Evaluating the Adoption of Health Information Systems in Mengo and Nsambya Hospitals, Kampala, Uganda

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Abstract—*The adoption of Health Information systems plays a key role in improving service delivery, quality of service and improving productivity in the healthcare. In-spite of many years of extra effort by the various facilities and institutions to implement Hospital Information Systems, the adoption of these systems in the healthcare remains low. This is attributed to various adoption models of new Information and Communication Technologies (ICT) has been one of the most challenging issues in developing countries like Uganda.*

The implementation of new HIS innovations involves fulfilling many requirements ranging from technical to human. This study used the Unified Theory of Acceptance and Use of Technology (UTAUT) model as an evaluation model to understand the behavioural intention on acceptance and use of technology. The study was conducted at Mengo and Nsambya Hospital in Kampala, which are one of the Non-profit faith based public Hospitals in Uganda.

Closed and open-ended questionnaires were administered to 150 Hospital Workers. The Staff members who were involved in the management of the targeted information systems were also interviewed. A total of 140 questionnaires were returned accounting to 80.1% response rate. The reliability yielded Cronbach's output of 0.677. The results indicated that effort expectancy, performance expectancy, social influence, facilitating conditions and Information Systems Skill of workforce as factors affecting the behavioral intention to use Hospital Management Information System (HMIS), which ultimately affects their adoption. The model explained 58.4% of the variance of the `behavioral intention to use HMIS

Keywords HIMSS-Health Information Management systems Society, HIS-Health Information Systems, IT- Information Technology, ICT-Information Communication Technology, IDT-Innovation of Diffusion Theory, UTAUT-Unified Theory of Acceptance and Use of Technology, WHO-World Health Organization, SDG-Sustainable Development Goal, TAM -Technology Acceptance Model

I. INTRODUCTION

The provision of health care services is envisaged in Sustainable Development Goal (SDG) three which focuses on ensuring healthy lives and promoting wellbeing for all [1]. To be able to achieve the SDG three, United Nations and the World Health Organization advocate for the use of Health Information Systems to enhance service delivery at all health facilities [2] [3]. The UN-SDG calls on governments to ensure that the benefits of new technologies, especially Information and Communication Technologies (ICT) are available to all. The World Health Organization (WHO) defines electronic-Health as the cost effective use of ICT in the support of health and health related fields including healthcare services, health surveillance, education, knowledge and research [4].

Globally the impact of electronic-Health (e-Health) has witnessed the reduction of healthcare costs and improved efficiency through better retention and retrieval of records, better management of chronic diseases, shared health professional staffing, reduced travel times and fewer or shorter hospital stays [5]. Health care facilities have adopted Health Information System, which helps in information sharing, easy record keeping and enhanced decision making. As a practice, WHO advocates for continuous evaluation of health information systems to ensure usage and accountability for investments made.

1.1.1 Health Information Systems in Developed Countries.

Recently, there has been an increase in the activities that promote the adoption of Health Information Systems in developed countries[6], the Health Information Systems provided by stake holders with in the Healthcare organization with in New York increased strongly from 50% in 2012 to 73% in 2013. In the United Kingdom (UK), the adoption rate of information systems has been rated at 89% among general practitioners (GPs) [7]. Nearly all General Practitioners in Hospitals use these systems for managing laboratory results and recording clinical notes. In addition, the United States of America (USA) and England have registered a tremendous growth of over 90% adoption rate of information systems with one study reporting that 97% of the 8810 practices in England use a system [8]. Denmark also has taken a step ahead in adoption of HIS for it leads away in European e-Health and

patients controlled health records [9] and [10]. In addition, doctors use computers to send live video, sound and high-resolution images between two distant locations as well as examining patients in clinics that may be thousands of miles away. These HIS are being rolled over to developing countries due to their immense abilities in reducing healthcare costs, suitability in monitoring progress, informing decision making and allowing for quality assurance in health care service delivery (McClure, 2007).

Developing countries are now waking up to the realization that they have to embrace information and communication technologies to deal with the problem of access, quality and costs of healthcare [11]. He further argues that the adoption of Health Information Systems will increase access of Health information. However the adoption of Health Information systems in developing countries is limited due to lack of understanding of the problems and challenges surrounding service delivery of healthcare in poor settings and addressing these special needs (Douglas, 2009) with in such environment. [12] also stressed that Health Information Systems should be adopted due to their ability in reducing overall patients costs, improving physicians efficiency and patients safety.

In Africa, there is an evaluation healthcare gap of HIS as investments in the Health section are minimal [13]. Health systems in Africa suffer from fragmentation, shortage of trained human resource, weak information systems, lack of good governance and financial constraints which have made it difficult to provide quality services to many people. One of Africa's major public health challenge is building and reinforcing Health systems capable of delivering essential healthcare to the population [14].

1.2 Statement of problem

The Ministry of Health has invested a lot in setting up Health Information Systems in Uganda's healthcare units. Such HIS's have enabled the reduction of healthcare costs and improved efficiency through better retention and retrieval of records, better management of diseases, shared health professional staffing, reduced travel times and fewer or shorter hospital stays [15]. Health care facilities have adopted Health Information System which help in information sharing, easy record keeping and enhanced decision making [16]. Despite the positive effects and huge investment in Health Information Systems in Uganda little is known about the adoption facilitators and inhibitor of such HIS's especially in faith-based Non for profit hospitals in Uganda. Many Health information Systems have either failed to kick-start or stopped working in their early stages [17] due to limited attention given to facilitating and inhibiting factors on behavior intention and adoption issues. Oladosu *et al. (*2009) stressed that due to gaps in the implementation frameworks many systems have failed to work hence

low levels of adoption. Cocca et al. (2009) stressed that the transfer of models from developed countries to developing countries is not appropriate as the two settings differ in a number of context

The study therefore focuses on understanding the facilitators and inhibiting adoption factors as derived from the existing evaluation models.

1.3 Purpose of the study

The purpose of this study is to evaluate the adoption of health information systems in Mengo and Nsambya hospitals in Kampala, Uganda.

1.4 General Objective.

Therefore the main objective was to evaluate the adoption of health information systems in Mengo and Nsambya hospitals in Kampala, Uganda drawing from the Unified Theory of Acceptance and Use of Technology (UTAUT) model.

1.4.1 Specific objectives

   i. To identify the factors that affect the adoption of Information System in the Mengo and Nsambya hospitals.
   ii. To determine the level of significance of factors influencing HIS adoption in Mengo and Nsambya hospitals.
   iii. To establish the relationship between the adoption factors and intention to adopt HIS in Mengo and Nsambya hospitals.

1.5 Research questions

The main research question was "What are the evaluate factors for the adoption of health information systems in Mengo and Nsambya hospitals in Kampala, Uganda drawing from the Unified Theory of Acceptance and Use of Technology (UTAUT) model?"

   1. What are the factors that affect the adoption of Information Systems in the Mengo and Nsambya hospitals?
   2. What is the level of significance of factors influencing HIS adoption in Mengo and Nsambya hospitals?
   3. What is the relationship between the adoption factors and intention to adopt the HIS in Mengo and Nsambya hospital?

1.6 Scope of the study

The study focused on identifying the factors influencing Health information system adoption within Private faith based non-for profit Hospitals in Kampala. The study sites included Mengo and Nsambya Hospitals as the faith based non-for profit hospitals in Kampala. The study was conducted in six month that is May 2016 – October 2016 for data collection and analysis.

1.7 Significance of the study

The study describes the factors that affect the adoption of Health Information System in the healthcare and derived a framework for adoption with in selected Health facilities.

To the policy makers within the ministry of health, the successful completion of this study sets a ground for coming with appropriate policies for the development of information systems that support information sharing, effective diagnosis and thus improving service delivery in the health sector. The findings of the study 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 form a basis for seeking skills geared towards the adoption of information systems in the different facilities they operate. The research will guide the Ministry of Health in formulating effective national IT plans that promote knowledge sharing and management of HIS. The research findings will provide knowledge needed by other public hospital facilities in developing countries that are in the process of successful adoption of HIS

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter presents a review of literature in accordance with the objectives of the study. Section 2.1 looks at the definition of key terms, section 2.2 focuses on Adoption of information systems in developed countries, 2.2.1 looks at facilitating factors in developed countries, 2.2.2 HIS Adoption in Developing, 2.2.3 inhibiting factors in Developing counties, 2.3 discuses Review of Information Systems Model.

2.1 Definition of key terms

2.1.1 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.

2.1.2 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. It is a layered structure indicating what kind of program can or should be built and how they interrelate.

2.2 **Adoption of information systems in developed countries.**

In the past three decade, there has been tremendous activity in the development of Health Information systems. According to the Health Information and Management Systems Society (HIMSS) a report indicates that there was an increment in adoption of Health Information systems among developed countries. Information Systems were being used by

more than 65% of physicians in the United States in 2008 (HIMSS, 2008). More so [18] stresses that due to the potential benefits of Health Information Systems in the United States, the implementation of HIS greatly improved, it was found that the adoption was rated at 80% in 2014.

In United Kingdom the adoption of Health Information Systems is substantially higher than in the U.S. or Canada, with one study reporting that 97% of the health workers in England use Health Information system that includes clinical documentation by physicians [8]. In England also, the researchers found out that the implementation HIS can bring about a change in the health outcomes, enhance service delivery and the unanswered questions faced by the system users [19] for this reason the adoption in this country has been increased to over 97%.

Germany and Netherlands also had high rates of Health Information systems use among Health care providers. The study suggests that approximately half of the General Practitioners in Germany have used Health Information Systems, which was spurred on with clinical documentation. Although Health Information Systems adoption rates in Germany are modest, nearly 3 out of 5 German General Practitioners (GPs) have the ability to order prescriptions electronically [7].

In Malaysia, their health care system is considered among the best in the region with 90% of the population accessing primary healthcare and affordable medication. This has been a result of the government effort towards the implementation of the HIS in the health sector which has lowered the cost and improved the quality of services offered in the Hospitals [20].

2.2.1 The factors of HIS Adoption in Developed Countries.

In developed countries a number of factors contribute towards the adoption of HIS which include; Human, Environment, Technical and organization [21]. Health workers are equipped with the skills and expertise on how to use HIS, The environment in terms of infrastructure favours the implementation of these systems. In addition Government and management support contribute greatly towards adoption since Hospitals are facilitated with enough financial resources to implement these systems. The nations and communities that comprise of developed world have had a high level of HIS adoption due to the existence of a strong leadership, sufficient resources, government policy on implementation of these systems. In the United States, the government implemented a Health Information Technology for Economic and Clinical Health (HITECH) Act 2009 which directed various institutions to adopt

Information Systems for decision making, information sharing and managing patient's records. The primary critical determinant of HIS adoption included nationwide IT policy. Government policies are considered highly instrumental in diffusion of computing in a society. This is very imperative within the context of developing countries where governments control majority of the IT infrastructures [22] and support diverse policies that impact the use as well as acquisition of the infrastructures by private institutions.

In addition Human behavior towards the adoption of HIS is another factor that has been key in developed countries [23]. Medical professionals behavior towards the implementation has been positive in a way that a number of health workers realized the benefits and importance of HIS in their daily work therefore this changed their perception to adopting HIS.

Technical support within the Health institutions have played a big role towards the adoption of HIS. Developed countries have strong technical teams that support the implementation and the roll-out of these systems [23] and not only that they have better technology in terms hardware and software. A strong technical team has the capacity to see a successful implementation and utilization Health Information system.

Perceived Usefulness of HIS has greatly contributed to HIS adoption. Hospital management have come to a realization that the use of HIS improves and enhances their work productivity [24]. Therefore the usefulness of these systems has been a facilitating factor to their adoption.

Organization barriers are also key factors that influence adoption of HIS. An organization whose top managers are in support towards the adoption of HIS will have a greater influence to accepting the implementation of these systems [23].

Another factor was perceived ease of use, it was a frequently mentioned factor that influences the adoption of Health information System. Perceived ease of use was defined as the perception by an individual that the utilization of an Information system will be relatively painless and effortless. [25] further noted that it was important for professionals to fully perceive the usefulness and ease of use of technology in their working environment.

2.2.2 Adoption in Developing countries.

Information systems are increasingly becoming important for measuring and improving the quality and coverage of health services. Reliable and timely health information is vital for operational and strategic decision-making that save lives and enhances health. [26] argues that the benefits of information systems are beginning to emerge among smaller practitioners and large organizations due to their benefits in information storage and retrieval.

The studies that provide an overview into the adoption of information systems remain scanty. However a study by [27] establishes the adoption rate of Information System in the Health care has remained low. In addition the factors responsible for the adoption of information systems have quite varying results.

In Ethiopia statistics have revealed that the adoption and utilization of information is at 32.9% this implies that information quality and use remains weak.

In Nigeria a study was conducted by [28] examining empirically the factors hindering adoption of hospital information systems were found to be lack of funding support, unfavorable government policy, the high cost, infrastructural problems and inadequate human capital alongside corruption as the factors affecting the adoption and utilization of information systems.

In Saudi Arabia there is an existing gap between planning for HIS and successful implementation[29] and as a result of deficiency in providing technical support for the system during and after the implementation as well as the costs incurred in design and maintenance [30] which has hindered HIS adoption.

In Egypt, a number of reasons are given that have prevented information system adoption, such include limited computer skills , Inadequate technical support but the most common reason is the high cost of acquisition and maintenance of the Health Information System.

Furthermore [31] posited that a poor technological base and lack of funding support by the developed countries are responsible factors for poor implementation of Hospital Information systems in the developing countries.

In Rwanda by 2008, the Health industry started recognizing the importance of HIS in recording patients information this was however hindered by inadequate skills on how to use these systems by the medical personnel's [32].

2.2.3 An overview of HIS inhibitors in developing countries.

Over the past few years, countries have participated in the implementation of Health information systems however there are still some inhibitors towards achieving this. These barriers of implementation include; high costs of Health information systems, lack of technical expertise, Resistance of hospital staff to adopt HIS, Limited knowledge of computer skills among health professionals and lack of facilities for data processing are the key issues to be addressed prior to implementation of hospital information systems [33].

One major cause of IS adoption inhibitor is cited in literature is the transfer of information systems and IS models from one environment to a different environment. Organization and institutions differ in

terms of managerial, cultural and economic environment [34]. Similarly developed countries differ from developing countries in terms of technology, processes, objectives, values, motivations, staffing, skills, management, structures and financial resources. The transfer and use of information systems and IS models in differing settings may therefore not be appropriate and could result into failure to adopt these systems.

Technical Expertise is one of the factors that have hindered adoption for a long period of time in developing countries which contrasts with Developed where most people have experience or understanding of the capabilities of such technology. Additionally Healthcare facilities in developing countries lack the range of internal expertise to support the implementation of these HIS [35].

Professional barrier related to the nature of the Healthcare Job. This involves the position and role played by health workers for example Management team would have a great impact on the adoption of HIS in a given organization[36]. Also low adoption of HIS by the management team would be a barrier for the rest of the team to adopt. [37] have highlighted management support as a critical adoption factor in any project. Any project is prone to failure in case it encounters problems any time during the project life cycle for as long as it lacks commitment from management.

Human barrier related to beliefs and behavior. The great resistance of physicians and other health workers to use Health information systems is one of the inhibitors of HIS adoption. Human factors are directly related to beliefs, attitude and behavior of Health professionals such as ability to learn over time, computer knowledge, motivation and personal initiative to use HIS [38].

Information quality is also a key factor that influences adoption. Good quality information is a very significant factor that contributes to adoption of information systems [39] Once IS stakeholders realize that the information quality obtained from the HIS is poor and does not meet their expectations, that can automatically result into rejection of the IS at hand.

2.2.4 An overview of Health Information Systems Adoption in Uganda.

In developing countries healthcare information systems have been driven mainly by the need to report aggregate statistics for government or funding agencies. In these countries technical issues, social organizational issues in Information System (IS) adoption are rarely given attention yet there is evidence that many IT innovations are failing due to these issues that are important for the success of HIS adoption [40]. HIS play a major role across all health related sectors in both public and private sector. A good number of HIS implemented in developing countries have turned out to be successful thereby bringing with them benefits accompanying HIS successful adoption. At the same time, studies indicate that HIS have not always been successfully adopted, and indeed there are many examples of total failure and partial failure**.**

In the recent past years, the Ministry of Health in Uganda introduced the use of HMIS for all the public facilities for monthly reporting of medical records within various Hospital departments (Litho,2010), this has however been impended by inadequate technical staff and limited resources to maintain and keep these systems up and running. According to [15] he stresses that information technology skills deficiency, inadequate information system infrastructure, 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.

2.3.3 The Theory of Acceptance and Use Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) model is as a result of merging constructs and moderating factors from eight different models [41] these include; Theory of Reason Action, Theory of Planned Behavior, Technology Acceptance Model, Motivational Model, Combine Theory of Planned Behavior and Technology Acceptance Model, Model of PC Utilization, Innovation Diffusion Theory, and Social Cognitive Theory (Oye et al., 2012). [41] showed that UTAUT explains 70% of the variation in the usage intention and adoption of technology which is greater than each of the eight previous models and extensions.

The UTAUT theory provides a refined view of how the determinants of intention and behaviour evolve over time. The theory assumes three direct determinants of intention to use (performance expectancy, effort expectancy and social influence, the two direct determinants of usage behavior that is intention and facilitating condition [41]. These relationships are moderated by gender, age, experience and voluntariness of use.

UTAUT has been proven to be a valid research instrument and tool that is a predictor of adoption behavior and BI with emphasis on performance expectancy (PE) and voluntariness as the most salient drivers of acceptance[42].

According to [41] the UTAUT Model has four major constructs that have a direct effect on behaviour Intention which also has an influence on use. The constructs include Performance expectancy, Effort expectancy, and Social Influence and Facilitating condition. The constructs were discussed as key variables that have an influence on behavioural intention to use HIS.

The key constructs include;

Performance Expectancy: The degree to which the individuals believe that the use of a technology will result to a performance gain. It is significant to determine Behaviour Intention with effects varying across gender and age.

Effort Expectancy: The ease of use of a given Technology. Users can easily adopt an information system due to the fact that less effort is required to perform their day today work.

Social Factor: The extent to which the Individual believes that important others believe that they should use the technologies. It was found that Behaviour intention was found to be contingent on gender, age, experience and voluntariness.

Facilitating Condition: The perceived extent to which the organization and technical infrastructure required for the support of the technologies.

The study therefore picked the four constructs from UTAUT to form a basis of the key variables that were used in the evaluation of Information Systems adoption.

The researcher seeks to examine all the above mentioned theories and models, find out the similarities between the various constructs used to explain individual user technology adoption and how these theories relate with each other to influence people's behavior to adopt a given Information system

[41]proposed the UTAUT model to gain a better understanding of technology acceptance. They compared and synthesized eight models of technology acceptance and created the Unified Theory of Acceptance and Use of Technology (UTAUT) model. These eight models are the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model (MM), the Theory of Planned Behavior (TPB), the Combined TAM and TPB, the Model of PC Utilization (MPCU), the Innovation Diffusion Theory (IDT), and the Social Cognitive Theory (SCT). To date, there are not many studies which empirically test this model [43]

RESEARCH METHODOLOGY.

3.1 Research Design.

Research design refers to a strategy chosen to integrate the different components of the study in a coherent and logical manner ensuring that it effectively addresses the research problem [44].

Creswell (2013) discusses two kinds of research design that is qualitative and quantitative design. He asserts that quantitative research approach is one in which the investigator primarily uses post positivist claims for developing knowledge. He also stressed that qualitative research is an activity that locates the observer in the world through a set of interpretive and material practice that make the world visible.[45]states that, this approach uses strategies like case study so that the researcher collects open ended data with the primary intent of developing theories from the data.

In addition, [45] discussed the mixed method as one in which the researcher bases knowledge claims on pragmatic grounds for example consequence-oriented and problem-centered. He adopted strategies of inquiry that involve collecting data either simultaneously or sequentially to best understand research problems.

The researcher applied a mixed method as an approach to address the study problem. Both Qualitative and quantitative techniques was used in data collection and analysis. The study was conducted in two faith based Hospitals within Kampala district seeking to discover the factor influencing information system adoption in the Healthcare. Data was collected from two Hospitals in Kampala, Nsambya and Mengo Hospital since these Hospitals were convenient in accessing information, were under a category of faith based non profit hospitals and gave a wider sample size.

In this study, the researcher explores generally to learn about the variables to study and then studies those variables with a large population sample. Also quantitative data was gathered using a self-administered questionnaire that was designed using the UTAUT model variables and the facilitating and inhibiting factor of Information system adoption that was identified in the literature reviewed.

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 was 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.

3.3 Data Collection techniques.

3.3.1 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 were utilized. Questions contained within the questionnaire were both closed-ended and open ended. This instrument was chosen given its confidentiality capabilities and high response rates in acquiring quantitative data.

3.3.1 Interview guide.

The questionnaires were supplemented by face-to-face interviews with the respondent management staff of selected health facilities. It involved a conversation in which a researcher recorded

information about the different aspects of adoption of information system from the interviewees. The use of tool allows a neutral probe as respondents are asked a same list of specific questions. This method was 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 practices.

3.4 Sampling Techniques

This involves selecting a number of individuals from a population such that the selected group contains elements representative of the characteristics of the entire group. Purposive was used in this study. Purposive sampling method enabled a researcher with a purpose to have access to a particular subset of people of interest and eliminates those that do not fulfill certain conditions.

The participation of the respondents in this study also made use of a random sampling technique. The simple random sampling design was of choice because it is instrumental in avoiding bias and gives equal chance of participation to each participant. On the other hand, management staff were selected purposively since they have a knowledge and interact with Hospital Information systems. This sampling method was of choice because it allows selection of only such participants with the right information to be collected.

3.7 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 provided informed consent to participate in the study.

Exclusion criteria
  i.   Health workers and management staff who were unreachable or on leave at the time of the study
  ii. Health workers that were busy during the time the study is taken.

Approach to achieving objectives.
The Study adopted both the UTAUT models, the model was evaluated and used to come up with constructs that extended the models. Despite the fact that the extensive replication, applications and integration of UTAUT have enabled many researchers to understand technology adoption, there is still a need for a systematic investigation and evaluation of Information system adoption (Venkatesh et al., 2012). Moreover, there is considerable debate among researchers (for a review, see Venkatesh et al., 2012) who argue that the

UTAUT's constructs may not be sufficient to explain user acceptance of new technology in a voluntary context as the initial UTAUT study focused on large organizations in the business environment which limit its explanatory power. Information gained from the review of literature and findings obtained from the survey were used to derive a model for adoption of Hospital Management Information System. MS Word 2007 advanced drawing tools is the software that was used because it is easy to use. It is at this stage that the second research question was answered.

UTAUT model was used to come up with self-administered questionners which were given to 140 respondents in both Mengo and Nsambya Hospitals. The respondents gave their views and experiences of HIS. The Questioners were adopted from UTAUT Model constructs which included Performance Expectance, Effort Expectance, Social Influence and Facilitating conditions.

3.11 Determining relationships and level of significance

Regression analysis was performed to evaluate the model. Results from regression analysis addressed the second and third research question. The questionnaire tool was used as a basis to come up with data and later analysis was performed.

Approach for factors influencing Adoption of HIS

The study used self-administered questionnaires, interview guides and observation to meet the first objective. Unified Theory and use of Technology (UTAUT) was used to identify the factors influencing HMIS adoption. Self-administered Questionnaires were distributed and given to health workers including Doctors, nurses, Lab technicians and IT teams. During the study, the researcher arranged interviews for the selected people including Managers, Administrator and IT members since these had a great influence on the adoption of the Information systems. The researcher also studied and reviewed literature in both developed and developing countries with their facilitating and inhibiting factors of HIS adoption.

In addition during the study, the observation technique was used to identify the information systems currently running, what are the major challenges that face adoption of these information systems. It is at this point that the first objective was addressed.

PRESENTATION OF THE STUDY RESULTS

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 3 below. The study findings in table 4.1 showed that the majority of the health workers were females (61.4%) as compared to males (38.6%). The majority were single (60.7%), had attained Bachelor's degrees (42.9%), aged between 25 and 30 years (52.9%) and had working experience of 1 – 3 years (47.1%).

Scales Reliability Testing.

The study used a [46] to determine the correlation coefficience among variables. Cronbach's alpha (1951) is a reliability coefficient that indicates how well the item is positively correlated to one another. According to (Hair *et al.*, 2006), scale reliability refers to the extent to which a set of variables is consistent in what it is intended to measure.

In addition [47] stressed that measurements are reliable to the extent that they are repeatable and that any random influence which tends to make measurements different from occasion to occasion.

Reliability of Constructs

Construct	Cronbach's Alpha	Number of Items
Performance Expectance	0.812	25
Effort Expectance	0.831	18
Social Influence	0.791	24
Facilitating Condition	0.842	30
IS Skill of Wok Force	0.814	31
Behavior Intention to use	0.781	12

Table 1: Reliability of tested constructs

According to [46]) the results of a given questionnaire can be relied upon, given that all variables under the study had a Cronbach's Alpha Coefficient greater than 0.7. All the values were above 0.70 the acceptable Cronbach's Alpha Coefficient. This implies that the results can be relied upon.

1) 4.5 Validity Analysis

Validity refers to "the degree to which a measure accurately represents what it is supposed to [48]. The study used factor analysis to compute validity of data that were got from the field. This was because several variables were used during the field study. Factor analysis was used because it helps to produce a small number of factors from a large number of variables (by grouping variables with similar characteristics together) which is capable of explaining the observed variance in the larger number of variables.

2) 5.2.1 Factors affecting information system adoption in the Healthcare

Results from the study indicate key factors that influence Information system adoption and utilization in the Healthcare and they include, Performance Expectance, Effort Expectance, Facilitating Conditions, Social Influence and IS Skill of Work Force.

HIS adoption failure is a factual challenge that continues to face Health facilities especially in developing countries (Devos et al., 2008, Laitinen, 2008). The existing HIS adoption models are generic in nature, not tailored to specific Hospital needs in developing country settings. Therefore the study used UTAUT models construct to evaluate HIS adoption in the Healthcare Hospitals within Kampala. Information systems adoption failure results into money wastage which is particularly affects growth in developing countries where development capital is generally in very short supply(Sander et al., 2005). One of the inhibiting factors of low adoption rate cited in literature is the transfer of information systems and IS models from one environment to a different environment. Developed countries healthcare differs from the developing ones in terms of managerial, cultural and economic environment (St-Pierre and Delisle, 2006). Similarly developed countries differ from developing countries in terms of technology, processes, objectives, values, motivations, staffing, skills, management, structures and financial resources (Malling, 2012).

The level of management support, performance expectance, effort expectance, facilitating conditions and social influence contributed to HIS adoption was significant. This finding is consistent with studies by (Sabherwal et al., 2006) who describes key factors that influence HIS adoption.

Results from the study indicate the factors influencing HIS adoption in selected faith based hospital: Skill of work force, effort expectancy, performance expectancy, facilitating conditions and social influence. The level to which users acquire information systems skills will influenced HIS. This is because the knowledge is necessary for one to be able to operate the systems in question. The results are consistent with a study by Abraham et al. (2011)

argue that optimal use of IT towards the improvement of health care requires IT skills in the medical sector. This has led to poor preparation of data for use, and low initiative for using the data in Tanzania (Smith et al., 2008).

Performance expectancy

Respondents' views were obtained on whether performance expectancy contributes to adoption of Hospital Management Information Systems. The variables investigated under the performance expectancy construct included system usefulness in their job, task accomplishment, improved productivity, chances of getting a pay raise.

Effort Expectancy

The results showed that users prefer systems that are easy to understand and with well-defined Interfaces. It was also discovered that users would rather use a system that has straight forward or simple features for example interfaces and also easy to learn how to use even without training. Therefore, majority of the respondents agreed that the ease of use of the system in their work, the ease of acquiring skills in system use and the ease of operating the system contributes to the adoption of HMIS.

Social influence

Data was collected to determine whether the social life of an individual has an impact on the adoption of Hospital Management Information Systems. The variables investigated under the social influence construct were peer influence, external influence, technical support and management support. Results from the respondents show that 69.5% of the people agreed that social influence was key in information systems adoption.

Facilitating conditions

Analysis conducted from the data shows 48.2% of respondents agreed that resource availability contributes to the adoption of HMIS as opposed to 4.3 % who disagreed. 21.3% of respondents strongly agreed that availability of system knowledge to the users contributes to adoption of HMIS as compared to 4.3% who disagreed. The study results are consistent with studies by Heeks (2006) who states that availability of resources is key factors essential for Information system adoption.

Skill of Workforce

From the analysis carried out, 60.3% of the respondents agreed that the work force require skills to be able to effectively adopt and use Hospital Management Information systems. A workforce with the necessary skill will find it easy and profitable to use HMIS in their day-to-day work since it enables them run their work effectively.

5.2.3 *Establishing the level of significance of factors influencing HIS adoption in Mengo and Nsambya hospitals*.

The study applied the UTAUT Model and used her constructs to establish the level of significance among variables. The results indicated that Facilitating condition with B= 0.417 has the largest level of significance in explaining variation of behavioral intention, followed by Performance Expectance with (B=0.055), then Information System skill of workforce (B=0.038). Given the five variables, three variables (facilitating conditions with P= 0.000, Performance Expectance with P= 0.038, Social influence with P = 0.000 and IS Skill of workforce P = 0.043) have a significant influence on behavioral intention since at the level P < 0.05 variables show a high level of significance.

5.2.4 *Identifying the relationship between the adoption factors and intention to adopt HIS in Mengo and Nsambya hospitals*.

The study had UTAUT variable which included Performance Expectance, Effort Expectance, Social Factors, Facilitating condition .Results thus imply that there is a strong relationship between the multiple independent variables and the dependent variable. Among the proposed constructs three of them including performance expectancy, facilitating conditions and Information System Skill of workforce showed a positive relationship with behavioral intention. , Facilitating condition with B= 0.417 has the largest impact in explaining variation of behavioral intention, followed by Performance Expectance with (B=0.055), then Information System skill of workforce (B=0.038). Given the five variables, three variables (facilitating conditions with P= 0.000, Performance Expectance with P= 0.038, Social influence with P = 0.000 and IS Skill of workforce P = 0.043) have a significant influence on behavioral intention since at the level P < 0.05 variables show a high level of significance.

5.3 Conclusion

Multiple regression analysis was performed to determining the strength, direction and level of significance of the relationships among factors. The multiple correlation coefficient R was equal to 0.677. R shows how strongly the multiple independent factors relate to the one dependent variable. Results thus imply that there is a strong relationship between

the multiple independent factors and the dependent variable.

The study findings from the correlation coefficient showed that three variables of which are performance expectancy, facilitating conditions, IS Skill of Work Force that are positively related to behavioral intention since their B values are positive. Facilitating Conditions with B=0.417 has the largest impact in explaining variation of behavioral intention, followed by Performance Expectance (B=0.055) then IS Skill of work force (B=0.038), Out of the four variables, two variables (Facilitating conditions with (P=0.000), and Social Influence with (P=0.000) have a significant influence on intention to use at the level P < 0.05 while the remaining three variables had Performance Expectance with P= 0.038, Effort expectance with (P = 0.081).

The outcome of the study shows that Facilitating conditions and Performance Expectance had a strong relationship with intention to adopt while Effort Expectance, Social Influence had a weak relationship with intention to adopt.

The study finding also showed that Performance expectancy, Facilitating conditions and Social influence were found to have a positive relationship with Intention to adopt. Also the variables were found to be influencing the adoption of HIS.

The study also is expected to raise the level of awareness about the successful implementation and adoption of HIS. It also serves as a guide for the hospital administration on the issues of implementation and for researchers providing an overview of different issues for future research.

The study used an existing model, UTAUT (2003) in evaluating key factors that influence HIS adoption. The key factors were grouped together hence coming up with a framework and this contributes to theory.

However 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.

5.3.1 Summary of contributions: Meeting Research objectives.

	Objective	Out put
1.	To identify factors affect adoption of HIS in selected Health facilities in Kampala	HIS adoption factors from the field of study (Performance Expectance, Effort Expectance, Facilitating Conditions, Social Factors and IS skill for work force Vankatesh 2003).
2.	To determine the level of significance of factors influencing HIS adoption in Mengo and Nsambya hospitals.	Data was collected and analyzed using structural equation to determine the level of significant between dependent and independent variables.
3.	To establish the relationship between the adoption factors and intention to adopt HIS in Mengo and Nsambya hospitals	Regression analysis results

Table 4. 1 : Summary of contribution.

Some IT officers discussed that the adoption of the HIS had contributed a lot in centralized repository, efficient reporting of Patients data. In addition one of the hospitals lacked a strong back up and they said that Data *Recovery and Business continuity hadn't been implemented due to financial constraints and have a plan for it in some years to come.*

5.4 Limitations of the Study

The study was carried out in the health settings may be the results would be different if the study was carried out in a different environment for example Education, Banking. The respondents would not give information freely and others delayed given the environment was a Health care setting. However the researcher tried to encourage them fill the questionnaires.

Given the busy setting, the respondents wouldn't give the researcher time for interviews and filling questionnaire. But the researcher had to visit the facility in the evening hours to meet the health workers when they have finished their work.

5.5 Giving directions for future research.

The study was explicitly carried out in two Faith based hospital in Kampala Uganda. This means that factors influencing adoption of HIS could change if the research was to be conducted in several different hospitals. This therefore creates need for further research to evaluate the factors that influence adoption of HIS both private and public Non faith based hospitals. This study was only validated in Uganda's setting given it lies in Low Developed countries. There is need for the model to be tested in other developing country contexts. Future research could focus on visiting only those Hospitals that have adopted HIS in order to establish their sustainability in the Healthcare.

5.6 Recommendations

Recommendations from this study highlights the key core factors for faith based hospitals and the constructs on the UTAUT Model, which include Performance Expectance, Effort Expectance, Social Influence, and Facilitating Condition.

The findings showed that 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.

We also discovered that the HIS was implemented in some departments within the hospitals however we realized that the system needed to be incorporated with in all the departments for efficient and effective record keeping and also improving service delivery in the hospitals.

More so from the interviews, we found out that "*one cannot have the systems running well if they [health workers] lack the necessary skills to use the information systems*", also in addition. "*The management need to support the health workers with the resources even pushing them to use the information systems*", said another management staff member during a separate interview. "*The cost of maintaining the systems is sometimes high and management needs to health*", said another member of management staff in a separate interview

This study was conducted in only two Faith based Hospitals in Kampala Uganda. There is need for more studies looking at large health facilities and hospitals in the whole country. Also similar studies in different countries may yield varying results. Heeks (2006) noted that the low levels of adoption are mainly due to a North-South transfer of information that does not take into account the context of developing countries.

In addition he study was conducted in Uganda, which is a Low Developed Country (LDC) and still has constraints in terms of finances, resources and highly skilled system developers to implement these systems in Uganda's settings. The software developers should subsidize their software's so as to enable the Healthcare medical facilities afford to procure and implement them.

There is a need to conduct a research on how HIS has improved service delivery in Government Hospitals Uganda.

There is a need to conduct a longitudinal research to investigate the factors affecting the health care providers' actual use of HIS system.

5.7 Study Contribution to knowledge.

Previous studies discussed different factors that affected the adoption of Health Information systems which are quite many. However, this study focuses on specifically the facilitating and inhibiting factors in faith based private non for profit Health. A few studies conducted have focused HIS adoption with in faith based private non for profit health facilities in Uganda.

The study also discovered that Facilitating conditions, performance Expectance, Skills of work force and social factors have a direct influence on Behavioral Intention to adopt HIS in resource constrained countries like Uganda.

This study provides a useful theoretical framework for hospital administrators needing to evaluate the likelihood of successful adoption of Health Information systems with in faith based private for non-profit settings

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