

**INFLUENCE OF SELECTED STRATEGIES ON IMPLEMENTATION OF DONOR  
ASSISTED E-HEALTH MANAGEMENT SYSTEMS IN KENYA: A SURVEY OF  
PUBLIC HEALTH FACILITIES IN NAKURU COUNTY**

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**A Research Project Submitted to the School of Business and Economics in Partial  
Fulfillment of the Requirements for the Award of Master of Business Administration  
Degree (Strategic Management Option) of Kabarak University**

**KABARAK UNIVERSITY**

**OCTOBER 2018**

## **DECLARATION**

This research project is my original work and has not been presented for a degree or any other award in any other university.

Signed \_\_\_\_\_

Date \_\_\_\_\_

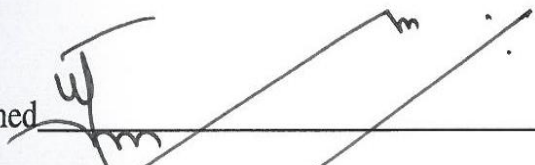
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## RECOMMENDATION

To the School of Business and Economics:


The research project entitled **“Influence of selected strategies on implementation of donor assisted e-health management systems in Kenya, a survey of public health facilities in Nakuru County”** and written by Purity Chemutai Cheruiyot is presented to the School of Business and Economics of Kabarak University. We have reviewed the research project and recommend it be accepted in partial fulfillment of the requirement for award of the degree of Master of Business Administration Degree - Strategic Management Option.

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## **DEDICATION**

I dedicate this work to my family and friends for their most needed moral support. May The Lord God Almighty abundantly bless them all.

## ABSTRACT

E-health is emerging as one of the most important paradigms of healthcare management due to its significant potential to deliver cost-effective, quality health care, and spending on e-health systems by governments and development partners. Consequently, the usage of e-health systems is increasing worldwide. However, E-Health adoption remain low in many countries and even when some of the known barriers have been mitigated by the implementers using several strategies, in several cases, the system falls into disuse or is used only as a redundant system in healthcare management. In Nakuru County, the adoption rates are still low at 21% with most medical practitioners preferring to use the hybrid system or rely purely on paperwork. Therefore, the main objective of the study was to analyze the influence of selected strategies used in implementation of donor assisted e-health management systems in Kenya focusing on public health facilities in Nakuru County. Specifically, it sought to establish the influence of facilitation strategy, training strategy, domestication strategy and Monitoring and Evaluation (M&E) strategy on implementation of e-health management systems in public health facilities in Nakuru County. The study was guided by The Systems Theory, The Resource based View and the Technology Acceptance Model. The study used descriptive survey research design targeting the health Ministry at both the national and county government and involved 42 public health facilities and 7 partnering NGOs in the County. The accessible population were, therefore, 220 persons comprising e-Health program managers and staff. Both purposive and stratified random sampling methods were used to obtain a sample size of 111 respondents from which 79 participated in the study. Data was collected using questionnaires and analyzed using both descriptive and inferential statistical methods. The study findings indicated that facilitation strategy ( $t = 0.92$ ,  $p > 0.10$ ) and training strategy ( $t = 0.12$ ,  $p > 0.10$ ) did not have a statistically significant relationship with the implementation of e-health management systems in the area as per the regression results. However, M&E strategy ( $t = 2.01$ ,  $p < 0.10$ ) and domestication strategy ( $t = 1.81$ ,  $p < 0.10$ ) did manifest a statistically significant relationship with the implementation of e-health management systems in public health facilities in Nakuru County. In addition, all the four independent variables could explain up to 27.2% of the variations in the implementation variable. From the findings it can be concluded that Monitoring and Evaluation, Domestication as implementation strategies were important factors boosting the e-health systems implementation in public health facilities in Nakuru County other than the other two variables; (Facilitation and Training). The researcher recommends that stronger emphasis should be put on facilitating e-health system implementation to cover all resource gaps. Similarly, more emphasis should be put on training to follow a needs assessment plan to fill gaps encountered during the implementation process. It is also recommended that the project implementers continually sensitize the donors and other development partners on the need to have more local input on the system that will enable both the implementers and end-users to build on the system and increase its perceived usefulness and usability. Finally, there is need for the implementing organizations to ensure that in addition to the M&E evaluations, quality evaluation and reporting be also made to raise the quality standards of the system after implementation.

**Keywords:** *e-Health management systems, Implementation, facilitation strategy, training strategy, domestication strategy and Monitoring and Evaluation strategy*

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## ABBREVIATIONS/ACRONYMS

<b>EHC</b>	- Electronic Health Card
<b>EMR</b>	- Electronic Medical Records
<b>HIEs</b>	- Health Information Exchanges
<b>HIT</b>	- Health Information Technologies
<b>HMIS</b>	- Health Management Information System
<b>ICA</b>	- Institute of Cultural Affairs
<b>ICT</b>	- Information and Communications Technology
<b>IT</b>	- Information Technology
<b>ITU</b>	- International Telecommunication Union
<b>M&amp;E</b>	- Monitoring and Evaluation
<b>METRIC</b>	- Measure Everything That Really Impacts Customers
<b>MoH</b>	- Ministry of Health
<b>NACOSTI</b>	- National Commission for Science, Technology and Innovation
<b>NGOs</b>	- Non-Governmental Organizations
<b>NHIN</b>	- Nationwide Health Information Network
<b>PHR</b>	- Personal Health Records
<b>RBV</b>	- Resource- Based View
<b>SDGs</b>	- Sustainable Development Goals
<b>SPSS</b>	- Statistical Package for Social Sciences
<b>SWOT</b>	- Strength Weakness Opportunities and Threats
<b>TAM</b>	- Technology Acceptance Model
<b>UK</b>	- United Kingdom
<b>UNDP</b>	- United Nations Development Program
<b>VLEs</b>	- Virtual Learning Environments
<b>WHO</b>	- World Health Organization

## OPERATIONAL DEFINITION OF TERMS

**Domestication Strategy** - Domestication is described as the process of technology adoption into everyday life and consists of three main processes namely Commodification, Appropriation and Conversion (Frissen, 2000). In this study the domestication strategy is defined as the approach used to increase the level of ownership of the e-health technologies among implementers and users.

**Donor** – is a person or institution who gives assets to another person or institution, either directly or through a trust. Under most circumstances, donors can deduct the value (or depreciated value) of the assets given from their taxable income. While many donors give out of the goodness of their hearts, many do so in order to avoid taxes, especially when donating through a trust (Xiao et al., 2014).

**Donor Assistance** - involves transfer of capital, goods, or services from donor country to recipient country as development aid on agreed terms. Such assistance includes grants and concessional loans with a grant element higher than 25 percent (Sahu et al., 2014).

**e-Health Management System**– is a computerized medical record system used to capture, store, and share information among healthcare providers in an organization, supporting the delivery of healthcare services to patients. The collective systems that can handle both statistical data processing and clinical applications are often referred to as e-Health or Health Information Technologies (HIT) (Malunga&Tembo, 2017).

**Facilitation Strategy** - Facilitation in management of project is a process of intervention in the working environment to increase productivity and efficiency of the team and to prevent project failure (Grabovski, 2012). In the context of the present study, facilitation strategy means the specific interventions used in e-Health to ensure its smooth implementation.

**Implementation** - Implementation is the carrying out, execution, or practice of a plan, a method, or any design, idea, model, specification, standard or policy for doing something. As such, implementation is the action that must follow any preliminary thinking for something to happen (Byrne et al., 2013). In this study, implementation refers to successful set up and universal usage of e-Health systems.

**Monitoring and Evaluation Strategy** - Monitoring is the process through which the essential aspects of project implementation such as reporting, usage of funds, record keeping, and review of the project outcomes are routinely tracked with an aim of ensuring the project is being implemented as per the plan (Mackay, (2010). In the context of this study, monitoring and evaluation is viewed as a strategy for ensuring the implementation of the e-Health systems remain tractable and achieve its objectives.

**Training Strategy** – Training is teaching, or developing in oneself or others, any skills and knowledge that relate to specific useful competencies it means the acquisition of skills through programmed instruction (Boonstra, Versluis&Vos, 2014). In the context of this study, training strategy means developing a comprehensive education and training plan that includes both individual and organizations to facilitate successful implementation of e-Health management systems.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background of the Study**

Achieving universal health care for its citizens is a noble goal for any government from a socio-economic perspective. As a result, governments together with their development partners and including Non-Governmental Organizations (NGOs) have been committing a substantial amount of funds from their budgets and other resources to meet this goal. E-health is emerging as one of the most important paradigms of healthcare management due to its significant potential for e-health to deliver cost-effective, quality health care, and spending on e-health systems by governments and development partners. Consequently, the usage of e-healthcare systems is increasing worldwide (Xiao, Sharman & Rao, 2014). For instance, a survey by the Office for National Statistics reports that 43% of surveyed UK internet users have accessed health related information online and this figure increases to 59% among those aged 24–35 (Office for National Statistics, 2013). In developing countries, mobile phone technologies have improved health outcomes for chronic disease conditions such as diabetes, heart disease and hypertension (Sahu, Grover & Joshi, 2014).

Accordingly, several governments in Africa have been rapidly adopting e-health in the last two decades. The South Africa government cemented the National Health operation by implementing a National Health Act of 2003 to set operating standards for e-Health applications (Ministry of Health South Africa, 2014). The Zambian government has also entrenched e-Health in its National Health Strategic Plan as it seeks to provide the strategic framework for ensuring an efficient, coordinated and well managed health sector by adopting these applications (Malunga & Tembo, 2017). Senafekesh, Tesfahun, Mulusew and Binyam (2014) also explain that despite the challenges being faced in the implementation of e-Health in Ethiopia, the government is still committed to the project embedded in its Fourth Health Sector Development Plan and insists that an e-health system called SmartCare be implemented in major hospitals. Similarly, the Government of Kenya implemented a National E-health Policy to overcome pre and post implementation challenges as quoted in the policy context annex of e-health strategy that seeks to set in motion the process of closing this gap by harnessing e-health for improved healthcare delivery in addition to other ongoing e-government efforts (Government of Kenya, 2011).

The World Health Organization (WHO) and International Telecommunication Union (ITU) defines electronic health system (e-Health) as a computerized medical record used

to capture, store, and share information among healthcare providers in an organization, supporting the delivery of healthcare services to patients (WHO, 2016). In this definition the data is collected from the medical records either paper based or electronic and later processed using Health Management Information System (HMIS) for statistical reports and clinical management (Kenya National eHealth Policy, 2016). The collective systems that can handle both statistical data processing and clinical applications are often referred to as e-Health or Health Information Technologies (HIT) (Malunga & Tembo, 2017). Hage, Roo, van Offenbeek and Boonstra (2013), however, describe e-health as any interactive communications and information technology aimed at enhancing community quality of life and/or individual health outcomes. Following this definition, health information can be accessed from the thousands of websites offering health information of varying quality used by health professionals as well as by laypersons (Ross, Stevenson & Lau, 2015). Such online health information has become one of the most important information sources for people seeking health information in recent years. In the current study, the focus will be on the definition supplied by WHO (2016).

E-health allows health organizations to streamline many of their processes and provide services in a more efficient and cost-effective manner. Planning to exploit the latest technologies in the healthcare industry is an important strategy for many healthcare organization and governments to enhance healthcare services so as to reduce operations costs. However, given the promising results on cost-effectiveness, such interventions are not as widely used as might be expected. There is enough evidence in research that suggests e-health is still characterized by low adoption in public healthcare management systems (Lieneke et al., 2017; Malunga & Tembo, 2017; Murray, May & Mair, 2010). The key perspectives emerging from this study as having the most significant bearing on e-health implementation success include the technological context, product features, and the user and organizational context (Lieneke et al., 2017). These have been used to inform implementation strategies in the past, however, their successes have not been quite forthright.

Several barriers have been identified in the implementation of the e-health system that affect even among those willing to adopt the system. For example, Hage et al., (2013) in their systematic review of various studies on e-Health implementation identified funding and costs, low availability, low accessibility, not fulfilling a demand and poor user friendliness as barriers to implementation of the e-Health system. A study carried out in



the Netherlands by Lieneke et al., (2017) found that while health care professionals and patients acknowledge the benefits arising from the implementation and use of eHealth services in daily practice, they were concerned with barriers such as availability, allocation of resources, financial aspects, reliability, security, e-Health system confidence, and the lack of education and training.

However, a study by Hoque, Bao and Sorwar (2016) in Bangladesh did not find a strong association between e-health and privacy concerns, rather perceived ease of use, perceived usefulness and reliability and gender were strongly associated with the adoption and use of e-Health services. In Ethiopia, user resistance was reported to be the primary hindering factor to its successful adoption (Senafekesh et al., 2014). Malunga and Tembo (2017) study in Zambia established that while e-Health core design and information products are so far considered adequate, the workforce training, clinical compliance, governance, regulation and policy and change management remain very poor coupled by inadequate ICT infrastructure.

Although previous studies have furthered knowledge by identifying factors thought to influence implementation processes and their outcomes, the underlying mechanisms at work have not been well characterized or explained (Mair, May, O'Donnell, Finch, Sullivan & Murray, 2012). Further, a review of e-health implementation strategy from a strategic management perspective is seriously lacking in majority of the studies done in this area. Pearce and Robinson (2007) explain that strategic management is a continuous process that involves attempts to match or fit the organization with its changing environment in the most advantageous way possible. It is an ongoing process to develop and revise future oriented strategies that allow an organization to achieve its objectives, considering capabilities, constraints and the environment in which it operates.

A strategy is a unified, comprehensive and integrated plan that relates the strategic advantages of the firm to the challenges of the environment. Strategies are methods or plans chosen to bring about a desired future, such as achievement of a goal or solution to a problem. Strategic management scholars agree with Porter (1985) that strategy is a competitive plan that relates to the overall pattern activities and provide a sense of direction to an organization (Johnson, Whittington & Scholes, 2011). It is designed to ensure that the basic objectives of the organization are achieved through proper execution by the organization (Thompson & Strickland, 2005). According to Porter (in Allen &

Helms, 2006), strategies can be grand or generic. Grand strategies are long-term and can be customized to a specific firm or large organization such as government, while generic strategies can be pursued by any type or size of business firm (Wheelen & Hunger, 2008).

Globalization, competition and technological changes in the environment have in the recent past forced organizations to adjust their ways of doing things. The adoption of a clear strategic perspective in organizations is one of the factors that affect the performance of these organizations (Schaap, 2006). Therefore, implementing a good strategy is one of the important factors that enable the organization to survive and gain a sustainable competitive advantage. Walker and Ruekert (2010) stated that strategy implementation is the process of allocating resources to support the chosen strategies. This process includes the various management activities that are necessary to put strategy in motion, institute strategic controls that monitor progress, and ultimately achieve organizational goals.

Effective and efficient strategy implementation involves developing an organization having potential of carrying out strategy successfully, disbursement of abundant resources to strategy-essential activities, creating strategy-encouraging policies, employing best policies and programs for constant improvement, linking reward structure to accomplishment of results and making use of strategic leadership (Cespedes & Piercy, 2010). Excellently formulated strategies will fail if they are not properly implemented. In addition, it is essential to note that strategy implementation is not possible unless there is stability between strategy and each organizational dimension such as organizational structure, reward structure and resource-allocation process.

Implementation strategies in the context of e-health are assumptions of how change needs to be executed, formulated with the aim to implement e-Health (Hage, Roo, Van Offenbeek & Boonstra, 2013). These strategies can be categorized as top-down and the bottom-up strategies. Top-down strategy treats implementation based on centralized project ownership with vertical relationships between a single stakeholder and external actors. The Bottom-up strategy is where the implementation strategy is based on shared project ownership based on horizontal relationships between stakeholders. In this vein, the patients' participation in their health care has been recognized as a key component in the quality of health care (van Bruinessen et al., 2014). Besides, as an end user of eHealth interventions, patient's involvement at different levels in the implementation process gives

valuable insights and may improve the implementation and use of eHealth interventions in daily practice (Nordin, Michaelson, Eriksson & Gard, 2017).

On one hand the government focus on policy interventions and infrastructure set up as strategies for implementation of e-health using Top Down approaches (Brennan, McElligott & Power, 2015). On the other hand, the donors and implementers pursue Bottom Up strategies in implementing e-health (Catan, Espanha, Mendes, Toren & Chinitz, 2015). In this study the focus was on the donor and implementers strategies such as Facilitation, Domestication, Training and Monitoring & Evaluation strategies which have so far not received significant research attention in existing studies on e-health. Government strategies, however, have been examined in policy documents and other previous studies such as World Health Organization (2015), Kenya National eHealth Policy (2016) and Registered Nurses' Association of Ontario (2017).

In a bid to realize improved healthcare for its citizens in Kenya, the Ministry of Health identified and prioritized the development and operationalization of a comprehensive National eHealth Policy meant to clearly outline and guide stakeholders on the strategic direction on the use of ICTs in the health sector. It is envisaged that the National and County Governments will benefit immensely from this policy framework as it will guide them as they plan and budget for healthcare services at all levels of care. Moreover, this policy is meant to accelerate the realization of Sustainable Development Goals (SDGs) and foster economic growth. Currently, in the country, more than 35 counties have implemented at least one eHealth project. Of these, most projects are concentrated Nairobi, Mombasa and Kisumu Counties projects (Kenya National eHealth Policy, 2016). However, while peri-urban regions like Busia, Kakamega and Vihiga counties also had a good number of eHealth projects, counties in Arid and Semi-Arid regions such as Turkana, Wajir, Garissa, Samburu, Marsabit and Mandera had the least number of eHealth systems and interventions.

Regarding ownership and investment, the policy document revealed that most of the eHealth projects implemented were mostly funded by development partners and Non-Governmental Organizations (NGOs). Currently, a number of donor supported HIV programmes are running HIV EMRs in some public facilities like Kenyatta National Hospital, Moi Teaching and Referral Hospital, Lumumba Clinic Kisumu and Migori, Nakuru Provincial General Hospital and Naivasha Sub-County Hospital among others.

The donors provide funding of up to 47% of the financial support to e-health programs (Gathara, 2013). According to Wamae(2015), the implementation is heavily controlled by donors or is implemented as a specific disease monitoring tool and hence not serving the universal needs of EMR. This has led to concerns over issues of sustainability and ownership. Consequently, the eHealth policy and regulatory framework was developed to provide guidance on ownership of eHealth.

The Ministry of Health began implementing e-health in Nakuru County in the year 2010. The system was first introduced in Nakuru Provincial General Hospital and Naivasha which began automating their systems. However, the implementation of e-health or its major components such as EMR has been low in the country and this also includes Nakuru County (Wamae, 2015). A previous study by Juma et al., (2012) on the Current Status of E-Health in Kenya and Emerging Global Research Trends had indicated that adoption of e-Health in country is at its infancy. A survey by Chebole (2015) in Nakuru County revealed varying levels of EMR systemsimplementation with only 21% of the health institutions having fully implemented the system while the rest were still opting to use a hybrid system consisting of both paper and electronic systems. Among the reasons cited for this state of affairs include inadequate capacities of Health Information System (HIS) staff, lack of systems interoperability, untrained personnel handling data, several parallel data collection systems, and poor coordination (National e-Health Policy, 2016). However, most studies including those done in Nakuru County have focused on EMR which is a component of e-Health, e-Health an encompassing construct has not received research attention.

## **1.2 Statement of the Problem**

In Kenya, the National e-Health Policy (2016) recognizes that there are marked disparities in e-Health adoption across geographical and administrative boundaries with the major cities in the country showing more promising adoption rates compared to the rural areas. The same trends can be observed across different counties. Mulwa (2013) found out that in Kenyan hospitals, data is entered manually and is thus bound to human error, misplacement or loss of files, and thus may increase the cases of misdiagnosis of a patient. A study by Chebole (2015) in Nakuru County found that while Electronic Medical Record (EMR) systems had been fully adopted by 21% of the implementers, a significant number of medical practitioners still using a hybrid system consisting of both paper and electronic systems. Therefore, it can be deduced that implementation of e-Health is partially adopted

in the country at best. Both studies focused on EMR which is a component of the E-health system. The present study, however, focused on the implementation of e-health systems which has data processing and clinical applications.

However, the strategies used in adoption vary due to the complexity of the processes of change at the micro level for professionals and patients and at the meso level for health-care organizations themselves (Ross, Stevenson, Lau & Murray, 2016). Therefore, an examination of the strategies being used to implement e-Health systems need to be undertaken. Most contextual studies on e-Health implementation have focused on the barriers to implementation of the system while systematic reviews in this area have mainly been concerned with benchmarking adoption rates without due regard to critical success factors and the strategies involved in achieving them. Moreover, studies done in Kenya have focused on ICT and EMR adoption rather than the broader e-Health implementation concept. Moreover, while there is significant attention on government strategies used in implementing the health sector strategies used in donor assisted e-health programs have not been previously examined. The present study, therefore, sought to examine the effect of selected strategies used in implementation of donor assisted e-health management systems in Kenya focusing on public health facilities in Nakuru County.

### **1.3 Purpose of the Study**

The purpose of the study was to analyze selected strategies used in implementation of donor assisted e-health management systems in Kenya focusing on public health facilities in Nakuru County.

### **1.4 Objectives of the Study**

- i. To establish the influence of facilitation strategy on implementation of donor assisted e-health management systems in public health facilities in Nakuru County.
- ii. To investigate the influence of training strategy on implementation of donor assisted e-health management systems in public health facilities in Nakuru County.
- iii. To examine the influence of domestication strategy on implementation of donor assisted e-health management systems in public health facilities in Nakuru County.

- iv. To assess the influence of Monitoring and Evaluation strategy on implementation of donor assisted e-health management systems in public health facilities in Nakuru County.

### **1.5 Hypotheses**

**H0<sub>1</sub>:** Facilitation strategy does not significantly influence implementation of donor assisted e-health management systems in public health facilities in Nakuru County.

**H0<sub>2</sub>:** Training strategy does not significantly influence implementation of donor assisted e-health management systems in public health facilities in Nakuru County.

**H0<sub>3</sub>:** Domestication strategy does not significantly influence implementation of donor assisted e-health management systems in public health facilities in Nakuru County.

**H0<sub>4</sub>:** Monitoring and Evaluation strategy does not significantly influence implementation of donor assisted e-health management systems in public health facilities in Nakuru County.

### **1.6 Significance of the Study**

The country has been on a trajectory of delivering healthcare services to its citizens on a e-Health platform for close to a decade now. Consequently, the National e-Health Policy 2016 – 2030 that not only identifies the challenges facing the health sector in the country and but also the potential benefits of implementing e-Health management systems as an intervention. The implementation of e-Health has subsequently attracted several stakeholders including the donor community. However, the implementation of e-Health in the country still encounters several barriers necessitating the implementers to craft strategies to ensure successful implementation of the system. Nevertheless, despite the benefits and strategies used to implement the system, the public health facilities and the public are still far from significantly embracing e-Health.

Therefore, the outcome of this study is meant to enlighten the managers of the e-Health projects in public health facilities in Nakuru County on the efficacy of their implementation strategies. Such information will be useful in helping the managers review their strategies for better outcomes. Other stakeholders in the e-health implementation process such as donors and system designers may also find the results of the present study useful in guiding their initiatives and interventions on e-Health in the area and beyond. The government as a major stakeholder in the e-health management systems may also find the outcome of the study beneficial in comprehending the dimensions and effectiveness of

the implementation strategies. Therefore, the outcome of this study together with other similar studies many prove instrumental in shaping policy interventions and other facilitations to make the project as success. Finally, the findings of this study is meant to be of much benefit to the academic community by filling gaps and adding to knowledge in this area and enable them to identify gaps upon which to build cases for further research.

### **1.7 Scope of the Study**

This study was confined to the influence of selected strategies used in implementation of donor assisted e-health management systems in Kenya focusing on public health facilities in Nakuru County. The study utilized primary data for the study obtained from the managers of the e-health management systems in both health ministries at the national and county government levels, the public healthcare facilities and the Non-Governmental Organizations (NGOs) partnering with the government to implement the e-health project in the county. The study was carried out over a period spanning six months from March 2018, to September 2018.

### **1.8 Limitations of the Study**

The main limitation of the study was its scope and design, as such, it is limited to government ministries, public healthcare facilities and NGOs in Nakuru County. Therefore, the findings may not necessarily be generalizable to other counties in the country due to contextual factors such as the demographic patterns and the levels of healthcare infrastructure in the areas. The findings may not also necessarily represent the situation in other county governments in the country or in other countries. This can likely affect accuracy, precision of the results and the scope interpretation. However, this was mitigated by proper sampling to make it more representative. Another limitation of the study was the instrumentation, the structured questionnaire as the preferred instrument for data collection is useful in surveys but lacks depth, it may also have other constraints such as researcher bias. However, these instrument limitations were overcome by pre-testing the instrument before administration. Ethical considerations may hinder respondents from giving honest responses due to fear of victimization and some respondents may be too busy to honor appointments during the study. However, every effort was made to assure them of the academic nature, its value to the stakeholders to whom it is addressed and also their confidentiality while participating in the study.

## **1.9 Assumptions of the Study**

Being a survey and given the busy nature of the respondents, the study used a structured questionnaire. Despite the subjective nature of this instrument, it was expected to adequately capture the positions of the respondents on the subject being investigated. The study also assumed that the variables were well operationalized and the constructs used were valid.



## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter introduces the concepts of the study and the background of the problem and helps to clearly define the problem or area of interest. It intends to make an extensive coverage of the general literature on the subject and give a critical review of major issues related to the objectives of the study. Theoretical and empirical literature will be reviewed and gaps to be filled by the study identified. It then concludes with the conceptual framework.

#### **2.2 Theoretical Review**

The study will be guided by The Systems Theory, The Resource Based View and the Technology Acceptance Model.

##### **2.2.1 The Systems Theory**

Ludwig defines a system as a set of objects or entities that interrelate with one another to form a whole. The System's theory is basically concerned with problems of relationships, of structures, and of interdependence, rather than with the constant attributes of objects. The systems theory views an organization as a social system consisting of individuals who cooperate within a formal framework, drawing resources, people, and finances from the services they offer. This theory is based on the view that managers should focus on the role played by each part of an organization; rather than dealing separately with the parts (Hannagan, 2002).

The system theory maintains that an organization (the Sub-County in the present case) does not exist in a vacuum. It does not only depend on its environment, but it is also part of a large system such as the society or the economic system to which it belongs. The approaches are concerned with both interpersonal and group behavioral aspects leading to a system of cooperation. Plomp and Pelgrum (1993) noted that a devolved public system is a complex system comprising of sub-systems at different levels; these are macro (national government), meso (County government) and micro (Sub-County staff and clients) levels. At each of these levels, the health care management decisions are influenced by different actors, for example, at the macro level; the national government and donors make certain decisions for public health care management systems operators and give opinions on their funding objectives and the expected outcomes from the resources. The systems theory

emphasizes unity and integrity of the organization and focuses on the interaction between its component parts and the interactions with the environment. It suggests that organizations must be studied as a whole taking into consideration the interrelationships among its parts and its relationship with the external environment.

### **2.2.2 Resource Based View**

The currently dominant view of business strategy resource-based theory or resource-based view (RBV) of organizations is based on the concept of economic rent and the view of the organization as a collection of capabilities. According to Kay (2005), this view of strategy has a coherence and integrative role that places it well ahead of other mechanisms of strategic decision making. According to Barney (1995), this theory formulates the organization to be a bundle of resources. It is these resources and the way that they are combined, which make organizations different from one another. It is considered as taking an inside-out approach while analyzing the firm. This means that the starting point of the analysis is the internal environment of the organization. Barney (1995) further contends that resources are inputs into an organization's production process, such as capital, equipment, the skills of individual employees, patents, finance, and talented managers. Resources are either tangible or intangible in nature. The resource-based view (RBV) offers critical and fundamental insights into why organizations with valuable, rare, inimitable, and well-organized resources may enjoy superior performance.

Moreover, the resource-based view is grounded in the perspective that an organization's internal environment, in terms of its resources and capabilities, is more critical to the determination of strategic action than is the external environment (Camisón, 2005). Instead of focusing on the accumulation of resources necessary to implement the strategy dictated by conditions and constraints in the external environment the resource-based view suggests that an organization's unique resources and capabilities provide the basis for a strategy. The business strategy chosen should allow the organizations to best exploit its core competencies relative to opportunities in the external environment (Ireland, Hitt & Hoskisson, 2008). This theory will therefore be adopted in this research since it focuses on the organization's internal environment.

### **2.2.3 Technology Acceptance Model**

Technology Acceptance Model (TAM) was introduced by Davis (1989), is an adaptation of the theory of reasoned action specifically tailored for modeling user acceptance of information systems. The goal of the theory is to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified. Ideally one would like a model that is helpful not only for prediction but also for explanation, so that researchers and practitioners can identify why a particular system may be unacceptable and pursue appropriate corrective steps. A key purpose of the theory, therefore, is to provide a basis for tracing the impact of external factors on internal beliefs, attitudes, and intentions. Technology acceptance theory was formulated in an attempt to achieve these goals by identifying a small number of fundamental variables suggested by previous research dealing with the cognitive and affective determinants of computer acceptance.

The technology acceptance theory has also been used by researchers to explain why a particular system may or may not be acceptable to users. It hypothesizes that there are two beliefs, perceiving usefulness and perceiving ease of use, which are variables that primarily affect the user acceptance. The theory is relevant to the study because it suggests that the external variables indirectly affect individuals' attitude toward adoption of information communication technology acceptance by influencing perceived usefulness and perceived ease of use. External variables might include individual user attributes, social factors or those related to their job tasks. A series of studies found that the theory is the best model in examining Physicians' acceptance of telemedicine technology because it is specialized in information technology, it is well-researched, it uses psychometric measurements, and it is a dominant model for investigating user technology acceptance (Mary, 2008). This theory was used to examine the appreciation of technology application in e-health implementation among implementers and users in the area.

## **2.3 Empirical Review**

### **2.3.1 Facilitation strategy and implementation of e-health management systems**

Facilitation is a strategy used very frequently in implementing and managing projects to ensure they have smooth operations processes and ultimately achieve their objectives throughout the implementation cycle (Kerry, 2007). Facilitation in project

management means a process of intervention in the working environment to increase productivity and efficiency of the team and to prevent project failure (Grabovski, 2012). This process aims to ensure success in project delivery. It should result in forming a well trained and experienced team committed to the implementation of the approved recommendations. In the context of e-Health implementation, the process of project facilitation comprises the following: funding, including loans, grants, investments and reporting; Analysis, including root cause analysis; Consulting, which also includes presentations, demonstrations, recommendations, and; Overall guidance, which also entails supervision reports.

Facilitation in managing projects favors smooth development of teams. Its benefits to the project environment are as follows: Development of collaborative skills and abilities; Ensures reduced number and cost of outside consultants and a higher level of commitment to the team goals (Stacy & Ulku, 2012). The role of project facilitator includes a series of duties and responsibilities to favor the development of a team by providing training, analysis, consulting and guidance to team members. It aims to ensure effective problem solving and decision making throughout the implementation life cycle (Mwangi, Namusonge & Sakwa, 2016). According to ICA (2017), facilitating an organization, no matter the size, can be difficult and quickly become dysfunction. To facilitate well requires training, practice, and awareness of the obstacles to success that facilitators may face, as well as knowing how to handle them.

The ICA (2017) recommends that establishing a facilitation framework is critically important. The framework is the architecture of group facilitation— where and how it begins and ends, how it sequences subject areas, and how it handles those subjects. The framework is the foundation for the design, the working document that guides discussion. The framework defines the schedule and provides the facilitator and the organization with boundaries and a procedural roadmap (Houghton, 2012). The design is so important because it enables the facilitator to establish and maintain focus of the implementation areas and the time allotted to each. However, even with an established framework and a working design, facilitators face the possibility of losing control of the process. Implementation can veer from the planned design, and the facilitator must be flexible enough to shift the direction of the implementation. The challenge is integrating the wayward implementation track into the original framework and steering it back to the design while allowing flexibility.

Mwangiet al., (2016) describes facilitating condition as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system. This includes the availability of resources required by the user to use the system, the compatibility of the system with other existing system, necessary knowledge to use the system, help to resolve system difficulties and whether the system is compatible with user's way of performing tasks are some key factors in the model that may influence system acceptability by users (Venkatesh et al.,2003). Therefore, facilitating strategies are enablers that encourage both implementers and end-users to fully adopt a system. Mugo and Nzuki (2014) observe that healthcare facilities in developed countries are being well facilitated to continue implementing electronic medical records management to lower costs and to improve quality of care. For example, in the US, \$1.2 billion grant was unveiled to facilitate adoption of electronic health records in all hospitals by 2014 (Stacy &Ulku, 2012).

With the adoption of electronic medical records, patient information will be electronically captured in any care delivery setting. This is aimed at increasing Health Information Exchanges (HIEs) and eventually maintaining a Nationwide Health Information Network (NHIN), which aims to provide a secure and interoperable health information infrastructure that allows stakeholders, such as physicians, hospitals, payers, state and regional HIEs, federal agencies, and other networks, to exchange health information electronically (Cline, 2012).Closely related to electronic medical records are Personal Health Records (PHR) that have emerged as a way of enabling patients control the access to their health information while empowering them make appropriate health-related decisions(Makori, Musoke& Gilbert, 2013). Using PHRs, patients are able to maintain, update and communicate their personal health information in the way they prefer thereby taking control of their health and in general lifestyles in greater way. For instance, Denmark national PHR service available to any Danish citizen to allows them control who accesses their medical information and how it is accessed is a fine example of a well facilitated and implemented e-health system (Cruicksack, Carl& Jon,2012).

Other European countries have their own distinctive approach in facilitating the journey towards enabling technologies in healthcare. France is developing the concept of digital hospitals via telemedicine technologies (Currie & Finnegan, 2009). Germany is working on an Electronic Health Card (EHC) which will allow the physicians to check the administrative data of the patient and to write prescriptions on EHC. The EHC will also

have voluntary medical functions like the emergency data record and later an electronic patient record that can be checked anywhere using appropriate card readers (Sunyaev, Göttinger, Mauro, Leimeister & Krcmar, 2009). However, the uptake of these PHR remains low in developed countries with little research having been conducted to explain this low adoption trend (Helmer, Lipprandt, Frenken, Eichelberg & Hein, 2011). Therefore, it is evident that there are still gaps in the facilitation strategies that need to be addressed.

According to Houghton (2012), well facilitated projects have a higher rate of success than those that are not well facilitated. For example, a study by Onyango (2016) on factors determining project implementation of health projects in Gedo Region, Somalia found that adequate financial support for project implementation at World Vision Somalia effective in achieving high levels of implementation since finances are essential in the running of a project initiative in terms of facilitating execution of implementation tasks. Ouma (2012) studied factors affecting the effective implementation of donor funded projects in Kenya Focusing on World Bank Funded Projects in Kenya. The study identified several resource and procedural gaps requiring better facilitation for the implementation of the projects. These were capacity building for staff of the donor agencies; use of local staff to overcome language and other socio-cultural factors; sensitization and training of beneficiaries; timely auditing of implementing agencies to ensure accountability; timely programme reports from project officers; frequent meetings with key stakeholders; adequate collaboration and networking of all development partners.

Nabwire (2014) examined factors affecting implementation of strategy using Barclays Bank of Kenya as a case study. The study found that the bank has a good organizational structure to be able to facilitate strategy implementation. However, the strategy facilitators did not follow through for feedback after its implementation. This is because once the strategy is implemented there is usually some lapses but there is no one to address these lapses. This leads to lack of ownership in some cases. The IT systems also need to be upgraded so as to sufficiently implement the organization's strategy. This is because once the strategy is implemented there is congestion in the system which makes it slow.

All these studies underscore the need for a better facilitation strategy for systems implementation. These facilitations range from establishing facilitation frameworks to centralization. However, it is evident from the discussions that the effect of the facilitation strategy in the implementation of e-Health management systems in the public domain has

not been closely examined in previous studies. Therefore, the present study seeks to examine this aspect in detail.

### **2.3.2 Training strategy and implementation of e-health management systems**

The education and training of staff is a critical step in the implementation of eHealth management systems, but it is a complex undertaking (Karwowski, Soares & Stanton, 2011; Boonstra, Versluis & Vos, 2014). Kelay, Kesavan, Collins, Kyaw-Tun, Cox and Bello (2013) explains that training prepares stakeholders impacted by the implementation to use the new eHealth solution and gain confidence with their new workflows. It is the means to a greater goal, and it can only be considered a success if the strategy employed results in successful end user adoption (Byrne et al., 2013). Several organizations in the studies reviewed attributed their success to comprehensive education and training plans developed to teach staff how to integrate the new system and workflows efficiently and effectively into their daily routine (Simon et al., 2013).

To ensure successful adoption of the eHealth solution, project teams need to develop a comprehensive education and training plan that includes both individual and organizational strategies (Boonstra et al., 2014). McCarthy, Eastman and Garets (2014) suggest that the training strategy at the individual level must be user-centric, meaning that it is role- and workflow-based, not system-based. Thus, a comprehensive education and training plan necessitates an assessment of learning needs for specific roles and job functions; the identification of staff who may require some type of pre-implementation training (e.g., basic computer training); and strategies to support the diversity of learning needs throughout the organization (McAlearney, Robbins, Kowalczyk, Chisolm & Song, 2012; Fenton, Gongora-Ferraz & Joost, 2012).

There is general consensus in literature that the most effective education and training strategies are delivered by the appropriate trainers, for example, champions and super-users (Kealey, Leckman-Westin & Finnerty, 2013; Vuk et al., 2015). The literature also recommends multiple and active training approaches, such as, classroom, simulation, hands-on training, and blended learning (Dastagir et al., 2012). The education and training plan also should include relevant role-based training by integrating realistic scenarios and hands-on practice to help end users gain proficiency with the new workflows and system functionality (Silow-Carroll, Edwards & Rodin & 2012). In clinical settings, user-centric training is facilitated through the help of health professionals, for instance, physicians,

nurses, and super users, who understand user workflows and can help to tailor the content to reflect relevant clinical contexts. Key topics to be included in a comprehensive education and training plan are as follows: new workflows, processes, policies, and procedures (Carayonet a., 2011; McAlearney et al., 2014); system and equipment utilization, such as, bar code scanner); and interpersonal communication skills when using a computer (Currie& Finnegan, 2009).

Post-implementation support is integral to successful adoption. Boonstra et al. (2014) emphasize the importance of peers and super-users providing real-time support to optimize effectiveness and efficiency. The ultimate goal of post-implementation support is self-sufficiency. Optimal adoption of an eHealth solution does not occur by chance. It requires the commitment of end users and organizational leadership (Simon et al., 2013). To be successful, the comprehensive education and training plan must be supported by organizational strategies, including visible leadership support at all levels, investments of adequate human and financial resources, and adequate time allocation for the staff to learn the system (Chaudry & Koehler, 2014; Pantaleoni, Stevens, Goad & Longhurst, 2015).

ICT training among clinicians is cited as a key determinant of electronic health (Ochieng & Hosoi, 2005; Martins & Oliveira, 2008; Terry, Giles, Brown, Thind& Stewart, 2009; Marques, Oliveira & Martins, 2011). According to Ochieng and Hosoi (2005) on a study that sought to establish the factors influencing diffusion of electronic medical records in Japan, ICT skills are required to foster positive attitudes about electronic medical records which translate to greater adoption of electronic medical records. Therefore, developed countries in an effort to raise ICT skills amongst clinicians have incorporated ICT training in health courses offered at various academic levels. New courses such as medical informatics, bioinformatics, computational biology, and health informatics have been started. Sood et al., (2008) notes that developed countries are using cutting edge technologies like 3D simulations, virtual reality and robotics to train clinicians and that ICT is included in the curriculum of medical courses. Availability of ICT skills amongst clinicians is likely to lead to the acceptance and actual use of eHealth in primary healthcare. This is because; clinicians with ICT skills are able to appreciate the possible benefits of ICT in execution and improvement of the various processes they are engaged in.



Omary, Lupiana, Mtenzi and Wu (2010) attribute low adoption of eHealth among developing countries to lack of computer skills amongst the clinicians. In countries that have assimilated ICT training for clinicians, acceptance of eHealth and actual use is relatively high (Khan, Shalid, Hedstrom & Andersson, 2012). Training boost awareness and confidence level as users are able to overcome technophobia while relating usage to expected benefits (Sahay&Walsham, 2006). Abraham, Nishihara and Akiyama (2011) add their voice by arguing that optimal use of IT towards the transformation of health care requires IT knowledge in the medical communities. The correlation between ICT skills and adoption of eHealth is also discussed by Juma, Nahason, Apollo, Gregory and Patrick (2012) who points out that inadequate ICT skills in the health sector in Kenya explains the low adoption of eHealth. Hogan and Palmer (2005) are of the opinion that those health care professionals who lack the ICT skills of processing the online health data end up spending too much time on the same. According to Malik, Larik and Khan (2008) sluggish internet use among doctors in Pakistan was due to unavailability of proper technology and lack of computer training. Without adequate ICT skills, user involvement in selection and development of ICTs becomes difficult and if it happens, it is only to rubberstamp the experts' decisions. This might lead to having eHealth technologies that are not widely accepted or used adequately.

A study by Ministry of Health Malawi (2014) on e-Health situation analysis focusing on the health service delivery institutions within the health sector found that management of health records at facility level is mostly and primarily manual and this brings about challenges in rapid decision making, management of patient profiles and surveillance. In terms of training, it was found that there is a gap in planning and offering of ICT related training. The study recommended that there needs to be collaboration in training with academic institutions to design and implement delivery platforms and learning systems such as Virtual Learning Environments (VLEs), repositories, learning management systems. There was also need for collaboration with training institutions to develop and upload learning content, including online resources, courses and learning objects. The study also recommended that further collaboration with training institutions was needed to deliver and assess the e-learning programs to health care workers.

Malunga and Tembo (2017) study in Zambia demonstrated that currently e-Health implementation was characterized by high levels of training gaps, lack of a regulatory policy, technology use challenges and many other factors. Although many opportunities

exist and are not limited to, but inclusive of stakeholder support, functional e-Health model sites, availability of e-Health training laboratories and government initiatives to implement E-government the challenges still remain unresolved. The study recommended pre and in-service examinable e-Health training curriculum, implementation of a mandatory use e-Health Policy and confront data sharing challenges amongst health care institutions to further encourage adoption of e-Health.

Kimani (2015) investigated factors affecting the utilization of health information technology projects in Nairobi County. The study established that health workers undertook refresher trainings after a period of 1 -2 years. This hinders them from improving their skills and expertise in utilization of health information systems. According to the study findings, it was necessary for the employees to update and improve their skills based on their areas of specialty since it gives them confidence and motivation to work. In addition, it enables them to tackle challenges in their work. The study concluded that lack of adequate refresher trainings has also influenced the utilization of the HMIS greatly. Delay in the repair the HMIS has also resulted in the users using the manual methods. This is evidenced in the usage of the HMIS whereby delay has been cited as one of factors that has resulted users to using the manual methods.

### **2.3.3 Domestication strategy and implementation of e-health management systems**

Domestication is described as the process of technology adoption into everyday life. The concept of domestication was originally adapted from other disciplines such as anthropology and consumption studies, as well as from the media studies considering the context in which ICTs were experienced by the people using them (Haddon, 2006). Domestication consists of three main processes namely Commodification, Appropriation and Conversion (Frissen, 2000). Some researchers split the appropriation stage into Objectification and Incorporation stages, thus making four stages. Commodification (also known as imagination) refers to the way a technological product is designed and is given an image by the users as it emerges into the public space. At this stage symbolic and functional claims about the product are noted. The images could be a result of an advertising campaign. The product is evaluated on how well it would fulfil the consumers' perceived needs (Habib, 2004). In the case where the consumer has a choice of adopting, the commodification process may affect his/her decision to acquire the product.

Once purchased by an individual or an organization, the product or object goes through a process of appropriation (Habib, 2006). At this stage the product is possessed by the owner and becomes authentic. When looking at appropriation, the objectification process is considered to examine how the product finds space and enters the geographical area of the owners. Objectification does not necessarily mean the product is accepted by the potential adopters. Products entering the school sphere may not be immediately integrated into its pedagogy. The product is then incorporated into the daily routines of its owners. Incorporation begins by first integrating the product in temporal structures both formally (in the work schedules) and informally (in the routines and habits).

In the conversion stage, the adopters of the innovation show their adoption by displaying it to the outside world physically or symbolically (Habib, 2004). In case of ICT for curriculum delivery, the display could be by individual teachers within a school environment or by the entire school as an adopter displaying to other schools. The first two stages of the domestication process are equivalent to what is normally referred to as adoption in most adoption frameworks (Pedersen & Ling, 2003). Thus, it is noted that the domestication framework allows for investigating the processes beyond the acquisition of the technology.

According to Weber (2015), the domestication framework is concerned with the incorporation of certain technology, or product into the daily life of a family or an individual user and its temporal-spatial and symbolic nexus. It involves cognitive work while acquiring knowledge about a “new” technology, as well as practical and symbolic work while using and becoming familiar with it. The domestication strategy puts a strong focus on the user who can either be an individual or a group. Haddon (2006) explains the framework looks beyond the adoption and use of ICTs (as well as gratifications or benefits) to ask what the technologies and services mean to people, how they experience them and the roles that these technologies can come to play in their lives. The processes observed in this framework are about how individuals encounter technologies and deal with them, sometimes rejecting them and at other times accepting them.

Domestication studies often stress that users create their own practices and meanings of technologies. While domestication seems appropriate to grasp the complex socio-cultural dynamics of everyday life, such strengths go along with some weaknesses. Domesticating carries the semantics of converting something to ‘domestic’ uses and of ‘taming’. A

discussion of domestication almost always involves design. Silverstone and Haddon (2012) explain that design and domestication are the two sides of the coin of innovation. Domestication is anticipated in design and design is completed in domestication. Both depend on a particular balance of structure and agency in which institutional processes - which are together economic, political and cultural - both constrain and enable the capacity of consumers to define their own relationship to the technologies that are offered to, or confront, them.

These constraints, which at least as far as the consumer is concerned are largely invisible, are embodied in design and marketing and in the public definitions of 'what these technologies can and should be used for' (Weber, 2015). Such public definitions are variously defined in the regulatory structures governing standards or services, in the particularities of a technology's appearance and style, as well as in the rhetoric of advertising and the instructions and guidance spelled out in the manual (Frissen, 2000). But equally, again from the point of view of consumption, these constraints are to be found in the domestic itself: in households and in the established patterns of everyday life. These will define in large degree how a particular technology will be used and, at least in part, also the consequences of that use. The emerging character of a new technology, as well as the established character of an old one, will depend on the constantly shifting relationship of actors and structures in both these domains.

Domestication also involves a number of different activities. The link between domestication and design is provided by commodification, the process through which objects and technologies emerge in a public space of exchange values: in a market place of competing images and functional claims and counterclaims (Haddon, 2006). But domestication also involves the consumer in appropriation, in taking technologies and objects home, and in making, or not making, them acceptable and familiar. Indeed, the process of appropriation is more than simply a matter of purchase, since, as we shall argue and hopefully also demonstrate, what consumers do with their technologies in their homes, is increasingly important work affecting both present and future technologies (Frissen, 2000). Domestication, finally involves conversion which indicates the importance of display. It involves the various things consumers do to signal to others their participation in consumption and innovation.

Chepkwony (2015) argues customizability is an important factor to enhance EMR adoption. It is defined as the ability of the system to conform to specific needs of the end user. Physicians are reluctant to adopt static EMR systems that do not support their personal styles and workflow. For example, the doctors like to have their own letter format and adjust it based on their needs (Randeree, 2007). Some physicians may also use this lack of customizability as a way to avoid admitting to other reasons for avoiding EMRs. However, it does seem that more effort is required from the vendors of EMRs to increase their customizability. However, such customer services will increase the costs to practices of implementing EMRs; potentially erecting financial barriers (Boonstra & Broekhuis, 2010).

A study by Chigona, Chigona, Kayongo and Kausa (2010) on domestication of ICT in schools in disadvantaged communities in South Africa revealed that not all schools which have the ICTs have domesticated the technologies, nor do the educators feel competent enough to use the technology in curriculum delivery. The study also revealed that most educators make limited use of ICTs for teaching and learning. The study further noted a number of factors which may hinder the domestication process of ICTs in the schools in the disadvantaged communities. It was also noted that the problem of limited resources affects the domestication of the technology.

In relation to e-Health, a study by Malunga and Tembo (2017) in Zambia found that the legal ownership of e-Health in Zambia has been an internal discussion and many feel that such systems should be controlled by the Ministry of Health. Unlike other stakeholders, during their study health workers gave responses to their preference with the results revealing a strong emphasis that the Ministry of Health owns the systems. There is an intention to transfer responsibility of most current e-Health applications to the Ministry of Health, however a plan with goals, an organizational structure, specific actions, and timelines needs to be addressed and encouraged. Additionally, many health practitioner's feel that the health Ministry is not doing much in terms of infrastructure and policy implementation.

Kimani (2015) study in Kenya revealed that user involvement plays a key role in the success of the utilization of an information system. This is because the users are able to air their views with regards to the project and hence lead to the sustainability of the project since they will have owned the project. In addition, user involvement leads to motivated

users because they are involved in decision making of the project. The study recommended that during project identification of any system development project, users should be involved in defining their needs. This is important since it ensures that the users identify their needs which should be taken into consideration during system design. In the end, it results to the utilization of the system since the users have a sense of ownership.

#### **2.3.4 Monitoring and evaluation and implementation of e-health management systems**

Monitoring and evaluation are thinly distinct elements within the project management cycle but are highly dependent and mutually of significant importance to project sustainability (UNDP, 1997). Monitoring is the process through which the essential aspects of project implementation such as reporting, usage of funds, record keeping, and review of the project outcomes are routinely tracked with an aim of ensuring the project is being implemented as per the plan (Mackay, 2010). Monitoring is undertaken on a continuous base to act as an internal driver of efficiency within the organization's project implementation processes and its main agenda is to develop a control mechanism for projects (Crawford & Bryce, 2003). Monitoring and evaluation should offer comprehensive and relevant data that will support decision making. According to Gianelle and Kleibrink (2015) Monitoring should achieve three fundamental purposes, Firstly, inform about what strategy is achieved and whether execution is on track and making the information available to decision makers; Secondly, clarify the rationality of intervention of the strategy and make it coherent to the stakeholders and lastly, support constructive involvement and involvement of stakeholders through transparent communication and encourage trust building.

Evaluation is a definite and systematic approach geared towards reviewing an ongoing project to ensure that it meets the goals or objectives that were fundamental to its undertaking (Uitto, 2004). Project evaluation serves various purposes; first, to inform decisions for project improvement by providing relevant information for decision making concerning setting priorities, guiding resource allocation, facilitating modification and refinement of project structures and activities and signaling need for additional personnel (Mulwa, 2008). Secondly, evaluation provides a process of learning. By learning from the past, one can improve the future. Further, evaluation helps project managers to develop new skills, open up to the capacity of constructive self-criticism, to objectivity and to improve on future planning as a result. Through evaluations the organization in extension

conducts a SWOT analysis since the strengths, weaknesses, opportunities and challenges of the projects are considered (Arbab-Kash et al., 2014). Evaluation creates future benchmarks to guide evaluations of other projects. It also helps in creating a knowledge bank for management which is an ideal trend in contemporary world where organizations are leaning towards knowledge management in project management (Calder, 2013). Lastly through evaluations, project managers are able to access how projects fared in terms of meeting the budgetary limits as well as in terms of efficiency.

Key aspects of monitoring and evaluation are the setting up of the system, implementing the system, involving all stakeholders and communicating the results of the monitoring and evaluation process. A monitoring and evaluation system should be as relevant as possible to the organization to ensure its reliability and independence (Garg, 2006). An effective monitoring and evaluation system should be able to offer conclusive information that can effectively be utilized towards better project success (Mulwa, 2008). Through the system, any stakeholder should be able to identify the potential benefits of the project, ways of enhancing screening and tracking of the project as well as offer an outline of the successes, challenges and opportunities for future projects undertakings. In order to foster the support of the employees, an effective monitoring and evaluation system should seek to enhance the communication and interaction among the personnel which will help to build up teamwork within the project (Blackstock, Kelly, & Horsey, 2007). Similarly, the involvement of the project stakeholders should not be downplayed as these are the people who own and are directly affected by the project successes and impacts.

Effectiveness of the M&E system focuses on expected and achieved accomplishments, processes, examining the results chain, contextual factors and causality, to understand achievements or the lack of achievement. Project objectives of a development project should be consistent with the requirements of beneficiaries and organization's strategies, and the extent to which they are responsive to the organization's corporate plan and human development priorities such as empowerment and gender equality. Development initiatives and its intended outputs and outcomes should also be consistent with national and local policies and priorities (Sipopa, 2009). Monitoring and evaluation activities enable the stakeholders determine whether the body undertaking project implementation has adequate legal and technical mandate to implement projects on their behalf (Soludo, 2006). Post completion assessment is done to correlate between plans and real impact of the project. Evaluation looks at what the project managers planned, their accomplishments

so far and how they achieved them (Mulwa, 2007). This can be done at the early stages of the project life or at the end of the implementation.

Within the context of eHealth solution implementation projects, evaluations can assume various forms and be conducted during different phases of the project (International Labour Organization, 2015). Ideally, considerations for evaluation should begin during the project design stage and carry through to the post implementation stage. Depending on their timing, evaluations may be used to inform future phases of the project, for example, formative evaluations. Evaluations performed later in the project like summative evaluations may serve accountability purposes by examining and reporting specific outcome metrics and lessons learned to relevant stakeholders, such as, project funders and partners (Fleur, Binyam& Martin, 2015). The acronym METRIC—Measure Everything That Really Impacts Customers—can be used to help identify evaluation priorities (Osheroff, 2009). In the context of eHealth, the term “customers” refers to all stakeholders, including persons who are receiving care, health professionals, health care leaders, and health care organizations.

The literature supports the need for all e-Health solution implementation projects to be formally evaluated using a comprehensive evaluation framework (McGrath et al., 2008). Despite this, there is a paucity of evidence in this area. Multiple researchers have described the challenges associated with the evaluation of eHealth solution implementation projects and the problems resulting from studies not guided by a comprehensive evaluation framework. Nykänen and Kaipio (2016) analyzed the scope and quality of evaluation studies conducted within the last fifty years. They concluded that many of these studies had design flaws attributed to the evaluation methods employed. Given the complexity of the health care environment, the variety of users, uses and practice settings, the researchers emphasized the need for systematic approaches and guidelines to design and to carry out different kinds of evaluation studies to provide evidence about the impacts and actual efficiency, quality, usability and safety of health IT.

A study by Makori and Wanyoike (2015) conducted among donor funded value chain projects found that implementation, training and capacity on M&E were very important in performance of value chain. The study recommended building M&E capacities through training, regular reviews, adequate budgeting. Underfunding of intermediary agencies and consequent lack of professional capacity and high staff turnover affects result based M&E



(Godfrey et al., 2002). Khang and Moe (2008) found empirical evidence that effective consultations are far more important in influencing the project success. Strategy reviews have been shown to be critical control processes for continuous modification of strategy. Maitlis and Lawrence (2007) found that constant clarification and successive modification of the plan leads to a more acceptable plan and hence reduced negative behaviors.

A study by Mumbua and Mingaine (2015) factors influencing implementation of strategic plans in the Machakos County Government found that there is no proper alignment of resources with the strategic plans of the Council. The study recommended that alignment of resources should be done properly to utilize the skills acquired and make use of the human and physical capital available. Further, proper training and instruction should be given to the lower level employees to be competent in their area of work. Ouma (2016) study also found that making allowances for adequate monitoring and evaluation gives the project manager and field officials the ability to anticipate problems, to oversee corrective measures, and to ensure that no deficiencies are overlooked thus resulting in effective project implementation.

#### **2.4 Knowledge Gap**

The foregoing literature review has underscored the importance of e-Health in delivering affordable yet competitive health care to the public. The studies have, however, revealed that adoption of nationalized e-Health is still very low in most parts of the world. The discussions focused on four variables of interest to the study namely; facilitation, training, domestication, and monitoring and evaluation. Gaps were also identified in relation to these variables. For instance, Boonstra and Broekhuis (2010) carried out a study on resource availability and adoption of electronic medical records (EMR) technology which is a component of the e-Health system in public health institutions. The study established that internal and external factors influence adoption of electronic medical technology by health institutions. However, the study did not show how facilitation strategies were used to address the resource gaps.

Concerning training, Senamu and Ochiotu (2014) and Ochieng and Hosoi (2005) examined staff educational levels and adoption of (EMR) electronic medical records technology in public health institutions. Both studies established that there was little or no awareness of the use of computers for record management and ICT skills are required to foster positive attitudes about electronic medical records. The studies, however, did not

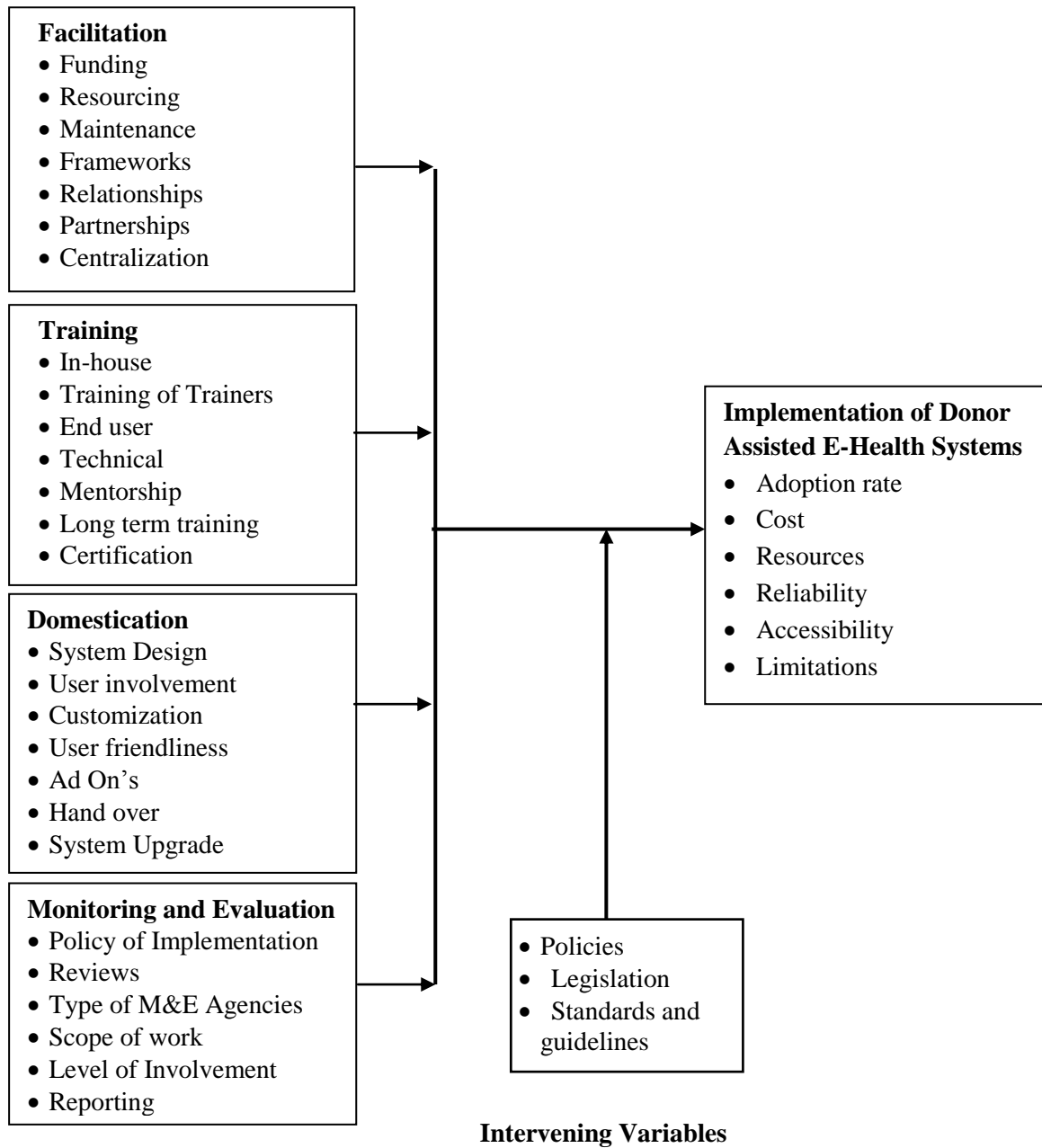
reveal whether training had been used as a strategy to implement e-Health. Miller and Sim (2004) study on accessibility to network and adoption of electronic medical records(EMR) technology in public health institutions found out that EMR systems were complex for clinicians. However, the discussions did not focus on domestication as a strategy for improving implementation of the system. Moreover, most of the studies were concerned with EMR which is essentially a component of e-Health, therefore, leaving much discussion on e-Health unattended. The present study will therefore examine the effect of strategies used in implementation of donor assisted e-health management systems in Kenya.

## **2.5 Conceptual Framework**

According to Kothari (2004) a conceptual framework is a diagrammatic representation of variables deemed important in a study. It represents the researcher's ideological position as far as the study variables are concerned. In the proposed study the researcher relates implementation of donor assisted e-health systems with several strategies expected to enhance implementation. The conceptual below served as guiding concept in this study

**Independent Variables**

**Dependent Variable**



**Figure 2.1: Conceptual Framework**

**Source: Researcher (2018)**

As shown in Figure 2.1, the study conceptualizes as independent variables; facilitation, training, domestication, and monitoring and evaluation as strategies critical to the implementation of donor assisted e-Health management systems in Nakuru County. These are individually expected to influence the e-health care management system in the County which is explained by adoption rates, costs, resources availability, reliability, accessibility and limitations. The intervening variables in this case Policies, Legislation, Standards and guidelines are also expected to influence e-Health.

## **CHAPTER THREE**

### **RESEARCH DESIGN AND METHODOLOGY**

#### **3.1 Introduction**

This chapter discusses the study design used in conducting the study; the target population, the sample size and the sampling procedure, the research instruments, instrument reliability, data collection and data analysis techniques.

#### **3.2 Research Design**

The study used descriptive survey research design. This type of design is appropriate for gathering information, summarizing, presenting and interpreting it for the purpose of clarification (Orodho & Njeru 2004). According to Orodho (2005), descriptive survey research design can generate accurate information for large number of people over a wide area using a small sample. It is used to explore relationships between variables and allows generalizations across populations. Since this study seeks to obtain descriptive and self-reported information on how certain challenges affect service delivery in a particular devolved unit of government, the descriptive research design enabled the researcher to expose the respondents to a set of standardized questions to allow comparison.

#### **3.3 Location of the Study**

Nakuru County is one of the 47 Counties in the Republic of Kenya created after the promulgation of Constitution in the year 2010. It has 11 Sub-counties (Constituencies) namely; Nakuru East, Nakuru West, Nakuru North, Subukia, Naivasha, Gilgil, Molo, Njoro, Kuresoi North, Kuresoi South, and Rongai, with a total of 55 wards and 110 villages. It has an estimated population of 2,176,579 people as at the year 2018. The population density is 290.4 per square km (+3.4% /yearly) and covers an area of 7495km. According to the 2009 census, 33.5% of the population lives below poverty line. It is served by a total of 656 Health facilities, of which 26 are hospitals, 630 primary care facilities and 249 community units (Nakuru County Department of Health, 2018). The area chosen for the study for various reasons. Despite a life expectancy that is higher than the national average (Central Bureau of Statistics, 2013), the county is still facing many health challenges. Several difficulties have been the result of its tremendous growth associated with its status as a major administrative and commercial centre. An annual rate of population growth of approximately 7% (UN-HABITAT, 2013) over the past three decades—compared to a national rate of 2.6% (World Bank, 2017)—has led to a dramatic

increase in demand for basic services and infrastructure, a challenge for the municipal authorities.

### 3.4 Population of the Study

According to Kothari (2004), a population is a well-defined set of people, services, elements, and events, group of things or households that are being investigated. The population of interest of this study comprised of the management of the ministry of health (MoH) both at the national and county government level, the management of public health facilities in Nakuru County, ICT staff at the ministries and hospitals and management and staff of NGOs assisting in the implementation of e-Health in the area. Therefore, the study targeted 2 levels health ministries, 42 public health facilities and 7 NGOs (Department of Health Services-Nakuru County, 2016). From these the accessible population was approximately 220 persons as shown in Table 3.1.

**Table 3.1 Study Population**

Organization	Number	Population		Totals
		Management	Staff	
Non-Governmental Organizations	7	14	52	66
Public Health Facilities	42	52	102	154

Source: Department of Health Services-Nakuru County (2016)

### 3.5 Sampling Procedure and Sample Size

A sample is a smaller group obtained from the accessible population and each member has equal chance of being selected to be a sample. It is also a finite part of a statistical population about the whole (Mugenda & Mugenda, 2003). Sampling may be defined as the selection or some part of an aggregate or totality based on which a judgment or inference about aggregate or totality is made. In other words, it is the process of obtaining information about an entire population by examining only a part of it (Kothari, 2004). Frankel and Wallen (2000) also defined sampling as a procedure of selecting members of a research sample from the accessible population which ensures that conclusions from the study can be generalized to the study population. The present study used stratified random sampling on ICT staff while using purposive sampling on the managers in order to obtain the required sample size.

### 3.5.1 Sampling Procedure

Purposive sampling was ideal for the present study because specific persons in the organizations, that is, Administrators and Managers are involved in the planning, executions and management of the public functions of the devolved governments. These were key informants and can give more accurate and reliable information on the status and performance of the projects. On the other hand, stratified random sampling was also ideal for the other respondents as it has the characteristic of providing each member of the target population in their strata an equal chance of being included in the study while at the same time keeping the size manageable. The main factor that was considered in determining sample size is the need to keep it manageable while being representative enough of the entire population under study. The use of the two sampling methods as opposed to other sampling designs was informed by the need for respondent specificity and the need for introducing randomness (Kothari, 2004).

### 3.5.2 Sample Size

In order to obtain the required sample size, the study employed the formula proposed by Nassiuma (2000) to calculate the required sample size from the target population of 220, thus;

$$n = \frac{Nc^2}{c^2 + (N - 1)e^2}$$

Where  $n$  = sample size,  $N$  = population size,  $c$  = coefficient of variation ( $\leq 30\%$ ), and  $e$  = error margin ( $\leq 3\%$ ). This formula enables the researchers to minimize the error and enhance stability of the estimates (Nassiuma, 2000). Substituting into the formula:

$$n = \frac{220 * (0.3)^2}{(0.3)^2 + (220 - 1) * (0.02)^2} = 111.486 \approx 111$$

Thus, a sample size of 111 respondents obtained from the above formula. The sample size was then proportionally allocated across the categories/ strata of the respondent size using the Neyman allocation formula:

$$n_h = \left( \frac{N_h}{N} \right) n$$

Where,  $n_h$  is the sample size for stratum  $h$ ,  $n$  is total sample size,  $N_h$  is the population size for stratum  $h$ ,  $N$  is the total population as shown in Table 3.2.

**Table 3.2: Spreading the sample across the study area**

<b>Respondent category</b>	<b>Population</b>	<b>Sample Size</b>
Management	66	33
Staff	154	78
<b>Totals</b>	<b>220</b>	<b>111</b>

### **3.6 Instrumentation**

The study used primary data which basically involves creating “new” data (Kombo & Tromp, 2006). The data was based on the perceptions and attitude of the respondents towards the subject of interest to the present study. Therefore, given the nature of data to be collected, the scope of the study, time available and the nature of variables under investigation in the study, questionnaires (see Appendix II) were the most appropriate data collecting instruments. The study used a structured type questionnaire, containing only closed ended items. This instrument has quite a number of advantages which include: confidentiality; time saving; and reduced interviewer bias. Questionnaires also have the advantages of low cost, easy access, physical touch to widely dispersed samples (Fowler, 1993) and the fact that the results are quantifiable. However, the use of questionnaires requires careful preparation as it could easily confuse the respondents, or discourage them, or simply fail to capture important information needed in the study (Mugenda & Mugenda, 2003).

#### **3.6.1 Pilot Study**

This study used questionnaires after pilot testing them for correctness and accuracy on 15 non-participatory respondent sample. Piloting of the questionnaires was done in Kericho County which has similar demographic patterns. The results of the pilot test were used to assess the usability of the questionnaires for the study purposed.

#### **3.6.2 Validity of the Instrument**

Validity is concerned with the accurate representation of the variables under study. It shows the accuracy and meaningfulness of inferences based on the results of the study (Kombo & Tromp, 2006). The study will adopt content validity which will be used to ascertain whether the test items represent the subject content that the study is investigating (Mugenda & Mugenda, 1999). Therefore, in order to ensure that all the items used in the



questionnaires are consistent and valid, the instruments were subjected to scrutiny and review by the researcher’s supervisors at Kabarak University. The items were rephrased and modified where necessary to avoid ambiguity before being used for data collection.

**3.6.3 Reliability of the Instrument**

Reliability is the measure of the consistency of the results from the tests of the instruments (Mugenda & Mugenda, 2003). It is a measure of the degree to which a research instrument yields consistent results or data after repeated trials. The researcher used the internal consistency method to check the reliability of the research instruments. This was done by calculating the Cronbach’s alpha coefficient for all the sections of the questionnaire from the results of the pilot study. The study established a Cronbach Coefficient instrument reliability  $\alpha = 0.895$  which was deemed admissible for the study. A value of 0.7 or below of the Cronbach’s alpha coefficient is generally taken to show low internal consistency, hence, requiring rephrasing or deletion and replacement from the instrument (Cronbach & Azuma 1962). Hence, any shortcomings or clarity issues that were found in the questions at this stage were duly corrected, modified or replaced as necessary. The results of the reliability analysis are summarized in Table 3.2.

**Table 3.2: Reliability Statistics**

Cronbach's Alpha	N of Items
0.895	37

**3.7 Data Collection Procedure**

Before the actual collection of data, the researcher first obtained an authorization letter from the Institute of Post Graduate Studies at Kabarak University and, subsequently, a research permit from National Commission for Science, Technology and Innovation (NACOSTI). The researcher then proceeded to obtain other permitting documents from Nakuru County Department of Education and the County Executive for Health. Afterwards, the researcher visited the organizations identified in the study to seek permission to conduct the study there and also to secure appointments with the respondents on the convenient dates to carry out the study. The questionnaires were administered on a drop-and-pick later basis and will be collected after one week at a designated point after they had been duly filled by the respondents.

### 3.8 Data Analysis

Data analysis is the process of looking at, analyzing and summarizing data with the intent to extract useful information and develop reliable conclusions (Bryman& Bell, 2002). Data obtained from the questionnaires were first cleaned and edited before being coded and subjected to further analysis. The Likert scales in closed ended questions in the questionnaires were converted to numerical codes and be scored on 1-5point scale in order of magnitude of the construct being measured, then be entered into the Statistical Package for Social Sciences (SPSS) version 21.0 computer program. The data was analyzed using both descriptive and inferential statistical methods. Descriptive analysis was done using means and standard deviations to describe the basic characteristics of the population. Inferential statistics involved the use of Pearson's Product Moment correlation and multiple regression models to determine the nature of the relationship between the variables. The multiple regression model used in this study were assumed to hold under the equation;

$$y_{ij} = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + e$$

Where;

$y$  = Implementation of Donor Assisted E-Health Systems

$b_0$  = Constant

$x_1$  = Facilitation Strategy

$x_2$  = Training Strategy

$x_3$  = Domestication Strategy

$x_4$  = Monitoring and Evaluation Strategy

$b_1$  to  $b_5$ , are the coefficients of the variables determine by the model

$e$  = the estimated error with zero mean and a constant variance

The results will then be presented in APA tables.

### 3.9 Ethical Considerations

It is important to think about ethical aspects in every stage of preparations to carry out an enquiry. Ethical issues to consider are: privacy, confidentiality, sensitivity to cultural differences, gender and anonymity (Kitchin & Kate, 2000). Ethical research does not harm; it gains informed consent from respondents and respects their rights. Therefore, the researcher will first seek authorizations and permissions from all relevant authorities before proceeding with the actual data collection. The respondents will be asked to participate in the study only after giving them adequate and clear explanations clarifying

the intentions of the research for them to give informed consent regarding involvement in the study. The respondents will also be assured of anonymity and confidentiality throughout the research process. The pre-testing of the instrument will also be done to ensure that the items in the instrument conform to ethical standards and in no way expose the respondents or cause them to breach their terms of service with their employer.

## CHAPTER FOUR

### DATA ANALYSIS, PRESENTATION AND DISCUSSIONS

#### 4.1 Introduction

This chapter presents the data analysis results and discussions. The chapter contains the results and discussions on the background characteristics of the respondents and the study variables namely; facilitation strategy, training strategy, domestication strategy, monitoring and evaluation strategy and implementation of donor assisted e-health systems. Finally, the results of the correlation and regression in relation to the variables are presented and discussed.

#### 4.2 General and Demographic Information

##### 4.2.1 General Information

The response rate for each respondent category is given in Table 4.1.

**Table 4.1: Response Rate**

Instruments issued	Instruments returned	Percentage response (%)
111	79	71

One hundred and eleven questionnaires were administered to the respondents and seventy-nine were returned duly filled and useable for the study purposed. This represented 71% response rate and acceptable for the study. According to Mugenda and Mugenda (2003), a response rate of over 50% is considered acceptable. The instrument response rate resulted from the self-administered method of administration of the instrument. Apart from the 111 questionnaires, the rest were not included as they were not returned by the respondents.

##### 4.2.2 Demographic Data

The study also sought to determine the background characteristics of the public healthcare facilities in terms of categories. The findings on these are summarized in Table 4.2.

**Table 4.2: Background Characteristics of the Hospitals**

Hospital Category	Number	Percentage (%)
Level 5	1	2
Level 4	17	41
Level 3	10	24
Level 2	14	33
Totals	42	100

The results Table 4.2 shows that majority (41%) of the healthcare facilities sampled in this study were level 4 hospitals. The findings also show that all levels of public healthcare facilities in the area with e-health components were represented in the study.

### 4.3 Facilitation Strategy and Implementation of Donor Assisted E-Health Systems

The first objective of the study was to establish the influence of facilitation strategy on implementation of donor assisted e-health management systems in public health facilities in Nakuru County. This objective was measured using several constructs; Funding; Resourcing; Maintenance; Frameworks; Relationships; Partnerships, and; Centralization. The responses were rated on a 5 point Likert scale ranging from; 1 = strongly disagree to 5 = strongly agree. The results are summarized in Table 4.3.

**Table 4.3: Facilitation Strategy and Implementation of Donor Assisted E-Health Systems**

<b>Statement</b>	<b>SA Freq(%)</b>	<b>A Freq(%)</b>	<b>N Freq(%)</b>	<b>D Freq(%)</b>	<b>SD Freq(%)</b>	<b><math>\chi^2</math></b>	<b>p- value</b>
We try to ensure there is adequate funding throughout the implementation process by proper budgeting	17(22)	55(70)	5(6)	2(3)	0	67.16	0.000
There is adequate resourcing for the project to ensure smooth implementation	26(33)	40(51)	7(9)	5(6)	1(1)	71.73	0.000
We have a reliable framework for facilitation of our projects	18(23)	45(57)	9(11)	5(6)	2(3)	79.06	0.000
We have built close relationships with other stakeholders so as to improve the implementation of our systems	21(27)	49(62)	6(8)	3(4)	0	57.55	0.000
We have formed strategic partnerships with the donors supporting the project	34(43)	34(43)	7(9)	4(5)	0	56.82	0.000
Through centralization we are able to coordinate all the implementation activities	23(29)	43(54)	12(15)	1(1)	0	56.25	0.000
The system maintenance issues are always attended to in good time	17(22)	46(58)	13(17)	2(3)	1(1)	134.07	0.000

The results in Table 4.3 shows that the respondents agreed (70%) ( $\chi^2 = 67.16, P \leq 0.001$ ) that efforts were made by the implementing agencies to ensure

there was adequate funding throughout the implementation process by proper budgeting. They strongly agreed and agreed (84%), ( $\chi^2 = 71.73, P \leq 0.001$ ) (respectively) that there was adequate resourcing for the project to facilitate smooth implementation. Similarly, the respondents strongly agreed and agreed (80%), ( $\chi^2 = 79.1, P \leq 0.001$ ) (respectively) that there was a reliable framework for facilitation of their projects. Most implementing agencies (62%), ( $\chi^2 = 57.6, P \leq 0.001$ ) agreed that they had built close relationships with other stakeholders to improve the implementation of their systems. The agencies strongly agreed and agreed (86%) ( $\chi^2 = 56.8, P \leq 0.001$ ) respectively that had formed strategic partnerships with the donors supporting the projects to ensure there were no facilitation gaps. Further, they agreed (54%), ( $\chi^2 = 56.3, P \leq 0.001$ ) that through centralization the agencies had been able to coordinate all the implementation activities.

Respondents agreed (58%) ( $\chi^2 = 134.1, P \leq 0.001$ ) all system maintenance issues were always attended to in good time. From these findings it is evident that three key concepts were undergirding the facilitation strategy; strategic planning, strategic resourcing, centralization and strategic partnerships (Schaap, 2006). These enabled the project implementers to ensure there were no significant interruptions in the facilitation process during the implementation of the project (Nabwire, 2014). For example, the finding that the facilitation strategy employed a guiding framework underpins the systemic approach that emphasizes inclusion and resourcing of all elements in the organization as espoused in the Systems Theory was critically important (Hannagan, 2002; The ICA (2017). Moreover, Houghton (2012) explains that well facilitated projects have a higher success rate than those that are not well facilitated.

#### **4.4 Training Strategy and Implementation of Donor Assisted E-Health Systems**

The first objective of the study was to investigate the influence of training strategy on implementation of donor assisted e-health management systems in public health facilities in Nakuru County. This objective was assessed on the basis of several training predictors; In-house training; Training of Trainers; End user training; Technical training; Mentorship; Long term training, and; training Certification. The responses were rated on a 5 point Likert scale ranging from; 1 = strongly disagree to 5 = strongly agree. The results are summarized in Table 4.4

**Table 4.4: Training Strategy and Implementation of Donor Assisted E-Health Systems**

<b>Statement</b>	<b>SA Freq (%)</b>	<b>A Freq (%)</b>	<b>N Freq (%)</b>	<b>D Freq (%)</b>	<b>SD Freq (%)</b>	<b><math>\chi^2</math></b>	<b>p- value</b>
We usually conduct in-house training for all project implementers	22(28)	49(62)	3(4)	5(6)	0	71.77	0.000
Our training program also has Training of Trainers (TOT) module to increase the training outreach	31(39)	39(49)	7(9)	2(30)	0	64.48	0.000
Our training program also allows our staff to go for long term training in institutions of higher learning	22(28)	35(44)	12(15)	8(10)	2(3)	83.51	0.000
We have specialized training for technical staff	21(27)	47(60)	8(10)	3(4)	0	54.24	0.000
We have a well-structured mentorship programs	24(30)	43(54)	10(13)	2(3)	0	47.88	0.000
We also carry out end-user training	26(33)	45(57)	6(8)	2(3)	0	51.06	0.000
All training is conducted by certified organizations and trainees are certified at the end of the process	29(37)	34(43)	5(6)	8(10)	3(4)	95.72	0.000

The result in Table 4.4 suggests respondents agreed (62%) ( $\chi^2 = 71.77, P \leq 0.001$ ) that majority of the e-health implementing agencies in the area usually conducted in-house training for all project implementers. They strongly agreed and agreed (88%) ( $\chi^2 = 64.48, P \leq 0.001$ ) respectively that the training programs also included Training of Trainers (TOT) modules to increase the training outreach. Similarly, the respondents strongly agreed and agreed (72%) ( $\chi^2 = 83.51, P \leq 0.001$ ) respectively in that most training programs also allowed staff to go for long term training in institutions of higher learning. They agreed (60%) ( $\chi^2 = 54.24, P \leq 0.001$ ) that most agencies also had specialized training for technical staff. The other findings from the respondents indicated that most of the implementing agencies had well-structured mentorship programs (54%) ( $\chi^2 = 47.88, P \leq 0.001$ ) and also carried out end-user training (57%) ( $\chi^2 = 51.06, P \leq 0.001$ ). In addition, they agreed that all training is conducted by certified

organizations and trainees were certified at the end of the process (43%) ( $\chi^2 = 95.72, P \leq 0.001$ ).

These findings underscore the importance of the application of strategic management precepts of centralization and standardization used in training the implementers of the e-health management systems and these were apparently effective in passing essential knowledge and skills to the program implementers (Walker & Ruekert, 2010). The use of multiple approaches to training evident in the findings are consistent with those recommended in literature that emphasizes need for multiple and active training approaches, such as, classroom, simulation, hands-on training, and blended learning (Dastagir et al., 2012). Also the use of the TOT approach to training was consistent with the views of Kealey et al., (2013) and Vuk et al., (2015) who credited training strategies delivered by the appropriate trainers, for example, champions and super-users as the most effective education.

#### **4.4 Domestication Strategy and Implementation of E-Health Systems**

The third objective of the study was to examine the influence of domestication strategy on implementation of donor assisted e-health management systems in public health facilities in Nakuru County. This objective was examined using several indicators namely; system design; user involvement; customization; user friendliness; provisions for Ad Ons, and; hand over. The responses were rated on a 5 point Likert scale ranging from; 1 = strongly disagree to 5 = strongly agree. The results are summarized in Table 4.5.



**Table 4.5: Domestication Strategy and Implementation of Donor Assisted E-Health Systems**

<b>Statement</b>	<b>SA Freq (%)</b>	<b>A Freq (%)</b>	<b>N Freq (%)</b>	<b>D Freq (%)</b>	<b>SD Freq (%)</b>	<b><math>\chi^2</math></b>	<b>p- value</b>
The system is always configured by the vendors who in most cases are foreigners	16(20)	36(46)	4(5)	11(14)	12(15)	111.14	0.000
Local implementers and end-users are involved in the system design	2(3)	16(20)	16(20)	45(57)	0	53.79	0.000
The system allows us to make major modifications to suit our context	9(11)	19(24)	9(11)	42(53)	0	75.11	0.000
Implementers are allowed to make minimal modifications and incorporate them to the system through the add-on appendage	22(28)	39(49)	6(8)	10(13)	2(3)	115.77	0.000
The e-health system is well customized to fit the local context	1(1)	21(26)	13(16)	44(56)	0	54.41	0.000
The system is friendly to end users	3(4)	28(35)	17(22)	28(35)	3(4)	123.41	0.000
We seldom face major ownership challenges during the hand over transition	14(18)	15(19)	6(8)	30(38)	14(18)	74.42	0.000

The results in Table 4.5 suggests that the respondents agreed (46%) ( $\chi^2 = 111.14, P \leq 0.001$ ) that the system was in most cases configured by foreign vendors. However, the other respondents (57%) ( $\chi^2 = 53.79, P \leq 0.001$ ) disagreed that most local implementers and end-users were involved in the system design. Similarly, others disagreed (53%) ( $\chi^2 = 75.11, P \leq 0.001$ ) that the system did allow the implementers to make major modifications to suit their context. Meanwhile some of the respondents agreed that e- health implementers could make minimal modifications and incorporate them to the system through the add-on appendage (49%) ( $\chi^2 = 115.77, P \leq 0.001$ ). The findings, moreover, indicate that most respondents were of the view that the e-health system was not well customized to fit the local context (56%) ( $\chi^2 = 54.41, P \leq 0.001$ ). As such, it was doubtful whether the system was indeed friendly to end users (35%)

( $\chi^2 = 123.41, P \leq 0.001$ ). This brought about major ownership challenges during the hand over transition (38%)( $\chi^2 = 74.42, P \leq 0.001$ ).

These findings imply that the domestication strategy was not well worked out and the system was largely owned by the foreign designers who were the donors (Kimani, 2015). This affected the perceived ease of use which is one of the key determinants primarily affecting the user acceptance as evidenced by the findings on the friendliness of the system to the end-users and that concerning system hand over (Davis, 1989). The findings on user involvement suggest that the implementers were overlooking a critical step in implementation which indicates that user involvement plays a key role in the success of the utilization of an information system (Kimani, 2015). According to Silverstone and Haddon (2012) is domestication almost always involves design and is anticipated in design and design is completed in domestication. Domestication can constrain and or enable the capacity of consumers to define their own relationship to the technologies that are offered to, or confront, them.

#### **4.6 Monitoring and Evaluation and Implementation of E-Health Systems**

The fourth objective of the study was to assess the influence of Monitoring and Evaluation strategy on implementation of donor assisted e-health management systems in public health facilities in Nakuru County. This objective was assessed on the basis of several M&E parameters; Policy of Implementation; Reviews; Type of M&E Agencies; Scope of work; Level of Involvement, and; Reporting. The responses were rated on a 5 point Likert scale ranging from; 1= strongly disagree to 5= strongly agree. The results are summarized in Table 4.6.

**Table 4.6: Monitoring and Evaluation Strategy and Implementation of E-Health Systems**

Statement	SA Freq (%)	A Freq (%)	N Freq (%)	D Freq (%)	SD Freq (%)	$\chi^2$	p- value
We often seek to incorporate M&E agencies at the beginning of a project to ensure they are conversant with our systems	25(32)	40(51)	10(13)	2(3)	2(3)	99.48	0.000
We always require that M&E organizations contracted by our organization are conversant with the implementation policies	27(34)	42(53)	7(9)	2(3)	1(1)	88.56	0.000
We have internally scheduled systems reviews	21(27)	45(57)	8(10)	5(6)	0	58.4	0.000
We have our own internal M&E team which we often require to work with the external M&E agencies	21(27)	46(58)	7(9)	3(4)	2(3)	87.12	0.000
We have a well-defined scope of work for M&E both internal and external	26(33)	39(49)	12(15)	2(3)	0	68.75	0.000
We have a specific template for M&E reporting	24(30)	42(53)	10(13)	3(4)	0	63.69	0.000
We always adopt the reports after making our own strategic review of the report	28(35)	30(38)	14(18)	6(8)	1(1)	149.49	0.000

The findings in Table 4.6 suggests respondents agreed (51%) ( $\chi^2 = 99.48, P \leq 0.001$ ) that most e-health management system implementing agencies in the area always sought to incorporate M&E agencies at the beginning of a project to ensure they are conversant with their systems. They also agreed (53%) ( $\chi^2 = 88.56, P \leq 0.001$ ) that M & E organizations contracted by e- health implementing organizations be conversant with the implementation policies. Majority of the respondents agreed (57%) ( $\chi^2 = 58.4, P \leq 0.001$ ) that they had internally scheduled systems reviews. In addition, they had their own internal M&E team which they often required to work with the external M&E agencies (58%) ( $\chi^2 = 87.12, P \leq 0.001$ ). Other respondents agreed that most implementing agencies had well-defined scope of work for both internal and external M&E evaluators (49%) ( $\chi^2 = 68.75, P \leq 0.001$ ). Most respondents agreed that they had specific templates for

M&E reporting (53%) ( $\chi^2 = 63.69, P \leq 0.001$ ). The agencies always adopted the M&E reports after making their own strategic review of the report (38%) ( $\chi^2 = 149.49, P \leq 0.001$ ). It can be deduced from the foregoing findings that the underlying strategic concepts used by the agencies for M&E were involvement and strategic direction setting (Cespedes & Piercy, 2010). These were achieved by first ensuring that all M&E organizations were involved at an earlier stage so as to enable them track developments and advise accordingly so as to enable the implementers to conveniently accommodate vital changes (Fleur et al., 2015). Second the adoption of the reports after strategic review was an important approach to strategic direction setting (McGrath et al., 2008).

#### **4.7 Implementation Status of Donor Assisted E-Health Systems**

Finally, the study sought to determine the implementation status of donor assisted e-health management systems in public health facilities in Nakuru County. This was the dependent variable and was measured by asking the respondents to respond to various statements describing the implementation status along certain constructs namely; adoption rate; cost; resources; reliability; accessibility, and; limitations. A 5 point Likert scale ranging from; 1 = strongly agree to 5 = strongly disagree was used to measure the responses to the statements posed. These results are presented in Table 4.7.

**Table 4.7: Implementation Status of Donor Assisted E-Health Management Systems**

Statement	SA	A	N	D	SD
	Freq(%)	Freq(%)	Freq(%)	Freq(%)	Freq(%)
The adoption rates for the e-health system are increasing in the county	9(11)	21(24)	24(30)	16(20)	12(15)
Our projects implementation costs rarely go beyond what has been budgeted for	15(18)	40(51)	15(19)	5(6)	4(5)
We are able to make maximum use of the resources at our disposal when implementing e-Health	21(27)	41(52)	9(11)	6(8)	2(3)
The system is proving reliable in to both implementers and users	21(27)	42(53)	13(16)	2(3)	1(1)
We have been able to reduce challenges associated with system downtime	20(25)	43(54)	11(14)	4(5)	1(1)
The implementation of the system has improved its accessibility to all intended users	28(35)	37(45)	10(13)	1(1)	3(4)
We have been able to achieve our performance targets	25(32)	32(41)	11(14)	9(11)	2(3)
We still experience several constraints which limit our operations	22(28)	34(43)	7(9)	9(11)	7(9)

The results in Table 4.7 suggest respondents (30%) that there was considerable uncertainty regarding the adoption rates for the e-health system are increasing in the county. The findings, however, indicate that the projects implementation costs rarely went beyond what has been budgeted for by the implementers (51%). The implementers were also able to make maximum use of the resources at their disposal when implementing e-Health (52%). Most respondents were also of the view that the system was proving reliable to both implementers and users (53%) as they had been able to reduce challenges associated with system downtime (54%). Moreover, the implementation of the system had improved its accessibility to all intended users (45%). Other findings also indicate that most system implementers had been able to achieve their performance targets (41%), though, most still experienced several constraints limiting their operations (43%).

The findings suggest that universal implementation of e-health management systems had not been attained. This is consistent with the report by the National e-Health Policy (2016) that recognized marked disparities in e-Health adoption across geographical and administrative boundaries. Earlier studies in the country by Mulwa (2013) and Chebole (2015) had also indicated that the implementation of the e-health systems was moving slowly than expected. The findings also imply that the system challenges were inherent on the system design and configuration as opposed to the implementation approaches. They

confirm the successes in the implementation of the e-health management system was primarily a result of the resource-based view where the project implementers tended to maximize on resources and opportunities available to achieve their objectives (Ireland et al., 2008).

#### 4.8 Correlation Analysis

Multiple correlation analysis results are presented in this section to evaluate the relationship between the dependent and independent variable. Correlation analysis was carried out to determine the significance and degree of association of the variables. The main result of a correlation is called the correlation coefficient (or “r”). It ranges from -1.0 to +1.0. The closer r is to +1 or -1, the more closely the two variables are related. If r is positive, it means that as one variable gets larger the other gets larger. If r is negative it means that as one gets larger, the other gets smaller (often called an “inverse” correlation).

Summary results of the correlation analyses are summarized in Table 4.8.

**Table 4.8: Summary of Correlation Results**

		Facilitation Strategy	Training Strategy	Domestication Strategy	M&E Strategy	E-Health Implementation
Facilitation Strategy	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	79				
Training Strategy	Pearson Correlation	0.682**	1			
	Sig. (2-tailed)	.001				
	N	79	79			
Domestication Strategy	Pearson Correlation	0.688**	0.599**	1		
	Sig. (2-tailed)	.001	.001			
	N	78	78	78		
M&E Strategy	Pearson Correlation	0.485**	0.486**	0.544**	1	
	Sig. (2-tailed)	.001	.001	.001		
	N	79	79	78	79	
E-Health Implementation	Pearson Correlation	.466**	.399**	.502**	.477**	1
	Sig. (2-tailed)	.000	.003	.001	.000	
	N	79	79	78	79	79

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Research data, 2018

The correlation summary above in table 4.8 indicates significant positive association between the independent and dependent variables. From the correlation results, it was found that facilitation strategy significantly influenced implementation of donor assisted e-health management systems in public health facilities in Nakuru County. The correlation results showed that a significant relationship existed ( $r = 0.466$ ;  $p < 0.05$ ), moreover, the relationship was strong and positive implying that the implementers had put considerable emphasis on facilitation to overcome implementation gaps and ensure the system was fully operational.

A correlation analysis was also done to determine whether training strategy significantly influenced implementation of donor assisted e-health management systems in public health facilities in Nakuru County. The results showed a significant relationship existed ( $r = 0.399$ ,  $p < 0.05$ ) between the two variables. The degree of the association of the two variables was moderate and positive suggesting that training was regarded as a key component of the e-health management systems implementation process by the implementers. This could be due to the fact that the donors and their implementing partners were of the view that training was critical in shaping the users perceived usefulness and perceived ease of use of the system.

The study also sought to determine the influence of Domestication strategy on implementation of donor assisted e-health management systems in public health facilities in Nakuru County. The correlation analysis showed that there was significant relationship existing between the two variables ( $r = 0.502$ ,  $p < 0.05$ ). This result suggests the donors and implementers were keen on domestication of the system probably owing to their funding limitations and their terms of engagement with the government. This was, however, having an undesirable outcome on the implementation status of the e-health program.

Finally, the correlation analysis to determine whether Monitoring and Evaluation strategy does not significantly influence implementation of donor assisted e-health management systems in public health facilities in Nakuru County indicates that the relationship was, in fact, significant ( $r = 0.477$ ,  $p < 0.05$ ). This finding suggests that the donors and implementers put strong emphasis on Monitoring and Evaluation of the project. This could be explained by the fact that that implementation process depended substantially on the M&E reports for strategic direction and review of the performance status.

#### 4.9 Regression Analysis

Multiple regression analysis was used to determine the relationship between the independent or predictor variables and dependent variable. To stabilize variances the square root transformation of all weighted variables was carried out on both response and dependent variables. Multicollinearity was carried out and the result on Variance Influencing Factor (VIF) showed that there was no multicollinearity since they gave values less than 10. The analysis was also meant to establish the extent to which each independent variable affected the dependent variable in such a collective set up and which were the more significant factors.

**Table 4.9: Multiple Linear Regression Analysis Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate
.556 <sup>a</sup>	0.31	0.272	4.19602

a. Predictors: (Constant), M&E Strategy, Facilitation Strategy, Training Strategy, Domestication Strategy

b. Dependent Variable: E-Health Implementation

The Multiple linear regression analysis in Table 4.9 shows that the relationship between the dependent variable and all the independent variables pooled together and had a model coefficient of determination,  $R = 0.556$  which was higher than the zero order value in the table. Despite transformation of the variables in this study, (Table 4.9) the model could explain up to 31.0% of the variations in the implementation variable. This indicates that the model could improve when more variables are incorporated when trying to analyze the strategies used in implementing donor assisted e-health management systems in Nakuru County or the nature of relationship could be nonlinear.

It was also salutary to carry out an ANOVA to validate the findings in table 4.9. The results of the ANOVA are summarized in Table 4.10.

**Table 4.10(a): Dependent variable: tImplementation ( ANOVA)**

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	0.78993	4	0.19748	8.15	.000 <sup>b</sup>
Residual	1.76965	73	0.02424		
Total	2.55958	77			

a. Dependent Variable: tE-Health Implementation (square root transformed)

b. Predictors: (Constant), M&E Strategy, Facilitation Strategy, Training Strategy, Domestication Strategy



The results of Table 4.10 indicate that there is a significant difference between the variables describing strategies used in implementing donor assisted e-health management systems and the variable describing the implementation status of donor assisted e-health management systems in Nakuru County ( $F_{o(4,77)} = 8.15 > F_c = 2.50$ ;  $\alpha < 0.05$ ;  $df = 4, 73$ ;  $p < 0.05$ ). This finding confirms that by the model predicted in Table 4.9 and shows that it is indeed significant. Further, in order to determine which of the independent variables was more important when it came to the implementation status of donor assisted e-health management systems in the study area, the beta value was used. The results are given in Table 4.10(b) provides a summary of the multiple linear regression analysis correlation coefficients

**Table 4.10(b): Parameter estimation of transformed variables**

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr >  t	Variance Inflation Factor
Intercept	1	0.19981	0.69958	0.29	0.776	0
tFacilitation	1	0.21241	0.23168	0.92	0.3623	2.44886
tTraining	1	0.02171	0.18625	0.12	0.9075	2.09303
tDomestication	1	0.28516	0.15733	1.81	0.074	2.27927
tMonitoring	1	0.42788	0.21272	2.01	0.048	1.48966

a. Dependent Variable: E-Health Implementation  
t ()=square root Transformation

It can be deduced from the findings in Table 4.10(b) that the most influential e-health implementation strategy in the model predicting implementation status of donor assisted e-health management systems in Nakuru County were M&E Strategy ( $t = 2.01$ ,  $p < 0.10$ ) and Domestication strategy ( $t = 1.81$ ,  $p < 0.10$ ). However, Facilitation Strategy ( $t = 0.92$ ,  $p > 0.10$ ) and Training Strategy ( $t = 0.12$ ,  $p > 0.10$ ) in that order were not found to be statistically significant to the model.

#### 4.10 Hypothesis Testing

The first hypothesis was tested under the null hypothesis;

**H<sub>01</sub>:** Facilitation strategy does not significantly influence implementation of donor assisted e-health management systems in public health facilities in Nakuru County.

From the beta values in Table 4.10(b), it was evident that there was no statistically significant relationship ( $t = 0.92$ ,  $p > 0.10$ ) between the two variables and, therefore, we accept the null hypothesis and adopt the view that facilitation strategy did not significantly influence implementation of donor assisted e-health management systems in public health facilities in Nakuru County. The finding agrees with Nabwire (2014) who found that a

good project facilitation framework was essential in overcoming implementation lapses because once the strategies were implemented there were usually some lapses, however, there was usually no one dedicated to address these lapses. This finding, however, disagree with Onyango (2016) whose findings on factors determining project implementation of health projects in Gedo Region, Somalia found that adequate financial support for project implementation at World Vision Somalia effective in achieving high levels of implementation.

The second hypothesis was tested under the null hypothesis;

**H<sub>02</sub>:** Training strategy does not significantly influence implementation of donor assisted e-health management systems in public health facilities in Nakuru County.

The beta value from the multiple regression results in Table 4.10(b) indicate that there was no statistically significant relationship between the two variables ( $t = 0.12$ ,  $p > 0.10$ ). Consequently, we accept the null hypothesis as the findings imply that there was no statistical relationship between training strategy and implementation of donor assisted e-health management systems in public health facilities in Nakuru County in the model. These finding implies that there was still less emphasis on training in e-health implementation in the area. As such, it agrees with the findings of various Health situation analyses studies across the region such as those carried out by the Ministry of Health Malawi (2014), Malunga and Tembo (2017) in Zambia and Kimani (2015) in Kenya that revealed significant gaps in planning, scheduling, resourcing and offering of ICT related training to health workers. This hinders them from improving their skills and expertise in utilization of health information systems. Karwowski et al., (2011) and Boonstra et al., (2014) had pointed out that education and training of staff was a critical step in the implementation of e-Health management systems, though, they observed that it was still a complex undertaking

The third hypothesis was tested under the null hypothesis;

**H<sub>03</sub>:** Domestication strategy does not significantly influence implementation of donor assisted e-health management systems in public health facilities in Nakuru County.

Looking at the results in Table 4.10(b), it is evident that there was no statistically significant relationship between the two variables ( $t = 1.81$ ,  $< 0.10$ ). This meant that we reject the null hypothesis. Therefore, it can be inferred that Domestication strategy as carried out in public health facilities in Nakuru County were significantly different

( $p < 0.10$ ) influence on implementation of donor assisted e-health management systems. That could be accounted for by the regression model. These findings agree with Chepkwony (2015) who found that customizability was an important factor to enhance EMR adoption. Also according to Chigona et al., (2010), lack of appropriate domestication of ICT disadvantaged communities in South Africa. Similarly, Malunga and Tembo (2017) also established that lack of ownership had considerably impeded the implementation of e-health systems in Zambia.

The fourth hypothesis was tested under the null hypothesis;

**H<sub>04</sub>:** Monitoring and Evaluation strategy does not significantly influence implementation of donor assisted e-health management systems in public health facilities in Nakuru County.

The results from the multiple regression analysis suggest that there was indeed a significant relationship between the two variables ( $t = 2.01, p < 0.10$ ). This led to the rejection of the null hypothesis and, subsequently, the view that Monitoring and Evaluation strategy does, in fact, significantly influence implementation of donor assisted e-health management systems in public health facilities in Nakuru County was adopted. These findings support those of Nykänen and Kaipio (2016) who found that the success of the implementation of healthcare projects which are generally complex in nature were dependent on the evaluation methods employed. The findings also concur with Makori and Wanyoike (2015) who found that implementation, training and capacity on M&E were very important in performance of donor assisted projects. Khang and Moe (2008) had also earlier on found empirical evidence that effective M&E consultations were far more important in influencing the project success.

Therefore, the emergent linear model is;

Implementation of donor assisted e-health management systems = 1.9981 + .121241 Facilitation strategy + .02171 Training strategy + .28516 Domestication strategy + .42788 Monitoring and Evaluation strategy

Or more concisely;

$$Y = 1.9981 + .121241 FS + .02171 TS + .28516 DS + .42788 M \& E$$

The study therefore establishes that facilitation strategy, training strategy, domestication strategy did not have a statistically significant influence in the model predicting the implementation of e-health management systems in public health facilities in Nakuru County. However, Monitoring and Evaluation strategy was a significant factor in the model predicting the implementation of e-health management systems in public health facilities in Nakuru County.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter summarizes and concludes on the research findings as carried out. It presents the summary of the findings and the conclusions drawn from them, and lastly the recommendations. The implications of the research are discussed and suggestions made on areas of further study. Some useful recommendations for all the stakeholders are proposed by this study at the end of the chapter to enlighten and enable them to craft viable solutions with regard to the problem statement based on the research findings.

#### **5.2 Summary**

This section presents the summary of the findings in terms of the objectives, the types of analysis and the major findings of the research. The present study sought to establish the influence of selected strategies used in implementation of donor assisted e-health management systems in Kenya focusing on public health facilities in Nakuru County. To gain insight into this, the study sought to establish how; facilitation strategy, training strategy, domestication strategy and Monitoring and Evaluation strategy influenced implementation of e-health management systems in public health facilities in Nakuru County.

Regarding the first objective of the study, the findings revealed that through the Facilitation strategy, the implementing agencies sought to minimize resource constraints by ensuring there was adequate funding and resourcing throughout the implementation process by proper budgeting. The agencies were also working under a reliable framework for facilitation of their projects. This strategy was further advanced by building close relationships between the implementing agencies and other stakeholders so as to improve the implementation of the system. It also emerged that the agencies had also formed strategic partnerships with the donors supporting the project so as to ensure there were no facilitation gaps. The agencies were also able to employ the centralization strategy to coordinate all the implementation activities and, in addition, ensured that all system maintenance issues were always attended to in good time. However, while a strong correlation was established between facilitation strategy and implementation of the e-health management systems, the study did not establish any statistically significantly

relationship between the facilitation strategy and implementation of donor assisted e-health management systems in public health facilities in Nakuru County.

Concerning the second objective, the findings revealed that the training strategy was mainly implemented through in-house training for all project implementers. Moreover, the training also utilized a cascading approach where the training programs also included Training of Trainers (TOT) modules to increase the training outreach in the shortest time possible and also reduce training costs. Further, the staffs especially the technical staff were allowed to go for long term and specialized training in institutions of higher learning. The findings also revealed that most of the implementing agencies had well-structured mentorship programs and also carried out end-user training. All training was conducted by certified organizations and trainees were certified at the end of the process. Further, results from the correlation analysis indicated that there was indeed moderate correlation between training strategy and implementation of donor assisted e-health management systems in the area. However, training strategy was not found to have a statistically significant relationship with the implementation of donor assisted e-health management systems in public health facilities in Nakuru County in the regression model.

In relation to the third objective of the study, it emerged that domestication strategy as currently carried out by the implementing agencies had a strong correlation with the implementation of donor assisted e-health management systems in public health facilities in Nakuru County. Among the reasons attributable to this development was that the system was in most cases configured by foreign vendors and, further, most local implementers and end-users were not involved in the system design. Moreover, the system did not allow the implementers to make major modifications to suit their implementation context. Local implementers were, nevertheless, allowed to make minimal modifications and incorporate them to the system through the add-on appendage. As such, there was prevailing view that the e-health system was not well customized to fit the local context leading to doubts over the friendliness of the system to end users. This brought about major ownership challenges during the hand over transition. The study nevertheless established on the basis of the regression model that domestication strategy did have a significant relationship with the implementation of donor assisted e-health management systems in public health facilities in Nakuru County in the model.

Finally, the findings revealed that most e-health management system implementing agencies in the area always sought to incorporate M&E agencies at the beginning of a

project to ensure they were fully conversant with their systems. Moreover, they also required that M&E organizations they contracted be conversant with the implementation policies. The findings also revealed that most implementing agencies had adopted internally scheduled systems reviews and, in addition, they had their own internal M&E teams which they often required to work with the external M&E agencies. They also had well-defined scope of work for both internal and external M&E evaluators and had specific templates for M&E reporting. The M&E reports were often adopted contingent on the agencies making their own strategic review of the report. Monitoring and Evaluation strategy was also found to have a strong correlation with the implementation of donor assisted e-health management systems in public health facilities in Nakuru County. Additionally, the study established that M&E strategy had a statistically significant influence on the implementation of the e-health management systems in the regression model.

### **5.3 Conclusions**

- i. Based on the results of the study, it can be concluded that Facilitation strategy as carried out by the implementing agencies did not have a statistically significant influence on the implementation of donor assisted e-health management systems in public health facilities in Nakuru County. However, the strategy as currently carried out by the organizations helped to mitigate the implementation gaps occasioned by resource constraints.
- ii. The study also concludes that the training strategies used by the implementing agencies did not have a statistically significant influence on implementation of donor assisted e-health management systems in public health facilities in the study area. Nevertheless, the centralization and standardization precepts used in training the implementers of the e-health management systems were apparently effective in passing essential knowledge and skills to the program implementers and end-users.
- iii. In addition, it was established that domestication strategy did have a statistically significant influence on implementation of donor assisted e-health management systems in public health facilities in the area. The system was found friendly to end users though there was need to still improve the level of ownership and control of system by the implementers.
- iv. Lastly, the study concludes that monitoring and evaluation strategy was very important to the implementation of donor assisted e-health management systems in

public health facilities in the study area. This approach ensured objectivity in the implementation process as well as providing strategic direction to the implementers.

## **5.4 Recommendations**

The following recommendations are made with regard to the study findings.

### **5.4.1 Recommendations for Policy**

- i. The donors and government need to harmonize their policies on facilitation of the systems so as to increase the level of domestic ownership.
- ii. The policymakers need to cascade the training on e-health to learning institutions in order to improve the appreciation and levels of competence in handling the system.
- iii. The e-health implementers and the donors need to come up with policies to resolve domestication problems especially concerning the levels of data access and system customization.
- iv. The implementers need to have policies on continuous monitoring of the e-health system implementation. In such as case the system can be configured to generate periodic reports on usage.

### **5.4.2 Recommendations for Practice**

- i. The implementers of the system need to factor in contingency plans for their operations as this will go a long way in ensuring that the resource gaps during project implementation were further reduced.
- ii. The training on e-health in implementing organizations should follow a needs assessment plan where training is meant to fill gaps encountered during the implementation process and address emerging implementation issues. This will ensure that the training is research based and dynamic, thereby, relevant for the range of applications during the implementation process.
- iii. The project implementers continually sensitize the donors and other development partners on the need to have more local input on the system that will enable both the implementers and end-users to build on the system and increase its perceived usefulness and usability.



- iv. Lastly, there is need for the implementing organizations to ensure that in addition to the M&E evaluations, quality evaluation and reporting be also made so as be able to raise the quality standards of the system after implementation and, thereby, increase the levels of confidence in the system.

### **5.5 Suggestions for further study**

The main aim this study was to establish the influence of strategies used in implementation of donor assisted e-health management systems in Kenya focusing on public health facilities in Nakuru County. As such only four objectives were investigated for their effect due to the scope and, as such, the findings are by no means exhaustive on the widely dynamic field of strategic management. Therefore, the study recommends that future studies in this area should be carried out using other strategic management variables. Also the scope and the design of the study should be expanded to include other counties in the country using a cross-sectional design so as to reveal the critical issues pervading the implementation landscape that require urgent redress. As this is already a decided policy path by the government, e-health is meant to stay for the foreseeable future and, hence, such studies will go a long way in strengthening the policy initiatives.

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## APPENDICES

### Appendix I: Letter of Transmittal

Purity Chemutai Cheruiyot  
Box 210-20100  
Nakuru.

15<sup>th</sup> March 2018

The County Executive for Health  
Nakuru County  
Private Bag,  
Nakuru  
Dear Sir,

#### **RE: REQUEST TO CARRY OUT RESEARCH WITHIN THE COUNTY**

I am a postgraduate student of Kabarak University -Student No. **GMB/NE/0171/01/16** and currently pursuing a Master of Business Administration – Strategic Management Option-Degree. As part of the course' requirements, I am conducting a research titled “***ANALYSIS OF SELECTED STRATEGIES USED IN IMPLEMENTATION OF DONOR ASSISTED E-HEALTH MANAGEMENT SYSTEMS IN KENYA: A SURVEY OF PUBLIC HEALTH FACILITIES IN NAKURU COUNTY***”. I do, therefore, request to be allowed to carry out the above research within the public health facilities in the County.

This research is purely meant for academic purposes. However, evaluation results may be made public after the completion of the study for future researchers and other relevant stakeholders to guide them in their work. Every care will be taken in the data collection procedure to ensure that it is within ethical limits. Thank you in advance for your cooperation.

Yours faithfully,

**Purity Chemutai Cheruiyot**

## Appendix II: Questionnaire for all Respondents

My name is Purity, a post graduate student at Kabarak University. I am currently carrying out a research project on *Analysis of selected strategies used in implementation of donor assisted e-health management systems in Kenya focusing on public health facilities in Nakuru County* as a partial requirement in fulfillment for award of my degree. The information that will be provided through filling of this questionnaire will be of great value to this study and will be treated with confidentiality.

### INSTRUCTIONS:

1. Please respond to all the questions accurately and honestly.
2. Please respond by ticking (✓) the appropriate spaces and filling the spaces that have been provided.

### SECTION A: General Information

1. How many years have you worked in the public service in Kenya?

.....

### SECTION B: Facilitation Strategy and Implementation of E-Health Management Systems

The following are statements related to the influence of facilitation strategy on implementation of e-health management systems in public health facilities in Nakuru County. Please rate them according to your understanding by ticking (✓) where it is appropriate.

SA=strongly agree; A= agree; N= Neutral; D= disagree (3); SD= strongly disagree

Statements	SA	A	N	D	SD
We try to ensure there is adequate funding throughout the implementation process by proper budgeting					
There is adequate resourcing for the project to ensure smooth implementation					
The system maintenance issues are always attended to					
We have a reliable framework for facilitation of our projects					
We have built close relationships with other stakeholders so as to improve the implementation of or systems					
We have formed strategic partnerships with the donors supporting the project					
Through centralization we are able to coordinate all the implementation activities					
We try to ensure there is adequate funding throughout the implementation process by proper budgeting					

**SECTION C: Training Strategy and Implementation of E-Health Management Systems**

The following are statements related to the influence of training strategy on implementation of e-health management systems in public health facilities in Nakuru County. Please rate them according to your understanding by ticking (√) where it is appropriate.

**SA=strongly agree; A= agree; N= Neutral; D= disagree (3); SD= strongly disagree**

Statement	SA	A	N	D	SD
We usually conduct in-house training for all project implementers					
Our training program also has Training of Trainers (TOT) module to increase the training outreach					
We also carry out end-user training					
We have specialized training for technical staff					
We have a well-structured mentorship programs					
Our training program also allows our staff to go for long term training in institutions of higher learning					
All training is conducted by certified organizations and trainees are certified at the end of the process					

**SECTION D: Domestication Strategy and Implementation of E-Health Systems**

The following are statements related to the influence of domestication strategy on implementation of e-health management systems in public health facilities in Nakuru County. Please rate them according to your understanding by ticking (√) where it is appropriate.

**SA=strongly agree; A= agree; N= Neutral; D= disagree (3); SD= strongly disagree**

Statement	SA	A	N	D	SD
The system is always configured by the vendors who in most cases are foreigners					
The system allows us to make major modifications to suit our context					
Implementers and users are involved in the system design					
The e-health system is well customized to fit the local context					
The system is friendly to end users					
Implementers are allowed to make modifications and incorporate them to the system through the add-on appendage					
We seldom face major ownership challenges during the hand over transition					

**SECTION E: M&E Strategy and Implementation of E-Health Management Systems**

The following are statements related to the influence of monitoring and evaluation strategy on implementation of e-health management systems in public health facilities in Nakuru County. Please rate them according to your understanding by ticking (√) where it is appropriate.

**SA=strongly agree; A= agree; N= Neutral; D= disagree (3); SD= strongly disagree**

Statements	SA	A	N	D	SD
We always require that M&E organizations contracted by our organization are conversant with the implementation policies					
We have internally scheduled systems reviews					
We have our own internal M&E team which we often require to work with the external M&E agencies					
We have a well-defined scope of work for M&E both internal and external					
We often seek to incorporate M&E agencies at the beginning of a project to ensure they are conversant with our systems					
We have a specific template for M&E reporting					
We always adopt the reports after making our own strategic review of the report					
We use M&E reports to inform our strategic direction					

**SECTION F: Implementation of E-Health Management Systems in Nakuru County**

The following are statements related to the status of implementation of e-health management systems in public health facilities in Nakuru County. Please rate them according to your understanding by ticking (√) where it is appropriate.

**SA=strongly agree; A= agree; N= Neutral; D= disagree (3); SD= strongly disagree**

Statements	SA	A	N	D	SD
The adoption rates for the e-health system are increasing in the county					
Our projects implementation costs rarely go beyond what has been budgeted for					
We are able to make maximum use of the resources at our disposal when implementing e-Health					
The system is proving reliable in to both implementers and users					
We have been able to reduce challenges associated with system downtime					
The implementation of the system has improved its accessibility to all intended users					
We have been able to achieve our performance targets					
We still experience several constraints which limit our operations					

*Thank you for your cooperation  
God Bless*

## Appendix III: University Authorization to Collect Data



### KABARAK UNIVERSITY

OFFICE OF THE DIRECTOR - NAKURU TOWN CAMPUS

P.O. Private Bag - Kabarak. Tel. 0720511838 Fax 051-343012, Email - [nakurutowncampus@kabarak.ac.ke](mailto:nakurutowncampus@kabarak.ac.ke)

11<sup>th</sup> April, 2018

Our Ref: KABU02/DIR/0012/066/VOL.2

#### TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: PURITY CHEMUTAI CHERUIYOT -GMB/NE/0171/01/16

This is to confirm that Purity is a bona fide student of Kabarak University registered for **Master of Business Administration – Strategic Management Option**.

As part of the requirement for a Masters Degree in Kabarak University, she is required to undertake a research project. Purity is currently pursuing a research work on **“Analysis of Strategies used in Implementation of Donor Assisted E-Health Management Systems in Kenya: A Survey of Public Health Facilities in Nakuru County”**.

The information granted to her will be used for purpose of the research only and will be confidentially handled.

Any assistance accorded to her will be highly appreciated.

Yours faithfully

**DR MAINA WAIGANJO**  
**DIRECTOR – NAKURU TOWN CAMPUS**

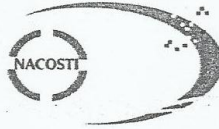
MW/ck

Moral Code – “We purpose at all times and in all places, to set apart in one’s heart, Jesus as Lord” 1 Pet 3:15



Kabarak University is ISO 9001:2015 Certified

## Appendix IV: NACOSTI Letter of Authorization



### NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: 020 400 7000,  
0713 788787,0735404245  
Fax: +254-20-318245,318249  
Email: dg@nacosti.go.ke  
Website: www.nacosti.go.ke  
When replying please quote

NACOSTI, Upper Kabete  
Off Waiyaki Way  
P.O. Box 30623-00100  
NAIROBI-KENYA

Ref. No. **NACOSTI/P/18/39351/22334**

Date: **24<sup>th</sup> April, 2018**

Purity Chemutai Cheruiyot  
Kabarak University  
P.O. Private Bag 20157  
**KABARAK.**

#### **RE: RESEARCH AUTHORIZATION**

Following your application for authority to carry out research on "*Analysis of strategies used in implementation of donor assisted e-health management systems in Kenya: A survey of public health facilities in Nakuru County*" I am pleased to inform you that you have been authorized to undertake research in **Kericho, Nakuru Counties** for the period ending **23<sup>rd</sup> April, 2019.**

You are advised to report to, the **County Commissioners and he County Directors of Education, selected Counties** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit a **copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

**GODFREY P. KALERWA MSc., MBA, MKIM  
FOR: DIRECTOR-GENERAL/CEO**

Copy to:

The County Commissioners  
Selected Counties.

The County Directors of Education  
Selected Counties.



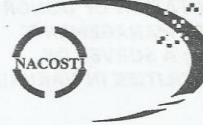
## Appendix V: Research Permit

### CONDITIONS

1. The License is valid for the proposed research, research site specified period.
2. Both the Licence and any rights thereunder are non-transferable.
3. Upon request of the Commission, the Licensee shall submit a progress report.
4. The Licensee shall report to the County Director of Education and County Governor in the area of research before commencement of the research.
5. Excavation, filming and collection of specimens are subject to further permissions from relevant Government agencies.
6. This Licence does not give authority to transfer research materials.
7. The Licensee shall submit two (2) hard copies and upload a soft copy of their final report.
8. The Commission reserves the right to modify the conditions of this Licence including its cancellation without prior notice.



REPUBLIC OF KENYA



National Commission for Science,  
Technology and Innovation

RESEARCH CLEARANCE  
PERMIT

Serial No.A 18340

CONDITIONS: see back page

THIS IS TO CERTIFY THAT:  
**MS. PURITY CHEMUTAI CHERUIYOT**  
of **KABARAK UNIVERSITY, 0-20100**  
Nakuru, has been permitted to conduct  
research in *Kericho , Nakuru Counties*

Permit No : NACOSTI/P/18/39351/22334  
Date Of Issue : 24th April, 2018  
Fee Received :Ksh 1000

on the topic: **ANALYSIS OF STRATEGIES  
USED IN IMPLEMENTATION OF DONOR  
ASSISTED E-HEALTH MANAGEMENT  
SYSTEMS IN KENYA: A SURVEY OF  
PUBLIC HEALTH FACILITIES IN NAKURU  
COUNTY**

for the period ending:  
*23rd April, 2019*

.....  
Applicant's  
Signature



*Paloma*  
.....  
Director General  
National Commission for Science,  
Technology & Innovation

**Appendix VI: Authorization Letter from Department of Health Nakuru County**

**REPUBLIC OF KENYA  
DEPARTMENT OF HEALTH SERVICES  
NAKURU COUNTY**

Telegrams "PROVMED" Nakuru  
Tele: Nakuru 2216710 Fax 22  
EMAIL: cohealth.nakuru@gmail.com  
When replying please quote



**CHIEF OFFICER, HEALTH SERVICES  
NAKURU COUNTY  
P.O. BOX 2060  
NAKURU**

Ref No. NCG/CDMS/GEN.VOL.1/252

4<sup>th</sup> May 2018

The facility in Charges,  
The medical Superintendent  
Public Health Facilities  
Nakuru County

**RE: RESERCH AUTHORIZATION**

This letter serves as an authorization from the Department of Health Services Nakuru for Purity Chemutai Cheruiyot to conduct research on "**Analysis of strategies used in implementation of donor assisted e health management system in Kenya: A survey of Public health facilities in Nakuru county**"

The County acknowledges receipt of clearance letter from NACOSTI and therefore authorizes the survey to proceed. The study is in line with the County Research priorities in the county research agenda and therefore the researcher is expected to present and submit the final report to the county Research and Development Unit.

Handwritten signature of E. Kiptoo.

E. Kiptoo

For County Director Administration and Planning

**NAKURU**

## Appendix VII: List of Targeted Public Health Facilities in Nakuru County

	<b>Health Facility Name</b>	<b>Category</b>
1	Nakuru Provincial General Hospital (PGH)	Level 5
2	Alexandria Cancer Centre & Palliative care Hospital	Level 4
3	Medicross Hospital	Level 4
4	St Mary's Hospital	Level 4
5	Naivasha District Hospital	Level 4
6	Bahati District Hospital	Level 4
7	Subukia SDH	Level 4
8	Keringet Sub County Hospital	Level 4
9	Gilgil Military Regional Hospital	Level 4
10	Valley Hospital	Level 4
11	Njoro Subcounty Hospital	Level 4
12	Olenguruone Sub-District Hospital	Level 4
13	Sunrise Evans Hospital	Level 4
14	Nakuru War Memorial Hospital	Level 4
15	Gilgil Sub County Hospital	Level 4
16	ElburgonNyayo Hospital	Level 4
17	Kabazi Sub-District Hospital	Level 4
18	Molo District Hospital	Level 4
19	Oserian Health Centre	Level 3
20	Mogotio Rhdc	Level 3
21	Kabarak Health Centre	Level 3
22	3KR Health Centre	Level 3
23	Nakuru West (PCEA) Health Centre	Level 3
24	Family Healthoptions Kenya (Nakuru)	Level 3
25	LangaLanga Health Centre	Level 3
26	Engashura Health Centre	Level 3
27	Kuresoi Health Centre	Level 3
28	Rongai Health Centre	Level 3
29	Agakhan Medical Centre	Level 2
30	Kabarak University Medical Centre	Level 2
31	Fitc Dispensary	Level 2
32	KAMOSOP DISPENSARY	Level 2
33	Ravine glory health services kabarak	Level 2
34	Kiungururia dispensary	Level 2
35	Kamwaura Dispensary	Level 2
36	Belba Dispensary	Level 2
37	Kayole Dispensary	Level 2
38	Ndoroto Dispensary	Level 2
39	MwishowaLami Dispensary	Level 2
40	Mona Dispensary	Level 2
41	Taita Dispensary	Level 2
42	LangaLanga Dispensary	Level 2

Source: Kenya Health Master Facility List (2018) <http://kmhfl.health.go.ke/#/home>