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Assessing the influence of the Health Labour Market Framework in addressing health worker availability: a case of Turkana County

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USING HEALTH MANAGEMENT AND INFORMATION SYSTEMS FOR DECISION MAKING: AN EXPLORATORY STUDY IN PRIVATE SECTOR LEVEL 3 & 4 HEALTH CENTRES IN NAROK

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other university. To the best of my knowledge and belief, the dissertation contains no material previously published or written by another person except where due reference is made in the thesis itself.

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May 2018

APPROVAL

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ABSTRACT

In the recent past there has been a rapid uptake in the deployment and use of HMIS by private facilities in Kenya. It is unclear how private sector managers have implemented these systems and whether they are using these systems to provide the information to make important strategic decisions vs. other sources of information and to what extent. Our objective is to explore the use of the information generated by these systems in the strategic decision making process to inform if managers of private sector facilities are reaping the expected benefits. Through an exploratory qualitative research design using semi-structured interviews, the perceptions of the facility managers on HMIS were explored. A total of 6 respondents were purposively sampled. Data was transcribed, themes explored, and analyzed in a thematic analysis approach. The results from this study indicate that most private level 3 and 4 facilities have in place HMIS systems that are comprehensive in their coverage of facility operations. The findings from this study also indicate that managers did not seem to consider HMIS as an essential tool in the decision making process in their organizations. The use of information in the decision making process was affected by the quality of the HMIS system, Low information quality due to insufficient training and lack of information policies, access and usability of their HMIS, user satisfaction and organizational processes.

DEDICATION

This research dissertation is dedicated to my parents, Dr. Henry Cheruiyot and Mrs. Ruth Cheruiyot who have always been my biggest support and source of inspiration. I could not have come this far without their love and support.

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ACRONYMS AND ABBREVIATION

EMR – Electronic Medical Record

HIS – Health Information System

HMIS – Health Management Information System

MIS – Management Information System

IT – Information Technology

LMIC – Lower Middle Income Country

FBO – Faith Based Organisation

NGO – Non Governmental Organisation

KMFL- Kenya Master Health Facility list

CHAPTER 1. INTRODUCTION

1.1 Background

A Health Management and Information System (HMIS) is meant to provide reliable information to managers at various levels of the health system in a timely manner. This information is important as a basis for decision making by policy makers, managers and care givers. It supports decision making in the areas of policy, planning, management, monitoring and evaluation of health systems including its programs and services.

A health information system (Figure.1.1) comprises an information process and a management structure (Lippeveld, Sauerborn, & Sapirie – 1997). The information process involves: Data collection, transmission, processing and analysis and the production of information for use in planning and management of health services

The management structure ensures quality information is produced. The resources part of the structure includes people (such as data collectors, planners and managers), hardware (computers, servers, telephones), software and finance. In addition, there are organizational rules such as procedures for data entry, definition of staff responsibilities aimed at efficient use of resources. A health information system is a functional entity within a health services framework to aid in rational decision making at management level.

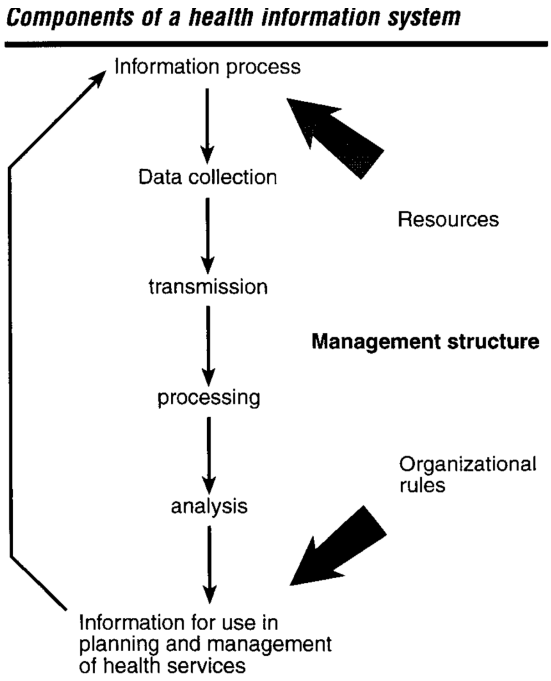

Figure 1. 1:Components of a health information system

In the recent past there has been a rapid uptake in the deployment and use of HMIS by private facilities in Kenya. HMIS vary greatly in design and scope and are generally designed to cover a wide range of hospital administration and management processes - these include but are not limited to: Patient administration, Clinical management, Resource management, Financial management and Management information systems. The emphasis in health care information systems development has been on clinical systems especially electronic health records rather than on developing management information systems (Kivinen & Lammintakanen, 2013). However Managers need information in decision-making regarding their daily work e.g. planning, organizing, staffing, coordinating, reporting and budgeting as well as in clinical management.

There is an enormous variety and contexts in which information systems are deployed in organizations (Tomasi, Facchini 2004). Thus, every facility or organization, in order to fulfil its particular needs, orders specific products to provide a solution to specific problems. Experiences reveal that the HMIS can never be fully integrated into a single entity in any setting (Chaulagai, Moyo 2005). Furthermore The information needs of managers working in different units (e.g. in-patient wards, human resource units, financial units) or different levels of organization (strategic, middle or operational level) differ in terms of MIS (Kivinen & Lammintakanen, 2013).

Research in the public sector suggests there is poor utilization of information from HMIS in decision making hence informing the need of research into the private sector in the context of using IT as a resource for improved performance.

Literature suggests that decision making is largely non-rational, influenced by individual cognitions, and individual management skills and experience (Simon 1955, Hodgkinson et all. 1999, Walsh 1995). However, in the paper by Vannoy & Salam (2010) – the study managers engage in a highly rational and cohesive competitive decision-making process purposefully facilitated by their use of information systems.

1.1.2 The role of Private hospitals in healthcare

Since the last 20 years the private health sector in Kenya has shown significant growth and Kenya's private health sector is one of the most developed and dynamic in Sub Saharan Africa. Potential factors contributing to this growth include: the lack of quality public health services, the introduction of user fees in the public facilities and health sector reforms that eased the licensing and regulation of private healthcare providers and allowed public sector staff to work in the private sector as well. Approximately 47% of the poorest quintile of Kenyans will go to the private (commercial) sector for their healthcare needs and two-thirds of the money spent in the private sector is on health services rendered in hospitals. The size of the private healthcare market in Kenya was estimated in 2005/06 to be KES 20.7 billion. The Kenyan private sector consists of commercial (for-profit) players and FBOs/NGOs or not-for profit. The private sector dominates in the nursing home segment and health clinics.

1.1.3 Narok North sub county

The research was conducted in Narok town –Narok North sub county - Narok County. It is the Headquarters and largest urban centre in Narok county with a population of 67,505. As per the 2010 poverty and environment initiative policy brief for the Kenya Vision 2030, Narok County is marked as one of the fundamental counties for the achieving economic pillar.

There are a total of 31 medical facilities within the Narok North sub county (KMFL, 2018) with 6 of them being level 3 and 4 private facilities.

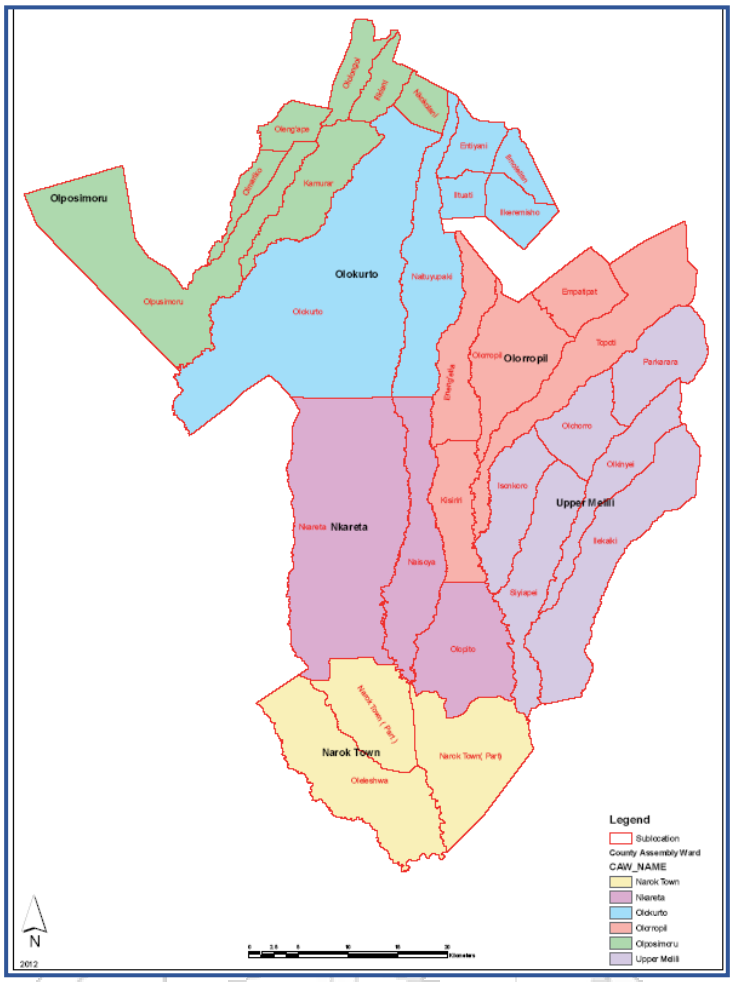

Figure 1. 2 :Map of Narok-North subcounty

1.2 Problem Statement

In the recent past there has been a rapid uptake in the deployment and use of HMIS by private facilities in Kenya. These systems are expected to have the benefits of reducing the costs of administrative and clinical transactions, and at the same time, providing better service to their consumers.

These systems are therefore expected to provide a host of direct benefits such as easier patient record management, reduced paperwork, faster information flow between various departments, greater organizational flexibility, reliable and timely information, minimal inventory levels, reduced wastage, reduced waiting time at the counters for

patients and reduced registration time for patients. All this should translate to improved decision making and a competitive advantage (Chaulagai, Moyo 2005).

HMIS however are frequently expensive to adopt and maintain due to the original cost of acquiring and installing hardware and software, as well as ongoing administration costs for hardware and software upgrades, maintenance, technical support, training, and even utility and real estate costs for housing the technology (Haux, 2006). This makes HMIS a significant investment that should translate into tangible benefits for the facility. One of these tangible benefits is the use of these systems to provide the information to make better decisions as a strategy for obtaining a competitive advantage (Porter & Millar, 1985).

It is unclear how private sector managers have implemented these systems and whether they are using these systems to provide the information to make important strategic decisions versus other sources of information and to what extent. Our objective was to explore the use of the information generated by these systems in the strategic decision making process to inform if managers of private sector facilities are reaping the expected benefits.

1.3 Objectives

1.3.1 Main Objective of the Study

To explore the use of HMIS for managerial decision making processes in private health facilities.

1.3.2 Specific Objectives

i. To explore the presence of management information systems in level 3 & 4 private sector facilities in Narok.
ii. To explore the information generated by them in level 3 & 4 private sector facilities in Narok.
iii. To establish the influences on the use information gathered from HMIS in managerial decision making process.

1.4 Research Questions

i. What Health Management information systems do these level 3 & 4 private facilities have?
ii. What Health Management information system modules have they implemented?
iii. What influences the use of this information by managers in their decision making process?

1.5 Scope of the Study

This study was limited to all private sector level 3 & 4 health centres in Narok North Sub county. The study involved an exploration of the utilization of Health Management and Information Systems in decision making in these facilities and the factors influencing it. Qualitative data was collected from the senior administrators of private level 3 and 4 health centres in Narok North sub county.

1.6 Significance of the Study

Despite widespread adoption of capital intensive HMIS with many touted benefits, it is unclear if the information provided is used in the managerial decision making process.

"HMIS like any other investment if well utilized has the potential to provide a competitive advantage. It is therefore important to explore the utilization of this information in creating value in an organization. Given the substantial investments being made in HIT, quantifying its impact on performance should and almost surely will continue to be an important focus of research" (Agarwal, Gao, 2010).

The findings of this research is potentially useful to the management of these facilities in understanding the utilization of HMIS in creating value specifically as a tool for information based decision making in an organization as well as understanding the factors that hinder or aid the use of information systems in their decision making process.

The findings are also important for other researchers who would like to pursue the subject further given the limited local data regarding utilization of HMIS in decision making.

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

There has been extensive research into the role of information systems in the performance of an organization as well as research into the connection between HMIS and decision making and the utilization of HMIS (Jawhari, Ludwick, 2006). This research has covered a wide variety of issues and provides a comprehensive body of knowledge. However there is not much information on HMIS and managerial decision making in the private sector and this is an important gap. The aim of this proposed research is to tie together the knowledge of information systems and performance and attempt to apply it to decision making and performance in for profit health facilities.

The literature review has been structured according to the objectives, including the following sub-sections:

a) Implementation of HMIS in private sector health facilities.
b) Use of HMIS in decision making

2.2 Implementation of HMIS in private sector health facilities.

2.2.1 Utilization of HMIS – how and why do LMICs use HMIS

The aim of health information systems was and is to contribute to a high-quality, efficient patient care (Haux, 2006). This aim is primarily centered towards the patient, and towards medical and nursing care, and the administrative and management tasks needed to support such care. However, over time it has been recognized that there is a need for managing information systems. In particular, the strategic, long-term information management was finally regarded as a serious and necessary task. Therefore, the aim of the IT-strategy is to, in the best possible way, support workflows in medicine, nursing, science and management through the implementation of suitable information and communication technologies, as well as by providing adequate procedures for patient care, management and administration.

Malawi conceptualized, designed and implemented a comprehensive HMIS for their public health system in 1999 (Chaulagai, Moyo 2005). The HMIS was designed to support individual patient care, health unit management and health system management functions. The practice of operating the new HMIS has resulted in improvements in

knowledge about the current health and management situation and use of such knowledge in routine management decisions.

Another public sector study conducted in Pakistan (Qazi & Ali, 2011) sought to explore health managers' perspectives about the reasons into and seek their suggestions for an improved use of National HMIS. It concluded that District managers need to have the basic skills for day to day decision-making using information generated through HMIS. They need to build their skills for creating a supportive environment for the improvement of data quality and the use of evidence based management. This was a public sector study that cannot be generalized to a private sector setting.

Heeks (2006) investigated the utilization of Health information systems by examining the failures and success of IT based systems in healthcare. They found using a design – reality gap model that the failures in implementation of HIS can be attributed to gaps between the design of systems vs the reality of their actually implementation and use.

Kijsanayotin & Pannarunothai (2009) concluded that health workers in Thailand demonstrated a high level of health IT acceptance and use.

2.2.2 Information Systems and Performance

According to an article (Porter & Millar, 1985) information provides a competitive advantage in various ways. The article describes how IT has changed the nature of competition and goes on to describe how managers can assess the role of information technology in their business and to help define investment priorities to turn the technology to their competitive advantage. We therefore see that acquisition and use of information is key to maintaining a competitive advantage and IT is one powerful tool for this purpose.

One study links IT and the resource-based view and provides a framework for understanding how IT may be appropriately viewed as an organizational capability (Bharadwaj, 2000). The study provides an identification of IT resources in terms of IT infrastructure, human IT skills, and IT-enabled intangibles and develops the notion of IT as an organizational capability created by the synergistic combination of IT resources together with other organizational resources and capabilities. The empirical

analysis examines the association between superior IT capability and superior firm performance and finds the relationship to be positive and significant. This study thus contributes to the IT business value literature by providing empirical support for the relationship between superior IT capability and firm performance. However although the analysis indicates that superior IT capability leads to improved firm performance, the underlying mechanisms through which this is achieved are by no means clear thus leaving room for additional research to identify the full chain of variables connecting IT capability to firm performance.

Another study (Powell & Dent-Micallef, 1997) looking at the resource based view of IT sought to understand why if IT is thought to confer economic value then why did they not produce direct competitive advantages for firms? The findings suggested two answers. First, that IT has become pervasive and relatively easy to acquire in competitive factor markets. Although retail systems varied greatly in their specifications, and some were far more advanced than others, all larger retailers had committed at some level to the basic scanning technologies. Second, the data suggest that most retailers had not merged IT with the requisite Human and Business complementary resources. Therefore, it was concluded that, although the industry has invested sufficiently in ITs to negate direct IT advantages, some firms gained IT-related advantages by merging IT with complementary resources, particularly Human resources. Among IT-intensive firms, the payoffs to the Human and Business resources were significantly greater than among IT-Lagging firms. However, the study is limited to the retail sector therefore more research would be required to explore the theory in other industry contexts.

Vannoy & Salam (2010) define competitive action as "a specific and detectable competitive move, such as a price cut or new product introduction, initiated by a firm to defend or improve its relative competitive position" and competitive response as "a clear-cut and discernible counteraction taken by a competing firm with regard to one or more competitors to defend or improve its position". Their paper sought to integrate information systems with competitive dynamics research with a view to examining the role of information systems in competitive dynamics and firm performance. They found that Information systems provide a requisite platform for enhancing awareness of the internal and external environment, facilitating a cohesive understanding of motivations

and firm capability to act; they also reduce uncertainty of the consequences or benefits of action. They also augment organizational memory by facilitating information acquisition and sharing, knowledge exchange, and interaction among decision makers and serve as a requisite platform to synchronize disparate managerial cognitions regarding conceiving competitive actions or responses. However, their study limited to a single firm and they recommend that a large scale study would be suitable to test specific aspects of their model and further the understanding of the complex relationship between information systems, performance and competitive decision making.

Agarwal & Gao (2010) state that systems that can affect providers' decision making tend to have a greater impact on performance. Therefore, information systems may not produce any obvious benefit without decision support components.

Mithas (2011) sought to evaluate how information management capability affects firm performance. They found that the three organizational capabilities of customer management, process management, and performance management mediate the links between information management capability and firm performance.

Other studies also support the relationship between information systems and performance (Devaraj & Kohli 2000), Housman & Hitt (2006) found results that suggest that higher levels of in IT capital are associated with reduced short-term operating costs in acute care hospitals, only after a threshold level of investment has been reached.

Kivinen & Lammintakanen, 2013 also stated that management information systems improve the quality of decisions because they enable more comprehensive use of information and promote proactive planning and management of practice.

2.2.3 HMIS in the private sector

Despite the significant use of the private sector by the population to seek services there has been limited research into the use of HMIS in the private sector especially in the LMIC context. One study (Nabyonga-Orem, 2017) noted that majority of private health facilities do not provide data routinely to the MoH. As a result health sector monitoring

is not comprehensive despite the private sector providing up to 47% of care in the lowest quintile.

2.3 HMIS in Decision Making

The number of studies focusing on Management information systems in healthcare organizations is relatively small. The emphasis in health care information systems development has been on clinical systems especially electronic health records rather than on developing management information systems. (Kivinen & Lammintakanen, 2013). They state that the information provided by these systems are not sufficient for managerial needs. This study highlights six success dimensions of information systems: (1) system quality, (2) information quality, (3) usage, (4) user satisfaction, (5) individual impact and (6) organizational impact. The system quality dimension consists of the characteristics of the information system itself and is assessed in terms of attributes like system flexibility and accuracy, response time, ease of use, convenience of access and integration of systems. Information quality measures include information system output e.g. information accuracy, usefulness, reliability, currency, format and timelines. Usage refers to the interaction of information products with the user, to system use, information use, or both. Examples of attributes are frequency and regularity of use, use or non-use, attitudes and motivation to use, and difference between the information needed and received. The influence of an information product on management work and manager's behaviour such as quality of decisions constitutes the dimension of individual impact. Organizational impact in turn refers to the effects of the system on organizational performance e.g. process quality, collaboration or costs.

They found that the information generated by these systems were incomplete and the usability poor, the respondents had doubts about the quality of the information. They also reported low use of the systems due to various reasons including negative attitudes and lack of motivation. The study concluded that according to the results the implementation and use of the management information system did not seem to be planned as an essential tool in strategic information management in the health care organization as managers argued that MIS does not enhance their decision making.

The study was carried out in one specialized healthcare organisation in Finland and therefore the transferability of the results are limited especially to a LMIC setting.

A public sector study in Zambia (Mutemwa, 2005) demonstrated that different forms of information are brought to bear, in district decision-making, through different channels and from a variety of sources in the district health system. HMIS was only one of those channels or sources. The study has confirmed the presence of written, verbal, observational, experiential and training information forms in managerial decision-making. This information is brought into the decision-making process through the whole process of management and key aspects of organizational routine. The study results thus suggest that the actual health management information system involves all aspects of organization: human resources, management/ organizational processes, organizational structure, and organizational systems. The HMIS is only one of the systems in a typical organization. This leaves the question of the extent to which HMIS provides information for managerial decision that informs our study.

Keyhani (2008) found that the presence of HMIS in the context of EHR (electronic health records) could alone not improve the quality of clinical care but required to be deployed with decision support. Further research was recommended into how EHR are implemented to understand the impact of EHR on quality of care.

2.4 Theoretical Framework

Rashid (2011) argued that there are various theories that can be used to explain management information systems and also the issues that arise as a result of these MIS. Various theories have been employed in explaining these MIS; these theories include the agency theory, stakeholder theory and stewardship theory.

2.4.1 Rogers' Diffusion of Innovations theory

This theory explains individuals' intention to adopt a technology as a modality to perform a traditional activity. The theory was developed by Roger's (1983). The critical factors that determine the adoption of an innovation at the general level are the following: relative advantage, compatibility and complexity.

This theory attempts to explain how ideas and technologies diffuse or spread among people and organizations. It also attempts to explain the factors that promote or hinder acceptance of computerized programs within firms. Several models have been put

forward to explain this such as the Technology Acceptance model (Venkatesh & Bala, 2008) and the Lazy User model (Tetard & Collan, 2009).

However, the most influential model is Everett Rogers' *Diffusion of Innovations model (1983)*. Rogers studied rural and agricultural sociology, his doctorate dissertation in 1957 was on the usage of a new weed spray among farmers. He developed the concept of innovation which he defined as any object, idea, technology or practice that is new. An innovation can include tangible, physical object such as a new information technology tool. In connection to the topic of study of hospital management system, Roger's contributions would be very significant in explaining the process of decision making, information quality, user satisfaction found in the HMIS and the challenges associated with them. This dissolved the barriers between disciplines and could openly consider adoption studies from multiple disciplines such as accounting, record keeping and MIS. With such a broad scope, the findings from various studies can be readily generalized.

Rogers came up with an innovation- decision process which describes the steps an entity goes through in deciding whether to adopt a technology or not. The decision begins with knowledge stage in which a company first becomes aware of the technology through accessing advertisements or from other business entities.

This is followed with persuasion in which case the entity begins to show interest in the technology and seeks out information about the specific aspect of technology such as QuickBooks, enterprise resource planning systems, sage or pastel. As Rogers points out, the process of deciding takes place silently and invisibly to the outside researcher and that one rarely captures the exact moment of decision. The implementation stage follows, where the innovation is integrated into specific use. After this is the confirmation stage which personalizes the decision regarding the adoption of MIS. This is similar to the Technology Acceptance theory (Martin& McCormack, 2011; Reimer-Reiss & Walcker, 2013; Dawe, 2014) who define assistive MIS as any item, piece of equipment or product system, whether acquired commercially off the shelf, modified or customized, that is used to increase, maintain or improve functional capabilities of company operation

The final stage in the decision is the discontinuance phase where after the initial period where the technology is used, the person or an entity may abandon the technology either due to obsolescence or just need for replacement. Roger's theory also attempts to come up with the influences of MIS adoption and uses such as the relative advantage, compatibility of innovation with users' lives and practices, complexity of using and understanding innovation. Roger's theory can be used explain the adoption of HMIS by private health facilities to provide a relative advantage.

2.4.2 Technology Acceptance Model (TAM)

According to Davis (1989) TAM suggests that perceived ease of use is the most important factor in explaining individual's user's adoption intention and actual usage. TAM has been extensively tested and validated and is widely accepted model which determine the preparedness of organization to adopt to new technology.

TAM follow four stages namely, belief, attitude, intention and use and belief has two variables that is perceived use and perceived ease of use. Belief derive attitude which is turn influence intention and finally actual use of the technology (Burtona & Hubona, 2005)

The willingness to adopt MIS is dependent on perceived usefulness as seen by the users of technology. Laura & Lin (2005) excluded the existing TAM model by adding four new constructs to understand MIS adoption. These include perceived credibility, perceived self-efficacy, perceived risk and perceived finance costs.

Although perceived usefulness, perceived ease and intentions to use concentrate towards the adoption of MIS, concerns around security and privacy are two other important considerations to users. In banking context, perceived credibility is defined as one's judgement on the privacy and security issues of MIS (Ba & Pavlou, 2002). Self-efficacy can be defined as the conviction that one can successfully execute a given behaviour (Bandura, 1998) it's an important factor as it helps in consider action of individual reaction to information technology thus individual with high level of self-efficacy will have higher trust perception of institutional environment (Luo et, al. 2010). Perceived risk is viewed as a hesitation regarding the results of using product/services. It's defined as a combination of uncertainty pieces seriousness of outcome involved and the expectation of losses allocated with purchase and acts as an inhibitor to purchase behaviour (Bauer, 1960). Perceived financial cost is proven to have an adverse

effect on an individual intention to use MIS (Laura & Lin, 2005). In this research, context perceived financial costs is associated with the cost of handset, lost, charged by the network providers for using the internet on the phone or cost of sending text message to the financial institutions. This model is useful to our study as it lays a framework for the willingness of managers to adopt HMIS in their decision making process.

2.5 Conceptual framework

From the literature review above, a conceptual framework was derived (DeLone & McLean, 1992). This framework showed decision making and performance as dependent variables while the independent variables were system quality, information quality, usage, user satisfaction and organization process.

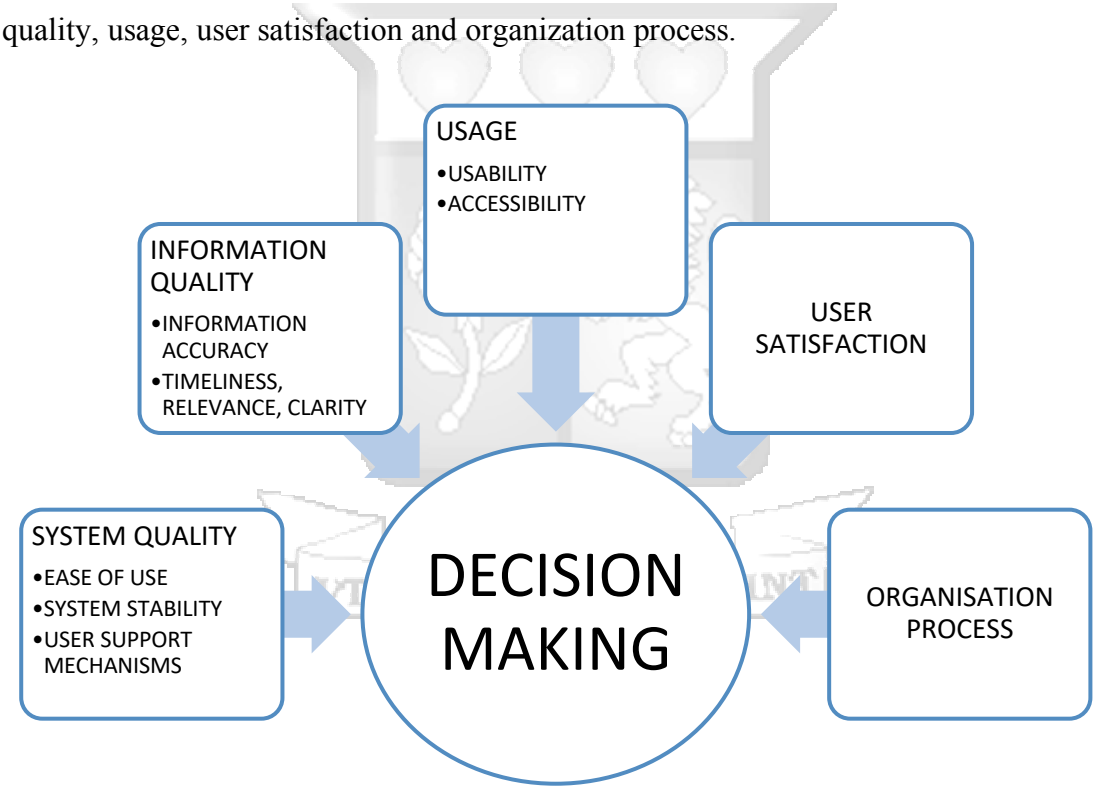

Figure 2. 1: Conceptual framework adapted from DeLone & McLean, (1992)

CHAPTER 3. METHODOLOGY

Research methodology covers the research design, population and sampling, data collection and analysis in response to the two research questions. Research quality and ethical considerations are also discussed.

3.1 The Research Design

A qualitative, exploratory approach in level 3 and 4 private sector facilities was adopted for this research. A qualitative approach, using a structured interview guide, was used as it provides deeper insights and meaning to various aspects of adoption and use of HMIS and management processes. The qualitative design was also motivated by previous studies that have noted the need for more research into the use of information in the work of health care managers, especially what kind of information is used and where and how the information is acquired (Kivinen & Lammintakanen, 2013). They noted that even though the integration and usability problems of information systems in health care are evident and essential for users, future studies could focus more on the perspective of the community, information culture and strategic information management.

The research adopted a qualitative explorative design, based on interviews with top level managers. The objective of the interviews was to establish, the interviewee's perception about the contribution of information quality, system quality, usage, user satisfaction and their organization's processes to their managerial decision making progress. Thus this research used qualitative methods of data collection.

3.2 Population and sampling

The research was conducted in Narok town –Narok North sub county - Narok County. It is the Headquarters and largest urban centre in Narok county with a population of 67,505. There are a total of 31 medical facilities within the Narok North sub county (Kenya master health facility list, 2018) with 6 of them being level 3 and 4 private facilities. Interviews were conducted with facility administrators to understand the implementation of HMIS systems and how they use the data in it to make management decisions (HR, finance, inventory, etc.).

3.2.1 Sampling Size and Sample Size Determination

The sample was restricted to private (for profit and not for profit including NGO and faith based) level 3 & 4 facilities within Narok North sub-county. A total of six (6) facilities fell within this criteria and formed the sample. Private level 3 & 4 facilities were selected as they represent a large proportion of primary healthcare providers which is a rapidly growing area in provision of healthcare in Kenya.

A top level manager was purposely selected in each of the facilities as they are the best source of the information which was required for the study such as knowledge of the HMIS systems in place and financial records. They were selected on the basis that they are familiar with the management information system and were willing to share their views and participate in the study.

3.3 Data Collection Methods

In depth interviews were the main form of data collection. Broad open ended questions were posed. This allowed the 6 respondents the opportunity to express their ideas using their own words instead of having to fit their thoughts and understanding into pre-set categories. The length of interviews were not predetermined to build rapport and to give the informants freedom to recall and expound on their experiences.

3.4 Data analysis

A thematic approach was employed in analysing data. Thematic analysis is defined as a method for identifying, analysing, and reporting patterns within data organising and describing data set in detail (Braun & Clarke 2006).

Data analysis involved transcription of the interviews. Interviews were recorded using a tape recorder which were transcribed soon after each interview. All notes taken during the interviews were labelled and saved. The data was grouped into subcategories according to the theoretical framework - system quality, information quality, usage, user satisfaction and organization process.

3.5 Research Quality

In qualitative research, quality depends on the interaction between data collection and data analysis to allow meaning to be explored and clarified. Research needs to satisfy the criteria of, validity, objectivity and reliability and to ensure that the research findings are not biased in any way (Saunders et al. 2012).

3.5.1 Validity

This research was designed in such a way as to ensure that it had construct validity of the conclusions and inferences.

In qualitative research validity refers to the extent to which the researcher has gained access to a participant's knowledge and experience, and is able to infer meanings that the participant intends from the language used by that person (Saunders et al. 2012). Validity is achieved where interviews are conducted with clearly defined questions and responses documented in detail. In order to enhance validity, all the interviews were recorded and transcribed verbatim. Additionally, the interviewer sought clarification of meanings where in doubt, using probing questions during the interview and follow up telephone calls after the interview.

It was the intention of this research to add to the existing knowledge of the factors affecting use of HMIS in decision making and to provide analytical synthesis that will enable others to understand similar situations and apply these findings in subsequent research.

3.5.2 Reliability

This refers to whether the techniques used to collect data and the analytical procedures would produce consistent findings if they were repeated on another occasion or by another researcher (Saunders et al. 2012). Reliability in qualitative research is affected by the researcher's own subjective interpretation of the research material, which is an essential aspect of this type of research. To ensure reliability, detailed notes were made of the research design and the methods of obtaining data as well as the respondents interviewed. These records create an audit trail and can be referred to by other researchers in order to understand the process used and enable them reanalyze the data collected.

3.5.3 Objectivity

This refers to the avoidance of conscious bias and subjective selection during the conduct and reporting of research. It is also the extent to which data is free from bias such as conditions which would individually or together distort data (Saunders et al. 2012). In qualitative research, the aim is for the researcher to remain impartial to the outcome and to acknowledge his own biases or preconceptions. The study sought to ensure objectivity by accurately recording and documenting data.

3.6 Ethical Issues in Research

The context of research ethics refers to the appropriateness of behavior in relation to the rights of those who become the subjects of my work. Permission was sought from respondents for data collection prior to engaging in the data collection process. This was facilitated through a letter of introduction from Strathmore University introducing the researcher as a student in the institution. The researcher declared that the data collected would not be revealed to any unauthorized persons, otherwise it would lead to breach of confidence. The researcher assured participants that the identity of the respondents would not be revealed in any way. Information on the nature and purpose of the study was expounded to the respondents as a means of providing sufficient information before they decide to participate. All the information obtained was kept private and treated with utmost confidentiality.

CHAPTER 4: PRESENTATION OF RESEARCH FINDINGS

4.1 Introduction

This chapter includes data presentation analysis and discussions of findings. The analysis was done in accordance with the research objectives and variables of the study. The variables influencing the use of information gathered from HMIS in the decision making process under the study were 1. HMIS system Quality, 2. Information quality, 3. Usability/Access of HMIS system, 4. User satisfaction and 5. Organisation process.

The interviews were undertaken in Narok North Sub County level 3 and 4 health centres. These include Premier-care diagnostics, Naramat medical and dental clinic, Narok cottage hospital, Sagam hospital, Lenana hills hospital, Masaai nursing home.

FACILITY	RESPONDENT ROLE	TYPE	STAFF	BEDS
Premier-care diagnostics	Owner	Radiology centre	6	N/A
Naramat medical and dental clinic	Clinical officer	Outpatient clinic	4	N/A
Narok cottage hospital	Owner	Hospital	35	30
Sagam hospital	Administrator	Hospital	15	10
Lenana hills hospital	Administrator	Hospital	10	9
Masaai nursing home	Owner	Nursing home	8	15

Table 4. 1 General information of respondents

4.1.1 Response rate

The study targeted a sample size of six health facilities in Narok North Sub County from which five respondents were interviewed fully - making a response rate of 83%. one of the respondents did not respond fully since their facility does not use a HMIS system. This response rate was satisfactory for the study to make conclusions as Cooper and Schneider (2003), states that a response rate of between 30 to 80% of the total

sample size can be used to represent the opinion of the entire population, The response rate is as shown below;

Response Rate	Frequency	Percent
Fully Responded	5	83.3
Not Fully Responded	1	16.7
Total	**6**	**100.0**

Table 4. 2:Response Rate

4.1.2 Respondent characteristics

The figures below display the distribution of interviewed respondents according to the respondents characteristics.

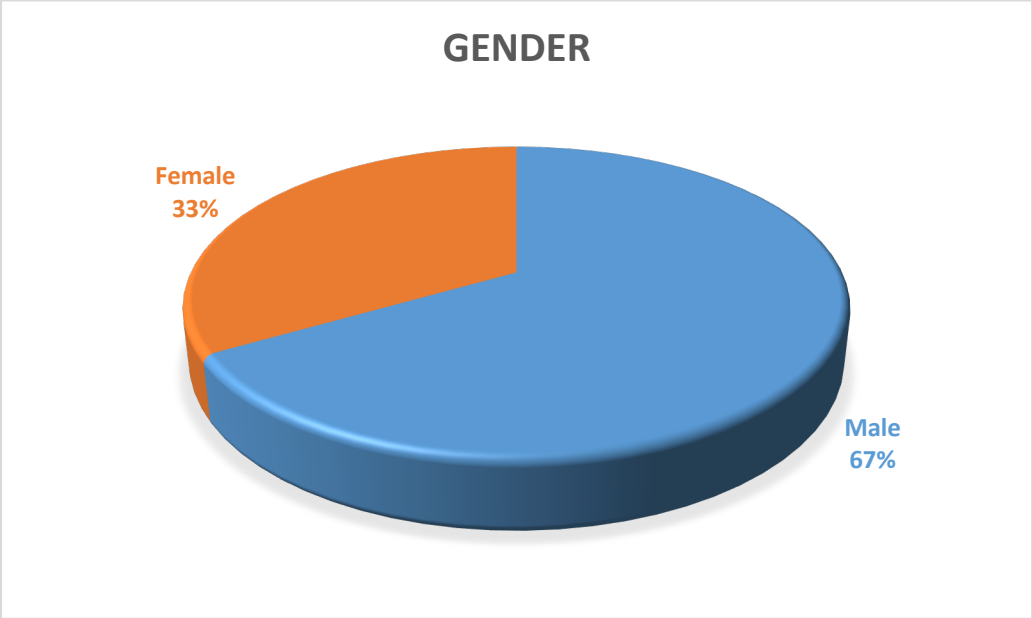

Figure 4. 1: Gender of the respondents

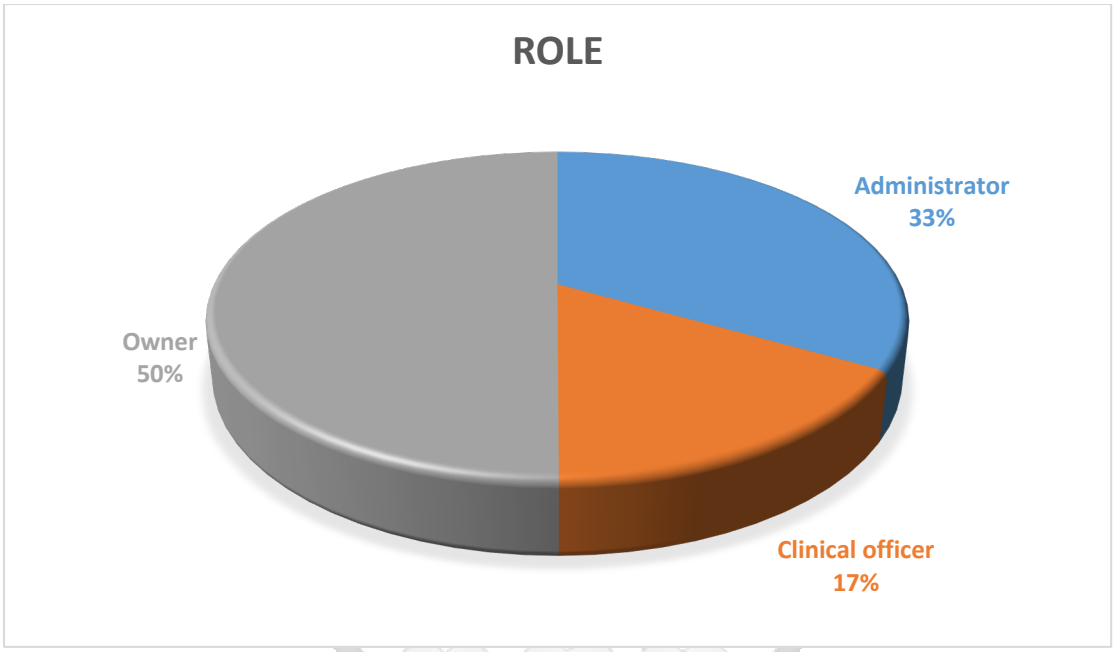

Figure 4. 2: Respondent Role

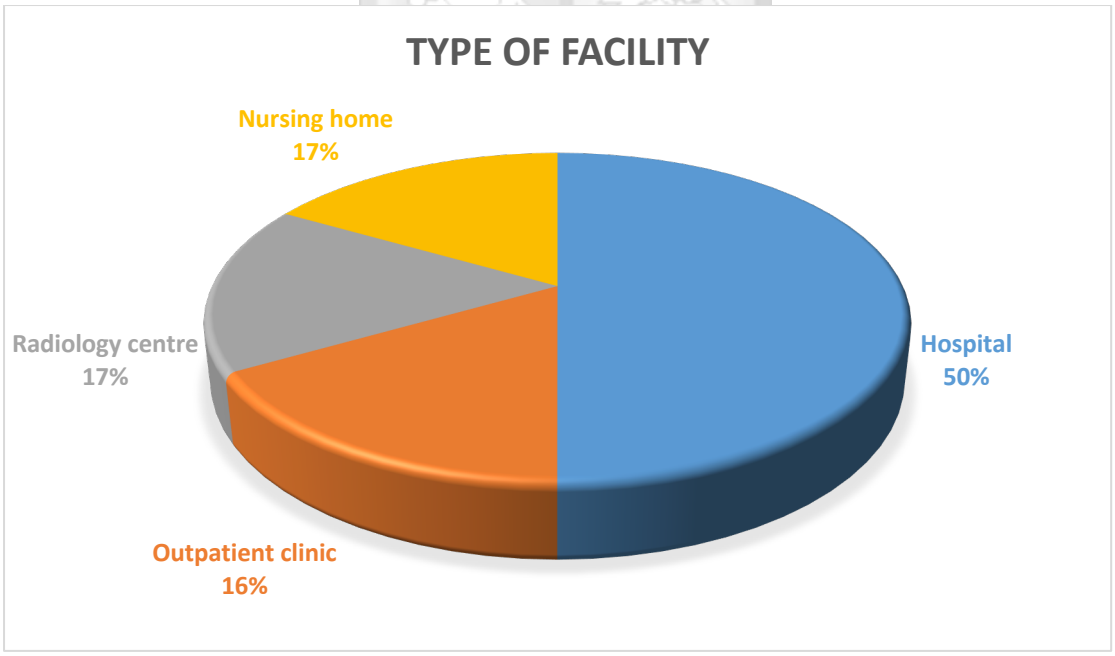

Figure 4. 3: Type of facility

It is observed from Figure 4.1 that the number of female respondents was 33.3% compared to the number of their male (66.7%)

On the role of the respondents, 33.3% of the respondents were Administrators, 16.6% Clinical officers and majority were Owners at 50%.

In terms of type of facility, majority of facilities were hospitals (50%) and Nursing homes, radiology centre and outpatient centre at 16.6% each.

4.2: Objective 1 - Implementation of HMIS

In the study the respondents were asked if they had HMIS implemented in their facilities and the results are summarized in table 4.3. The facilities that had HMIS in place - 83.3% while only one facility had not been installed with a system (16.7%). This facility did not use a dedicated HMIS system – only standalone computers running basic office software for general office tasks.

Facility	HMIS implemented	System Implemented
1	Yes	Limsoft
2	Yes	Health-wise
3	Yes	Medisoft
4	Yes	Insta-HMIS
5	No	N/A
6	Yes	Clinisoft

Table 4. 3:HMIS implemented

It was noted that different facilities use different HMIS systems such as – Health-Wise hospital management system, Clinisoft hospital management system etc. This shows that each health facility uses their own management information system for their needs.

4.2.1: HMIS Modules implemented

The respondents were asked what HMIS modules are implemented in their HMIS system and if they are interlinked. The HMIS modules implemented include:

Modules implemented	Facility
Patient Registration/ Electronic Medical Record	1, 2, 3, 4, 6
Investigation/ Lab Management	1, 2, 3, 4, 6
Inpatient	1, 2, 6
Pharmacy	1, 2, 3, 4, 6
Billing	1, 2, 3, 4, 6
Store and Inventory Management	1, 2, 4, 6
Accounts and Financial Management	2, 4, 6
HR Management/Payroll Management	2

Table 4. 4: Modules implemented

There was a lack of uniformity in the HMIS used and modules varied widely. They had implemented modules specific to the needs/type of facility, for example facility 4 had only installed a patient registration module and did not have any EMR or inpatient module. Facility 3 despite having inpatient facilities did not have an inpatient module and used a paper based file system for their inpatient operations.

4.2.2: Objective 2: Information generated by HMIS

The respondents were asked what types of reports does their system able to generate and how frequently they generate these reports and for what purpose. Some respondents stated plainly that they were aware that their systems were able to generate reports but had never taken the time to pull up any reports for any purpose. While another believed their system was primarily an EMR and not management focused.

> *"Well I don't use the reports that our system can produce since I already have that information from our other records." – Admin, facility 2*

> *"The accountant give us reports from quick-books. It's not connected to the system."- Owner, facility 6*

"This system is mostly for patient records and billing – we don't use it for financial matters."- Admin, facility 1

"A lot of people have access to the system so we don't feel secure putting too much information there."- Owner, facility 4

The other main reasons for not using HMIS reports, according to the managers, was negative attitudes toward information systems in general and lack of motivation to use the management information system.

"Our system sometimes loses data and I end up having to spend hours looking for that information." – Admin, facility 2

Modules implemented	Facility
Revenue reports	1, 2, 3, 4, 6
Sales reports	1, 2, 3, 4, 6
Diagnosis summary	1, 2, 3
Bed occupancy/Bed return summary	1, 2, 6
Shift reports	2, 6
Petty cash	2, 4, 6
Profit and loss	2, 4, 6
Balance sheet	2, 4, 6
Creditors account statement	2
Debt ageing	2, 4
Claim management	2, 4
Scheme attendance	2
Banking collections	4

Table 4. 5: Reports Generated

Table 4.5 outlines the commonly generated reports according to facility.

Consequently the quantity and frequency of generation of reports varied from non-use to weekly use.

Some respondents reported that other departments used their systems and printed reports for the managers.

> *"Before our meetings each department will prepare for the meeting by printing out their reports so we can discuss their performance."- Owner, facility 6*

Most respondents noted that their systems were capable of producing various useful reports though the extent of use varied. They commonly used reports to: Evaluate financial performance, Evaluate employee performance, Inventory management, Budgeting, Cost management etc.

Managers who acknowledged use of reports stated they used them for reviewing periodic performance, monitoring the functioning of their own units, financial controls, budgeting and planning.

> *"we use the revenue reports to track our performance and direct our marketing efforts."- Admin, facility 2*

> *"Pharmacy reports help us control theft and planning for re-stocking."- Owner, facility 1*

> *"We base our employee performance reviews on departmental reports." – Admin, facility 2*

The main reason for not using HMIS, according to the respondents, was negative attitudes toward information systems and lack of motivation to use the management information system. Other reasons for not using the MIS were lack of confidence in using the systems, prioritization of the use of patient information systems by clinicians and usability problems of the systems. Respondents in Facility 1 and 6 reported that their systems had limited information that impeded their decision making process.

4.3 Objective 3: Factors influencing the Managerial Decision Process

4.3.1 System Quality

The nature of comments concerning HMIS was positive but the number of different information systems and the difficulties in integration and communication between

systems was reported to seriously disrupt effective functions in the facilities. The information systems are incomplete and the usability is poor according to the respondents.

> *"I can go there (to HMIS) and I can do some things, basic things, but more complex things I can't." - Owner, facility 3*

Ease of Use

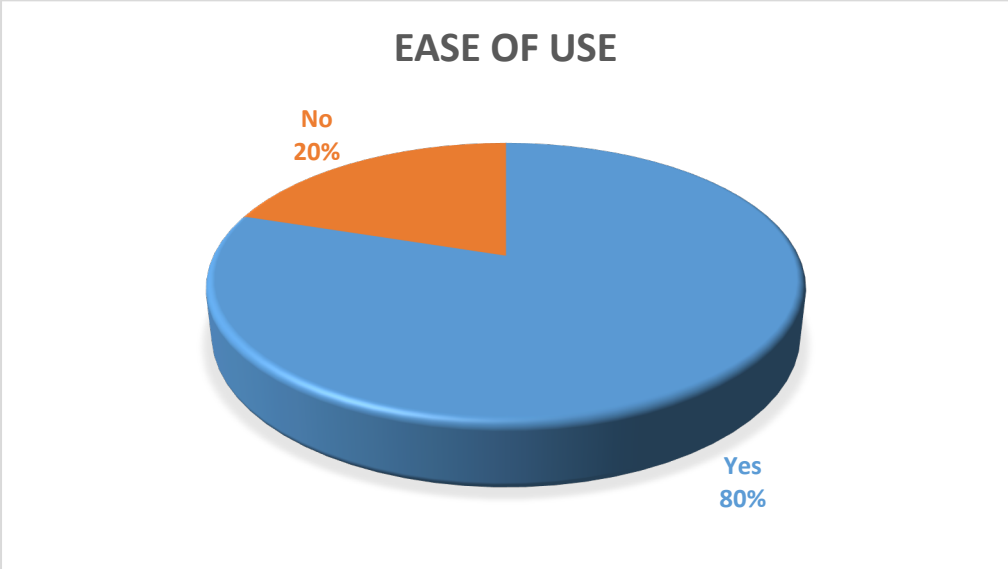

Figure 4. 4: HMIS ease of use

The respondents were interviewed on the ease of the use of their HMIS and the respondents strongly agreed with a rating of 80%. The respondents stated that the system is easy to learn and easy to use although in some cases the systems were cumbersome and the response time too slow causing experiences of frustration, extra work and inconvenience.

> *"The system is not complicated, it's used by the staff and they learn to use it in a short time."- Owner, facility 3*

> *"We are able to use the system without much problems however it could be better organized to need less steps." – Owner, facility 6*

Respondents also noted that some reports were easy to generate however were not easily customizable for their specific needs.

System stability

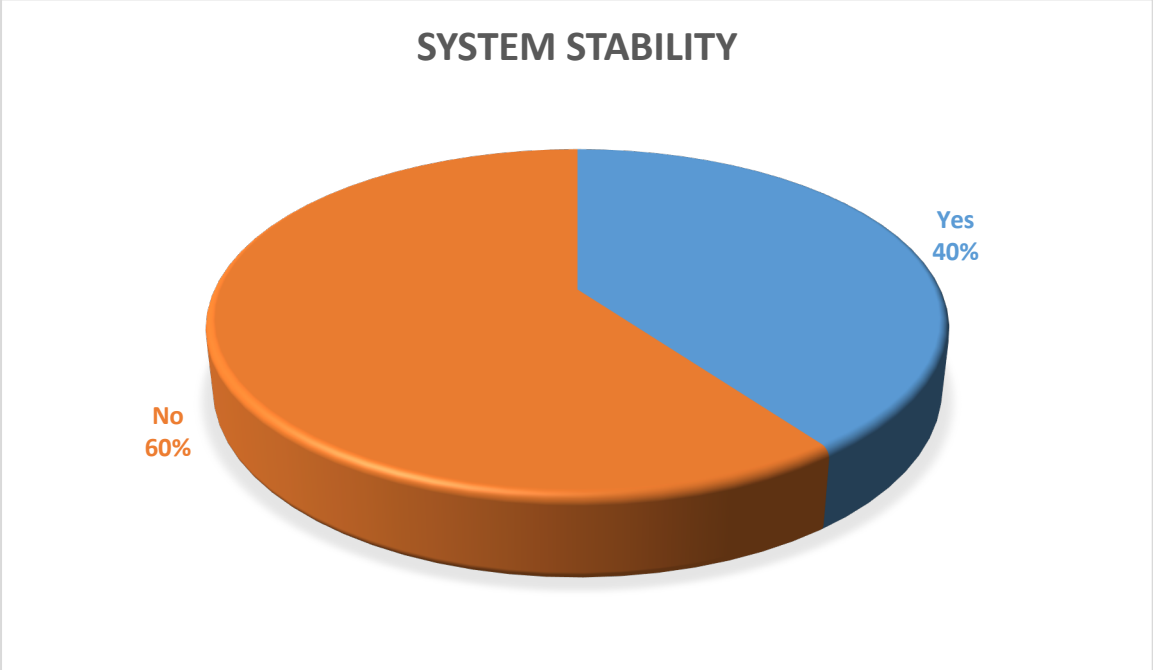

Figure 4. 5: System Stability

The interviewees were asked about their system stability and the respondents strongly disagreed with (60%) this shows that there are system failures in their health system which the respondents termed it as usual system break down.

> *"The system works well mostly but when it goes down occasionally it means we have to use papers to record and we lose a lot of information that way." – Owner, facility 4*

> *"Our system administrator is based in Nairobi so we have difficulty getting the system back up for hours or even days when it fails." – Admin, facility 2*

> *"The computers are old and we don't have a full time IT person to maintain things." – Admin, facility 1*

Some of the respondents stated that there is failure of the systems due to power outage, internet failure or the computers themselves. The system outages were noted to affect the information quality as data would not be input in the system during these times.

User support mechanisms

The respondents were asked what user support mechanisms are available for their system and the response was that none had full time on-site IT personnel. Some had remote support, while others had on-call IT visits.

> *"The system vendor is able to remotely access the system to update and fix some errors." – Admin, facility 2*

> *"We call the IT guy over the phone and he walks us through how to solve any problems, he only comes when it is very serious." – Admin, facility 1*

The views of user education differed among respondents; some stated that there had been ample user education, whereas others claimed that they had had no education in using the MIS and they had learnt from colleagues rather than formal IT orientation. Some respondents criticized the content of the education to being too technically oriented instead of focusing more on the quality of data and what kind of reports they could get from the system and how to interpret them.

The knowledge and skills of managers varies considerably.

> *"Only the people who were here the first time the system was installed were properly trained, the rest learnt on the job." – Owner, facility 3*

The lack of training on use of the system impacted how likely managers were to generate and use reports in their decision making process.

> "*If we had been trained properly we would be more confident to use the reports in the system."- Admin, facility 2*

The lack of training on use of the system also affected the information quality as incorrect use of the system leads to inaccurate data input.

4.3.2: Information quality

Most informants were pleased with the format and content of the basic reports from HMIS although they simultaneously doubted the accuracy and reliability of the reports because of the previously described unreliability problems concerning data input.

Information accuracy

Some respondents noted they did not have confidence in the accuracy of the data in their systems. Data saving is decentralized so the data is input in the units where it is produced. This was noted to be a weak point for accuracy as commonly there were no detailed guidelines/training for employees to ensure accurate data input.

> *"Every-time we have a new employee we get some errors in our reports when they make mistakes." – Admin, facility 2*

> *"I doubt the accuracy of the information on the system because of double entries and mis-posting, I prefer the excel sheets."- Owner, facility 4*

Information timeliness, relevance and clarity

Respondents mostly stated that most of the information was real time as it was input immediately. Some noted that their data was updated with too much delay making real time information unavailable and this delay in turn diminishes the usefulness of information in planning, decision-making and evaluation and causes haste in budgeting as well. For these reasons some managers also had backup systems (e.g. Excel) for their information management.

> *"In my opinion the basic reports from HMIS are quite good and you can get them as soon as you need them."- Owner, facility 4*

Respondents further articulated the need for more multifaceted information systems. In addition to the existing basic reports the managers would like to have more analyzed, refined and detailed information from HMIS in the formulated information products for different user groups. They thought that too much is left for the end user to mine and edit to meet the information needs and for this they above all lack the time to do. The

available information did not support the daily processes and work sufficiently although it was quick to acquire if the database was updated.

> *"There is in HMIS a huge number of figures, statistics, exact information which an operative manager like me can't take sufficient advantage of because there is too much of it and it is poorly analyzed."- Admin, facility 1*

4.3.3 Accessibility/Usability of HMIS systems

Accessibility

On accessibility to the HMIS in their health facilities, the respondents stated that they adequate access to the system to retrieve reports and input data. Facility 2 and 6 even had online systems that enabled them access the HMIS while away from the facility.

Some respondents reported though that some aspects of their system was closed off to lower level managers which hampered their access to important information and caused delays in sharing information and decision making.

The clinical vs financial aspects of the HMIS was noted to bring a disconnect in the accessibility of information to different managers.

Usability

All respondents reported that they use their systems on a daily basis.

Most respondents agreed that the HMIS is helpful in their day to day work and it reduces the use of manual work this shows it saves time and it is efficient.

> *It's a web-based system and our internet connection is slow, delays in the system loading." – Admin facility 6*

4.3.4 User satisfaction

The respondents were asked about user satisfaction of the HMIS. All the respondents were mostly satisfied with HMIS in-terms of stability, usability and access. However compared to their information needs in management work they were not very satisfied with the information received.

The respondents also strongly agreed that HMIS system contributes to their productivity.

> *"The system is user friendly and it generates what the user wants quickly" – owner, facility 6*

This shows that generally HMIS are perceived as useful, efficient and productive in facilities.

4.3.5 Organisation process

Respondents generally stated their organisational processes were not purposely centered around HMIS use. This was shown by lack of dedicated IT personnel, Information policies or guidelines.

The respondents considered that there should be discussions on systematic information use in decision- making and management on what kind of information is important and essential for different groups of managers.

Most respondents agreed that they require information in their HMIS in their daily tasks, without the HMIS they would be doing their tasks manually. The respondents stated that HMIS helps them in their daily cashier's reports, information about the patients and reports sent to their bosses automatically by the system, they say that HMIS is a bigger supporting tool in hospital management.

> *"The system helps us in our daily job such giving information of a patient, giving out cashier reports. It actually saves us time" – Owner, facility 4*

> *"Yes we use have to use the system in our day to day tasks" – Admin, facility 2*

They also stated that they have other reporting systems other than HMIS e.g. Sage, QuickBooks, Excel etc that are mostly used by accountants in the facilities for accounts management and reporting.

CHAPTER 5: DISCUSSION

5.1 Objectives 1 & 2: Implementation of and Information generated by HMIS

This research study explored the presence of management information systems and the information generated them and the use of the information generated by HMIS in the strategic decision making process to inform if managers of private sector facilities are reaping the expected benefits.

The findings from this study indicate that majority of facilities in have implemented these systems in widely varying configurations and these systems are comprehensive in their coverage of hospital operations. These systems were found to generate a wide range of reports dependent on the modules that were implemented. The information available to managers ranged from clinical data to financial and accounting data. This correlates with Bharadwaj (2000) in which IT is viewed as an organizational capability.

The systems in use with the respondents despite having been supplied by different vendors had similarities in their function and capability. The modules in operation and the reports the systems are programmed to generate were similar among facilities. This similarity seems to points towards systems that are copy-paste among vendors and may not sufficiently address the information needs of managers.

5.2 Objective 3: Factors influencing the Managerial Decision Process

The findings from this study indicate that managers did not seem to consider HMIS as an essential tool in the decision making process in their organizations. These findings were consistent with the study by Kivinen & Lammintakanen, which argued that the implementation and use of management information systems did not seem to be planned as an essential tool in strategic information management in the healthcare organization.

There was comprehensive coverage of hospital operations by their HMIS systems through the various modules allowing for a multiplicity of data gathering. This meant that the was an abundance of detailed reports. However respondents tended to use other sources of information preferentially in their decision making processes for various reasons primarily – lack of confidence in the information due to doubts as to its reliability, lack of competence and negative attitudes towards HMIS in general.

5.2.1 HMIS system quality

It was observed that generally the systems were easy to use however issues with reliability, stability, training and user support posed challenges to the respondents that affected their confidence in using their systems and relying on them more for day to day operations. This also led to the creation of back-up systems for information management.

5.2.2 Information quality

Managers reported they had doubts as to the accuracy of the data in their systems mostly due to errors during input in the different decentralized modules. This failure could possibly be attributed to insufficient training of staff and lack of clear organisational policies on information management. Due to this lack of trust in the information received from MIS some managers even had their own backup systems for their information management. According to Hedelin and Allwood (2002), the properties of information are appropriate content, form, trust and accessibility to information and these were lacking among the respondents.

5.2.3 Accessibility/Usability of HMIS systems

The respondents reported having sufficient access to information and also noted they found it reasonably easy to use the HMIS. This would be expected to promote the use of HMIS in the decision-making process.

5.2.4 User satisfaction

Managers also wanted reports that were more processed and sophisticated and covering wider operations than just financial information. According to Choo - It is important to identify all user groups information needs, work and social settings to be able to meet the different information needs in the healthcare organisation (Choo, 1998)

5.2.5 Organisation process

Respondents generally stated their organisational processes were not purposely centered around HMIS use. This was shown by lack of dedicated IT personnel,

Information policies or guidelines. They tended to use other sources of information in their decision making processes. According to Choo et al. (2008), information culture explains up to half of the information use. The organization must have a strategic plan for systemic information use in decision making and quality of information so that information forms the basis of organizational decision-making.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the conclusions drawn from the findings highlighted in chapter four and five and the recommendations made therein

6.2 Conclusion

The results from this study indicate that most private level 3 and 4 facilities have in place HMIS systems that are comprehensive in their coverage of facility operations similar with Kijsanayotin & Pannarunothai (2009) where they concluded that health workers in Thailand demonstrated a high level of health IT acceptance and use. Information systems and information processes are enabling conditions for knowledge creation, sharing and use.

The findings from this study also indicate that managers did not seem to consider HMIS as an essential tool in the decision making process in their organizations. These findings were consistent with the study by Kivinen & Lammintakanen, which argued that the implementation and use of management information systems did not seem to be planned as an essential tool in strategic information management in the healthcare organization.

The use of information in the decision-making process was affected by the quality of the HMIS system where the systems with less than ideal reliability, stability, training and user support lowered the users confidence in them and led them to rely more on other information sources.

Low information quality due to insufficient training and lack of information policies also hampered confidence in the use of HMIS information in decision making. According to Choo (1998), inadequate identification of information needs of different groups is the most serious mistake in information management of organization.

The respondents were reasonably content with the access and usability of their HMIS which favored the use of the information in decision making.

Respondents were generally pleased with the basic reports that the systems produced but would have preferred more processed and sophisticated reports that would further aid in their work.

All facilities lack specific information policies and guidelines or strategic plans for information management. This greatly affected the use of HMIS as it affected the quality of information, system quality, access and user satisfaction. It also meant frameworks for information based decision making were lacking.

6.3 Recommendations

To achieve the strategic goals of productivity, effectiveness and quality of care information based management is required and the implementation of the management information system as a part of strategic information management should be planned and coordinated as a whole including every phase of the information management process as well as information culture development.

The organizations should develop strategic information management plans to ensure the information needs of the organization are met. Such strategic plan would also ensure other factors such as access, information quality, user education, process management and attitudes towards HMIS contribute towards the decision making process.

6.4 limitations of the study

This study reported the results of six level 3 and 4 private health centres in Narok North and thus its transferability may be limited except to similar contexts, although earlier studies do indeed concur with some of the findings of this study.

6.5 Areas for further study

These results point to the need and raise some ideas for further research.

It would be beneficial to study further the information needs of health care managers with a view to better understanding what information they require to better perform their tasks.

It would also be useful to study the information culture of healthcare organizations as a factor in the management of information in decision making.

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APPENDICES

Appendix A: Informed consent form

Utilization of Information Technology in Decision Making Research Project:

Informed Consent Form

Interviewee:

Name (first, middle, last)	
Date of Birth (dd/mm/yyyy)	
Location	
Work place	

Thank you for agreeing to participate in this study. We are very interested in hearing your valuable opinion on the use of Information Technology in Decision Making in your work experience. The Utilization of Information Technology in Decision Making Research Project aims to gather information on IT use in decision making in private healthcare settings.

The study aims to understand practices and challenges around Hospital Management information systems (HMIS) utilization in these settings. For this purpose a set of interviews will be conducted with management personnel of private healthcare facilities.

This research will involve interviews that will cover areas that include questions about your work and experiences regarding technical aspects of your facilities HMIS systems as well as your managerial decision making processes.

Results of the research will be published. You will not be identified in any report or publication. Your institution will not be identified in any report or publication. If you wish to be given a copy of any reports resulting from the research, please ask us to put you on our circulation list.

Whilst there are no immediate benefits for those people participating in the project, it is hoped that this work will have a beneficial impact on how HMIS is used in facilities as a tool for decision making. Results will be shared with participants in order to inform their professional work.

In signing this form, I understand the following:

- That the information you give us is completely confidential, and that we will not associate your name with anything you say in the interview.
- We would like to tape record the interviews so that we can make sure to capture the thoughts, opinions, and ideas we hear from the interviewee. The tapes will be destroyed as soon as they are transcribed.
- That you may refuse to answer any question or withdraw from the study at any time.
- That the information you give us is kept private and confidential.
- That the study has been reviewed and approved by Strathmore University Institutional Review Board, which is a committee whose task it is to make sure that research participants are protected from harm. If I wish to find about more about the IRB I can contact them using the information below.
- That the principle investigator for this study is Dr. Daniel, student at the Institute of Healthcare Management, Strathmore Business School, Nairobi, KENYA. I understand that I am free to contact him if I have any questions in relation to this study using the contact information below.

Strathmore IRB	**Principal Investigator**
Amina Mkonje Salim Strathmore University, Ole Sangale Road P.O. Box 59857-00200 Nairobi KENYA Email: asalim@strathmore.edu Phone: +254 703 034 000 Fax: +254 020-607498	Dr. Daniel Kemei Shepherds Hospital Narok Narok Bomet Rd P.O. Box 186-20500 Narok KENYA Email: drdankem@gmail.com Phone: +254 722278810

_____ _____ _____

Signature Place Date

Appendix B: Research Budget

ITEM	UNIT COST KSH	TOTAL KSH
Transport – Narok return	2,500.00	5,000.00
Accommodation	3,000.00	6,000.00
Materials	3,000.00	3,000.00
Airtime	1,000.00	1,000.00
Contingencies	2,000.00	2,000.00
TOTAL		**17,000.00**

Appendix C: Interview guide

Utilization of Information Technology in Decision Making Confidential interview guide

Confidential in-depth interview with Facility administrators.

Interview protocol

Setting up the interview	Choose location, creating a relaxed atmosphere, avoiding interruptions
Ensure confidentiality and written (or oral) consent	Explain use of data, confidentiality
Note taking and/or tape recording	In case of recording obtain consent
15 main questions (interview guide)	See interview guide, general rules: Use open-ended instead of close-ended questions, Avoid leading questions, Use factual questions before opinion questions Use probes: Would you give me an example? Could you explain that further? Is there anything else?
Concluding the interview	Thank interviewee for his/her time
Summarizing notes	Review notes, if necessary verify facts given by the interviewee with the clinic

Interview guide

General information on facility (warm-up)

What are your Qualification, experience and Job description?

What services at offered at your facility?

A. The Presence of HMIS systems and the information they generate

What kind of system do you have installed?

What services at your facility are covered by your HMIS system?

What Modules are implemented in your HMIS system/ are these modules interlinked

What types of reports does is your system able to generate/ how frequently do you generate these reports and for what purpose.

B. Factors influencing the use of HMIS in the managerial decision making process

1. HMIS system Quality

Do you consider your HMIS system easy to use?

- Is your system stable? – frequent downtimes, errors etc.
- What software support mechanisms are available for this system? Do you have full time IT personnel?

2. Information quality

Do you consider the information in the system accurate?

- Is the information timely?
- Is the information relevant?
- Is the information clear?

3. Usability/Access of HMIS systems

At your workplace, do you have direct access to the HMIS?

How do you use HMIS and in what kind of situations / questions / how regular?

How are HMIS helpful in your day-to-day work?

Do you face any challenges/ limitations towards consulting the HMIS in your daily practice?

4. User satisfaction

Are u satisfied with the overall system/information quality of your HMIS?

Do you feel the HMIS system contributes to your productivity?

5. Organisation process

Does your day to day work require the use of information in your HMIS?

Do you have recording and reporting systems other than the HMIS system (e.g. excel sheets, ledger books etc.)

Do you use information generated by your system in making managerial decisions?

Is HMIS utilization incentivized at your current or prior workplace?

- CMEs,
- trainings,
- giving access to updates

Appendix D: Ethics review board approval

Strathmore UNIVERSITY

3rd April 2018 SU-IRB 0183/18

Dr. Daniel Cheruiyot Kemei
Nairobi.

Email: drdankem@gmail.com

Dear Dr Kemei,

REF **Student Number:** MBA-HCM 093842 **Protocol ID:** SU-IRB 0183/18
Title: Using Health Management and Information Systems for Decision Making: An exploratory study in private sector level 3 & 4 health centres in Narok

We acknowledge receipt of your application documents to the Strathmore University Institutional Ethics Review Committee (SU-IERC) which includes:

1. Study Proposal version 2 dated March 2018
2. Participant Information sheets and consent Form version 2 dated March 2018
3. Interview guide version 2 dated March 2018
4. CV

The committee has reviewed your application, and your study *"Using Health Management and Information Systems for Decision Making: An exploratory study in private sector level 3 & 4 health centres in Narok"* has been granted **approval.**

This approval is valid for one year beginning **3rd April 2018** until **2nd April 2019.**

In case the study extends beyond one year, you are required to seek an extension of the Ethics approval prior to its expiry. You are required to submit any proposed changes to this proposal to SU-IERC for review and approval prior to implementation of any change.

SU-IERC should be notified when your study is complete.

Thank you

Sincerely,

Amina Salim
Regulatory Affairs Fellow

STRATHMORE UNIVERSITY ★ APPROVED ★ INSTITUTIONAL REVIEW BOARD