

# A Framework Assessing Information System Adoption and Utilisation in the Healthcare

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## Abstract

*The healthcare industry has undergone a major drift aimed at enhancing quality of life, diagnosis and treatment of diseases, improved service delivery as well as efficiency and effectiveness of the health care system. The adoption and utilization of Information systems plays a key role in improving service delivery and quality of service in healthcare.*

*Despite the importance of information systems in Uganda's health care, Uganda continues to register low levels of system adoption and system failure. The existing Frameworks do not sufficiently explain the reasons for low adoption and system failure. The current IS Models and Frameworks were developed in a different environment and settings therefore they do not sufficiently meet the system quality and designs in LDCs like Uganda.*

*The purpose of this paper is to assess the factors that influence adoption and utilization of information systems in the Healthcare. The study will ascertain adoption and utilization factors in selected Hospitals in a developing country context like Uganda and build a Framework for adoption of IS.*

**Keywords** - HIS- Health Information Systems IS- Information Systems, IT- Information Technology

## I. INTRODUCTION

The provision of health care services is envisaged in MDG goal three of the sustainable development goals that envisages ensuring healthy lives and promoting wellbeing for all at all ages.[1] Such service provision is offered through a system health care facilities and physicians called the health care system. *Unfortunately more than one billion people lack access to a health care system both for caregivers and facilities globally.*

In Africa it is worse as the continent lags behind the rest of the world characterized by infrastructure, social and political problems which has made it difficult to provide quality services to many people [2]

The use of information systems is recommended given its suitability in monitoring progress, informing decision making and allowing for quality assurance in health care service delivery.

Fortunate enough is that the adoption and utilization of information systems help much in not only reducing costs of health care but most importantly improving efficiency and effectiveness through

better records retrieval and thus fewer or shorter stays in healthy facilities .[3]

However quite unfortunate is that reducing the disease burden as a result of improved efficiency in health service delivery has been impeded not only by scarcity and inadequate use of available evidence and information to guide action but less utilization of information systems. In the Sub Saharan Africa the health systems are dominated by paper-based data collection and storage of patients' information which does not only that tend to generate incomplete and inaccurate reports but exacerbate inefficiency or delayed service delivered to health seeking patients. [3]

Despite the challenges associated with Hospital Management Information Systems, this technology remains a method of choice for delivering cost effective quality healthcare. It has the potential to significantly impact healthcare in developing countries where there are persistent shortages of medical personnel[4]

Miller et al [5]stresses that recording of patient information in many hospitals in developing countries has been on papers and identifies limitations of these paper-based records as including illegibility, ambiguity, incomplete data, poor availability and data fragmentation.

Additionally, paper-based systems have limited functionality; many people cannot easily view the same record at the same time this makes the quality of service poor [6].

It is therefore important to note that having electronic medical records can support medical professionals in their decision-making and also improve operating efficiency, thus improving medical care quality [7]

The WHO urges countries to develop strategies for proper design and implementation of e-health technologies since it is a cost effective method of healthcare Service delivery [8]).

By so doing, governments would be able to benefit from services such as medical education, health surveillance, knowledge sharing and research among others.

In Uganda information systems have been and are used in healthcare units service delivery in Uganda including easy record keeping, enhancing communication, performing simple calculations, supporting decision making, medical order entry, gaining competitive advantage, better management

of chronic diseases, faster retrieval of records, improving process flow and increasing productivity. What is unfortunate is that the adoption and utilization of these information systems amongst which is patient records management systems, decision support systems, drug monitoring and control systems, mobile technologies, electronic mail, enterprise resource planning systems and several other office automation systems remains low and is characterized of failure [9].

The country health care units continue to make use of paper-based systems which do not only contribute to poor data quality in terms of reliability and availability but are characterized poor timeliness, incompleteness in reporting and thus compromises health service delivery[10]. It is against this background that this study assesses information system adoption and use in the healthcare with Kampala district establishing the responsible factors for redress.

WHO, (2006) report discussed that Uganda is characterized with low rate of computer usage which stands at 11% [3]Technophobia in Uganda exists mainly among the elderly and those in remote regions. They prefer to write by hand, finding it difficult or uncomfortable using electronic media.

### **1.1 Statement of problem**

Health information systems have been and are used in healthcare units service delivery in Uganda including easy record keeping, enhancing communication, performing simple calculations, supporting decision making, medical order entry, gaining competitive advantage, better management of chronic diseases, faster retrieval of records, improving process flow and increasing productivity.

Uganda as a country is characterized by an imbalanced access to health care between rural and urban areas with consequential poor service delivery as witnessed by the patients. The country health facilities' personnel are more engaged in the utilization of paper in recording of both patient and health facilities' records which recording system is associated with difficulties in retrieval and storage. It is alarming that in the country where health of the population remains indicated as still poor has its health facilities characterized by up to 50% of the patients who are unsatisfied with the time taken to be attended and 44% unsatisfied with the time taken to get medicine (World Health Organization, 2014). This is attributed to the fact that even with the institutionalized health information systems for nineteen years now, their adoption and utilization for faster patient information retrieval remain low. Efforts by government through extension of support supervision to the district, health sub district and lower level health facilities are yet to yield feasible results. Without urgent redress health information systems adoption and utilization failure will not only continue to contribute to inefficiency in health

service delivery but also result in wastage of money by government.

Bosman, [11] show previous studies have discovered that manual documentation of patient's diagnosis and measurements can take up to 20% of nurses' work time. Introducing a Hospital management system may thus save time and costs that could be used for other nursing tasks such as interactive patient care Hendrich, [12].

Oladosu [13]discusses that many systems have either failed to kick-start or they have stopped working in their infancy stages. Part of the causes of these failures, are the gaps in the implementation frameworks and urges that practicable solutions need to be tailored towards existing success stories of these information systems.

Cocca [14]stresses that the transfer of models from developed countries to developing countries is not appropriate as the two settings differ in a number of context for example social, economic aspects and therefore implementing these systems in developing countries will result into system failure.

### **1.2 Specific objectives**

1. To identify the factors that affect the adoption of Information System in the Healthcare in Uganda.
2. To establish the critical success factors for Information System Use and sustainability in the Healthcare in Uganda.
3. To design a Framework for an Information System use and sustainability among health care staff in selected health facilities within Kampala district

### **Research questions**

1. What factors have influenced adoption and utilization of information systems amongst health care staff in health facilities within Uganda?
2. What are the critical success factors of information system use and sustainability in the Healthcare?
3. What suitable Framework would be proposed to influence the utilization and sustainability of information systems in the selected health facilities within Kampala district?

### **1.4 Significance of the study.**

The study findings will equip Health workers with general knowledge about information system adoption and utilization in the healthcare delivery.

To the policy makers within the ministry of health, the successful completion of this study will set a ground for coming with appropriate policies for the development of information systems projects that support information sharing, effective diagnosis and thus improving service delivery in the health sector.

The findings of this study will form a basis for further empirical studies in Information System for health facilities by contributing to scholarly material. To the administrators of health facilities and the health care staff, the results of this study will form a basis for seeking skills geared towards the adoption and utilization of information systems in the different facilities they operate.

## CHAPTER TWO: LITERATURE REVIEW

### *2.0 Introduction*

This chapter presents a review of literature in accordance with the objectives of the study. It particularly presents literature about the information systems and their role in the health care, the adoption and utilization status of information systems in the operations in health facilities and the factors affecting the adoption and utilization of information systems in health facilities.

#### **Definition of key terms**

Health care refers to the act of taking preventative or necessary medical procedures to improve a person's well-being either through medicine administration, surgery or other personal lifestyle alterations.

Health Information Systems (HIS) refers to a set of interrelated components working together to retrieve, store, and disseminate information to support the activities of Health planning and decision making in management and service delivery [15].

A Framework is a real structure intended to serve as a guide or support for the building of something that expands the structure into something useful Margaret Rouse, [16] It is a layered structure indicating what kind of program can or should be built and how they interrelate

### *2.1 Information systems and their role in the health care*

Several studies highlight the role of information systems in health care services. For instance a study that focused on not only the current but also the future research trends with regard to the role of information systems in healthcare by [17] Kolodner reports that information systems are of great potential in both reducing costs of health care and improvement of outcomes from health Care interventions. In support Hilliard, [18] establishes that the proliferation of information systems is largely invoked by the large impact that the existing technology platforms plays when it comes to improving service delivery within the healthcare. Hilliard further articulates that information systems that are technology supported influences the way operations are undertaken in health care facilities that they need to be fully adopted.

Similarly a study undertaken in the United States and United Kingdom by Johnson [19] finds that the utilization of health care information systems offer

eminent economic benefits mainly through efficiency savings particularly in data management.

The author also reports that such information systems are vital in identifying not only the potential bottlenecks in the provision but also the administration of the health care. Different however, Kolodner [19] finds the utilization of information systems vital in improving the quality of the health care coupled with the successful management of costs of healthcare. It is also important to note that Information systems in the healthcare not only improve service delivery but the quality of service. This is evident in a way that they are comprehensive, fast in terms of speed, flagging potential conflicts, verifying medication and dosage.

Pilat and Lee [20] also report that information systems are important in the improvement of health care productivity and also improving service delivery. In support a study by Hannu and Pekka [21] finds the utilization of communication technologies and in specific the related information systems as supporting in the diagnosis of patients for ages. Hannu and the colleague further assert that information systems also results in improved treatment and consequently contribute to patients' Health. Perera [22] supplements that through the adoption and utilization of information systems, diagnosis of the patients improves and health information sharing between patients and their healthcare providers resulting in improved patient education alongside promoting of self-care.

Calman [23] finds that information systems are most important tools in a hospital as they facilitate the improvement of quality and performance of treatments. The authors also establish that the utilization of information systems does not only improve service delivery but also fosters better performance and quick decision making.

In support Ah-madi [24] finds the adoption and utilization of information systems as improving efficiency and effectiveness of healthcare service delivery. None of these two studies were however based in the Ugandan health facilities which gap this study hopes to fill.

In another study that looks at how health information technology infrastructure supports accountable care arrangements, [25] Robinson and Coughlin reports that the adoption of information systems plays a vital role patient's treatments and diagnosis.

Robinson and the colleague also find that information systems provides uncompromising opportunities related to the reduction of health care costs, improved services and patients responses through e-Health. Different however Chiasson & Davidson [26] finds that the benefits of using information systems with the health care facilities are not guaranteed. These results are however contradicting which gap the current hopes to clarify.

## **2.2 The adoption and utilization status of Information Systems in the operations in health facilities.**

The studies that provide an overview into the adoption and utilization status of information systems remain scanty. However a study by Aggelidis and Chatzoglou, [27] establishes the adoption rate of Information System in the Health care as remained low. In support a study by though not articulate Ammenwerth [28] reports that reduced adoption of new information technology information systems by health care facilities renders such facilities to not only become inactive but also lose credibility among patients.

In another study that examines the different aspects of the implementation of Health Information Systems in two public hospitals in Malaysia Ahmadi [29] in a quantitative study reports that the utilization of Information Systems in the healthcare facilities are rather slow. Heeks [30] however reports two categories of information system failure which is total failure and partial failure. To Heeks the partial failure is the case where the information system in which the major goals are unattained as opposed to total failure in which the information is never adopted at all. The two studies however remain silent on the level adoption and utilization which gap the current study intends to establish.

Heeks, [30] further discusses that it is estimated that up to 85% of HIS projects encounter some form of failure with numerous issues that plague their implementation and use in as much as these systems have the potential to improve the quality of care.

In another study to determine the state of adoption of these technologies as well as the factors influencing adoption in South Africa, Mamatela [31] reports that health facilities use information systems ranging from simple electronic fund transfer systems to more complex electronic record and clinical decision support systems. The author also establishes that an average medical enterprise uses an average of six application systems thus are average medium technology adopters.

## **2.3 The factors affecting the adoption and utilization of information systems in health facilities**

Studies highlighting the factors responsible for the acceptance of information systems have quite varying results. For instance a study by examining empirically the factors hindering adoption of hospital information systems by Ayodele [32] establishes the high cost, infrastructural problems, expertise scarcity and inadequate human capital alongside corruption as the factors affecting the adoption and utilization of information systems in the Nigerian hospitals.

According to Ochieng and Hosoi [33] 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 levels of electronic medical records.

Amanyire [34] however found information technology skills deficiency, inadequate information system infrastructure, limited expertise resistance to change, high cost of information system infrastructure and poor design of the information systems as the factors limiting adoption and utilization of information systems in Uganda health facilities which is quite contradictory.

In another study Bhatti [35] reports the lack of management support as one of the factors that limit the adoption and utilization of information systems in Dubai. The author argues that lack of management staff commitment renders adoption and utilization of information system hard in organizations. In support recent study by Namakula and Mayoka, [9] indicates not only management support but also user involvement, resource supply coupled with education and training as the factors influencing utilization of information systems in health facilities in Uganda.

Vest, [36] found out that hospitals with lower technological readiness had poorer odds of health information exchange systems adoption. Additionally, technology readiness is found to be related to receptivity of the management to novel technology. For example, Hung [37] noted that hospital management's readiness to change influenced their willingness to adopt CRM systems and other Hospital Information systems

Lehman, [38] discusses that without the presence of motivational forces (eg, health care providers' dissatisfaction with the status quo), it is unlikely that the innovation process would be initiated. If health care providers resist change or do not possess attributes necessary for change (eg, adaptability and growth-orientation), the change process is less likely to proceed.

In a systematic review of the literature to identify and synthesize influential factors to health care providers' acceptance of various eHealth systems Li et al., (2013) establishes that in 93 papers studied health care provider characteristics, medical practice characteristics, voluntariness of use, performance expectancy, effort expectancy, social influence, were the factors that influence the adoption and utilization of information systems. Different however, the MoFED, [9] finds and reports unstable power supply, poor system quality as the factors that influence adoption and utilization of information systems in Ugandan health facilities. These results are however contradicting which gap this study hopes to fill.

In Indonesia a study undertaken by Sarosa, and Zowghi [39] establishes limited resources that are

allocated for the management of information systems adoption process as one of the constraining factors in health facilities. The authors argue that limitedness in resources impede proper adoption and utilization of information system. In disagreement however a study by [40] Muchangi and Nzuki assert the factors influencing utilization and adoption of information systems as e-Health infrastructure, insufficient ICT resources and low rate of internet penetration.

In Nepal a study undertaken by Mallig [41] establishes that variations in technology, motivations, skills and financial resources among others were the factors that resulted in variation in the adoption and utilization of information systems in health facilities. This is however different for the case of Tanzania where Ishijima [42] identifies the challenges to adoption and utilization of information systems as lack of consensus on sustainable information systems among stakeholders, inadequate skills in computer skills and unsatisfactory information and communication technology infrastructure.

Tornatzky, (1990) [43] discusses key variables including Technology, Organization and Environment that these are key factors that influence adoption technology adoption at a firm level. This framework is seen as a key in the implementation of systems with in the healthcare .

Rogers, (1995) [44] discussed the Diffusion of Innovation theory and recommends that the predictors of organizational innovativeness (that facilitates new IT adoption) include individual characteristics and characteristics of the organization. In addition, the theory also posits that diffusion of a technology innovation depends on innovation characteristics, such as relative advantage, complexity, compatibility, observability, and trailability.

#### **2.4 The critical success factors of Information system use and sustainability.**

Szewczak and Snodgrass [45] stresses that individual's play an effective and important role in technology adoption and utilization process. A technology is not successful if its user do not accept it and in case of Information Systems it is also true. Lack of user acceptance to technology has long been an impediment to the success of new technologies. Therefore, its understanding has been a high priority item for researchers and practitioner alike [46] (Chau & Hu, Venkatesh & Davis.

According to Petter [47] the successful adoption of technologies in companies are much depending on technology characteristics, project and organizational characteristics, user and social characteristics, and task characteristics. He stresses that information quality is the desirable

characteristics of the system outputs. For example: relevance, understand ability, accuracy, conciseness, completeness, understand ability, currency, timeliness, and usability. The proposed theoretical framework assumed that information quality effect on the perceived usefulness and user satisfaction

Hwang, [48] discusses that information quality is a key success factor to information systems he supported that increases in information quality will cause increases in perceived usefulness. In addition Park, et al. supported that information quality has a positive influence on perceived usefulness.

Moreover Petter & McLean [48] supported that there is a significant positive relationship between information quality and user satisfaction. In addition Lee & Yu supported that information quality will positively affect user satisfaction.

Bhatti [35] highlighted that management support is a critical success factor in any project. He stresses that lack of management support, poor planning, limited resources and poor information quality are the major causes of information system failure.

### **CHAPTER THREE: RESEARCH METHODOLOGY**

#### **3.1 Introduction.**

This chapter presents the research design, study area, study population, sample and sampling design utilized by the study. It provides data sources, collection tools, collection procedure, data processing and analysis. It also presents the quality control measures and the likely limitations to the study.

#### *3.2 Research Design.*

A case study was conducted in two Hospitals within Kampala district seeking to discover the factor influencing information system adoption and utilisation.

The study applied both qualitative and quantitative research techniques in collecting and analyzing data. Data was collected from two Hospitals in Kampala, Nsambya and Mengo Hospital.

Qualitative research is generic and on looking at a particular variable in the natural settings in which they are found [49]. It aims at acquiring an in-depth understanding of human behaviour.

Quantitative studies have results that are based on numeric analysis and statistics [9] Namakula., Examples of quantitative research are surveys and experiments. Quantitative research involves analysis of numerical data, logic of inquiry is deductive, reality is objective, and the researcher is independent from what is being researched,

Self-administered questionnaires were used to collect data from IT managers, Administrators, Doctors, Nurses and Laboratory Technicians. The data was

later entered into SPSS and subjected to descriptive analysis. More so Interview guides were designed and administered to management staff using purposive sampling.

The case study research design is also useful for testing whether scientific theories and models actually work in the real world, it is an in-depth study for a particular situation.

This cross-sectional survey was chosen because it collects information from a sample and makes measurements at one single point in time, more so cross-sectional study design allows researchers to compare many different variables at the same time.

It is also important to note that cross-sectional surveys provide information on the frequency (level) of attribute of interest in the study population Casley [50] are also important in assessing practices, attitudes, knowledge and belief of the population.

### 3.3 Study population

#### Target population.

The target population will be all administrators, management staff and health workers in selected health facilities within Kampala district. This population is of choice because it is directly involved in the adoption and utilization of the information systems within the daily operation.

#### Accessible population

The accessible population will be the health workers within the different departments in 2 health facilities within Kampala district during the study time that is Nsambya and Mengo Hospital..

#### 3.4 Sample size

Considering the total population (N) of 214 workers of which 109 work in Nsambya Hospital and 105 in Mengo Hospital, the sample size will be determined by Slovincs formula Yamane, [51] as here below;

$$n = \frac{N}{1 + Ne^2}$$

Where e = 5% (level of precision significance at 95% confidence level)

$$n = \frac{214}{1 + 214 * 0.05^2} = 140$$

Therefore a total of 140 health workers will be targeted distributed as follows

Category	Population(n)	Sample (n)
Nsambya Hospital	109	109/214*140 = 71
Mengo Hospital	105	105/214*140 = 69
		140

Total	214	
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### 3.5 Sampling design

The participation of the respondents in this study made use of a random sampling technique. In particular, identical paper sheets were numbered and then folded and placed in a box. They will be then mixed up and picked at random without replacement in such a way that any individual who picks a paper sheet with a number responding total within sample size range will be included in the study. The simple random sampling design is of choice because it is instrumental in avoiding bias and gives equal chance of participation to each participant. On the other hand, management staff will be selected purposively. This sampling method is of choice because it allows selection of only such participants with the right information to be collected.

### 3.6 Selection criteria

#### Inclusion criteria

- i. All health workers and management staff accessible at the selected health facilities during the study period.
- ii. Health workers and management staff who will provide informed consent to participate in the study.

#### Exclusion criteria

- i. Health workers and management staff who may be unreachable or on leave at the time of the study
- ii. Health workers that were busy during the time the study was taken.

### 3.7 Data Collection instruments

**Questionnaire:** In undertaking the study, a questionnaire which is an instrument consisting of a series of questions and other prompts for the purpose of gathering information from respondents was used. In particular, the study made use of self-administered questionnaires specifically designed bearing in mind which research questions the data so collected would answer the research questions will be utilized. Questions contained within the questionnaire were both closed-ended and open ended. This instrument has been chosen given its confidentiality capabilities and high response rates.

#### **Interview guide**

The questionnaires were supplemented by face-to-face interviews with the respondent management staff of selected health facilities. It will involve a conversation in which a researcher will try to get information about the different aspects of adoption and utilization of information system from the interviewee and records it by himself. The use of tool allows a neutral probe as respondents are asked a same list of specific questions.

This method is chosen because it allows a diversity of views to be collected.

The tool also enables the respondent to freely air out their views. Besides it provides information that is rich enough as per the respondents' way he or she sees and judges adoption and utilization practices.

3.8 Study variables

**Independent variables**

- Personal factors like Information system knowledge and skills
- Organizational related factors like infrastructure, management support
- Technology and the Environment will also be considered.
- Firm Size
- Perceived Ease of Use
- Perceived usefulness

**Dependent variables**

- Information system adoption and utilization status

**CHAPTER FOUR**

**PRESENTATION OF THE STUDY RESULTS**

**1) 4.0 Introduction**

This chapter contains the presentation and discussion of study findings which are based on the study findings. Data analysis was done using statistical package of social sciences (spss). The results presented in this chapter are from the data collected using questionnaires that were used in the hospitals

**2) 4.1 Demographic characteristics of the respondent health workers**

The study ascertained the socio-demographic characteristics of the respondent health workers. Among the characteristics ascertained include; gender, marital status, education level, and experience as presented in table 1 below

*Table 1: Demographic characteristics of the respondent health workers*

Demographic Characteristics			
		(%)	frequency
<b>Gender</b>	Male	38.6	54
	Female	61.4	86
<b>Marital status</b>	Married	35.0	89
	Single	60.7	45
	Separated	4.3	6
<b>Level of Education</b>	Secondary	8.6	12
	Advanced	8.6	12

Diploma	10.0	14
Bachelors	42.9	60
Masters	30.0	42

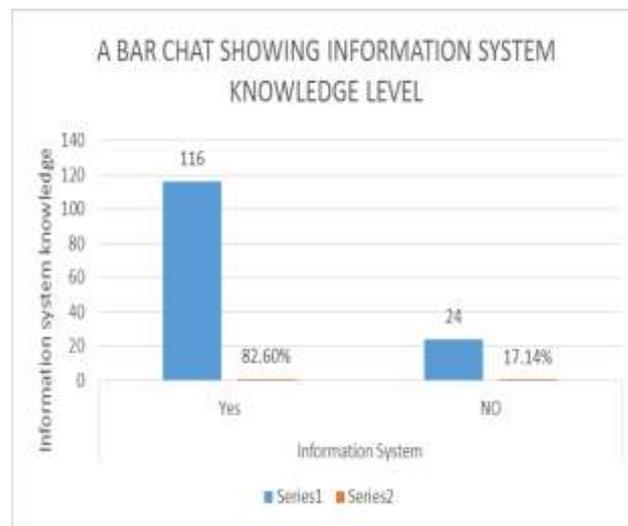
**Demographic Characteristics**

	Frequency	percentages	
	(%)	(N = 140)	
<b>Age group</b>	12.9	20-24	18
	52.9	25-30	74
	8.6	30-35	12
	8.6	35-40	12
<b>Experience in years</b>	17.1	45-50	24
	22.1	0-6 Months	31
	47.1	1-3 years	66
	8.6	2-6 years	12
	22.1	6-9 years	31

**3) 4.1.2 Information system knowledge among health workers, information systems and devices used and rationale.**

The study also examined the information system knowledge among health workers, information systems and devices used and rationale and the results are presented in figures 1 and 2, and table 2 below.

**4) Figure 1: Ability to articulate meaning of Information systems**



The study findings in figure 1 showed that the majority of the health workers had the ability to articulate the meaning of information systems (82.6%) as compared to 17.14% who were no able to articulate.

The study findings show that the majority of the respondents strongly agreed that top management support is the factor that spurs the use and adoption

of Information System in health facilities in Kampala 88(48.1%). In addition, the majority of the health workers agreed that skill of work force is the factor that spurs the use and adoption of Information System in health facilities in Kampala 85(60.3%). In this regard one of the members of management staff said, that user training contributed a lot during the time when the system was being rolled out the IT Team took time to train user and at the time of actual use, the end users had a few challenges in using the Information System.

The findings also show that the majority of the health workers remained neutral in regard to government support as a factor that spurs the use and adoption of Information System in health facilities in Kampala 54(38.3%).

Further still, the majority 98(69.5%) of the health workers agreed that organization infrastructure is the factor that spurs the use and adoption of Information System in health facilities in Kampala. The organizations environment contributed to adoption since the behaviour and attitude of system users was paramount in IS adoption.

The findings also show that the majority 98(69.5%) of the health agreed that workers user satisfaction is a factor that spurs the use and adoption of Information System in health facilities in Kampala. adoption. Users find satisfaction in a system that meets their needs therefore user satisfaction was also considered to be a key factor on adoption.

The study results further showed that the majority 68(48.2%) of the health workers agreed that expansion of access to health care spurs the use and adoption of Information System in health facilities in Kampala.

The majority 90(63.8%) of the respondents agreed that improvement in operation efficiency spurs the use and adoption of Information System in health facilities in Kampala.

Similarly, the majority 39(21.3%) of the health workers agreed that health workers involvement in designing the use and adoption of Information System in health facilities in Kampala.

Performance expectancy was also agreed upon by the majority 91(64.5%) of the health workers as a factor that spurs the use and adoption of Information System in health facilities in Kampala.

Lastly, effort expectancy also agreed upon by the majority 84(59.6%) of the health workers the factor that spurs the use and adoption of Information System in health facilities in Kampala.

#### **Deriving a Model /Framework for Information System Adoption and use.**

This section presents a model /Framework for Information system adoption and utilization in the Healthcare . Factors of Information system adoption and utilization were obtained from the field study

and were used to extend Technology Acceptance Model of Vankatesh & Davis [51]

The researcher adopted the Technology Acceptance Model and used it in assessing Information adoption and utilization, However in Uganda's settings the model lacked some constructs that are important for Information system use and adoption.

Vankatesh & Davis [51]extended the Technology Acceptance Model by eliminating attitude construct and introducing behavioural intention construct .The Model had various variables as explained. The research therefore extends the Technology Acceptance Model to suit Uganda's environment being a Low developed countries some come constructs seemed too generic to be implemented.

#### **4.4.1 Theoretical contribution of Vankatesh and Davis on the Technology Acceptance Model**

The study builds on Technology Acceptance Model by Vankatesh & Davis [51]. The Model had variables as indicated below.

**Perceived Usefulness:** The degree to which an individual believes that using a given system would enhance their job performance

**Perceived Ease of Use:** The degree to which an individual believes using a given system would free mental and physical effort

**Behavioural Intention:** The individuals manner of perception towards using a given system or Technology

**System Use:** This is the manner or means by which customers intend to use a given system.

Many Models have been discussed and used but TAM(Technology Acceptance Model ) has been popular of all in handling Technology acceptance Chuttur[52]. Davis, [51] used the TAM model as a means to explore new Technology in form of Perceived Usefulness and perceived ease of Use.

This is important to note that although the TAM, DOI, and UTAUT models have been implemented in several studies, the TAM has been referenced and implemented to a larger extent Chuttur, [52] the TAM is the most popular this gave the researcher an understanding that the TAM model would suitably be used in the Research study.

#### **Model /Framework Derivation**

The Model of Information system adoption and utilization apart from Perceived Usefulness, Perceived ease of use, Behavioural intention and System Use by Davis and Vankatesh,[53] , More Three constructs have been added and these include Organisation Environment, Skill of work Force , Quality of System.

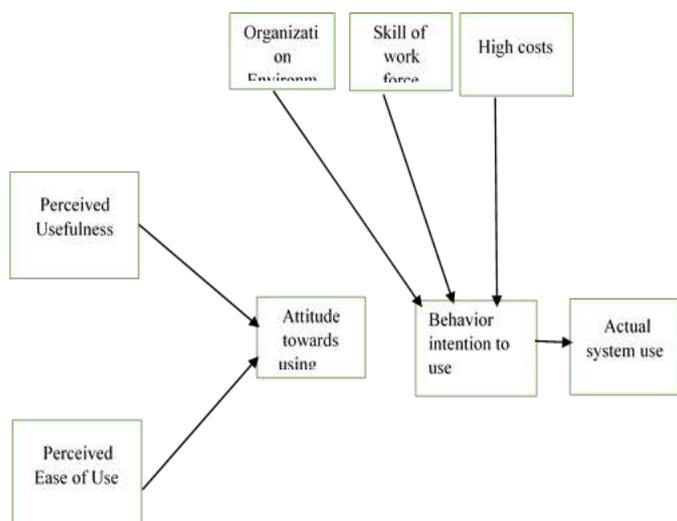
**Organization Environment;** this basically involves the organization settings, infrastructure and the various platforms at which an Information system can run.

**Skill of Work force**, This construct is key since health workers always need to be equipped with knowledge and skill in regards to new technology to improve service delivery

The variables were acquired from the field study during data collection, they were subjected to regression analysis and it was discovered that they had a strong correlation with System Use .

#### High Cost of IS

Most Hospitals and other Healthcare facilities argue that costs incurred in procuring these systems are high and Uganda being an LDC find it hard to afford the expensive systems.



We therefore notice from the Study that Organization Environment, Skill of Work Force and System Quality have a strong correlation with behaviour intention to use the system. Thus the more skills are acquired from Healthcare workers, the more they will adopt Health information Systems. Also the better the systems quality the more people would like to use a given Information system.

The organization environment in-terms of infrastructure and management also are key in adopting a given Information within the Healthcare settings, Support from management is key for HIS to be adopted

#### Regression Analysis

Regression analysis was conducted to estimate the relationships among multiple variables .Multiple regression analysis was used since there was one dependent variable and multiple independent variables. Regression analysis was used because it is predictive and can handle multiple variables, a regression analysis is able to predict relationships between Dependent and Independent variables \

## CHAPTER FIVE: DISCUSSION OF FINDINGS

### 5.1 Introduction.

The previous chapter four discussed the analysis of data from the field and results were obtained .This chapter presents the findings and resulting conclusions

### 5.2 Discussion of findings

The research study aimed at assessing information system adoption and utilization in the Healthcare, the study designed a framework that would help system developers and implementers.

In order to achieve this main objective, the study was guided by the three research questions of: What are the factors influence information system adoption and utilization in the Healthcare in Uganda?

What are the critical success factors of information system use and sustainability in the Healthcare in Uganda?

What suitable Framework would be proposed to influence the utilization and sustainability of information systems in the selected health facilities within Kampala district?

### 5.3 Conclusion

The adoption and utilization of Health information system is key towards improving quality of healthcare service and service delivery.

Systems designed in developed are generic in nature and are designed without putting in consideration developing countries that have challenges related to economic and design Infrastructure. In order to have this in place, in Uganda’s settings some challenges have to be addressed including systems slowing down, Interrupted power failure, system failure, slow internet speed and gaps in the system design.

### 5.4 Recommendations.

My recommendations are from the new constructs on the Technology Acceptance Model which include Management Support, satisfaction and Health involvement. In a way to improve system adoption, Health workers need to be trained on how to use these systems, More so Health workers involvement during the design process is a vital factor.

The research study also found out that in order for Health information systems to be successfully implemented , key points have to be put in account; A strong and consistent power back up has to be in place, Reliable internet connection should be up and running , continual training and equipping health workers with skills in Information systems should be prioritized.

The study was conducted in Uganda which is a LDC and still has constraints in terms of finances, resources and highly skilled system developers to implement these systems in Uganda’s settings.

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