).

“There are too many available standards so which is which” (C27).

The only available standard is the one that supports District Health Information Systems (DHIS) and Electronic Medical Record (EMR), however this has limitations as private hospitals do not report their workload to the system. It only caters for the public healthcare facilities

“The private healthcare sector is not compelled to report their workload thus this standard is not all inclusive of all health facilities” (C2).

“Why then do private hospitals fail to upload their data on the system” (C16).

“The DHIS standard is not all inclusive thus we need one that addresses all aspects of patient’s management” (C22).

“The only standard am aware of is the EMR standard of 2010, however this particular one does not address medical record portability as well as ethical issues of the patient information”(C28).

Whereas, others mentioned lack of implementation guidelines for the accessible standards as barrier to the implementation.

“The available standards do not have implementation guidelines” (C3).

“The standards lack foundational infrastructure” (C25).

“We no idea on how to implement the standards” (C25).

Besides the stakeholders do not appreciate the importance of having standards at institutional level thus no or little resources are allocated to the process.

“The management is not committed to development of standards” (C12).

“There is absence of importance of standards among the stakeholders therefore little effort is made to allocate resources that support the process” (C14).

“Little resources are allocated for development of the standards” (C18).

Majority were of the opinion that low level of representation of African countries in standard development, meant that the continent’s ability to influence development was minimal. Thus this resulted to standards that do not address the peculiar local needs.

“We are not involved or consulted when these standards are being developed” (C11).

“Little effort is made to involve us in the development of the standards” (C15).

“Our views are not sought during the development of the standards” (C8).

“There is very low representation of African countries in the development of standards” (C8).

“Most of the standards tend to be western biased thus not helpful for our local needs” (C8).

Similarly in the same argument others said the available standards are not user friendly

“The available standards are difficult to understand and apply” (C10).

“The standards are not easy to use either” (C24).

Finally others suggested the need of adopting a user centred standard of general usability principles. This ensures uniformity in the use of terms and definitions, simplicity and comprehension by non technical users of the standards.

“There is need of adopting a user centred application to standard development” (C3).

“For consistency and simplicity there is need to have a user centred standard of general usability principles” (C27).

Consequently it was apparent that there was agreement on the significance of e-standards in the implementation of e-health systems. Generally the respondents agreed that the presence of detailed user centred e-standards had a positive effect on the implementation of e-health systems. Thus the researcher noted that ensuring the availability of user centred e-standards is among the success factors necessary for the implementation of e-health systems.

4.16 Chapter Summary

This chapter presents the findings of data analysis of this study through the application of grounded theory methodology. This is the process where categories and concepts are linked systematically through constant comparative analysis between the codes. Examples of the reactions from the respondents were provided to show the support of the emergence of categories. The main purpose of this chapter was to investigate elements that affect the implementation of e-health systems in the healthcare sector in developing countries with a focus of the Kenyan sector utilizing a data driven approach. The study began by collecting data using interviews. The interviews were then transcribed. This was then followed by coding of the data through open, axial and selective coding. The study generated thirteen categories that gave an indication of the issues that affect the implementation of e-health systems in Kenya.

CHAPTER FIVE

DISCUSSIONS

5.1 Introduction

This chapter provides discussions on the issues that were analysed in the previous chapter. The final framework developed explains the issues that need to be addressed for successful implementation of e-health in the healthcare sector to take place today in developing countries and specifically Kenya.

5.2 Factors that affect the Successful Implementation of e-health Systems

The analysis of the data generated 13 key elements recognized as follows: quality of e-health systems, benefits of e-health systems, macro political environment, sociocultural environment, online safety and security, e-standards, technological environment, change process management, systems integration, ICT competence, organisational efficiency , socioeconomic environment and legal environment that were later refined into five categories namely political e-readiness, managerial practices, IS Capability, societal e-readiness and regulatory framework. The following section describes the detailed discussions for each of the 13 factors generated in chapter four.

5.2.1 Quality of e-health System as a Determinant for the Success of e-health

From the preceding studies, quality of e-health systems was regarded as a contributing factor to the success of IS implementation including e-health systems (Jennett *et al.*, 2004; Eysenbach *et al.*, 2007; Korpela, 2011). The results of this study showed that perceived quality of e-health systems is probably to be amongst the significant factors of successful implementation of e-health systems. In essence quality of systems can be measured by the

following: greatly responsive to users needs, enabling users to recall patients medical history without difficulty, having e-health systems available throughout the day and enabling better interaction with the all the stakeholders, responsiveness, context -focused, well-defined, interoperable, online support, user friendly, reliable, security, well-structured, and interactivity. Furthermore for e-health system to add value along the implementation chain the systems need to meet the above minimum qualities. This will make users either to reject or accept usage of the systems all together which translates to successful or failure of the implementation of the systems. Moreover users are likely to accept systems that they perceive that they are user friendly and reliable in carrying out various processes.

5.2.2 Sociocultural Environment as a Determinant for the Success e- health

The preceding studies indicate, sociocultural environment is considered a key contributing factor for the success of IS implementation including e-health systems (Treurnicht, 2009; Oladosu, 2009b; Bhatia, 2014). The results of this study pointed towards the development of sociocultural environment as being probably among the key elements of successful implementation of e-health systems. Generally users' perceptions on technology can affect how a new technology is conceptualized and if it will be accepted and further utilized. Reference is made to a study that involved exploring hopes and fears in the implementation of electronic medical records in Bangladesh (Hedstrom & Andersson, 2012), it was found that most users are scared of utilizing ICT in health care sector based on their perceptions about it. In this study for example, some stakeholders thought that utilizing technology in their practice would be more time consuming, and an interruption to the patient's privacy. Whereas others felt that it would negatively influence the time they could spend with

patients as well as depersonalize healthcare. Additionally more explicitly interfere with their rapport with their patients. Furthermore some of the respondents consider e-health systems as a threat to patient privacy and confidentiality and as a potential tool for 'Big Brother' interference in their practice. Thus this indicates that for successful implementation of e-Health to be done stakeholders must change their attitudes towards e-Health.

Moreover cultural issues need to be sorted out as well in view of appropriateness and relevant content (Bhatia, 2014). A further element of culture is the necessity to examine and challenge the cultural inhibitions and barriers within society and institutions that hinder effective utilization of e-health systems. Accordingly the management of the organisation can encourage users to accept technology by building their confidence levels through introduction of e-health education programs. In the same context seminars and workshops can be held to sensitize users about the benefits of e-health in their daily practise. Similarly early participation of users puts them at the leading end, instead of just forcing them to accept an already developed system and forcing it on them. Moreover change process management with users, as well as staff should be encouraged at all levels. Besides a local champion may be appointed, who can be sensitized in depth about the system and may serve as the connection between developers and staff. This would go along way in solving the problem of user resistance to technology (Akanbi et Al., 2011).

Furthermore Oladosu, (2009b) suggests sensitization programs and workshops focusing on the current ICT trends and alignment to business process would need to be arranged. The management may also conduct short courses on ICT skills courses for the staff on a regular basis. Besides introduction of bonuses and reward system can also entice the users to embrace technology. Furthermore stakeholder's involvement in the implementation process

may encourage participation and reduce sabotage. In conclusion to resolve this, differences between existing organizational culture and changes need to be carefully discussed by evaluating the possible benefits and challenges when introducing e-health systems.

5.2.3 Online Safety and Security as a Determinant for the Success of e-health

Initial preceding studies, indicates online safety and security as a consideration for the success of IS implementation including e-health systems ((Mugo, 2014; Xiangzhu *et al.*, 2013; Oladosu, 2009; Ronen *et al.*, 2011). The results of this study highlight the issue of maintaining the safety and security of e-health systems as being among the elements of successful implementation of e-health systems. Normally privacy and security of electronic patient's data are of pertinent significance if e-Health is to increase confidence amongst healthcare stakeholders. Privacy is the claim of individuals to determine for themselves when, how, and to what extent information about them is communicated to others.

On the other hand security can be referred to as the degree to which private information can be preserved and transmitted such that access to the information is limited to authorized parties (WHO, 2013). Largely ICTs are susceptible to security and privacy breaches which negatively impact their implementation in the healthcare sector (Xiangzhu *et al.*, 2013). Fundamentally organizations should seek to introduce digital signatures to increase the security concerns of all the users of e-health. Privacy and protection of the information should be guaranteed by adopting advanced security techniques. In addition system authorization, authentication and controls should be introduced at all levels of use. Similarly security sensitization training should be carried on a regular basis. Moreover the management should support the process by ensuring tight security measures are put in place and allocate resources for supporting the security procedures. Equally new innovations such as block chain technology can be embraced to protect the patient's data on the network.

Certainly the block chain technology can have a great impact on securing patients data online. A patient's differing interactions in the healthcare system can not only be repaired, but having multiple checkpoints rather than one single gateway for sensitive data can also improve security. Block chain relies on established cryptographic techniques to allow each participant in a network to interact without preexisting trust between the parties. Patients who are part of the block chain would then be able to approve or deny any sharing or changes to their data, helping to ensure a higher level of privacy and greater consumer control. Whereas this is similar to how health information exchange may operate there is an important difference. The validation aspect is what will set block chain technology apart. Therefore patient records or data on a block chain are secure, almost impossible to manipulate, auditable and easily accessible with public and private keys. In essence security is totally guaranteed.

5.2.4 Technological Environment as a Determinant for the Success of e-health

The technology environment incorporates the internal and external advances that are significant to the implementation of e-health frameworks. In light of past reviews, the technological platform is regarded as a contributing factor for the achievement of IS implementation including e- health frameworks (Mbarika, 2004; Anwar, 2012; Qureshi et al., 2013; Mbarika et al., 2012; Korpela 2013; ITU, 2015). The findings of this review demonstrate that the technological components are probably among the key elements of successful implementation of e- health frameworks. Korpela, (2013) notes that internet availability is essential for effective implementation of e-Health frameworks. This study revealed that occasionally some stakeholders may be eager to conduct e-health searches online in order to share health information with their colleagues in others parts of the world.

However lack of ICT infrastructure restrains them from carrying out the queries. Furthermore combined with the low rate of internet browsing and low transfer speed are among a number of the difficulties confronting e-Health implementation in developing nations. Generally with connectivity you have to deal with things like the lack of an enabling telecommunication policy and regulatory environment; access to electricity, solar power options, back-ups, insufficient infrastructure, connectivity access and high costs. The finer these things are working the more prominent the possibility for effective implementation of the systems.

Omary et al (2009) indicates that due to inadequate ICT platform and internet infiltration in Tanzania, the majority of regions in the country cannot support internet deployment, which in turn, hampers e-Health implementation. Moreover, even in developing nations that have high internet infiltration, bandwidth speed may in any case be a challenge, while creating a barrier to implementation of e-Health frameworks. Nevertheless organizations need to embrace selection of appropriate technologies and solutions to be used within their specific environments, bearing in mind the current state of power supply standards and telecommunications infrastructure. Mainly healthcare needs should drive acquisition of technology and usage and not the other way round (Anwar, 2012). By and large other focus should be on establishing internet connections for health institutions; establishing websites for each health facility; building local area networks and establishing telemedicine facilities. In this case the adoption of open ICT platform technologies should be encouraged, and maintenance of adopted technologies should be done.

In addition to solve the interoperability and maintenance problems, simple, local, user-friendly software should be used. Moreover developing countries may opt for open source software due to its open methodology and lower expenses. Besides, they could build on current already existing and working innovations, while customising their own relevant solutions. Thus the macro political environment may play a key role in regulating computer prices, systems prices, and internet access costs, such that more people can have access to such resources. Similarly systems standards and guidelines need to be in place and assessed for suitability prior to extensive implementations (WHO, 2012).

5.2.5 Macro Political Environment as a Determinant for the Success e-health

Past studies indicate that macro political environment is observed as a determining factor for the achievement of IS implementation including e-health frameworks (Oladosu, 2009; Murray, 2010; Mbarika, 2013). The aspects of micro political environment that emerged include poor history of IT implementation in the healthcare sector, social and economic development, foreign donor investments, poor collaboration with both private and public sector, insufficient funding, conflicts of interest, low political goodwill in sector, inadequate knowledge about e-health frameworks in the region, embedded corruption, ROI is lower in healthcare than other sectors therefore entrepreneurs are reluctant to invest in the sector. In this study macro political environment is referred to as the external environment that is impossible to control and generally has an effect on the aspect of decision-making in the country. This is predominantly on national strategies and policies, which implies the effect on services and functions provided by various organisations.

The micro political environment is mandated to ensure there is equitable distribution of resources equitably to the entire population. This may address the issue of inadequate ICT resource distribution among various healthcare institutions. Indeed the outcomes from this study demonstrate that the improvement of a conducive political setting is probably among the key determinants of effective implementation of e-health systems. The study revealed that there is very little or slow yields on e-health systems in developing countries. Thus these systems do not yet show up on the thrust areas of entrepreneurs in developing countries to invest in the sector (Murray, 2010). As a result this discourages the potential entrepreneurs in investing in e-health systems.

Moreover politicians are not very keen on focusing on the healthcare sector IT investment as the return on investment is very low coupled with deep conflicts of interests among the political class. By and large the political environment is characterised by personal interests that over ride the over role interests of the society. Thus the politicians may be reluctant to support the implementation of e-health systems because they do not see the benefits in the short run. Accordingly the political environment should establish an enabling policy environment that will encourage the private sector to seek funds for capital investments that will allow the introduction of new cost-effective technologies. Additionally the political sector needs to make policies that attract investments in ICT infrastructure and services in the health sector, using domestic and external financing.

Likewise there is need to ensure there is integration of e-health in all budgetary processes to promote sustainability of the e-health projects. Equally they should develop policies on e-Health which articulate the commitment of the government to invest in an ICT-based healthcare system. Furthermore international partners and donors should be encouraged to

support national efforts towards implementation of e-health projects. Similarly there is need to come up with a social national health policy plan for all citizens that can work for both private and public facilities. The current NHIF cover capitations are too low to match the needs of the private sector that does not get government subsidy to run their facilities. In addition the political sector should seek to equitably share the resources to the population to reduce the digital divide among the rural and urban population. Moreover Public Private Partnerships (PPP) should be encouraged so that the various institutions may be able to share resources and expertise. This would help fast-track e-health implementation especially in the public health sector which still lags behind in innovations utilization.

5.2.6 Change Process Management as a Determinant for the Success of e-health

The preceding studies have highlighted change process management as a contributing factor for the success of IS implementation including e-health systems (Fanta, 2015; Anwar, 2012; Ekeland, 2010; Eysenbach, 2001; WHO, 2011). The analysis of this study indicates that the change process management is probably amongst one of the key elements of successful of e-health frameworks. Change process management is crucial in influencing the user's attitudes and commitment towards usage of e-health systems which translate to easier implementation. Stakeholders need to be involved in the entire process of system development from analysis to implementation stage. Thus by engaging stakeholders through each stage of the e-health project reduces the likelihood of sabotage and resistance to the innovation which negatively affects the implementation. The change process management is necessary in promoting IS leadership in the organisation as well in identifying a champion to advocate for the change. Such actions would ensure there is continuity plans put in place of the initiated e-health projects. Likewise the change process management is important in sensitizing the benefits of the systems to the top management which translates in resources allocation to support the process.

Fundamentally the management should demonstrate support commitment for change by sensitizing employees to accept change through training or seminars. Furthermore they should spearhead the process by nominating a champion to implement change as well as engage all stakeholders in the change process. Equally the organisation needs to set aside resources for supporting the change process. This will ensure there will be continuity plans put in place for the smooth running of the project.

5.2.7 Systems Integration as a Determinant for the Success of e-health

System integration was regarded as a contributing factor for the success of IS implementation including e-health systems (Iacovou, 1995; ITU, 2015; Siedlecki, 2001; Kimaro, 2007). The findings of this study demonstrate that sustaining the integration between various e-health applications was amongst the elements for successful implementation of e-health system. Interoperability is referred to as the capability of two or more systems or their components to share information and to utilize the information that has been shared. In the health care context, whether regional, national, or global, interoperability is commonly referred to as the capability of e-health systems to work jointly within and across organizational boundaries in order to advance the effective delivery of health care for individuals and societies. Interoperability is a fundamental component of enabling desired cross-institutional point of care access to accurate patient data and to achieve better health care outcomes, cost savings, and efficiencies (Korpela, 2013).

Mugo *et al.* (2014) suggests that in order to attain interoperability across institutions requires coordination and cooperation among main stakeholders in the healthcare sector. Consequently the government should ensure there is proper coordination between national and county hospitals on issues of incompatibility and interoperability, reengineering of

internal processes and synchronisation to exchange data. Ideally the donors should be encouraged to have good will and allow integration of the donor funded systems and local systems. In addition policies and laws need to be put in place to support the integration of the systems and sharing of information. Furthermore various institutions can embrace some of the new emerging technologies to increase the interoperability of such systems. For example the block chain technology has the likelihood to address the interoperability issues currently present in e- health systems and to be the technical standard that enables individuals, health care providers, health care entities and medical researchers to securely share electronic health data. A national e- health infrastructure based on block chain has far-reaching potential to promote the development of precision medicine, advance medical research and encourage patients to be more accountable for their health.

5.2.8 Organisational Efficiency as a Determinant for the Success of e-health

The findings of this study show that organization efficiency is among the determinants for fruitful implementation of e-health frameworks. In light of past reviews, organizational efficiency is observed to be a key determinant in the implementation of IS systems including e-health systems (Avgerou, 2008; WHO, 2013; Qureshi *et al.*, 2014; Ronen *et al.*, 2011; Juma *et al.*, 2012). Senior management support refers to the extent of commitment and resource support given by the top management for implementing of the systems. The organisations are characterised by various issues that derail implementation of the e-health systems. This include lack of top management support, accountability, innovativeness, IS leadership, strategic orientation, trust issues, red tape bureaucracy, unrealistic expectations, complacency, personal interests and conflicts of interests. The bureaucratic procedures in the supply change processes hinders faster and easier decision making thereby crippling implementation of the e-health systems. Thus the government can introduce laws that break

some of these bureaucratic processes. In addition the organization may form a multi sectoral and multidisciplinary consultative process involving all key stakeholders. This would include the users and beneficiaries. This kind of a team should be used to fast track the implementation process as well as ensure the change process management is done properly. Moreover there is need to set up a monitoring and evaluation of systems to measure progress in the implementation of e-Health project (Eysenbach *et al.*, 2007).

Furthermore the top leadership should spearhead the project by supporting it by word and action. In the same context the organisation needs to prioritise and set aside resources for e-health project from capacity building to implementation details. The capacity building will go along way in fostering innovativeness in the organisation as well as increase accountability among the various stakeholders. The issue of trust among various health institutions needs to be addressed so that interoperability of the systems is possible. Fundamentally interoperability helps in sharing of patients data among various healthcare institutions. Similarly streamlining of internal processes needs to be properly done so that bureaucratic procedures are reduced as this acts as a barrier to the project as well as inviting aspects of corruption in the process (Korpela, 2013).

Consequently there is need for a shared mind set between Information System managers and organisation leaders to embrace new tactics in reaction to changes in the competition and technology landscape in the system implementation (Ronen *et al.*, 2011). The study also found out that there was a lot of conflict of interest among the stakeholders where by the personal gain override the organization gain, thus this creates a barrier towards implementation of the systems. This conflict of interests may also be referred to as organizational politics overriding the project. Many of the stakeholders seek to satisfy their

personal interest as opposed to looking at the bigger good of the organization. Thus they seek to benefit from the e-health project at a personal point instead at the expense of the organization. Such behavior may cripple the process of implementation of e-health project. This may be handled through change process management and having a good will for the e-health project amongst other existing projects. Largely there is need for a change of mindset on prioritizing e-health projects among other projects so that resources are set aside for its implementation. Moreover public private partnerships should be encouraged so that issues of sharing of data among institutions are made much easier. Equally the public private partnerships would help in bridging some of the gaps that may exist in terms of resources and expertise.

5.2.9 Socioeconomic Environment as a Determinant for the Success of e-health

The earlier studies indicate that socioeconomic environment is observed as a contributing factor for the success of IS implementation including e-health systems (Eysenbach, 2001; Kaye, 2010; Korpela, 2012; Hansen, 2011). The findings of the study revealed that the improvement of socioeconomic environment is probably amongst the significant factors of successful implementation of e-health systems. The social economic aspects that emerged include high poverty levels, low income rates, purchasing power, digital divide, generation gap, demography characteristics, literacy levels, equity and access, return on investment and unequal distribution of resources. Majority of the potential users of the e-health applications are economically challenged with low purchasing power. This means there are significant members of the population who may not afford to buy the ICT gadgets because of the high costs of the devices. This coupled with high IT illiteracy levels among the population may hinder them from maximum utilization of the e-health applications.

Generally the country is characterised by unequal distribution of resources which then affects equity and access of the e-health applications. This is more prevalent in the rural setting than the urban settings who are the potential users of the e-health applications thereby creating a big digital divide among the population. Digital divide refers to those people who have skills and knowledge on how to exploit innovations. Similarly the low rate of return on investments of e-health systems may deter potential entrepreneurs in investing in that area. This is because the e-health systems do not attract investment interests among entrepreneurs as it is perceived that there are no direct benefits in e-health systems investments as compared to other sectors. Thus the government needs to intervene to reduce the inequities that exist between the rural and the urban population.

Furthermore the government should seek to empower their people economically so that the poverty levels are drastically reduced which affects their purchasing power. This can be done by introduction of income generating activities especially in the rural areas where the poverty indices are very high. Besides the government in partnership with donors can seek to educate the masses on what e-health is all about and the benefits of using the technology. Consequently this way they will gradually accept technology just like they did to the m-pesa technology thus directly impacting on the e-health implementation.

5.2.10 Legal Environment as a Determinant for the Success of e-health

An effective legal environment is regarded as a contributing factor for the accomplishment of IS implementation including e-health frameworks (WHO, 2013; Mbarika, 2010; Ekeland, 2010; Sanders, 1995). The legal environment prevalent in most developing countries, is not sufficiently strong in bringing up changes in the healthcare sector and in essence the implementation of e-health systems. The outcomes show that the improvement of a

conducive legal setting is among the fundamental elements of successful implementation of e-health systems. The legal environment aspects that emerged include weak laws, out dated legislations, data processing laws, e-laws lacking, enforcement issues, lack of importance of e-laws and lack of goodwill. Majority of the respondents were of the opinion that the current laws that guard patient's data are obsolete while there is an absence of laws that protect patient's data on the network. This hinders the interoperability of the systems and sharing of patients data on the network. Generally users of various e-health systems need to be guaranteed that the patient's data is protected on the network to avoid ethical issues that guard the patient's management. In some instances even where the law exists there is no enforcement to compel all health institutions to report their workload thus it makes it difficult to know exactly what is happening in the healthcare sector for planning and decision making.

Consequently the government need to develop policies related to legal liability, ethical, and confidentiality of the patient's data. Furthermore an e-health policy and enabling policy-environment are crucial to the success of e-Health solutions (Pagliari et al., 2005). Hence there is need to develop a security policy for e-health systems. Essentially e-Health policies should deal with e-Health maintenance and support, regulations for privacy, benefits, cultural differences, interoperability, and capacity building. The e-government has a security policy and the healthcare sector can customize it. Accordingly there is need of developing a clear policy and regulatory oversight on transmission of health data and information as well.

5.2.11 Benefits of e-health Systems

Previous studies have revealed that user's perceived usefulness plays a key role towards dealing with resistance of e-health systems (Akanbi et al., 2011; Ash, 2012; Ronen, 2011). The benefits of systems include increased productivity, more accurate diagnosis, cost reduction, assists in national planning, equitable healthcare, time saving, enhanced decision making, efficiency and effectiveness, empowered citizens. The findings of this study indicate that user's perceived ease of use and usefulness of the systems are likely to be influential in dealing with acceptance of the e-health applications which translates to implementation of the systems. Largely the users are likely to accept systems that they perceive as beneficial to their work as well as to the patients. Failure to which, the users would resist the implementation of the systems. Thus the management needs to sensitize all the stakeholders in the healthcare chain on the perceived benefits of the system way in advance. This would prepare the users prior to implementation thus sabotage of the system would be unlikely to happen. In this regard there is need to involve the users right from the initial stages of the system development up to the implementation stage.

5.2.12 ICT Competence as a Determinant for the Success of e-health

ICT competence is regarded as a contributing factor for success of IS implementation including e-health systems (Kimaro, 2005; Lazaro *et al.* 2013; Murray, 2010 & Kaye, 2010; Kiura, 2012). The results from this research revealed that ICT competence is a key factor in implementation of e-health systems. This study indicated that the number of healthcare workers equipped for utilizing ICT in their work remains limited. Health workers are not systematically prepared in the use of technology. Besides there are insufficient numbers of healthcare workers with the capacity to design, deploy and oversee e-Health frameworks. In

addition the use of ICT facilitated learning remains low in most health training institutions. Furthermore this is made worse by the inadequate IT personnel available in the sector which is characterized by high turnover of the staff for greener pastures.

Lazaro *et al.* (2013) observes that poor internet skills on the part of healthcare workers hinders them from comprehending the difference between biased and unbiased information, to distinguish evidence-based claims, and to interpret the information which is meant for healthcare workers. Thus the ministry of education can introduce ICT in the curricula of all health training institutions. Moreover training in e-health should be included in the continuing education programs for clinicians. Largely the government should consider establishing centers of excellence to training e-Health professionals. Equally the organization needs to offer competitive packages that can attract and retain IT personnel longer in the sector. Furthermore investing in capacity growth and training in technological, communication and content development of skills will result in a more successful implementation of e-health in the organization. Therefore it is important for the management to allocate enough resources to support capacity building programs in the organization. Moreover making opportunities available to see the e-health applications in practice or a clearly reported trial should be part of the training that can help improve the user's skills on IT thus improving the chance for successful implementation.

5.2.13 E-standards as a Determinant for the Success of e-health

Primarily e-standards is observed as a determining factor for the success of IS implementation including e-health systems (Braa, 2007; Juma, 2012; Lazaro, 2013 ;Fanta *et al.*, 2015; Korpela, 2013; WHO, 2011). The results from this study indicate that e-standards are a key determinant in implementation of e-health systems. A standard is a settled upon,

repeatable method for accomplishing something; it is viewed as the way to accomplishing interoperability of e-health frameworks. E-health standards cover a wide range of spectrum of technology; ranging from those that deal with patient data content, to electronic medical devices (WHO, 2011). The aspects of e-standards that emerged include inadequate standards, limited participation in standards development, lack of available standards, no legislation exists, standards do not address one unified area of technology, conflicting and overlapping standards, lack of importance of standards. To a great extent, healthcare systems in Kenya are paper-based. ICT is mainly utilized to support data capturing, storage, retrieval, and monitoring and evaluation of health programmes that are mainly sponsored by external donors. Although the government remain a highly significant stakeholder in the healthcare sector, there are no policies and strategies to govern e-health initiatives at national levels (Juma, 2012).

Fanta *et al*, (2015) takes note that Africa for instance has no known policy framework that governs areas of common interest at continental level. Notable in this regard is the European Patient Smart Open Systems (EPSOS) project, which provides for the development of interoperable electronic medical records systems across Europe in order to improve the quality of cross-border healthcare services for its citizens. Furthermore, many of the stakeholders do not understand the important role of standards in affecting quality care; this is largely due to the technical nature of standardization. Moreover Braa (2004; 2007) emphasis that for system integration and interoperability to be achieved there is need to have standards that cover the following areas: Identifier standards: these are standards that deal with unique identification of various entities, such as, patients, healthcare providers and healthcare institutions. Examples of these standards include the identification of subjects of healthcare standards and the provider identifier standard. Messaging standards: these

standards specify the structure and format of messages to expedite secure transmission and receipt of the messages between healthcare providers. They also specify the acknowledgements that should be sent by the recipient of a message, as well as the warnings that should be generated when the message has not been delivered or if it is declined.

In addition clinical terminology and classification standards need to be addressed. These standards support the description of medical conditions and treatments using common language in order to prevent ambiguity in the interpretation of healthcare information that is transmitted electronically. Security and access control standards: these standards enable the secure transmission and delivery of healthcare information so as to ensure that personal healthcare information is protected from unauthorized access. This may be achieved by addressing uniformity in standards development. In addition local institutions should be equally engaged in the development of standards that meet their unique needs other than rely on foreign standards that are difficult to meet local needs. Moreover organisations need to set aside resources for standards development. Furthermore there is a necessity of coming up with standards that address one unified area of technology for example e-health (Lazaro, 2013).

5.3 Interrelationships between the Core Category (implementation of e-health systems) and other Categories

The data analysis of this study showed the interrelationships between various sub categories. The core category was implementation of e-health systems and is mentioned recurrently during the responses below. This core category, however, links all other categories. Figure 5.1 shows the interrelationships between the thirteen categories that emerged from the study.

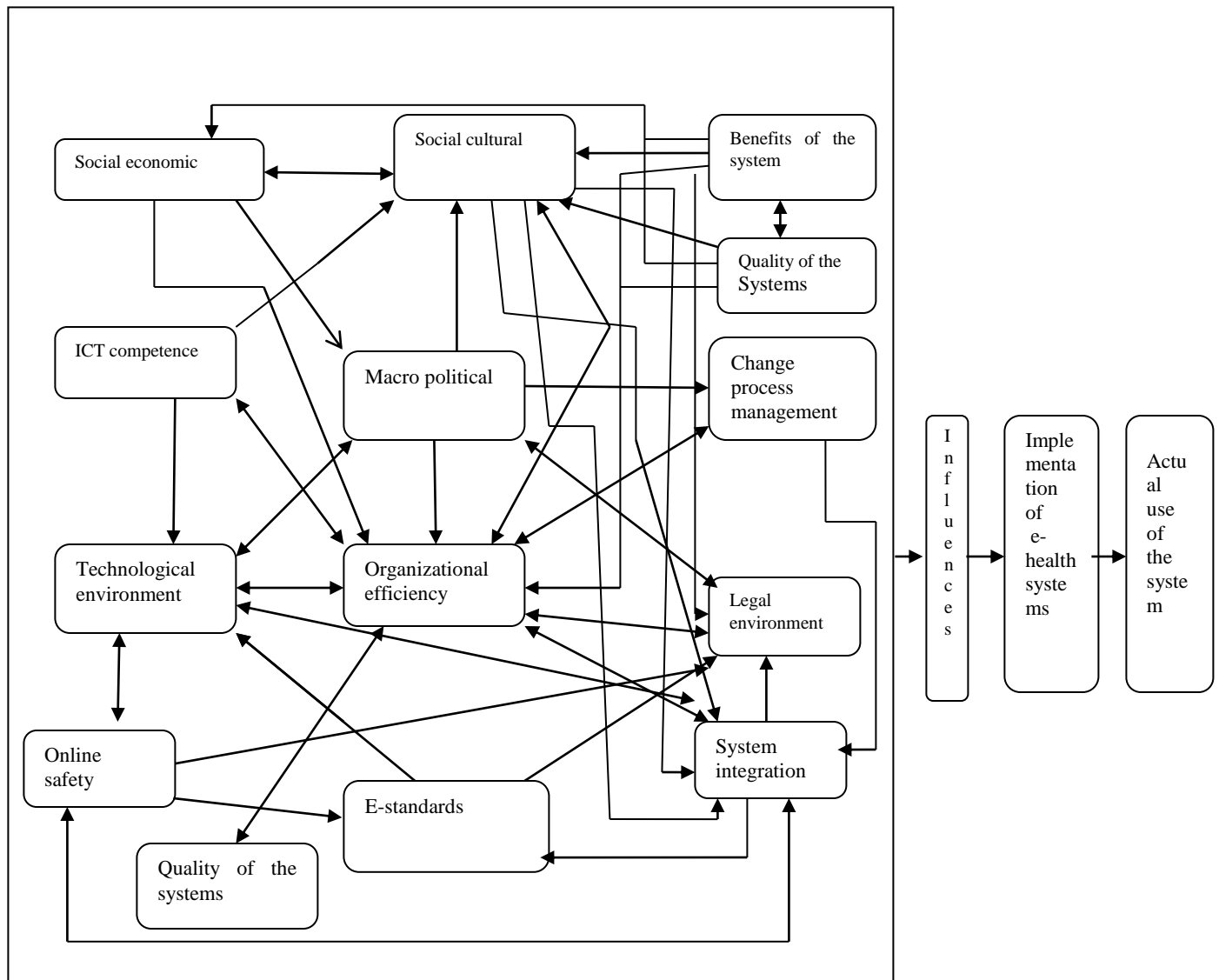


Figure 5.1: Interrelationships between Categories

Source: Author 2017.

The symbols provided below such as R1, R2...etc refer to interrelationships that have been revealed between categories in different perspectives in Figure 5.1.

R1. Organisational efficiency and Social cultural environment: The analysis indicated a clear relationship between organisation efficiency and social cultural environment. If the organisation has good will towards supporting the project it would influence the users in changing some of their attitudes toward technology. Organisation need to focus on how they can motivate their users to accept technology and this would have a positive effect toward implementation of the system.

R2. Legal environment and System integration: The analysis demonstrated the effect of improvement in the legal factors, especially those identified with system integration is significant to guarantee there is interoperability in order to share information. Organisational culture involves a legislative and legal environment to guarantee the sharing of data between different healthcare institutions. Thus, the absence of an effective legal environment concerning the utilization of system interoperability in the healthcare institutions causes a negative effect on the sharing of patient's data thus this hinders effective implementation of e-health systems.

R3. Legal environment and Benefits of the systems: The analysis demonstrated the significance of improvement in the legal environment, chiefly those linked to e-health in order to boost trust and confidence among the users. However, the absence of e- laws associated with confidentiality and protection of patients data on the network negatively affect the confidence that the users have in utilising e-health systems which translates to a negative effect on implementation of e-health systems.

R4. Organisational efficiency and Change process management: Dealing with the change process management was found to be a crucial factor in the achievement of e-health implementation in Kenya. Many facets of the utilization of e-health rely largely on the

organisational efficiency supporting the process in terms of financial support, communication, capacity building and how the aspects of change management can be as an enabler or obstacle to the users utilising the technology. This implies that the absence of effective change management aspects regarding implementation of e-health will affect negatively the process.

R5. Organisational efficiency and Legal environment: The organisational culture needs an enabling legal environment to facilitate the process of change in accomplishing the goal of utilising the new technology. Thus, the absence of effective laws concerning the implementation of e-health in the organisation negatively affects its implementation.

R6. Quality of e-health systems and Benefits of the systems: The analysis demonstrated a positive relationship between the quality of e-health systems, the systems benefits and confidence among the user. This implies that guaranteeing the e-health systems are of acceptable quality may boost the trust among the users in implementation of the systems. Users will only use the system if they are assured they are perfect and will meet their needs appropriately.

R7. Macro political and Organisational efficiency: The analysis indicated the effect of political decisions and perceptions on the implementation of e-health. Political goodwill and enabling environment leads to effective leadership at organisation level thus this positively affects the organisations implementation of e-health systems. An enabling political environment acts a vital function in influencing the social and economic development for the improvement of the population in general and in essence trying to reduce the digital divide between the rural and the urban citizens.

R8. Social economic and Micro political environment: The analysis exhibited the relationship between social economic factors and micro political factors on the citizen's utilisation of the e-health. In Kenya for instance, the utilization of technology is mainly found in the major towns where economical development is higher as compared to the rural areas. Thus this makes the urban people more enlightened on new technologies or innovations, consequently if this was cascaded down to the rural areas then everyone would be eager to use the technology which makes acceptance and implementation of e-health systems much easier. Thus the micro political environment plays a critical role in ensuring there is adequate distribution of resources equitably to the entire population to reduce the poverty levels.

R9. Quality of the system and Organisational efficiency: The quality of the system has a direct relationship with organisational efficiency. Well designed interfaces results to the higher quality of e-health systems. This means that good design characteristics have a direct effect on the quality of the systems, as users are likely to accept the user friendly systems which in turn translate to greater implementation, thus this results to a positive effect on the implementation of the e-health frameworks.

R10. Online safety and e-standards: The analysis demonstrated a relationship between online safety and e-standard development. This was probably amongst one of factors determining the success of e-health system implementation. This requires the development of standards and policies to protect the patient's data on the network. This aspect has a probability of impacting on the implementation of e-health systems.

R11. Micro political environment and Legal environment: Generally the political environment plays a significant role in the improvement of laws regarding the utilization of the innovations. In essence this would enhance knowledge on the benefits of e-health systems and as well as reduce the digital divide between urban and rural people which in turn improves equity and access of e-health systems to all citizens. Indeed this would improve the lives of all citizens. However, this effect is negative on the grounds that political stance towards the implementation of e-health systems are not at the level required. Moreover the inadequate legislation governing on the sharing of patient's data on the network may greatly affect the safety and confidentiality, thus needs to be addressed by the stakeholders and the political arena.

R12. System integration and e-standards: There is a relationship between system integration and e-standards. The e-standards define a minimum acceptable way of sharing data on the network. Thus for integration to work there is need to have specific standards that guide on the way the data is transmitted which in turn affects implementation of e-health systems in one way or the other

R13. Social cultural values and Organisational efficiency: The analysis indicated a relationship between social cultural values and practices and organisational efficiency on the perception of users towards implementation of e-health systems. The culture that is prevalent in most organisations is generally negative to technology. This is because technology is considered an intruder to their daily work than an enabler and thus this explains the negative attitudes that users possess towards e-health which directly affects implementation of the systems.

R14. Micro political environment and Technological environment: The analysis revealed that there is a direct relationship between micro political environment and technological environment. The micro political environment plays a key role in making policies that regulate the ICT equipment including regulating taxes on the imports. Thus this would affect the availability of a robust ICT platform that supports the e-health systems.

R15. Micro political environment and Organisational efficiency: The analysis indicated a relationship between micro political environment and organisational efficiency. The political class have a hand in the choice of leadership of the healthcare institutions. Thus with wrong choice of leadership means implementation of e-health systems may remain a challenge.

R16. Online safety and System integration: The analysis showed there is a relationship between online safety and system integration. The stakeholders need to be assured of online safety of the patient's data as it is transmitted through a network from one institution to another. Thus for integration to work security and confidentiality of the patients data need to be guaranteed.

R17. Macro political and Social cultural environment: Macro political factors are key to sustaining a positive social cultural environment. Political goodwill acts as a catalyst in promoting an enabling social cultural environment. The political class have the mandate of ensuring there is equitable distribution of resources to all the citizens in order to reduce the ignorance, illiteracy and unemployment levels. An elite society is likely to be more open minded and technology oriented which in turn has a direct effect to implementation of e-health systems.

R18. ICT competence and Social cultural factors: There is a relationship between ICT competence and social cultural factors. Some of the users of e-health systems have high IT illiteracy levels which cripple utilisation of the systems. Thus there is need to have interventions done to empower users in IT skills. Users who are conversant on how to manipulate systems are less likely to resist or sabotage the system which translates to greater implementation of the same.

R19. Technological environment and Organisational efficiency: There is a relationship between technological environment and organisational efficiency. Technological infrastructure provides the platform that supports the e-health systems. The organisations require a robust IT platform to support the implementation of the e-health systems. Without the right ICT infrastructure in place means implementation of e-health systems in the organisations would be a challenge. Thus this has a direct effect on the implementation of e-health systems.

R20. ICT competence and Organisational efficiency: There is a relationship between ICT competence and organisational efficiency. The e-health systems require personnel to operate thus it is very critical for each organisation to have the right IT personnel in place to support these systems. The entire users in the organisation also need to have basic skills on how to utilize the systems. Hence the organisation needs to factor issues of short ICT sensitization in their planning. This has a direct relationship in e-health implementation.

R21. Social cultural environment and Organisational efficiency: The analysis showed there is a relationship between social cultural environment and organisational efficiency on the implementation of e-health. Confidence in e-health frameworks requires trust both in the

organization and in addition confidence in the technology, where users are guaranteed that the frameworks can address their issues successfully. Thus it is necessary to build trust between the users and the organization so that implementation may be made much easier.

R22. Sociocultural environment and System integration: The analysis revealed that there is a relationship between the sociocultural environment and the system integration. Culture, for example, resists change. The integration of various e-health systems affects user's responsiveness to utilisation of the e-health systems. However system integration may not be successful because of the user's cultural hindrances. This is on the issues of fear of sharing of patient's data online where issues of security and confidentiality emerge and thus affects implementation of the systems.

R23. Technological environment and implementation of the e-health system: The analysis indicated that the effect of improvement of technological infrastructure platform on the effectiveness of e-health. The stability in the infrastructure platform in dealing with aspects of reliability, availability, accessibility, affordability and maintenance is among the main reasons that positively influence implementation of e-health in the country today.

R24. Social cultural and Micro political environment: There is a relationship between social cultural factors and micro political factors. There is a major divide in the population in terms of access and literacy levels. Some members of the population are relatively poor thus they may not be in apposition to afford the ICT gadget to access e-health applications. In addition the IT literacy levels are fairly low so utilization of the systems would be a challenge. Therefore the more economically challenged the users are, the more likely they are to resist, sabotage and fear implementation of technology as this comes with a cost aspect. Thus this may have an effect of the implementation of e-health systems.

5.4 Final Categories

The thirteen categories discussed above were analysed further through selective coding and reduced to five fundamental themes or points of view in particular: political e-readiness, managerial practices, IS Capability, societal e-readiness and regulatory framework viewpoint. This integration among the five viewpoints gives clarification as to why many developing countries have not been fruitful in implementation of e-health frameworks appropriately. In any case, the analysis demonstrated that the achievement of e-health with regards to developing countries by and large and Kenya specifically is not a simple undertaking since it relies on upon a multifaceted blend of variables. The purpose of amalgamating the categories according to the researcher is based on the need to generate an integrated framework that explains the issues that underlie implementation of IS, especially e-health systems. In any case, these factors differ depending on the environment, in which e-health systems are being implemented.

5.4.1 Managerial Practices

Figure 5.2 demonstrates the managerial practices category, and their related concepts that are likely to influence the implementation of e-health systems. The categories that were grouped together to form the managerial practices include change process management, political e-readiness, organisational efficiency and ICT competence. The analysis indicated that the effective managerial practices in the organisation play a significant role in the successful implementation of e-health (Anwar, 2012). Fundamentally, the organisation usually coordinates functions related to planning, organising, coordination, implementation and management of e-health systems, thus it has to facilitate the process of change management as well as ensure that there is capacity building in the organisation (Boonstra et al., 2014). This equips the users with the necessary skills needed to utilise the systems as well as manipulating user's perception towards implementation of e-health systems.

Inadequate or unsustainable funds were cited as a major hindrance to e-health implementation (Ronen *et al.*, 2011). In the long term, donor funding may present a challenge for sustainability of e-health projects. Furthermore in endeavouring to scale-up e-health systems, programs may be disadvantaged by dependence on donor funding hence there is need for transiting to alternative and varied resources. Consequently the political environment plays a critical role on allocation of more resources to the various healthcare institutions (Avgerou, 2008; WHO, 2013).

However well organised, in practice, IS may face failure especially when the aspect of human element is neglected. In most instances the human element is ignored and roles are not allocated in the process. Generally there is no framework that does not work without the existence of users that comprehend the framework, its significance and after that utilizing it (Fanta, 2015). Basically, if the e-health system is perceived as an information system which it is, the success of the system needs the involvement of users in different ways thus change process management is very critical in the organization. Besides this would play a great part in sensitizing the users (Juma *et al.*, 2012).

Among one of the outstanding issues emerging from effective managerial practices is the organisational politics that are dominant in the institutions where personal interests override the organisations interest. Thus change process management is significant in sensitising the stakeholders on the importance of e-health systems thereby demystifying the perception stakeholders have towards the systems. Similarly this would assist in ensuring there is continuity of the e-health projects initiated in case there is change of leadership. In essence supporting the IS leadership in the organisation. Besides such users would be the champions of the e-health project in the organisation. Moreover involving the users in the change management means there are less likely to resist technology thus the effective managerial practices plays a fundamental role, which would positively or negatively touch on the success of e-health implementation in the healthcare sector in Kenya (Qureshi *et al.*, 2013).

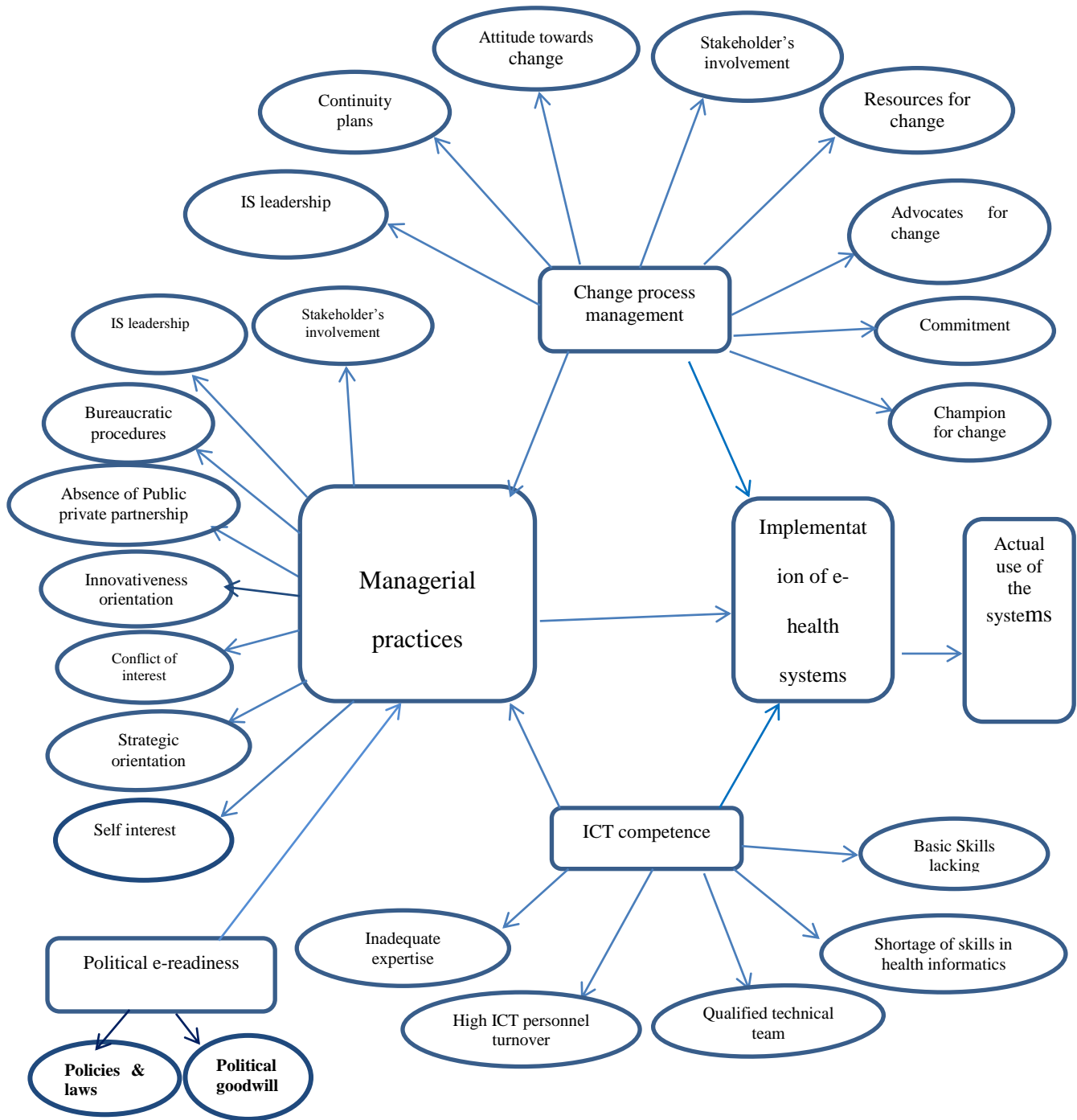


Figure 5.2: Managerial practices, and their associated attributes that are likely to affect the implementation of e-health systems

Source: Author 2017.

5.4.2 IS Capability

IS Capability plays a key role in the implementation of the systems. IS capability includes resources such software, hardware, communication, IT personnel and IT applications which are inimitable, unique and consequently can be used to support and sustain the e-health systems (ITU, 2015). The IS capability concept has also been used by Peppard and Ward (2004) who refers to IS resources as business resources, technical IT resources and human competence. They propose that these three attributes have to work together for the success of IS capability to be realized. Basically for implementation of e-health to be achieved there is need for the organization to exploit its IS resources properly.

The categories that were grouped together to form the IS Capability category include system quality, system integration, e-standard, online safety and technological environment. Undoubtedly an often mentioned example of a weak ICT infrastructure platform is inadequate network infrastructure and connectivity. Primarily lack of network infrastructure can result in a set of security flaws, while others are lack of backup mechanism (Anwar, 2012). Moreover technical resources such as on-site computers and computer systems are inadequate as well. Hence key to e-health implementations is the delivery of the right information, at the right place and at the right time. It is vital to keep a core dataset that acts as a point of comparison for data accuracy and user traceability. Such include audit logs of user activity, page viewing and editing. The utmost straightforward solution to address interoperability issues is the setting of national e- standards. (Braa, 2007; Mbarika *et al.*, 2012; Korpela, 2013).

In addition for the e-health to work, online safety is very important. This will assure users of safety of the data being transmitted over the network as well as supporting system integration which is necessary for interoperability to work (WHO, 2013). In this case for integration to be feasible the systems have to have certain desired qualities. Thus e-standards will provide an enabling environment for safety to be enforced on the network which in turn supports integration (Kimaro, 2007). The e-standards provide a uniform platform on how data is to be transmitted over the network which is a necessity for success of e-health implementation (Qureshi *et al.*, 2013).

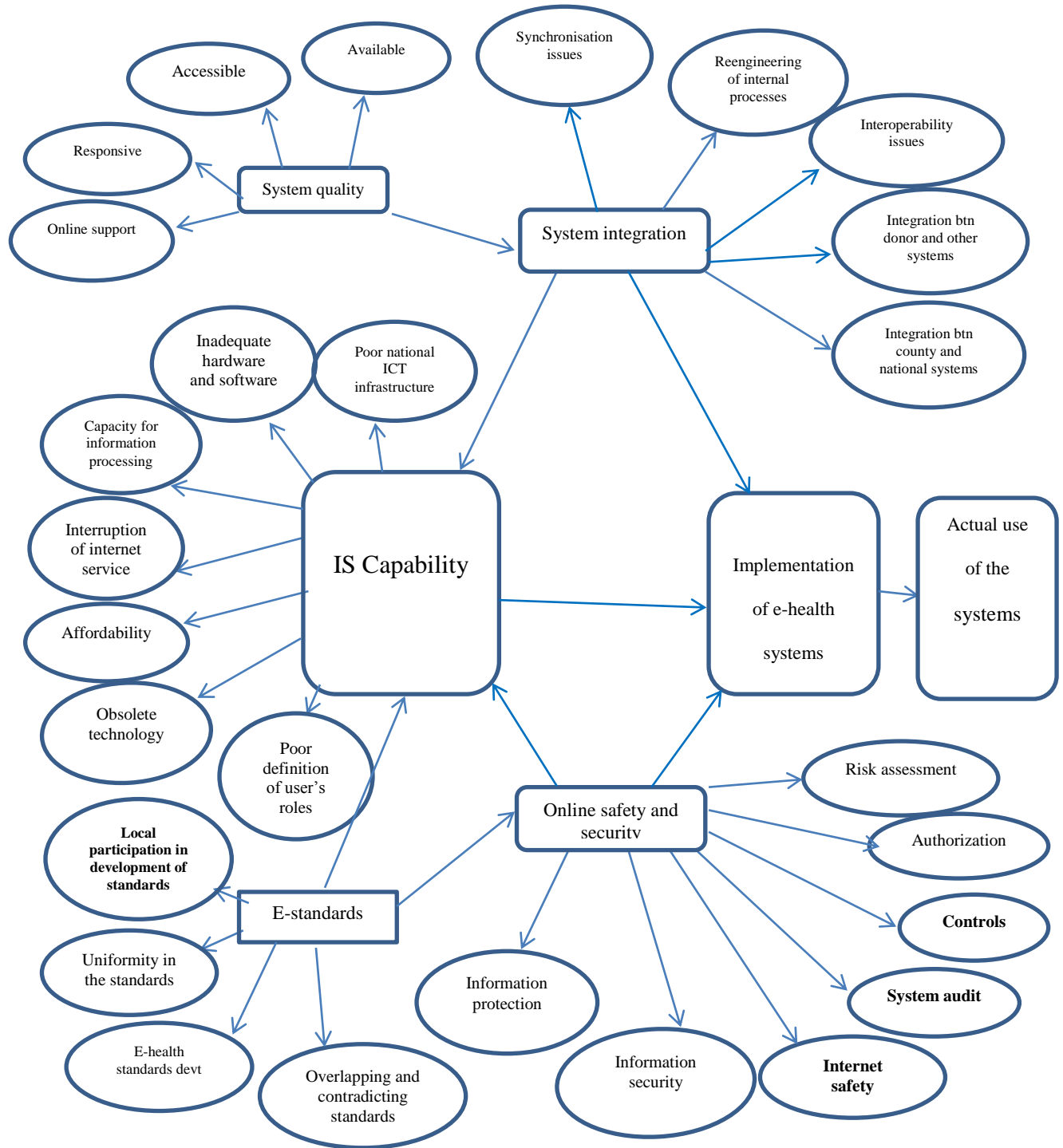


Figure 5.3: IS Capability, and their attributes that are likely to affect the implementation of e-health systems

Source: Author 2017

5.4.3 Political e-readiness

E-health readiness means the preparedness of healthcare organizations or communities for the expected change caused by plans associated with ICT-application. In other words e-readiness is referred to as the facility and capability to follow value creation chances assisted by the utilizing the Internet. In this case the community's capability to support and sustain the development of ICTs in healthcare (Qureshi, 2013). Political e-readiness as a concept here refers to the preparedness of politicians in the willingness to support and sustain e-health systems by word and action. The political arena is characterized by lack of good will towards implementation of e-health systems coupled with self interests that override the larger society good. This concept has also been discussed by Beebeejauna and Hemant (2017) who refers to political e-readiness as key in dealing with policies and legislations that promote, support and manage e-health implementation and utilization in the healthcare sector.

A conducive political environment is very key towards implementation of e-health. The categories that were grouped together to form the Political e-readiness include legal environment, organisational efficiency and e-standards. Political goodwill will lead to better organisational leadership. Organisational leadership is charged with carrying out functions such as planning, coordination, controlling, and directing various aspects of e-health implementation. Thus it is appropriate to have a stable focused leadership that can steer the implementation of the project. Political goodwill will promote equitable distribution of resources between the rural and the urban healthcare facilities. Besides it will also promote an enabling legal environment for enactment of laws and standards which in turn translates to success of e-health implementation (Oladosu, 2009; Mbarika, 2012; Murray, 2010).

The purpose of e-standards in e-health is seen in the healthcare organizations as the driving force behind the technology platform that supports interoperability of the systems. A standard is a settled upon, repeatable method for accomplishing something. Fundamentally it is viewed as the key to accomplishing interoperability of e-health systems. Any individual organization or project involved in e-health applications has to make its own decisions concerning official standards, actual standards, and proprietary solutions (Korpela, 2014 & Juma, 2012). Thus the political e-readiness plays a significant role in ensuring that the right laws and legislations are put in place to support the e-standards development. Basically IS leadership is lacking in the political field. There is need to have a champion in place who would advocate and steer the process of e-health implementation in the country. Consequently there is need for creating awareness among politicians, regarding e-health, to acquire more support for e-health programmes in particular. This may be done in terms of advocating for policies and resources that support the program.

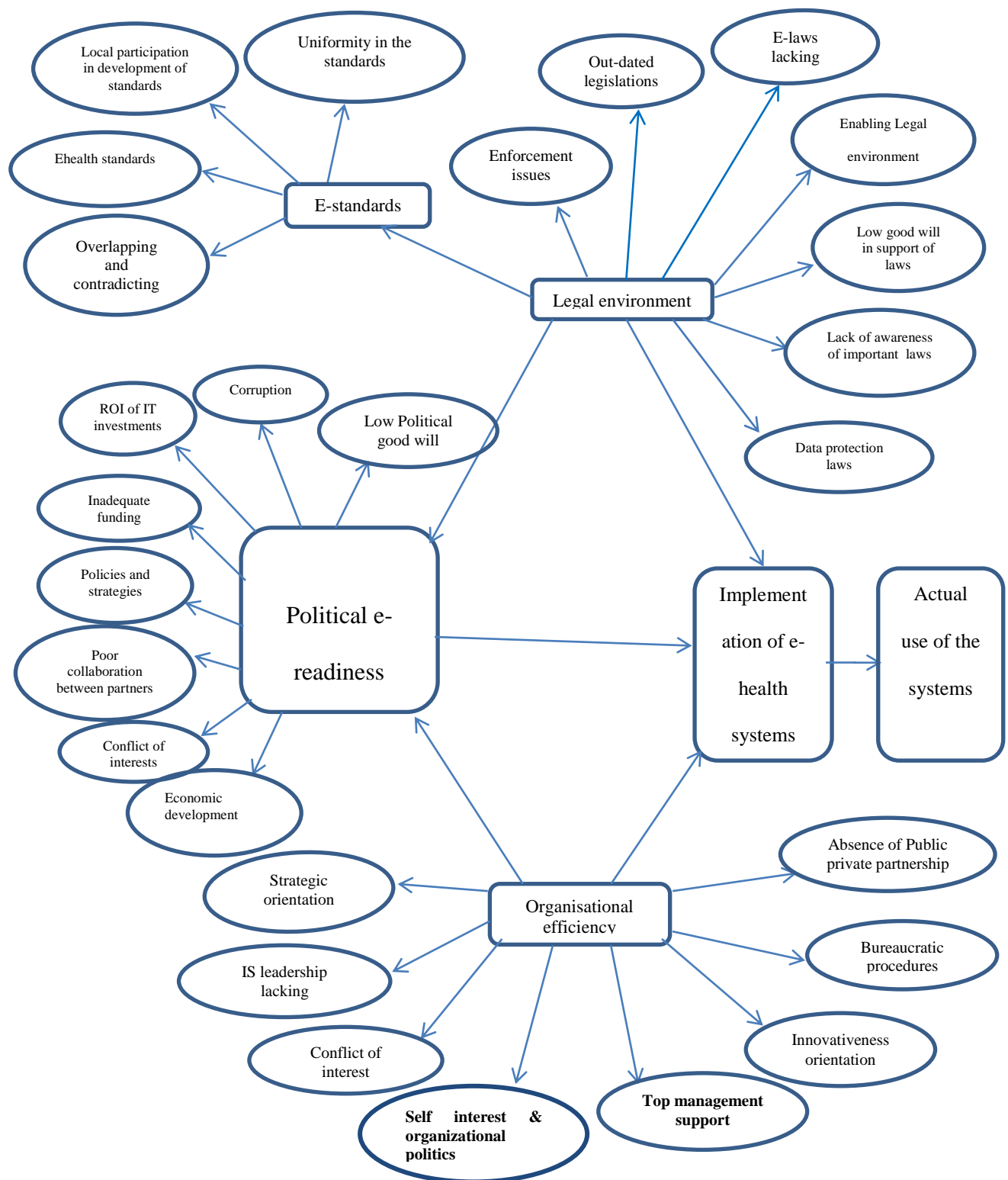


Figure 5.4: Political e-readiness, and their associated attributes that are likely to affect the implementation of e-health systems

Source: Author 2017.

5.4.4 Societal e-readiness

E-readiness refers to the degree to which a society is prepared to participate in the Networked world. It is gauged by assessing the societies relative advancement in the areas that are most critical for ICT adoption and in this case the implementation of ICT in the healthcare (Qureshi *et al.*, 2014). Khoja et al. (2007) further discusses this concept as the preparedness of healthcare institutions to implement programmes that involve use of Information and Communication Technology (ICT) in provision and management of health services. The societal e-readiness dimension deals with an organisation's socio-cultural and economic issues related to e-health implementation. This includes the stakeholder's ability to utilize the systems including attitude, culture, purchasing power, training and skills. Societal e-readiness concept has been used by Li and Seale (2012) who elaborates on the need of having societal e-readiness in place that deals with the organisation's socio-cultural and economic issues related to e-health implementation. Additionally Jennett et al. (2003) mentioned e-societal readiness as the degree to which users and the health care organization itself are prepared to participate and succeed in implementation and utilization of e-health applications.

Qureshi et al., (2014) further notes that developing countries require not only a transfer of technology but also needs to focus on the culture of users in using these IS systems. The implementation of e-health, therefore, is not limited to the adaption to machines, hardware, software, but also involves the stakeholder's behaviors and competence. Typically the implementation of the e- health systems requires involvement of all the stakeholders, thus users play a key role towards its success. The categories that were grouped together to form the societal e-readiness include; social economic factors, political environment, social cultural environment, benefits of the system and organisational efficiency. Ideally the relationship between the social cultural and economic aspects directly impacts on the organisation's success of implementation of the systems (Oladosu, 2009b). Thus the

managerial practices in place need to be effective dealing with the cultural issues so that the users cannot sabotage the process which leads to a positive or negative effect towards the implementation (Hedstrom & Andersson, 2012).

Typically little confidence levels of ease in utilizing of technology may have to do with issues such as fear of computers. Moreover there could be technological concerns such as perception of risk, including concerns about security, validity and reliability of the technology, as well as privacy, safety and discretion concerns (Hansen, 2011). Furthermore, Bhatia (2014) notes that a significant potential barrier to implementation might not essentially be technological intricacy, but could be job losses apprehensions. In addition limited user involvement in the system development appears to be a great contributor to failure of e-health systems (Treurnicht, 2009). Besides for the users to deal with their social barriers they need to appreciate the benefits that they are likely to gain from utilizing the systems more so in their line of work (Korpela, 2012). Ultimately once they perceive the systems to be beneficial to them then they are likely to support implementation.

In addition the stakeholder's purchasing power comes into play as this is quite significant in their ability to acquire the ICT gadgets. Low purchasing power may hinder the stakeholders from accessing and acquiring the electronic gadgets which in turn leads to low uptake of e-health systems. Furthermore the electronic gadgets need to tackle the key determinants of accessibility to e-health systems pertinent to their environment, along with other major planning issues such as needs assessment, execution, and evaluation. Besides in order to solve the digital divide among the stakeholders there is need to permit greater access to e-health systems for various stakeholders of different genders and socioeconomic groups. Moreover a conducive political goodwill will ensure there is equitable distribution of resources which solves the challenge of inadequate resources or increased poverty levels. This in turn influences the users in utilising technology easily (Akanbi et al., 2011: Kiura, 2012).

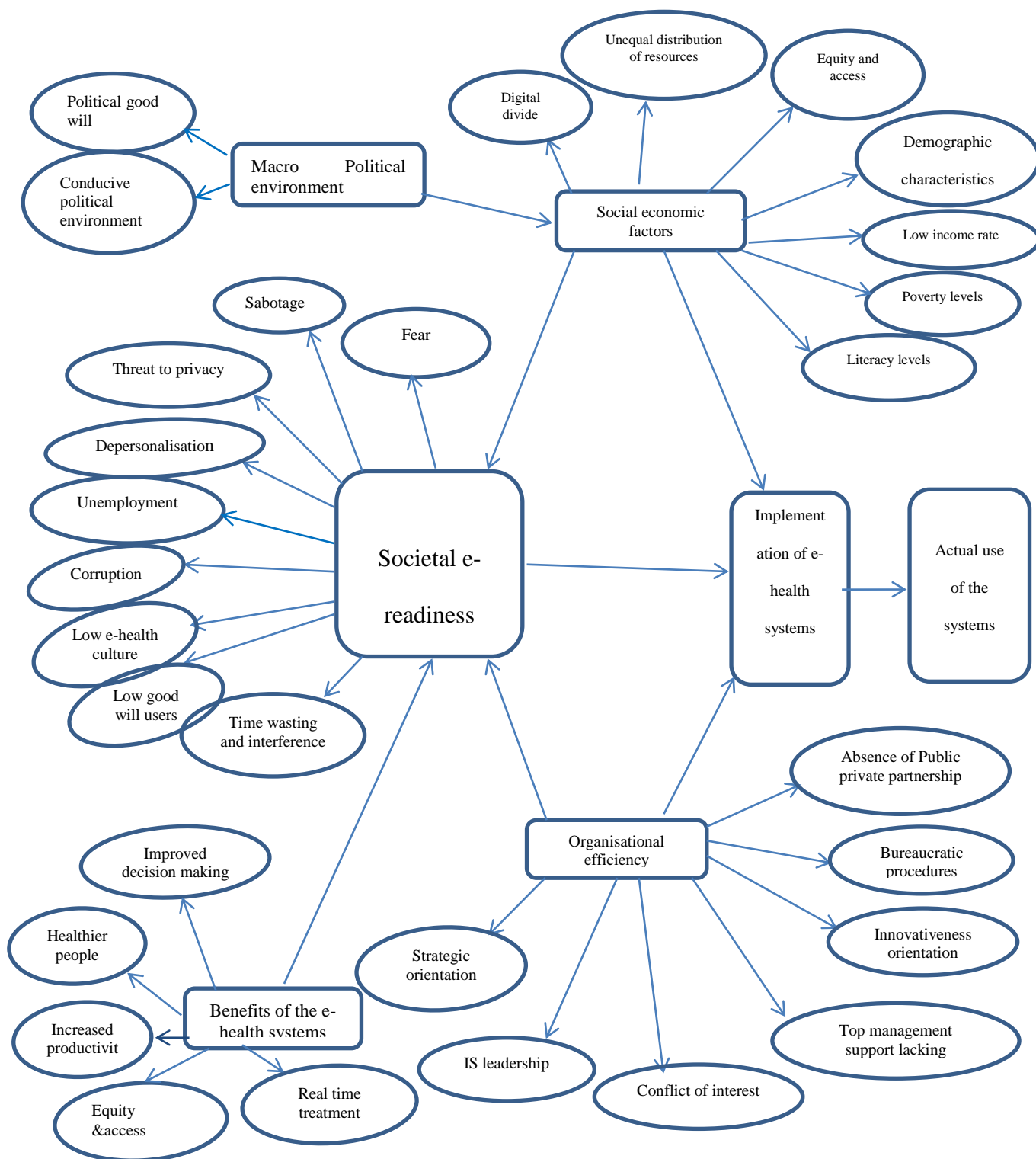


Figure 5.5: Societal e-readiness, and their associated Concepts that are likely to Affect the Implementation of e-Health Systems

Source: Author 2017

5.4.5 Regulatory Framework

The implementation of e- health requires an enabling regulatory framework. This includes e-laws and regulations, e-standards, e-policies (Sanders, 1995). An effective regulatory framework will facilitate fast tracking of laws and policies that protect the e-health transactions on the network (WHO, 2013). There is a relationship between the legal and the political factors as they directly impact on the organisation success of implementation of the systems. The political environment has a responsibility to pass laws and fast-track the process of their implementation. Basically with the right laws in place then the organisations can champion the implementation of the systems (Ekeland, 2010). Besides the laws would also help to deal with some cultural issues of online data security as well as sort the issues of systems integration which are all aspects that may affect the implementation (WHO, 2011).

One of the major hindrances to systems integration and sharing of data among institutions is lack of e-laws that can support this process. The users of e-health systems need to be assured that the patient's data over the network is protected and confidentiality is assured. This may increase the confidence levels among the users which directly increases user's acceptance of the systems which in turn translates into greater implementation of the systems (Qureshi, 2014). Thus e-standards are critical in ensuring there is uniformity in the transmission of data online. Similarly laws need to be put in place that compels organisations to report their patient's data to the District Health Information Systems (DHIS). This would compel all healthcare institutions both private and public to report their workload. This would assist in national planning for disease trends and patterns. In addition penalties and enforcement should be introduced at organisational levels for those who fail to abide by the laws.

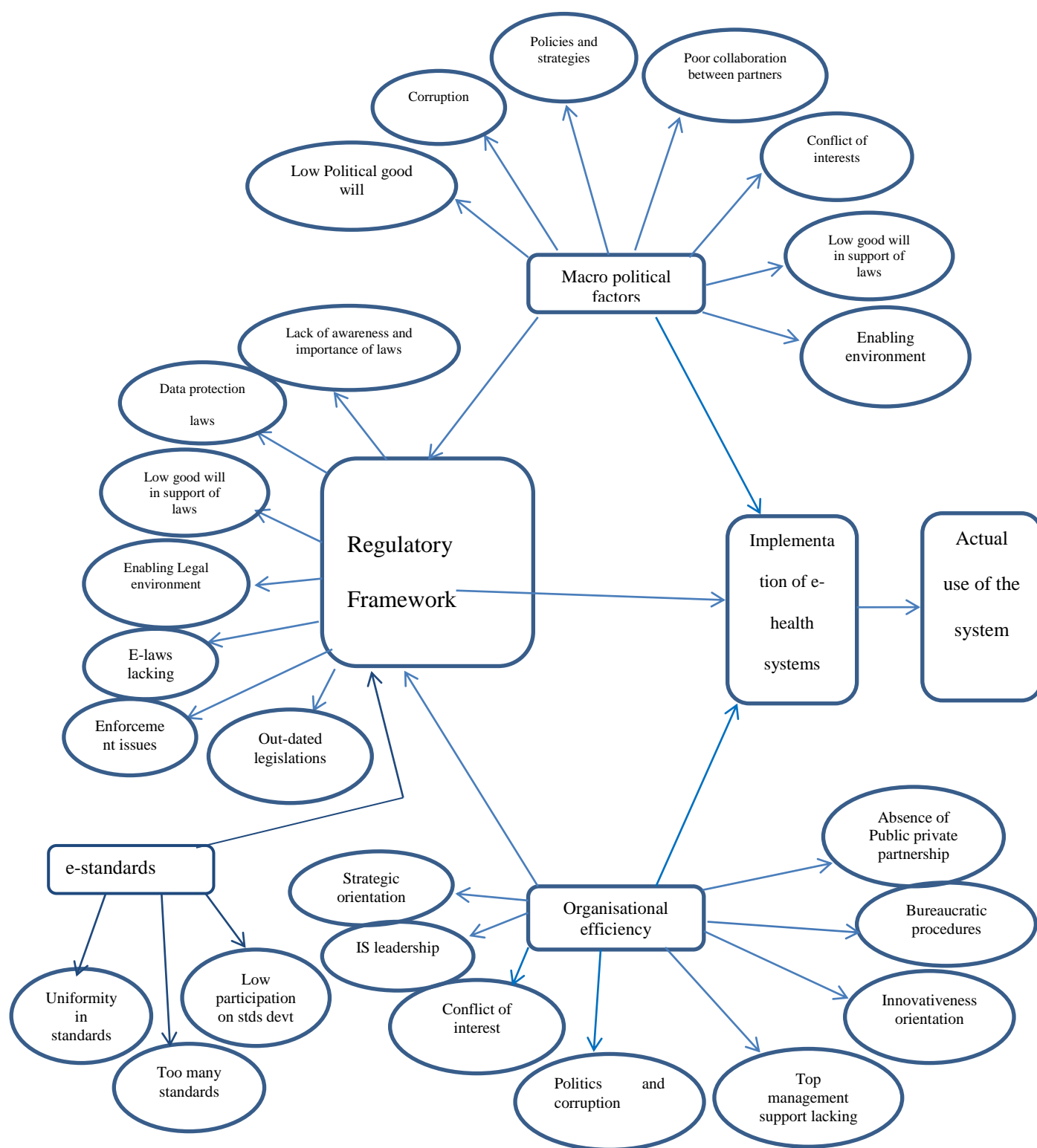


Figure 5.6: Regulatory Framework, and their Associated Attributes that are likely to affect the Implementation of e-health Systems

Source: Author 2017.

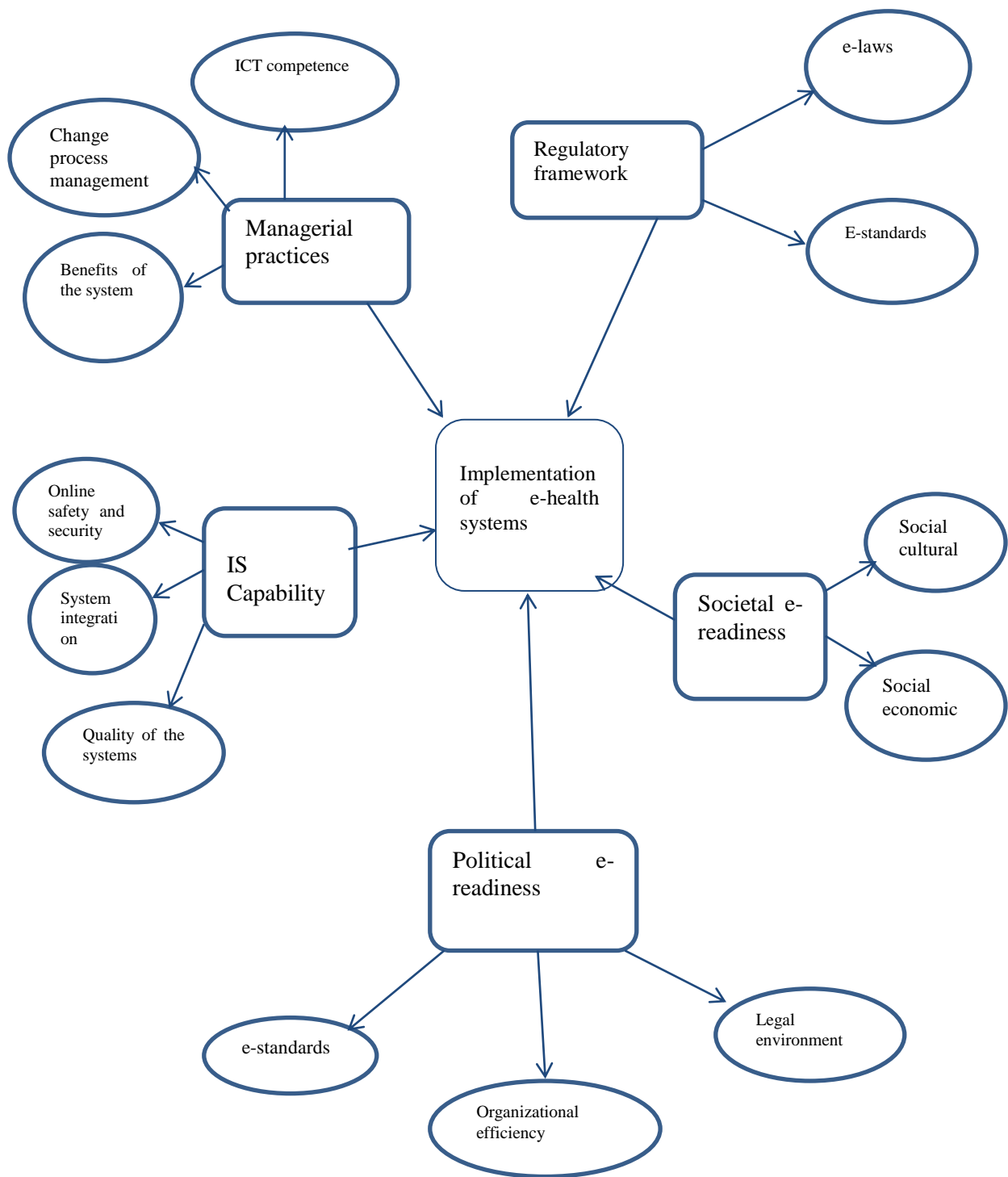


Figure 5.7: Concept Diagrams showing the Emergence of the Five Main Themes from the Thirteen Sub categories

Source: Author 2017

5.5 The Final Conceptual Model

Based on the analysis of the results and the supposition of interrelations among the themes, a theoretical model was developed that explains implementation of e-health in the healthcare sector in Kenya. The final model generated a theory that explains implementation of e-health in the healthcare sector in Kenya. According to Strauss and Corbin (1994) theory consists of “plausible relationships proposed among concepts and sets of concepts. Without concepts, there can be no propositions, and thus no cumulative scientific knowledge based on these plausible but testable propositions” (p.278).

The final conceptual model is comprised of five main perspectives namely; political e-readiness (policies, laws and regulation) Oladosu, 2009; Mbarika, (2012), managerial practices (change process management, ICT competence, benefits of the systems) Boonstra *et al.*, 2014; WHO, (2013) IS Capability (system integration, online safety and security, quality of the systems) ITU, 2015; Korpela, 2013; Qureshi *et al.*, (2013), societal e-readiness (social economic social cultural, benefits of the systems) Bhatia 2014; Akanbi *et. al* 2011: Kiura, 2012; Braa, (2007) and regulatory framework (e-standards, e-laws) Ekeland, 2010; WHO, (2011), effectively as shown on Figure 5.8. All these factors influence the implementation of e-health in the healthcare sector in Kenya today as reasoned out below.

Political e-readiness has a positive effect on the managerial practices and IS leadership. Political e-readiness leads to effective organizational leadership. Thus with this in place organizations are bound to champion for the change process management that in turn influences on how e-health systems are implemented. Similarly the political e-readiness is equally significant in the allocation and distribution of national resources equitably. Thus this goes a long way in resolving the social economic issues of the users of the systems.

Additionally IS Capability provides the platform on which e-health systems run both in terms of infrastructure and personnel. Consequently without a robust infrastructure in place then issues of connectivity, reliability, interoperability, and accessibility will not be possible.

Typically societal e-readiness has a direct effect whether positive or negative on the managerial practices. Fundamentally the users of the system are key to the success of e-health so if their attitude is negative they are bound to resist change or sabotage the process. Moreover resistance to change may be detrimental to the implementation of e-health as users are one of the main components of information systems. In addition change process management need to be carried out properly so that each stakeholder is involved in the project as this would eliminate the resistance aspect. Moreover top management support would be critical in allocation of resources to support the change process management and acquisition of the infrastructure that provides a platform for the information system. Furthermore for integration and online safety of data to be feasible there should be e-laws in place that protect and support the interoperability and online transactions. Therefore all these factors are intertwined without which e-health implementation would not be a success.

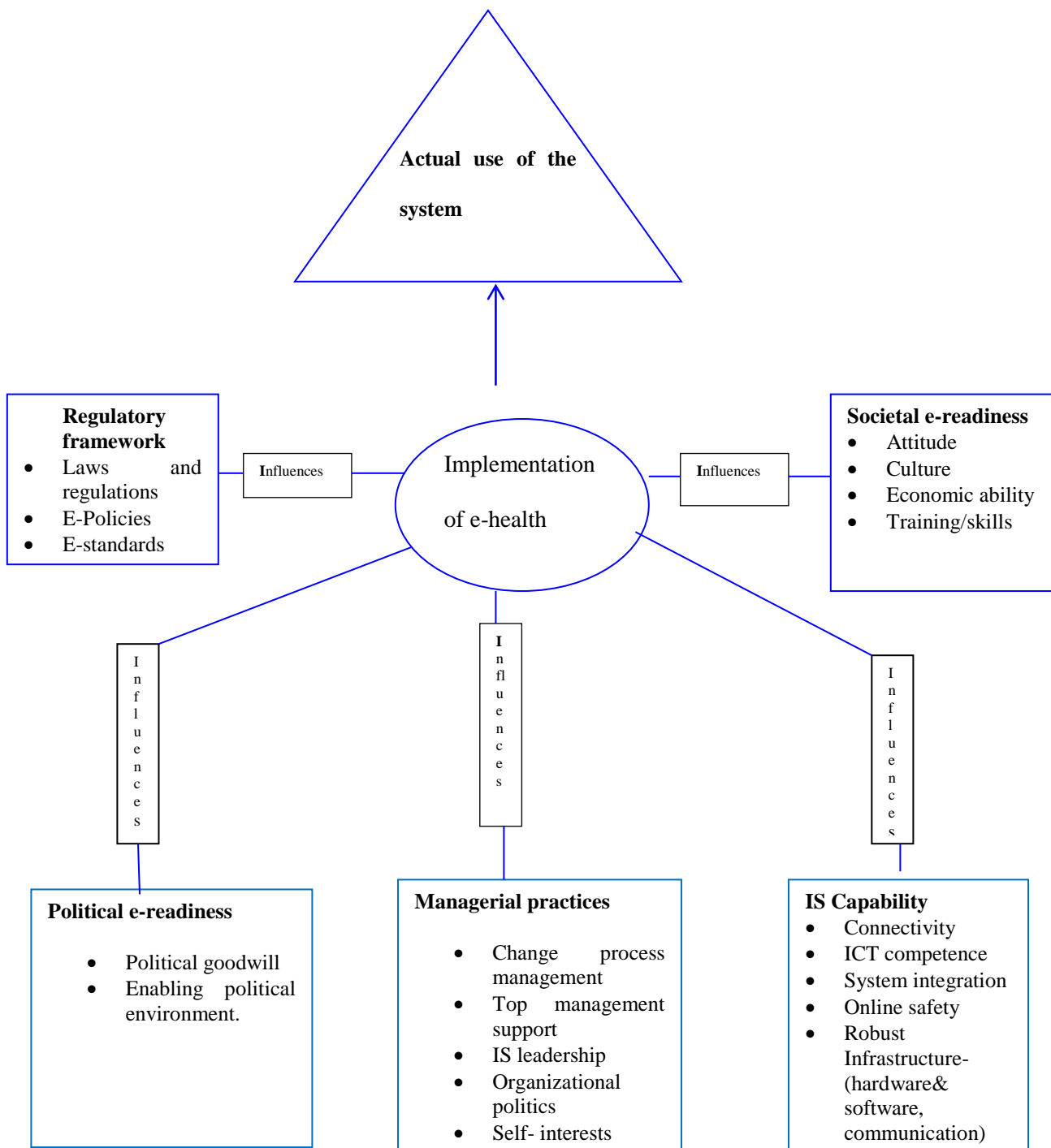


Figure 5.8: Final Framework of the factors that affect implementation of e-health systems that is grounded from data
Source: Author 2017.

5.6 Comparison of the New Framework with other Existing Frameworks

The framework presented on figure 5.8 provides five elements that need to be addressed for successful implementation of e-health systems in Kenya to be accomplished. These elements include IS Capability, managerial practices, regulatory framework, societal e-readiness and political e-readiness. Extensive literature review done at the beginning of the study indicated five issues that needed to be addressed mainly: e-Health standards; ICT and e-health policies; e-legislation; e-Health infrastructure; ICT competence. However these five issues only constitute two of the factors of the current framework that is, IS Capability and regulatory framework, consequently there was an addition of three other issues that emerged from the data, that is political e-readiness, managerial practices and societal e-readiness.

Generally the other existing frameworks tend to address just a few aspects presented in the new framework. For instance Braa (2004, 2007) framework addressed the issue of e-standards leaving out other aspects that may influence implementation. Although Korpela's (2013) framework was more focussed on the healthcare specialists, system users and developers it ignored other aspects of implementation that includes the political e-readiness and managerial practices. Other frameworks (Juma et al., 2012; Xiangzhu et al., 2013; Kaye, 2010; Mugo et al., 2014; Mbarika et al., 2012; Kiura, 2012; Lazaro et al., 2013; Fanta, 2015) were not holistic and only addressed discrete bits of the elements that may affect implementation of the e-health systems.

The new framework developed above is grounded from the data that was gathered from respondents. Basically the framework offers greater scope or coverage of e-health issues compared to other existing frameworks. It is more holistic in nature and presents the real context of developing countries and more so the case of the Kenyan healthcare sector. This would provide a basis for successful implementation of e-health systems in developing countries similar to Kenyan context.

5.7 Chapter Summary

This section introduces the summary of the review after data analysis. The conceptual model presented in Figure 5.8 summarizes the significance of applying grounded theory methodology. A theory was developed that best explains the issue of e-health implementation in developing countries and specifically Kenya. An inclusive and integrated framework of the development of categories, concepts and their properties of the issue that was being explored was thus presented. This model clarifies the issues that should be addressed for fruitful implementation of e-health systems in developing countries like Kenya to be achieved.

The findings of the study showed various other elements that affect implementation of e-health frameworks that were not included in the literature review. Five issues emerged from the extensive literature review done. In contrast the data driven study came up with thirteen categories. These were later reduced to form five larger categories. The study generated three new categories not included in the earlier literature review namely political e-readiness, managerial practices and societal e-readiness. The five factors found in the literature review were only part of the two factors namely regulatory framework and IS Capability generated. Therefore a data driven methodology provided a deeper understanding into the field of study. Generally the approach was able to explore the underlying issues in detail thereby generating information that would not have been otherwise available in a theory testing approach. Thus this methodology provided a suitable dimension of understanding the e-healthcare better as opposed to theory testing approach. The findings were grounded from the respondents experiences thus providing an opportunity to gather as much data as possible that is helpful in dealing with e-health implementation challenges in the country.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter provides the summary, conclusion, recommendations, contributions and limitations of the study. The purpose of this research was to find out the factors that are relevant towards successful implementation of e-health in the healthcare field in Kenya.

6.2 Summary of Findings

The main goal of this thesis was to conduct an exploration of the elements that affect the implementation of e-health systems in Kenya's healthcare sector. To address the problem of this study, the researcher formulated a research question: which was, what are the factors that add up to the successful implementation of e-health systems in Kenya and how are they interrelated?

The study began by conducting an extensive literature review in the field of healthcare sector in general and Kenya in particular. Five issues emerged from literature review mainly: e-Health standards; ICT and health policies; e-legislation; e-Health infrastructure; ICT competence. These five issues stood out significantly in the e-health literature as elements that affect implementation of e-health in general. This formed a starting point of this study. Pragmatism philosophy was used for this study. Pragmatism allows the researcher to use the most suitable method to understand the problem being investigated. In pragmatism paradigms are not seen as abstract entities with timeless characteristics but rather perceived as ever changing belief systems. They are means of doing research rather than means of defining the ontology and epistemology underpinning research. Thus this

philosophy emphasis on whatever works to meet particular needs of the researcher instead of restricting the researcher to explicit methods in answering the research question (Scott and Briggs, 2004; Morgan, 2007). As such the researcher adopted a theory building approach to explore the factors that affect implementation of e-health in Kenya. Grounded theory approach was embraced as the methodology for this research.

Grounded theory is an inductive approach that allows researchers to generate theories directly from raw data and maintains data to be grounded rather than forcing data to fit with existing theories thus fostering creativity. Grounded Theory does not start with testing existing hypothesis but utilizes the empirical data to produce the theory (Charmaz, 2014). The Straussian version of Grounded theory was adopted for this study. This version of GT allows the researcher to begin with doing some literature review in the area of study in this case e-health implementation and this forms a baseline of the data collection (Strauss & Corbin, 2015).

However the mind of the researcher remains open even as she approaches the data collection allowing ideas to flow freely. The researcher is thus able to collect rich thick data that makes the world appear new (Charmaz, 2006). The researcher embraced theoretical sampling to interview a total number of 30 key stakeholders in the healthcare sector who are involved in ICT implementation in the sector. In this study saturation was attained with 22 interviews. However the researcher went ahead to interview 8 other respondents with the hope of finding new data concepts.

Nvivo software version 11 was used to assist in the analysis of the data. Data analysis began with transcribing of the audiotaped interviews. This was followed by three stages of coding namely open, axial and selective. In open coding the interviews are analysed and coded

using the segments word by word and line by line. These sections of the analysis were later called occurrences. At this stage the researcher was trying to recognise activity verbs for each bit of the data. Consequently initial categories started to appear after several interviews. The initial concepts and categories were equated with other segments of the data to establish theoretical relevance. 158 concepts were generated at this stage. Each of the concepts were coded by sub categories and their properties. Word trees were used to visualise results in a tree like diagram. Word trees show the context surrounding categories from across the data and discover recurring themes and phrases that surround a category of interest.

Explore diagrams assisted the researcher explore the connections between the concepts visually and how they relate to the central category. The central category in this case was implementation of e-health systems in Kenya. Memos were written through out the study. These are notes and ideas linked to the codes and their relationships that appear during the coding process. Memo writing assisted the researcher to write down notes on the developing categories and the relations between them. In addition literature review was another source of data that the researcher used to fuse into the theory.

At axial coding data was put back together in new ways after open coding by making connections between categories. At this stage thirteen subcategories were generated which included quality of e-health systems, benefits of e-health systems, macro political environment, sociocultural environment, online safety and security, e-standards, technological environment, change process management, systems integration, ICT competence, organisational efficiency , socioeconomic environment and legal environment. The emergence of the thirteen categories was supported by extracts of interview scripts from the responses.

At selective coding the researcher sought to integrate and develop the theory by creating relationship among the categories. The core category in this case in point is implementation of e-health system. The thirteen sub categories that were generated in axial coding were assembled into 5 key categories of view namely: political e-readiness (policies, laws and regulation), managerial practices (change process management, ICT competence, benefits of the systems), IS Capability (system integration, online safety and security, quality of the systems), societal e-readiness (social economic social cultural, benefits of the systems) and regulatory framework (e-standards, e-laws) viewpoint.

The amalgamation of these five viewpoints affects the accomplishment of implementation of e-health frameworks in Kenya. Finally a new framework was developed that consisted of these five categories. Namely: political e-readiness, regulatory framework, managerial practices, societal e-readiness and IS Capability that were grounded from empirical data. The new framework may explain e-health implementation in developing countries.

6.3 Conclusion

This study set out to identify the factors that hinder successful implementation of e-health in Kenya. The researcher embarked on filling the gap using a holistic approach and developing an integrated framework. The study developed a theory rather than test existing theory. The study generated five major themes namely political e-readiness, regulatory framework, managerial practices, societal e-readiness and IS Capability. A framework was developed that that is holistic, detailed and grounded from data. The model is easy to implement as it represents the healthcare context at it is. It reveals the factors and their interrelationships from five main perspectives, namely; political e-readiness (policies, laws and regulation) managerial practices (change process management, ICT competence, benefits of the

systems), IS Capability (system integration, online safety and security, quality of the systems), societal e-readiness (social economic social cultural, benefits of the systems) and regulatory framework (e-standards, e-laws) effectively. All these factors are interrelated and intertwined. For the implementation of e-health system to be successful all the factors have to be integrated together.

Conducive political e-readiness determines the kind of laws and policies that are put in place to support the systems. In essence political good will lead to efficient managerial practices and leadership. Thus with this in place change process management will be enhanced as well as breaking the bureaucratic structures that hinder progress of the e-health project. In addition political e-readiness will ensure there is equitable distribution of resources thereby empowering people economically and increasing their purchasing power thus sorting the societal e-readiness. Furthermore political e-readiness may steer the process of developing laws and regulations that support systems integration and data sharing as well as create legislations that support public private partnership initiative in the sector.

Effective managerial practices are key to the progress of the e-health project. Top management support would steer the project to success by facilitating the funds needed for the implementation of the e-health project. Ideally with adequate funding in place there will be a robust infrastructure to support the implementation. Moreover good organizational leadership would champion the e-health project to greater heights by capacity building to break the social cultural barriers as well as attract and retain the best IT professionals to fast track the project. In addition the organization may initiate IS leadership and the change process management so that users can easily accept the innovation. Indeed with top management support the users are unlikely to resist introduction of technology or even

sabotage it. Besides effective managerial practices plays part in promoting continuous ICT training programs for the workers. This would equip them with the necessary skills to utilize the systems, which in turn translates to greater implementation of e-health systems. Moreover user resistance was cited as a major barrier in implementation of the e-health systems as users tend to resist its usage because of lack of ICT skills. Furthermore inadequate ICT skills may hinder full exploitation of the e-health systems. Thus training may go along way in solving the problem of user resistance to technology.

IS Capability are also crucial in the achievement of e-health systems. This is because it provides the platform on which the system runs. Thus there is a need of having adequate infrastructure in place for the technology to be utilized properly by all players on the healthcare chain. Besides system integration among organizations can only be possible if there are laws in place that support that integration. Moreover organizations need to be guided by laws in order to report their data. In the absence of laws it would be difficult to compel unwilling parties in the healthcare chain to cooperate in sharing patient's data online. In addition for integration to work the social factors such as economic and cultural issues need to be addressed so that data can be exchanged on the network. For instance poverty plays a big hindrance to acquisition of ICT gadgets that may be used by users to access e-health application like m-health. Therefore users need to be empowered economically.

The societal e-readiness empowers the users of the system both economically and knowledge wise. Thus the political e-readiness may play a part in ensuring there is equitable distribution of resources among all citizens. Basically the users need the purchasing power to buy the ICT gadgets that they may need to access certain e-health applications. By and

large Internet connectivity is a necessity to most of the consumers. Thus political e-readiness may play a part in ensuring there is equitable distribution of resources among all citizens. Moreover they need to regulate laws that may reduce taxes on imports of the ICT equipment to make them available to the general public.

Generally the regulatory framework is essential in providing e-laws that support e-health implementation. For instance for system integration to work, there is need to have e-laws that guard patient data on the network. Ideally these laws ensure confidentiality and security of patients data on the network is guarded. Besides in the absence of these laws system integration and sharing of patient's data may not be possible. Furthermore the laws will guide on the e-standards which each player in the healthcare chain is to abide by. Consequently the political e-readiness plays a significant part in fast tracking of these policies and laws.

In conclusion the researcher found that the issue of successful implementation of e-health needs to be addressed holistically so that all the stakeholders are engaged in the project. The five main issues that are grounded from the data are intertwined and inter related thus there is need to address them holistically for e-health implementation to be effective.

6.4 Implications of the Study

This section presents the key contributions made by this study to the field of academia, theoretical, methodological and practical implications for research.

6.4.1 Theoretical Contribution

First theoretically, the adopted theory building methodology aimed at identifying the elements and their interrelationships that affect implementation of e-health systems from a grounded theory viewpoint thereby generate a theory (theory building). Most previous studies were positivist oriented which are intended to identify the factors that affect implementation of e-health systems by adopting theories and empirically testing the theories unlike this study that is data driven. This study generated a substantive theory that can be adopted to explain e-health implementation issues in a developing country context especially in Kenya. This is supported by Charmaz, (2001) who emphasis that Grounded theory gives preference to data and the subject being explored as opposed to the earlier hypothetical suspicions. With GT, theory is originated and created by the field of study, and emerges out of the exact data gathered from it. According to Charmaz, (2011) the grounded theory method offers “a logically consistent set of data collection and analysis procedures aimed to develop theory” (p. 245). These methods permit the recognizable proof of examples of data, by examining these examples researchers can determine hypothesis that is exactly substantial to the issue being explored (Strauss & Corbin, 2015).

6.4.2 Contribution to Knowledge

This study makes a contribution to existing body of knowledge in regard to the process used in applying the methodology of pragmatist grounded theory approach to develop an integrated model for e-health implementation for this research. This study was intended to connect existing gap in information on the implementation of e-health frameworks in developing countries generally and Kenya specifically from the perspective of IS. As needs be, this exploration adds to filling the knowledge gap in past studies. The study generated a new model that explains the issues that need to be addressed for successful implementation

of e-health systems. This model is more holistic than the existing models as it introduces categories that are not addressed in the existing models (Braa, 2007; Korpela, 2013; Juma et al., 2012; Xiangzhu et al., 2013; Kaye, 2010; Mugo et al., 2014; Mbarika et al., 2012; Kiura, 2012; Lazaro et al., 2013; Fanta, 2015). The framework increases in expansion from the two original issues to five that have been generated from the data.

6.4.3 Methodological Contribution

The application of the grounded theory in the analysis of e-health implementation meets the grounded theory explanatory power leading to generation of a substantive theory. The grounded theory methodology allowed open exploration depicting development of concepts showing their relationships and development of substantive theory that may be used to explain e-health implementation issues in Kenya. Most of the other IS studies in healthcare research use positivist approaches that have a bias that forces certain preconceptions unlike Grounded theory approach that allows theory to emerge from data. This study is significant as a pioneer in theory building in IS in Kenya and in the IS healthcare research using grounded theory. As such other scholars can draw from this pioneering study.

6.4.4 Contribution to Policy

This research has noteworthy ramifications for practice, and could give some prescriptive bearings to policy makers in developing countries, and an inspiration to implement e-health frameworks. Other than the general ramifications for the government and the research community, multinational organizations and non-governmental organizations interested in e-health ventures could better comprehend the factors impacting the implementation of e-health systems. Additionally these findings may guide the stakeholders in better policy formulation and improvement of e-health strategies in regard to the field to e-health implementation.

6.4.5 Contribution to Practice

This research provides decision-makers, and all the stake holders in the healthcare sector, with a key instrument through which they can survey the effective implementation of e-health frameworks from a comprehensive perspective. This would add to the comprehension of key issues that should be addressed for the implementation to be fruitful. Besides the most critical ramifications of this exploration is it has offered healthcare stakeholders a guidance that can be vital in executing e-health systems in Kenya.

The usability and success of the framework for developing countries is underpinned by a mind-set which recognizes the national politics among key determinants within the social structure of any project, of which e-health form part of. Moreover a significant contribution of the framework to information systems research is its recognition of IS Capability, managerial practices, political e-readiness, regulatory framework and societal e-readiness that influence or mediate the success of e-health implementation in the country. In addition the framework contributes to a better understanding and knowledge of Information System implementation in developing countries in general. This provides a foundation for information system professionals and consultants to improve on their professional practice especially in the area of e-healthcare research.

6.5 Recommendations

The researcher recommends that the Government of Kenya adopt and use the findings of this study to implement the e-health policy as well as improve on the existing one. Likewise both the County and the National Government can use these findings to implement e-health systems and improve on the already existing applications in their healthcare facilities.

Besides the methodology used for the study was informative and detailed thus the researcher recommends other researchers to utilize it in their studies. In addition consultants in the IS healthcare research can benefit from these findings in their future endeavors in this field. Majority of the IS consultants are more positivist oriented thus the findings of this study should guide them to give equal attention to non-technological perspective. In essence they need to give equal weight to the other three categories that emerged from this study.

6.6 Limitations of the Study

The findings of this study cannot be utilized generally in other service sectors because this was more of a case study done in Kenya only so it may be hard to apply the results of this study to explicate other happenings, of other countries not similar to Kenya. E-health research in the IS society is generally new; little research has been conducted and published in developing countries. Generally much of the available literature is skewed towards the developed countries. Thus there is little literature review available for developing countries. The study generated a theory that explains the issues that need to be addressed for e-health implementation to be successful. However this substantive theory is yet to be developed into a formal theory.

6.7 Suggestions for Further Study

The research intended to distinguish the components that impact the up take of e-health implementation in developing countries particularly in Kenya. The review was data driven and came up with a model that may influence implementation of e-health frameworks. A repeat of the same study can be done in a different context to make the substantive theory a formal theory. A similar study may be done using other methodologies for triangulation such as survey etc.

The research findings provide means to give guidance to Kenya's healthcare sector specifically and other developing nations, which have attributes like Kenya regarding population demography, particularly in the healthcare sector area. Hence, studies to contrast the results of this examination in other developing countries might be of an incentive in this unique situation. These relative studies ought to be with the nations similar to Kenya, in any event in some fundamental attributes to permit the researcher to generalise the outcomes. The findings of this study can be repeated in another context to find out whether the outcome would be similar. A further study may be done to compare the model from other developed countries versus the model developed in this study. In addition an extension of the study can be done to establish the factors that affect actual usage of e-health systems in Kenya.

6.8 Chapter Summary

This chapter gave a brief summary of the findings of the study together with recommendations and conclusions. The implications made by the study are discussed in detail as well as highlighting areas for further research. The main contribution to the body of knowledge is the development of the new theory that is grounded from data. This adds on to the already existing IS knowledge in the area of implementation of the systems. Further studies may be done in other contexts to make the substantive theory a formal theory. In addition further studies may be done using other methodologies commonly used in IS research for triangulation purpose. Thus this study was distinct in its own way mainly by the methodology adopted for the study. Grounded theory methodology resulted in theory building which was a divergence from the common practise of theory testing. Hence this provided the researcher with a deeper and more complete understanding on the implementation of e-health in the healthcare sector.

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APPENDICES

APPENDIX 1: Interview Guide

What is your understanding of e-health?

What are the benefits of e-health to your citizens in general?

What do you perceive as the benefits of e-health to the economy as a whole?

What are some of the hurdles that you are facing with the current manual systems?

How would implementation of e-health systems be of assistance?

ICT Policy and e-health policies

What is your understanding of ICT policies?

What e-health policies are you familiar with?

Are there policies specifically tailored to promote the utilization of ICTs in healthcare?

Have you been involved in developing any of the healthcare policy?

How does the ICT policies affect e-health systems implementation?

Computer Security & Standards of e-health

What is your understanding of computer security?

What security controls would be necessary for the success of e-health implementation?

What standards are you familiar with?

What policies are specifically tailored to ensure data security and standards in healthcare?

How does computer security affect e-health implementation?

How do standards affect of e-health implementation?

ICT Infrastructure

What is the kind of IT infrastructure is available in your organization?

Are there more reliable and readily accessible ICT infrastructures in healthcare?

What is the quality of healthcare infrastructure available?

Does the government influence the supply and demand of ICTs in healthcare?

Does the government ensure standardization of interconnectivity, interoperability and quality of information of computer networks?

What challenges do you have in regard to infrastructure in relation to healthcare support?

Does the government regulate the supply of ICTs infrastructure (for example: removing economic barriers).

Does the government regulate the demand of ICTs?

Does the government give ownership and control of telecommunications provision to private enterprises and private enterprises can freely compete in the mobile phone, ICT and ISP markets?

How does the government promote the development of ICTs?

Is there adequate number of wireless networks available?

Is there a steady supply of electric power, whether by national grids or backup electrical generators in the organization?

Do health institutions have adequate access to phone services, whether land telephone lines or mobile/cellular phones?

How does the infrastructure affect e-health implementation?

What solutions would you recommend to these challenges?

Organizations and ICT competence

How does the organization generally support and actively promote the structural change when introducing e-health (strong leadership, invest in training and experiment with the e-health technology, etc) and necessary.

How does top management support the e-health project by word and action?

Whose responsibility is it?

Is there adequate number of ICT workers skilled in developing and maintaining ICTs, training others how to use ICTs, and managing ICT infrastructures?

Do top managers support the project by word and action?

Are Healthcare professionals, administrators, patients, and other stakeholders closely involved in the design and development of the e-health systems?

Are Healthcare professionals computer literate and are adequately trained in using the system?

Who is one person who purposefully champions the project by encouraging and advocating it?

Is the system development team skilled in the pertinent technologies.

Attitude and Behaviors related to e-health

Is there a greater readiness for e-health?

What are some of your experiences in e-health systems?

Are the staffs well trained in use of ICT applications?

What are some of healthcare challenges and how can use of ICT help?

What are some of the barriers to implementation of e-health systems?

Health practitioners generally do not trust ICTs.

Health practitioners typically prefer to adopt ICTs only if they have been proven to be effective.

Health practitioners are usually hesitant to attempt new ICTs applications.

How can we ensure e-health systems are successfully implemented in Kenya?

What are the main barriers to e-health implementation?

Suggest possible solutions to these challenges

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APPENDIX 1I: Samples of interviews scripts

Samples of interviews scripts from open and selective coding

“We are well aware that the quality of e-health services are not up to the level of the dream of every kenyan , but innovativeness may make the dream come true” (C13).

“ I believe that the beginning should be by seeking for alternatives to existing policies to provide Kenyans with better and improved healthcare services. However if the e-health system were to be operational they need to be easily accessible and available at all times of need” (C2).

“Also, service response time is important for us” (C1).

“Despite the presence of a few systems in the institution we are yet to experience a fully functioning e-health system. The expectations would be that the systems would have be interoperable and well structured. This would go a long way in the supporting data sharing among institutions” (C8).

“Security is paramount when we talk about passing data over a network. Thus there is need to have systems that protect the patient’s information so that confidentiality is maintained as well as addressing issues of emerging security solutions. Furthermore backup mechanism goes hand in hand with protection of the data” (C9).

Communication amongst various stakeholders is very key in enhancing decision making. The systems need to be interactive to support this aspect” (C5).

“Meeting user requirements is key to any success of the system. Thus it should be customised to suit the particular context of the organisations need. In most cases things are done the way round and in this case the system would be bound to fail”(C6).

“The system should have its sufficient documentation to facilitate ease of use” (C15).

“There should be online support that assists users in solving problems when needed to do so. This helps in technical support during use of the systems” (C7).

“we should not be discussing quality of the e-health systems first since these systems do not exist in the first place as they exist in theory they but not in practise. Thus I feel that quality may not be a key issue to implementation of the systems in this case” (C4).

“Iam not sure how quality of e-health systems would be related to its implementation however the system needs to have user friendly interfaces for easy navigation” (C3).

“let me must admit there are budgetary constraints, the government is willing but not able. The available funds are given to priority areas whereas e-health is considered a luxury than a necessity” (C6).

“The government relies on donor funded projects in the sector. These donors are conditional projects that are meant to serve the needs of mother countries. So most of these donors funded systems are unwilling to integrate with the local systems to share data” (C14).

“There is poor coordination from development partners which results to many fragmented systems that exist that are meant to serve certain donor driven needs. Resources used to set up these systems would be helpful if there was cooperation and coordination in the design and implementation of these fragmented systems thereby reducing costs of infrastructure”(C2).

“The government lacks leverage when dealing with development partners which leads to fragmented system. Because of financial reliance on the donors the government is compelled

to accept the donor conditions thus are reluctant to integrate their systems with the existing systems” (C7).

“Most NGO’s’s are unwilling to work together or even share infrastructure resources and funding because of the policies from mother countries” (C1).

“We hardly make too much than the need for basic needs” (C21).

“E-health may be regarded as a luxury not a basic need” (C21).

“The current healthcare is meeting my needs so I do not see why use technology” (C11).

“Most of the rural areas are not connected to electricity so using electronic gadgets might be difficult” (C9).

“I agree the rural areas are worst hit when it comes to connectivity issues” (C9).

Internet connection is stronger in urban areas than rural areas “(C1).

“We rely on technically inadequate expertise for advise” (C3).

“I agree the team spearheading implementation are not technically qualified” (C9).

“The confusion lies on who is technically qualified to head implementation” (C14).

“We do not have qualified technical team to support the process” (C27).

“We rely on interns for provision of IT service and as such not qualified to support the implementation” (C5).

“There are very few qualified IT officers in the organisation thus IT support is a real problem” (C16).

“Its costly to hire qualified IT officers” (C29).

“Hoping that there is a commitment from the institutions not to use the data for other purposes without prior permission” (C13).

“My experience with some government departments makes me afraid to be clear enough to accept utilising the systems” (C4).

“there must be specific controls on what information can flow among departments or to other institutions” (C6).

“Also we believe that a policy outlining how the patient data will be used and stored would make me comfortable utilising the system” (C28).

“The healthcare facilities do not share data as there is no agreed standard for interoperability” (C17).

“Interoperability is difficult to achieve because of lack of standards” (C2).

“There are no incentives offered for data exchange” (C10).

“We are unwilling to share the data” (C17).

“Incentives are lacking” (C28).

“What we have in general is many standards that do not address one area of technology application” (C19).

“There are many existing some conflicting and overlapping as well” (C10)

APPENDIX III: Memos

Writing memos for categories emerging from the study

Box 5.1 memo 1 **quality of e-health systems**

There is an urgent need to improve healthcare services provided to all healthcare institutions in the country. This can only be possible by harnessing ICT as a key enabler the management of patients. This includes development of systems that the healthcare stakeholders can interact with without problems. The system should be operable and user friendly at the same time accessible, available and timely. However the implementation of such systems in the healthcare sector is a tall order and requires the involvement of every stakeholder in the process. The stakeholders have a certain minimum expectations of the quality of the e-health systems that they would meet their needs accordingly.

Box 5.2 memo 2 **Social cultural environment**

It is clear that social cultural issues have an effect on the implementation of e-health frameworks. These incorporate Lack of goodwill, dread, depersonalized human services, risk to patient security, potential device for impedance, unemployment rate, absence of e-culture, manner to self-transaction and up close and personal correspondence, less measure of open correspondence, resistance, sabotage, staff ignorance, corruption. however overcoming these social cultural issues may build trust in utilisation of the system

Box 5.3 memo 3 **Social economic environment**

It is clear that social economic issues affect implementation of e-health systems. These include: Socioeconomic environment Purchasing power, population growth, digital divide, and distribution of resources, generation gap, poverty levels, literacy, demographic characteristics, low income rate, sustainability, Equity and access. Settling these social economic issues would increase the purchasing power of the citizens therefore utilisation of the systems becomes more effective

Box 5.4 memo 4 **Legal environment**

It is clear that legal factors have an impact towards implementation of the e-health frameworks. This include: Lack of a powerful legitimate condition for e-exchanges, absence of e-laws for online exchanges, obsolete arrangement of enactments, laws and directions in regards to online exchanges, absence of patient information assurance laws, absence of implementation of the existing laws, penalty's lacking, liability. having an enabling legal environment will facilitate system integration and

data sharing

Box 5.5 memo 5

Online safety and security

It is clear that online safety and security is a noteworthy concern with regards to e-health. Clients are worried of the security of the information as it is transmitted over the system. Different issues of security include: Privacy and security, framework endorsement, security preparing, familiarity with Internet health, interruption recognition, and attentiveness of individual data, framework review, recognizable proof and validation, get to control, data security, chance appraisal, data confirmation, internet security, good security procedures, management complacent. unless these issues are sorted then users will remain adamant to use the systems

Box 5.6 memo 6

Organisational management and efficiency

It is clear that there are management issues that directly affect the implementation of e-health systems. They include: Lack of senior management support, innovativeness orientation, lack of liability within public, lack of public private partnership, interdepartmental conflict, organisational bureaucracy, foreign donor projects, bureaucracy in the supply chain, Strategic orientation of key stakeholders in the project, unrealistic expectation, Lack of clarity regarding specific costs, trust issues, Conflict of interests, these issues need to be addressed for there to be successful implementation

Box 5.7 memo 7

IS Capability

To enable use of e-health a country requires a good infrastructure. Other issues that are related to IS Capability include: Interruption of Internet, cost of e-services, inadequate capacity for information processing, inadequate ICT infrastructure, connectivity issues, lack of adequate hardware and software. Presence of out-dated technology, back up facilities, lack of standard, poor definition of users role, clients have poor definition of specifications, lack of clear e-health policies in implementation. These need to be addressed as they provide the platform on which e-health is implemented

Box 5.8 memo 8

e-standards

It is clear that e- standards are a barrier to e-health implementation. Others related to e-standards include: lack of available standards, no legislation exists; standards do not address one unified area of technology. these to be addressed as well for the success of the project

Box 5.9 memo 9

ICT competence

It is clear that ICT competence is a hindrance towards the success of e-health projects. These include: inadequate ICT training among healthcare workers. There are inadequate numbers of health laborers with the ability to configuration, convey and adequately oversee e-Health frameworks. Moreover the utilization of ICT encouraged learning stays restricted in most health preparing foundations. This is made worse by the inadequate IT personnel available in the sector which is characterized by high turnover of the staff for greener pastures. managers need to capacity build on their staff so that they can acquire the right IT skills to use

Box 5.10 memo 10

Macro political factors

It is clear that micro political factors affect implementation of e-health systems. They include: Poor history of IT implementation in the healthcare sector, social economic imbalance, overseas donor investments, lack of collaboration between the private sector and public sector, weak sustainability of funding, low political good will in sector, insufficient knowledge about e-health, embedded corruption, ROI is lower in healthcare. These issues need to be addressed as they touch basically on all other factors of implementation

Box 5.11 memo 11

System integration

It is clear that system integration is needed in order to share data among various facilities. This include: poor coordination between national and county government hospitals , incompatibility, reengineering of internal structures, absence of standardisation to exchange data, interoperability problems, lack of synchronisation between systems, lack of integration of donor funded systems and local systems.

Box 5.12 memo 12

Change process management

It is clear that change process management is an important element toward successful implementation of e-health systems. This include: committed for change, mentality of workers towards tolerating change, change preparedness, absence of champion to execute change, absence of association in change handle, assets for change, imperviousness to change, non-appearance of promoters and supporters in

the establishments to roll out the improvement, absence of progression arrangements, absence of partners contribution in the plan and advancement of the framework, complacent management, disconnect between policy and implementation, lack of IS leadership champion. Various stakeholders need to be involved in the process so that they do not sabotage the implementation. Resources need to be put aside for the process as well.

Box 5.13 memo 13

Quality of health systems

It is clear that quality of e-health systems affect its implementation, as users are bound to resist or use the systems depending on the quality of the systems. This include: availability, accessibility, responsiveness, traceability, context -focused, well-defined, interoperable, online support, user friendly, reliable, security, well-structured, and interactivity.

Box 5.14 memo 14

Benefits of e-health systems

It is clear that the stakeholders appreciate the benefits that the health systems would bring to their practice. These include: Accurate diagnoses, accessibility, interoperability expert diagnosis, Increases timeliness of treatment, supports real-time treatment, National planning for the population, Empowered citizens, Increased productivity, efficiency and minimized costs, Governments becomes more responsive to health needs, Equitable and accessible healthcare to all citizens. Thus everything need to be done to ensure that the systems are successfully implemented so that the users can utilize the technologies

Box 5.15 memo 15

Relationship between organisational and macro political factors

There is a relationship between the political environment and organisational efficiency. Political goodwill results in better organisational leadership and management, which in turns champions the implementation of the e-health systems. With good leadership the organisation has a clear strategic direction of where it is going.

Box 5.16 memo 16

Relationship between online safety and legal factors

There is a clear relationship between online safety and legal factors. For the online to be enforced on the network it needs to be backed up by laws and regulations that back it

Box 5.17 memo 17

Relationship between the economic and cultural factors

There is a clear relationship between social cultural factors and economic factors. There is a major divide in the population in terms of access and literacy levels. The more economically poor the users are, the more likely they are to resist introduction of technology as this comes with a cost aspect.

Box 5.18 memo 18

Relationship between change process management and quality of systems

Many parts of the utilization of e-health frameworks depend for the most part on dealing with the change procedure regarding support and communication. Additionally preparing how the attributes of the systems user interface can be a driver or hindrance to the clients using the innovation. This implies the nonappearance of management practices towards implementation of e-health will affect the quality of e-health frameworks.

Box 5.19 memo 19

Relationship between social cultural environment and organisational efficiency

There is a reasonable connection between social and organization effectiveness. This implies confidence in an e-health framework that requires trust both in the association, and additionally confidence in the innovation, where clients are guaranteed that the frameworks can address their issues adequately. Accordingly it is basic to re-assemble trust between the clients and the organization and this requires a particular accentuation on a few perspectives that influence the clients of the innovation.

Box 5.20 memo 20

Relationship between IS Capability and implementation of e-health

There is a relationship between the improvement of technological infrastructure on the effectiveness of e-health. The stability in the infrastructure platform in terms of consistency, accessibility, ease of use, affordability and maintenance is amongst the main reasons that positively influence implementation of e-health in the country today.

Box 5.21 memo 21

Relationship between legal environment, and system integration

It is clear that there is a relationship between legal environment and systems integration to share data. Organisational culture requires a legislative and legal environment to ensure the exchange of information between various health facilities. Thus, the absence of a legal environment and legislation relating to the application of IT interoperability in the healthcare sector causes a negative effect on the exchange and integration of information systems across the various health facilities.

Box 5.22 memo 22

Relationship between political environment and organisational efficiency

There is an association between political decisions and attitudes on the implementation of e-health. Political goodwill and enabling environment leads to effective leadership at organisation level thus this positively affects the organisations implementation of e-health systems. The political environment plays a key role in determining the social and economic development for the improvement of the general population and in essence trying to reduce the digital divide between the rural and the urban citizens.

Box 5.23 memo 23

Relationship between social cultural and system integration

The analysis revealed that there is a dual relationship between the sociocultural environment and the system integration among facilities. Culture, for example, resists change. Nonetheless the integration of various information systems affects user's responsiveness to utilisation of the e-health systems. Integration and sharing of data might be hindered by user's cultural barriers such as fear of security of data online.

Box 5.24 memo 24

Relationship between social cultural and organisational efficiency

The exploration showed there is clear link between social cultural environment and organisational efficiency on the other hand towards implementation of e-health. This implies confidence in e-health frameworks requires trust both in the organization, and in addition confidence in the innovation, where clients are guaranteed that the frameworks can address their issues successfully. Subsequently there is need to re-fabricate trust between the clients and the organization and this requires the organisation to concentrate on a few concerns that influence the clients towards e-health innovations.

Box 5.26 memo 26

Relationship between social cultural and implementation

The examination revealed the effect of socio social values and practices on the dispositions of clients towards usage of e-health frameworks. This impact in nature is regularly negative in the way of life common in developing countries where innovation is seen as an intruder to their daily work than an enabler and thus explains the negative attitudes of the users towards implementation of e-health in Kenya.

Box 5.27 memo 27

Relationship between organisational politics and implementation.

There is a relationship between organisational politics and implementation of the system. Poor leadership leads to poor decision making thus lack of failure to involve all stakeholders in the process of implementation may lead to the failure of the project. Personal interests override the organisations interest. Bureaucratic structures in the organisation exist as a barrier to the success of the project too.

Box 5.28 memo 28

Relationship between social cultural factors and implementation of e-health

There is a relationship between social cultural factors and implementation of e-health system. Users perception towards technology will determine whether the they will resist or accept technology. Others include fear of unknown, attitude and technophobia

Box 5.29 memo 29

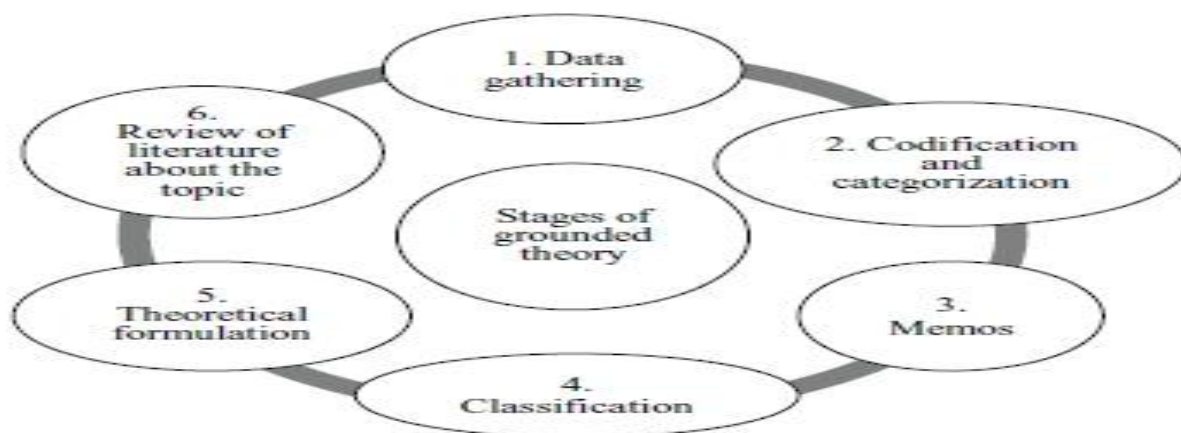
Relationship among all the factors

All the 13 factors seem to be integrated and interlinked. For e-health implementation to be considered successful in the healthcare sector, all the factors require to be functional otherwise its bound to fail. These 13 factors can further be combined to form five main themes namely: macro political, organisational efficiency, technological, legal and social cultural factors

Box 5.30 memo 30

The final model consists of five main contextual factors namely: macro political, organisational efficiency, IS Capability, legal and social cultural factors. Even if the organisation has a good will to support the e-health project, it requires the prerequisite laws in place to support online safety and system integration. These are all aspects of a successful implementation of e-health systems.

APPENDIX IV: Grounded Theory Methodology



The researcher starts with data gathering by use of open headed interviews. Data is then transcribed and translated. Memos are written. Memos are the written notes or records of analysis related to the development of the theory. When using grounded theory, we begin memo writing from the very start of our research. This is followed by analysis of the interviews using open coding. Openness in the initial coding helps researchers to explore and allow new ideas to emerge. During this however, the interviews are analyzed and coded using the segments word by word and line by line. At the second phase of axial coding data that has been broken up into separate codes is re-assembled. This will be used to investigate conditions of situations described in the interview, their action and consequences Charmaz (2006). Final phase is selective coding. According to Strauss and Corbin (1990), this phase aims to explore more depth and focus on the focal core code by verifying the initial concepts, properties and categories, which is believed to have an impact on the phenomenon studied. In selective coding the researcher begins to code in relation to the core category. This in turn means that theoretical memos become focused on aspects of the core category. The theory gradually emerges from grounded data through the constant comparison method with the literature reviewed earlier.

APPENDIX V: Letter of invitation for the interview

Description

This research assignment is being undertaken as part of the PHD course on developing a Framework for E-Health Implementation in Healthcare Sector in Kenya: A grounded theory approach.

The researcher would like to use your feedback to develop an e-health implementation framework for healthcare sector in Kenya that will assist to enhance healthcare delivery. Participation in this study is purely on voluntary basis. You may wish to pull out from this participation at any time without penalty or judgment.

Incase of any queries or further clarification please contact the researcher on carolboore@gmail.com. All comments and responses will be treated as anonymous and with utmost confidentiality. Participants are however assured that no one outside the research team shall have access to the information provided and no individual will be identified with any of the responses.

Consent to participate

By signing below you are indicating that you have read and understood the information about this project and are willing/not willing to participate in the project.

- ☐ I agree to participate in the project
- ☐ I do not agree to participate in the project