

**FACTORS INFLUENCING ADOPTION OF  
INFORMATION SYSTEMS IN PRIVATE HEALTHCARE  
FACILITIES IN KIAMBU COUNTY, KENYA**

**By**

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**DECLARATION**

I declare that this is my original work and has not been presented for examination in any other university.

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This Project has been submitted for examination with my approval as the university supervisor.

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## **DEDICATION**

I wish to dedicate this work to my wife Mary, my son Ian and my niece Ann Florence for their moral support during this study. Without their cooperation and understanding this work would not have been accomplished.

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## **ABBREVIATIONS AND ACRONYMS**

CRM	Customer Relationship Management System
DOI	Diffusion of Innovation
ERP	Enterprise Resource Planning
HMIS	Hospital Management Information System
I.T	Information Technology
ICT	Information, Communication and Technology
IS	Information Systems
MIS	Management Information Systems
TOE	Technology Organization and Environment factors

## ABSTRACT

The adoption and application of information technology is essential to reform healthcare and meet the needs of patients in the coming decades. By harnessing the power of information technology for the health care field, we can enhance the effectiveness of the care we provide patient safety, increase workforce productivity and satisfaction, streamline payment-billing and administrative systems, and meet consumer expectations for service and access to information. Thus, the purpose of this study was to investigate the factors influencing the adoption of information system (IS) in service delivery at all departments in hospitals. The objectives of this study are; to examine the influence of the staff Information and Communication Technology literacy on the adoption of information system in healthcare service delivery in private hospitals in Kiambu County ,to establish the influence of information system characteristics on the adoption of information system in healthcare service delivery in private hospitals in Kiambu County, to establish the influence of the external pressure on the adoption of information system in healthcare service delivery in private hospitals in Kiambu County and to establish the influence of the Top management innovativeness on the adoption of information systems in healthcare service delivery in private hospitals in Kiambu County. Based on theories from the technology adoption literature, a conceptual framework for the adoption of information systems in healthcare service delivery has been developed. This study was conducted In Kiambu County. Questionnaires were distributed through drop and pick method and post office mail to all the participants in the study. The result of this study revealed that the staff information and communication technology literacy significantly influences adoption of information system. The study also revealed that information system characteristics influences information systems adoption. On the influence of the external pressure, the study revealed that external pressure does not influence adoption of information systems adoption. This study recommends that information systems be incorporated in the curriculum for all the courses as it is an important factor that influences information systems adoption. The study further recommends that organizations should continuously train their staff on the emerging technologies as this can help in the adoption of new information systems.

## **CHAPTER ONE**

### **INTRODUCTION**

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

The term information system is widely used in the whole world today. Businessdictionary.com defines information systems as “A combination of hardware, software, infrastructure and trained personnel organized to facilitate planning, control, coordination, and decision making in an organization.” Management information systems have been in existence since 1960s when the mainframe computer began being used significantly in automating information based activities at large co-operations, the first MIS however was not very useful due to the equipment shortcomings and lack of computer literacy towards the intended users. Today information systems are generally being used to generate routine reports for functional areas of a business.

Ouma, Marlien, Herselman and Greunen (2009) explained that “developed countries have embraced the use of information communications technologies (ICT) within the hospitals and health clinics. A few examples of the use of ICT include computerization of medical records, electronic scheduling for appointments, use of the Internet for the purposes of communication and the use of magnetic cards.”

Automated information systems were used in the hospital since the 1970s in the financial department. In the hospital laboratory a standalone system was installed for administrative purposes in the beginning of the 1980s. In 1987 the first ‘integrated hospital information system’ was installed, based on a turnkey contract with a supplier. The supplier went bankrupt in 1989. In 1990 the hospital decided to develop its own hospital wide information system, including the support of various medical and paramedical activities in the hospital. In 1993 a large number of medical support activities were supported by the new system. Over 200 application modules were used in a network of 750 workstations. Information Systems (IS) was heading for the development of ‘integrated hospital wide information systems’. The hospital has never had a (large) record of outsourcing IT activities. Organizationally, the IS department had

been part of the financial department in the 1970s. In the 1980s the IS department became a department, reporting directly to the hospital board. During the hospital reorganization process operation with local partners and health care providers. Information Technology (IT) is slightly changed since 1993: management requests have led to new 'island' applications, stand alone, and uncontrolled. This shows that some IT decisions are taken on the level of cluster management while a general supporting IT structure is lacking. This hampers the integration of the separate systems. IT systems are still operated, controlled and maintained internally. Even more external suppliers are involved in the delivery of information systems. IT processing power is highly decentralized,( Smirt and Pijl ,1999). Ouma et al (2009) states that, "the quality of healthcare is essential to all. The factors that are of significance in the provision of quality healthcare include timeliness, patient centeredness, efficiency, effectiveness, equity and safety. These factors however do not exist in the provision of healthcare in some of the rural communities. The rural inhabitants actually receive fewer healthcare services compared to the problems that they have." The healthcare system in Kenya is structured in a step-wise manner so that complicated cases are referred to a higher level. The public health system consists of the following levels of health facilities: national referral hospitals, provincial general hospitals, district hospitals, health centers, and dispensaries,(Kenya Health policy, 2008-2014).

According to softkenya.com, there are 8365 healthcare facilities registered in Kenya and they are distributed between level 1 and level 6. Kiambu County has a total of 324 health facilities and a population of 1,623,282. The doctor to population ratio is 1:25000.

As outlined in the Kenya Vision 2030, provision of healthcare is key to achieving the millennium development goals. Information Technology has been identified as one of the pillars that will help Kenya achieve its millennium development goal. The ministry of health has identified ICT as one of its reform strategy to ensure they effectively support service delivery.

The Kenya health system faces a challenge in understaffing of medical staff, lack of financing and late reporting and inadequate integration between departments.

Niang (2006) explains that, “In order to fully utilize the resources in the hospitals, attention should be paid to adopt more efficient technologies to provide better services for patients. Computers have become indispensable to most business including the healthcare industry, where investment in information technology is made to address financial, clinical, and marketing issues. The purpose might be to reduce office expenses, to improve service quality, to raise patient satisfaction and compliance, to make more legible and accessible patient records, to improve response time, and to meet the pressure from patients or customers. Thus information technology can improve both aspects – medical care and the underlying administrative infrastructure.”

Hence to overcome the challenges that the Kenya health system is facing, there is a need to improve information and communication exchange in the healthcare industry in order to accelerate knowledge diffusion and increase access to information. The adoption of information system has shown to improve businesses performance since ICT is known as a tool that improves business competitiveness (Niang 2009). Hence this study will focus on investigating the factors that influence the adoption of information system in the healthcare industry.

## **1.2 Statement of the Problem**

Kenya has embarked on a program of implementing vision 2030 that will make it a leading technology solution provider in the region and be part of information age. According to Muathe, Wawire and Ofafa (2013), there is a need for Small and Median Enterprises (SMEs) in Kenya, particularly those in the health sector, to adopt Information and Communication Technology. The perceived benefits of ICT have motivated Small and Medium Enterprises to adopt and invest in it. Many hospitals have also realized the importance of adopting information systems as a tool for enabling them to gain the competitive advantage in the market thus creating a demand for hospital information systems. Kiambu County has a doctor to patient population ratio of 1:25000 thereby increasing the demand for quality healthcare. The effective use of information systems has become a key component for improving quality service delivery in organization.

Most health-related SMEs are faced with the critical decision of whether or not to adopt ICT (Payne, 2005). The studies that have been done on the adoption of information systems in healthcare ((Niang, 2009),(Rahimi,Moberg and Timka,2008),(Khoumbati 2005),(Hung,Tsai and Jiang 2010)) were done in developed countries which have better information technology infrastructure as Compared to developing countries. Kenya is a developing country and the factors that drive information systems adoption are different from those that drive adoption in developed world. Thus, this study will fill this gap by investigating the important factors influencing the adoption of information systems in healthcare service delivery.

### **1.3 Purpose of the study**

The purpose of this study was to investigate the factors that influencing the adoption of information systems in healthcare facilities in Kiambu County.

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

The objectives of the study are:

1. To examine the influence of the staff Information and Communication Technology literacy on the adoption of information system in healthcare service delivery in private hospitals in Kiambu County
2. To establish the influence of information system characteristics on the adoption of information system in healthcare service delivery in private hospitals in Kiambu County
3. To establish the influence of the external pressure on the adoption of information system in healthcare service delivery in private hospitals in Kiambu County
4. To establish the influence of the Top management characteristics on the adoption of information systems in healthcare service delivery in private hospitals in Kiambu County

## **1.5 Research Questions**

The following will be the research questions of this study:

1. What is the influence of staff information communication technology literacy on the adoption of information system in the healthcare service delivery in private hospitals in Kiambu County?
2. How does Information system characteristics influence adoption of information systems in Healthcare service delivery in private hospitals in Kiambu County?
3. What is the influence of external pressure on the adoption of information systems in healthcare service delivery in private hospitals in Kiambu County?
4. What is the influence of the influence of the top Managements characteristics on the adoption of information systems in healthcare service delivery in private hospitals in Kiambu County?

## **1.6 Significance of the study**

This study will contribute to the adoption of information systems in the healthcare facilities through gathering information on the important factors that drives the adoption of information systems. This study will also provide information to the managers of health care institutions that will help them to avoid problems that would arise if they fail to adopt information systems.

The information generated in this study will enable various stakeholders to come up with good plans and formulate policies that will favor adoption of information systems in various fields. It is expected that the vendors will use the information from this study to develop information systems with desirable characteristics that will increase their adoption in the healthcare industry.

The findings of this study will help all the healthcare institutions in Kenya by providing the Staff information and communication technology literacy, information systems characteristics, Top management characteristics and the size of the hospital issues and how to improve the relationship between these factors on the adoption of information systems.

It is also expected that the findings of this study can be used to improve the management process and that the findings can also be applied in areas that are yet to be computerized.

### **1.7 Delimitations of the study**

This study targeted private hospitals within Kiambu County that have implemented information systems. This ensured that the research population was identified faster, more easily and accurately.

### **1.8 Limitations of the study**

This study comprised of the current private hospitals in Kiambu County, this makes the research limited in the sense that the findings cannot be generalized to other healthcare institutions that are owned by the government. Second, the purpose of this study was to investigate the factors that influence the decision to adopt information systems in healthcare service delivery. As a result, respondents were not required to evaluate a particular information technology (IT) applications based on its specific version, operating system, and manufacturer. Thus, the results of this study cannot be generalized beyond the findings.

### **1.9 Assumptions of the study**

This study involved examining the healthcare institutions in Kiambu County that use information systems and therefore it was assumed that;

1. It was assumed that the respondents completed the questionnaire objectively and accurately on the basis of their own perception, knowledge, and experience of information systems adoption.
2. This study was carried out on healthcare facilities that are running different types of information systems on different platforms. It was assumed that the differences on the types of information systems did not affect the responses.

## **1.10 Definition of significant terms**

**Adoption of information systems:** This is the use of computer hardware's and software applications to support the service delivery in healthcare institutions.

**Complexity:** This refers to the difficulties in understanding of an information systems and its utilization.

**External Pressure:** This refers to the influence on the firm from the organizational environment through competitive pressure and imposition by trading partners.

**Healthcare facilities:** This refers to all hospitals that have both outpatient and inpatient services.

**Hospital Management Information System:** It is an integrated system that supports the comprehensive information requirements of hospitals, including patient, clinical, ancillary and financial management. Hospitals are extremely complex institutions with large departments and units coordinate care for patients.

**Information System Characteristics:** This refers to the perception of the potential adopter towards the attributes of an information technology innovation leading to his or her decision to adopt or reject it. The attributes of information system that this study will focus on are relative advantage and complexity. The perception on these characteristics will be measured using a 5 point likert scale. The tool for measure will be adopted from Moore and Benbasat(2001).

**Information Systems:** Information systems refers to all computer based applications that healthcare providers use to help them deliver services to their clients.

**Private Hospital:** This will comprise all hospitals that are not run by the government. This will also include the faith based hospitals.

**Relative Advantage:** These are the perceived benefits that information systems bring to the organization.

**Size of the Hospital:** The size of the hospital refers to the number of beds that a hospital has.

**Staff Information and Communication Technology Literacy:** This refers to the professional information systems qualifications amongst the staff and the technical ability to use information technology applications.

**Top managements characteristics:** This will refer to the innovativeness of the top executives and their level of information systems knowledge.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Introduction

This study focused on the related literature on the factors that influence the adoption of information systems in healthcare service delivery. It also presents the conceptual framework which this research will be based on.

#### 2.2 Background to Literature Review

According to Mwathe (2013), Kiambu County covers the old administrative divisions of Thika, Gatundu, Githunguri and Kiambaa. Kiambu includes the old Lari, Limuru and Kikuyu divisions. These divisions have since been upgraded to administrative districts. It constitutes of 5 constituencies namely Gatundu south, Juja, Githunguri, Kiambaa, Kabete, Limuru and Lari. Kiambu County has a total of 324 health facilities and a population of 1,623,282. The doctor to population ratio is 1:25000.

The demand for quality healthcare in Kenya has been increasing, providers are looking for better ways to improve management and offer better services. As a result, the pen and paper system of running hospitals' affairs is being dropped in favor of technology, greatly facilitated by the connection to the fiber optic cable, Daily Nation (8, April 2013). The purpose of this study was to investigate the factors that influence the adoption of information systems in healthcare service delivery. The factors that influence the adoption of information systems are:

1. Staff Information and Communication Technology literacy
2. Information system characteristics
3. External pressure
4. Top management Characteristics

### **2.3 Influence of the Staff Information and Communication Technology Literacy on the adoption of information systems in healthcare service delivery**

Technological innovation has implications for employees of small businesses. Typically, small businesses are lacking in specialized IS knowledge and technical skills. Thong (1999) suggested that the higher IS capabilities the staff have, the higher their potential in the use of information systems, and thus the higher percentage of adopting IT. A small business that has IS knowledgeable employees will lower the knowledge barrier in understanding and using the IS.

In order to facilitate the successful implementation of information system in organizations, and to avoid adoption failure, the businesses should provide employees with computer education and training courses. IT acceptance among users of IT who form part of a firm employees base will impose positive impacts on IT adoption, (Apulu and Latham, 2009).

The lack of knowledge on how to use technology and low computer literacy are factors that affect the adoption of ICT. In summary, there is a need for computer education. Owner-managers need to attend training programs that will enlighten them on the benefits associated with the use of ICT. In addition, there is the general issue of skills and training. The skill deficiencies appearing in SMEs include not only technical abilities but also management skills (Arendt, 2008). Generally, SMEs do not develop training plans. In most Nigerian SMEs, there is reluctance among owner-managers to invest on training their employees because these owner-managers are afraid that following the completion of such training and having improved their qualifications, these employees will leave and find employment in large companies that offer better salaries (Arendt, 2008). Notwithstanding, owner-managers need to conduct training sessions for staff that will assist in creating awareness on the benefits of adopting technology in organizations (Apulu and Latham, 2009).

Attewell (1991) believed that innovation diffusion theory targets employees in small organizations. Small organizations usually lack professional IT knowledge and IT technical skills. He believed that small European organizations failed because they lacked knowledge of information systems. Because of the obstacle lack of skill and technical

knowledge required in the development process, many organizations delay innovation adoption, and tend to wait until they have sufficient technical expertise. Thus, if employees in small organizations have more knowledge of information systems, then they will be more likely to adopt the information systems. Attwell (1991) explained that staff must have some knowledge of IT innovation in order to use more innovative IT. Based on these discussions, the IS knowledge of staff and the information intensity in the hospitals can be seen as the IS capabilities of staff.

According to Mohammad (2009), IT personnel helps organizations react to changes as well as providing necessary connectivity and modularity that enable rapid organizational response to changes. IT personnel contribute significantly to the extent of IT implementation. The lack of computer skills is regarded as the most common barriers to HIS adoption (Johnson 2001). The unfamiliarity with IT and computer operations amplified the degree of difficulties experienced by the end users in the initial transition stage. The consequent loss in work efficiency and frustration over the foreign technology directly attribute to the negative attitude end user adopted towards the new system, which have been proven to be detrimental to the assimilation of the new system and may result in system adoption failure (Berner, Detmer and Simborg 2005).

Ifinedo (2012), found that lack of computer literacy among small business enterprise owners and a lack of knowledge regarding the benefits of Information Systems use is an inhibitor to Information Systems adoption in small businesses. Chircu and Kauffman (2000) found that inability to acquire skill and expertise in new technologies, and lack of training and education form significant barriers to the adoption of Information systems. Caldeira and Ward (2002) concluded that for small businesses to successfully accept technological innovations, their executives and employees must have a reasonable knowledge of the relevance of IS in business operations. Mutula (2001), explained that the new problems, which are closely linked with the introduction of the computer technology, include low computer literacy among staff among other reasons. In agreement with this state of affair, low levels of IT literacy in the developing countries is the major factor that hinders efficient utilization of ICT.

Thong and Yap supported that end-users with computer experience are more at ease in participating in computer based information systems. A study by Montazemi (1988) indicates that the level of an end users computer literacy correlates with the user's participation in the systems development process. Effective organizational support and comprehensive user education are dominant concerns when introducing end users computing. He reported an increase in the use of computers with computer training. He also noted that the user education is important and that different types of users need different types of training. Montazemi (1988) found end user computer literacy positively correlated with user's satisfaction in context of small business environments.

#### **2.4 Influence of Information System Characteristics on the adoption of information systems in healthcare service delivery**

Relative advantages and complexity have been identified as the information systems characteristics that influence a potential adopter towards information systems adoption.

Thong (1999) said that relative advantage is the benefit gained from adopting the innovation. According to a study on the adoption of PACS (Picture Archiving and Communication Systems) conducted in the healthcare industry in Taiwan, both adopters and non-adopters agreed that the healthcare industry is competitive. Hung et al(2010) argued that the adopters of information systems tends to utilize them as a tool for increasing customer satisfaction and improving medical service quality in order to help the hospital gain relative advantage and ultimately increase operation performance.

According to Rogers's (1983) innovation theory, an individual forms an attitude toward the innovation, leading to a decision to adopt or reject and, if the decision is to adopt, to implementation of the innovation. The perception of the potential adopter toward the IS is the primary determinant of IS adoption. Based on a meta-analysis of the technological innovation literature concerning characteristics of innovations, Tornatzky and Klein (1990) identified relative advantage, compatibility, and complexity as innovation characteristics that are salient to the attitude formation. Relative advantage is the degree to which an innovation is perceived as better than its precursor. The positive perceptions

of the benefits of IS should provide an incentive for the small business to adopt the innovation. Compatibility is the degree to which an innovation is perceived as consistent with the existing values, needs, and past experiences of the potential adopter (Rogers, 1983). If the IS are compatible with existing work practices, the small business will be more likely to adopt them. Complexity refers to the degree to which an innovation is perceived as difficult to use (Rogers 1983). The perceived complexity of the IS is expected to influence the decision to adopt them negatively.

Mohamad and Jamaludin (2009) argued that ERP software attempts to integrate business processes across departments onto a single enterprise -wide IS. The major benefits of ERP are improved coordination across functional departments and increased efficiencies of doing business. Other immediate benefits include reducing operating costs, such as lower inventory control cost, lower production costs, lower marketing costs and lower help desk support costs.

Mugeni et al (2012) in their research on evaluating factors affecting broadband adoption in Kenya argued that relative advantage of broadband internet over its predecessor narrowband internet was very influential in explaining variations in broadband intention. Considering the items used to measure this construct, notably faster download speeds, higher reliability, better quality of service and better quality of experience, policy makers and regulators are called upon to foster an appropriate enabling environment. For example service and platform competition would spur improvement in download speeds, reliability, quality of service and quality of experience. Availability of a national broadband strategy would also serve as blueprint for broadband development and clearly set targets of download and upload speeds, among others.

Rodrigues (2010) explained that introduction of ICT significant productivity improvement has been corroborated in the health sector of developed countries with significant positive changes in the; Professional productivity and efficiency of interventions, Quality of care and reduction in medical errors, Improving access to knowledge base, Enabling standardized information exchange and communication,

Extending the scope and coverage of healthcare interventions, Empowering consumers and patients ;Bringing about the establishment of new relationships between patients and health professionals and Making healthcare more equitable.

Cragg and King (1993) found relative advantage was a primary reason for encouraging further IT growth. They argued that relative advantage was expressed by perceived benefits and found a positive relationship between perceived benefits and Information systems adoption. Gemino, Mackay and Reich (2006) found a positive correlation between perceived benefits and intent to adopt information systems. They reported that relative advantage was a predictor of Internet adoption in SMEs and he concluded that attitude toward adoption (i.e., positive or negative anticipated consequences of adoption) strongly influenced a small business executive's decision to adopt an IT to help his/her firm compete.

Complexity is the level of difficulty implementing and using information systems, inhibits adoption. Hung et al (2010) on their study on decision support systems said that technological innovation is always considered a complex assignment and bewildering to the adopting department. They explained that results of this factor in their research are different from the results generated from past literature and the major reason was that IS vendors in Taiwan usually supply implementation solutions such as on-site training or consulting to link the emerging technology to the healthcare industry.

IS in hospitals is expensive and normally comes with manuals and supports. Therefore, adopters and non-adopters all perceived that the effect of CRMS complexity is not obvious. Another reason is that when a hospital considered adopting CRMS, the IS capabilities of its staff had already been considered as an important factor. Once a hospital adopts CRMS the IS capabilities are high enough, and therefore the effect generated from system complexity is relatively reduced. Grover (1993) found that perceived complexity inhibited the adoption of customer-based information systems. Conversely, if the Web is a natural extension of current customer or channel interactions,

such as those of a catalog retailer, complexity is reduced and those firms will rapidly adopt information systems.

## **2.5 Influence of the External Pressure on the adoption of information systems in healthcare service delivery**

External pressure refers to the influences that health facilities receive from sources external to it. If a firm's competitors, suppliers or customers are adopting and some types of IS or IT, this results in pressure for non-adopters to also adopt similar IS. This pressure is caused by the perception that adopters will have certain competitive advantages by using certain systems. Depending upon the intensity of the pressure, the type and need for implementing IS varies across organizations. Various studies have shown that increased external pressure in the marketplace has been a major force propelling companies to adopt and utilized various kind of IT / IS such as e-business, (Mohamad,2009).

External influence can take the form of encouragement or pressure and can vary from encouragement or pressure to recommendations, requests, or providing incentives or imposing penalties. External pressure here refers to the influence from trading partners and customers. The pressure exercised by powerful trading partners to adopt an innovation influences the adoption decision of an organization (Iacovou, Benbasat and Dexter, 1995). An organization that adopts a particular innovation would demand their partners to possess a similar innovation process to fully utilize the innovation at an inter-organizational level. Similarly, the demands from potential customers to possess an innovation have a strong impact on the adoption of IT in organizations (Abereijo, Adeniyi and Aderemi, 2009). Small businesses are very vulnerable to customer pressure, since they are more likely to be economically dependent on larger customers for their survival. The pressure from trading partners and customers is particularly high for small organization compared to larger businesses (Iacovou et al., 1995). Studies have provided evidence that significant external pressure in the adoption of IT and hypothesized external pressure can have a positive relationship with IT adoption (Chan and Ngai, 2007).

Hameed and Council (2012) in their research on *Assessing the influence of environmental and CEO Characteristics for Adoption of Information Technology in Organizations* explained that, competition increases the likelihood of innovation adoption. It is tough rivalry that pushes businesses to be innovative. They argued that empirically, studies have shown that more intense competition is associated with higher adoption rates. Competition leads to environmental uncertainty and increases both the need for and the rate of innovation adoption. Porter and Millar (1985) suggest that, by adopting IS, businesses will be able to compete in three ways. IS can change the industry structure and, in so doing, alter the rules of competition. Information systems (IS) can also create competitive advantage by giving businesses new ways to outperform their rivals. Finally, IS spawning new businesses, often from within existing operations of the business. Therefore, a small business in an environment that is more competitive would feel a greater need to turn to IS to gain a competitive advantage. On the other hand, a small business in a less competitive environment would not be faced with a push to be innovative.

Organizations adopt innovation in reaction to an external demand or to achieve an advantage of an environmental opportunity (Damanpour and Schneider, 2006). The external environment plays a significant role in the adoption of new technologies and has been widely considered in IT innovation adoption in organizations.

Quaddus and Hofmeyer (2007) considered competitive pressure, government support, trading partners support and vendor support as different environmental aspects in investigating the factors influencing adoption of business to business trading exchange in small businesses. Examining the adoption of four different IT innovations in US small businesses, Premkumar and Roberts (1999), considered competitive pressure, pressure from trading partners, trading partners support and vertical linkage in the context of environment.

Ifinedo (2012) identified three main sources of external pressure as follows: competitive pressure, supplier's pressure and customer's pressure. He explained that competitive

pressure impacts the adoption of IS innovations in large businesses and SMEs. According to Raymond (2001), and Hadaya (2006), business partners' pressure affect the acceptance of technological innovations.

Fei and Shera (2011) in their research on understanding hospital information systems adoption in china argued that given the hospitals are responsible for making the HIS investments, the decisions of whether and how to adopt HIS solely rest on the hospital executives. Strong commitment from the executives ensure the deployment of adequate financial and human resources as well as the careful implementation of the HIS adoption plan. It is also able to influence the other adoption factors such as user acceptance to improve the chance of successful system adoption. As a result, HIS adoption projects are commonly nicknamed the executive's project in China and as the IT manager revealed: If one hospital failed to adopt HIS, there must be some problem with their hospital executives.

With respect to customer's pressure, Kula (2003) said that the key driver for SMEs to accept Information systems and other innovations is customer feedback, demand, and pressure. In many cases, a company may adopt a technology due to the influences exerted by its business partners and/or its competitors, having no relation to the technology and organization itself. For example, pressures from business partners or competitors have been found to be an important factor in the adoption of integration technologies (Kuan and Chau, 2001). Against this background, this study also anticipates that increase competitive pressure on the organization should also result higher level of information systems use. To this effect, External pressure is has been considered as a factor that influences information systems adoption in hospitals.

## **2.6 Influence of the top managements characteristics on the adoption of information systems in healthcare service delivery**

This study will consider Innovativeness of top management as a characteristic that influences them to adopt or not to adopt information systems. Innovativeness of senior executives refers to the willingness of executives to adopt innovative technology and

bearing the risk of innovation. When hospital executives are familiar with the characteristics of innovation, the hospital reduces the uncertainty concerning the use of information systems and increases the willingness of adoption. The leader is an entrepreneur figure who is crucial in determining the innovative attitude of a small business (Rizzoni, 1991). This is because the leader's qualities are the determinants of the overall management style of the business. The leader must be aware of the ability of the IT innovation and how to use it properly. With greater knowledge, the degree of uncertainty involved in IT adoption will diminish, resulting in a less risky adoption of IT. This is consistent with the findings of other studies which reported that the lack of knowledge of the IT adoption process and insufficient awareness of the potential benefits may be inhibiting businesses from adopting IT. To the extent a leader can lower the knowledge inadequacies; it will facilitate the path to adoption of IT. Dewar and Dutton (1986) found that extensive knowledge is important for the adoption of technical process innovations.

Research has also explored several CEO characteristics that influence the IT adoption process. Rogers (1983) suggests that innovation adoption is related to the innovation decision process. When the knowledge of the innovation is gathered, an attitude will be formed towards the innovation as to whether to adopt or reject innovation (Rogers, 1995). Top managers often make the final decision to adopt IT based on the internal needs of the organization or environmental changes (Damanpour and Schneider, 2006). CEO also takes the responsibility of managing and use technological innovation in organizations (Pinheiro, 2010). An organization's strategic decision to adopt or reject an innovation often reflects the personal characteristics of its top managers. Hence researchers have frequently examined various characteristics of CEO when addressing the factors influencing the adoption of IT in organizations.

In examining the CEO characteristics and organizational characteristics in IT adoption of small businesses, Thong and Yap (1995) considered CEO innovativeness, CEO attitude towards change and CEO IT knowledge amongst others. Damanpour and Schneider (2006) investigated manager age, gender, education level, tenure in position and attitude

towards innovation while focusing on the organizational, environmental and top managers' effect on the phases of the adoption of innovations in organizations.

The CEO's perception of new innovation plays an important role in the adoption of IT. CEO's innovativeness and favorable attitude of new technology affects in a positive way the adoption of IT (Damanpour, 1991). According to Rogers (1983), the creation of attitude towards an innovation happens before a decision to adopt has been made. Top management's favorable attitude assists all stages of IT adoption. In the initiation stage, managers' help developing awareness among the organizational members, in the adoption-decision stage they are responsible for allocating necessary resources and in the implementation stage they can create an environment for smooth integration into the organizational settings. Mehrtens et al. (2001) found a direct link between CEO's positive attitude towards adoption of IT and success of adoption process. Every adoption process is associated with uncertainty; however, a CEO with more positive attitude challenges these risks and continues to maintain their enthusiasm by committing increasing amounts of resources.

Manager's tenure refers to the length of time the CEO has been in their current job. Researchers found contradictory results when examining manager's tenure. Experienced managers with their organizational 'know how' can facilitate a smooth adoption processes and at the same time use their authority to establish an atmosphere for a successful IT implementation. CEOs with longer tenure have a better knowledge of the organizational operations and would be more competent in handling unforeseen events that may arise due to the adoption IT. Hence, more experienced managers will be more advantageous for the adoption of more complex innovation (Damanpour and Schneider, 2009).

In an empirical study Sharma and Rai (2003) found that organizations with a CEO on a shorter tenure had a higher adoption rate. The majority of studies that investigated manager's tenure verified a significant influence on IT adoption (Damanpour and Schneider, 2006). Hence, we predict a positive association for the relationship between manager's tenure and IT adoption.

Individual characteristics of CEO play an important role in the adoption and assimilation of IT in organizations. Amongst these CEOs, IT knowledge was found to have a strong correlation with IT innovation adoption (Thong and Yap, 1995; Chan and Ngai, 2007). A CEO with more IT knowledge is able to assess the benefits of new technology and more likely to adopt innovation. Lack of IT knowledge creates uncertainty and it is only the awareness through knowledge that informs confidence in new innovation which facilitate adoption (Rogers, 1995). Chan and Ngai (2007) found that CEOs in small organizations lack the basic knowledge of IT and have insufficient awareness of the potential benefits of IT adoption. CEOs with no IT knowledge are less likely to commit resources for IT adoption.

CEOs can influence IT adoption by virtue of their innovativeness and interest toward change. Due to the dominant role of CEO in small businesses, these aspects are essential in the adoption of IT. CEO willingness to innovate notably dictates the adoption of IT (Thong and Yap, 1995). Cragg and King (1993) discussed the role of CEO as a product champion. In small businesses, the CEO is usually the owner and the sole decision maker and CEO's innovativeness and involvement contributes to the success of any IT adoption process Innovative CEO's are willing to take risks and would prefer solutions that have not been tried before (Thong, 1999). Past literature found CEO innovativeness significantly and positively influenced the adoption of IT (Thong and Yap, 1995; Thong, 1999; Mirchandani and Motwani, 2001).

Thong (1999) found that there is a positive relationship between the innovation of senior executives and the adoption of information systems in small businesses. Hung et al (2010) also found a positive relationship between innovation of senior executives and the adoption of CRM in hospitals in Taiwan.

## **2.7 Adoption of Information system**

The widespread adoption of hospital information systems harbors the potential to transform health care services and to change the traditional roles and responsibilities of physicians and other health care practitioners. Niang (2009) defines the hospital information system as “The application of information processing involving both

computer hardware and software that deals with the storage, retrieval, sharing, and use of health care information, data, and knowledge for communication and decision making”. This definition includes such applications as: electronic health record, personal health record, electronic billing, electronic discharging and telemedicine. By implementing the electronic health record, hospitals can save expense associated with record keeping, improved workflows, practice management and billing including one-time electronic order entry and the elimination of transcription.

According to Apulu and Latham (2009), in developed countries, ICT has been used to change the way businesses are conducted in order to have a strategic advantage in their various operations. However, the investment returns of ICT in developing countries have fallen short of the potential. Researchers have attributed this problem to organizational factors, environmental factors and lack of technical skills, among others.”

Niang (2009) explained that the adoption of information system in hospitals can transform the health care system thereby simultaneously improving quality and productivity. Desires motivating the adoption of information technology in hospitals include achieving productivity growth evident in other industries that have made extensive use of information technology. Ongori (2009) states that the adoption of ICT would change the way businesses operate in this era of globalization by changing business structures and increasing competition, creating competitive advantage for businesses and by changing business operations. Hence, for SMEs to grow and become successful, they must have the ability to compete and dynamically respond to rapidly changing markets. This implies that SMEs need to be connected to the digital marketplace.

## **2.8 Theoretical Framework**

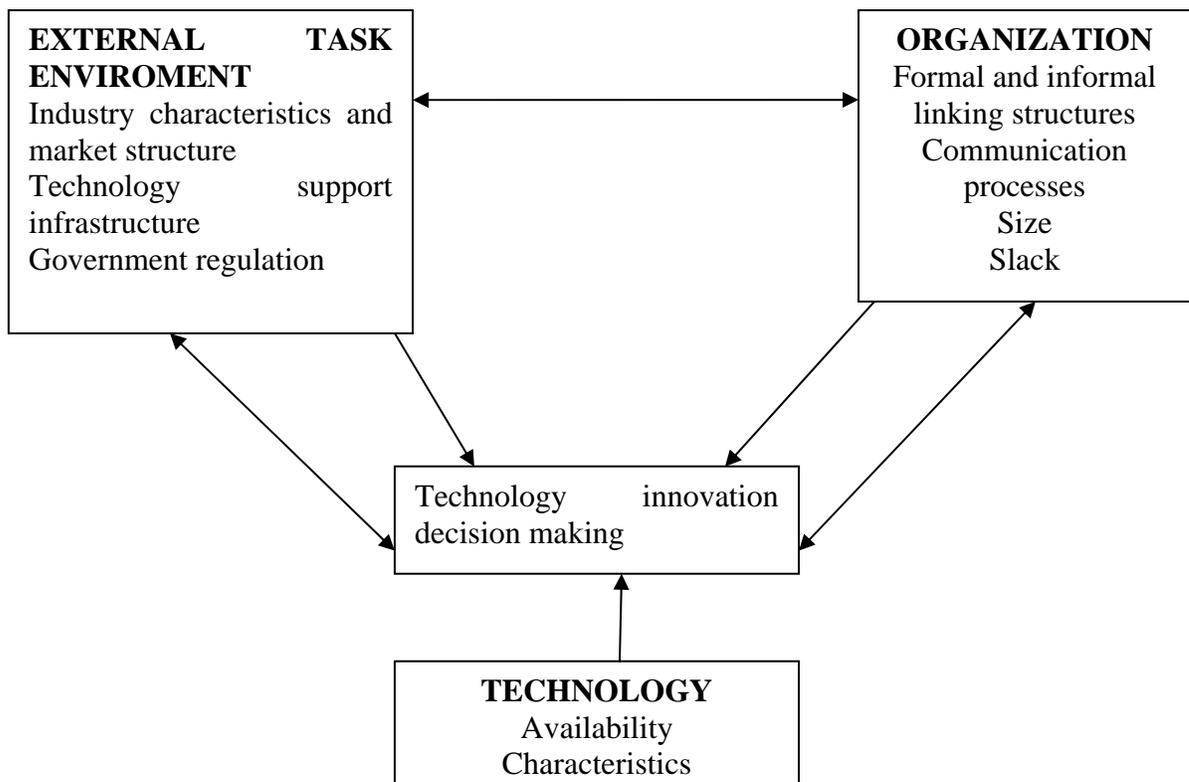
The theories that have been used in the study of ICT in healthcare includes; the Diffusion of Innovation (DOI). This model suggests that there are three main sources influencing the adoption and diffusion of an innovation, namely perceptions of innovation characteristics, characteristics of the adopter, and contextual factors. DOI theory sees

innovations as being communicated through certain channels over time and within a particular social system (Rogers 1995). Individuals are seen as possessing different degrees of willingness to adopt innovations, and thus it is generally observed that the portion of the population adopting an innovation is approximately normally distributed over time (Rogers 1995). Breaking this normal distribution into segments leads to the segregation of individuals into the following five categories of individual innovativeness (from earliest to latest adopters): innovators, early adopters, early majority, late majority, laggards (Rogers 1995). The innovation process in organizations is much more complex. It generally involves a number of individuals, perhaps including both supporters and opponents of the new idea, each of whom plays a role in the innovation-decision. This model has been applied to study the adoption of various information technologies in healthcare. However, the DOI does not provide information on how to assess innovation characteristics. Furthermore, this model has been criticized for its lack of specificity, Gagnon (2010).

The Technology Acceptance Model (TAM) has also been used by researchers to explain why a particular system may or may not be acceptable to users (Davis et al., 1989). It hypothesizes that there are two beliefs, perceiving usefulness and perceiving ease of use, which are variables that primarily affect the user acceptance. The TAM suggests that these external variables indirectly affect individuals' attitude toward technology acceptance by influencing perceived usefulness and perceived ease of use. External variables might include individual user attributes, social factors or those related to their job tasks. A series of studies found that TAM is the best model in examining Physicians' acceptance of telemedicine technology because it is specialized in information technology, it is well-researched, it uses psychometric measurements, and it is a dominant model for investigating user technology acceptance (Mary 2008, Chau & Hu, 2001, 2002; Hu et al., 1999).

Tornatzky and Fleischer (1990) developed a framework for organizational adoption based on Contingency Theory of Organizations. This theory postulates that an effective organization should have a structure which is consistent with its environmental needs.

The effectiveness of an organization is based upon its fitness towards both internal and external factors such as environment, organization size, and organization strategy and technological factors to make a decision. In this framework, three key determinants were identified (Donaldson, 2001). Therefore, decision makers should take in to account technology, organization, and environment factors that affect technology adoption. Hence, this framework was named as “TOE” framework and used successfully in the study of adoption within organizations.



**Figure 1. TOE Framework**

The TOE framework has been adapted in IT adoption studies in the past and it provides a useful analytical framework that can be used for studying the adoption and assimilation of different types of IT innovation, Oliveira and Martins (2011).

Institutional theory has also been used in the past studies which emphasizes that institutional environments are crucial in shaping organizational structure and actions (Scott 2001). According to the institutional theory, organizational decisions are not

driven purely by rational goals of efficiency, but also by social and cultural factors and concerns for legitimacy. Institutions are transported by cultures, structures, and routines and operate at multiple levels. The theory claims that firms become more similar due to isomorphic pressures and pressures for legitimacy. This means that firms in the same field tend to become homologous over time, as competitive and customer pressures motivate them to copy industry leaders. For example, rather than making a purely internally driven decision to adopt information system, firms are likely to be induced to adopt and use information systems by external isomorphic pressures from competitors, trading partners, customers, and government. Institutional theories tend to be variance theories and are therefore better in explaining among types of institutions than the development of one or another individual institution.

This study modified the TOE framework which considers the technology, environmental and organizational factors as factors that influence adoption of technology and came up with a conceptual framework below.

## 2.9 Conceptual Framework

The conceptual framework below shows the relationship between the dependent and the independent variables.

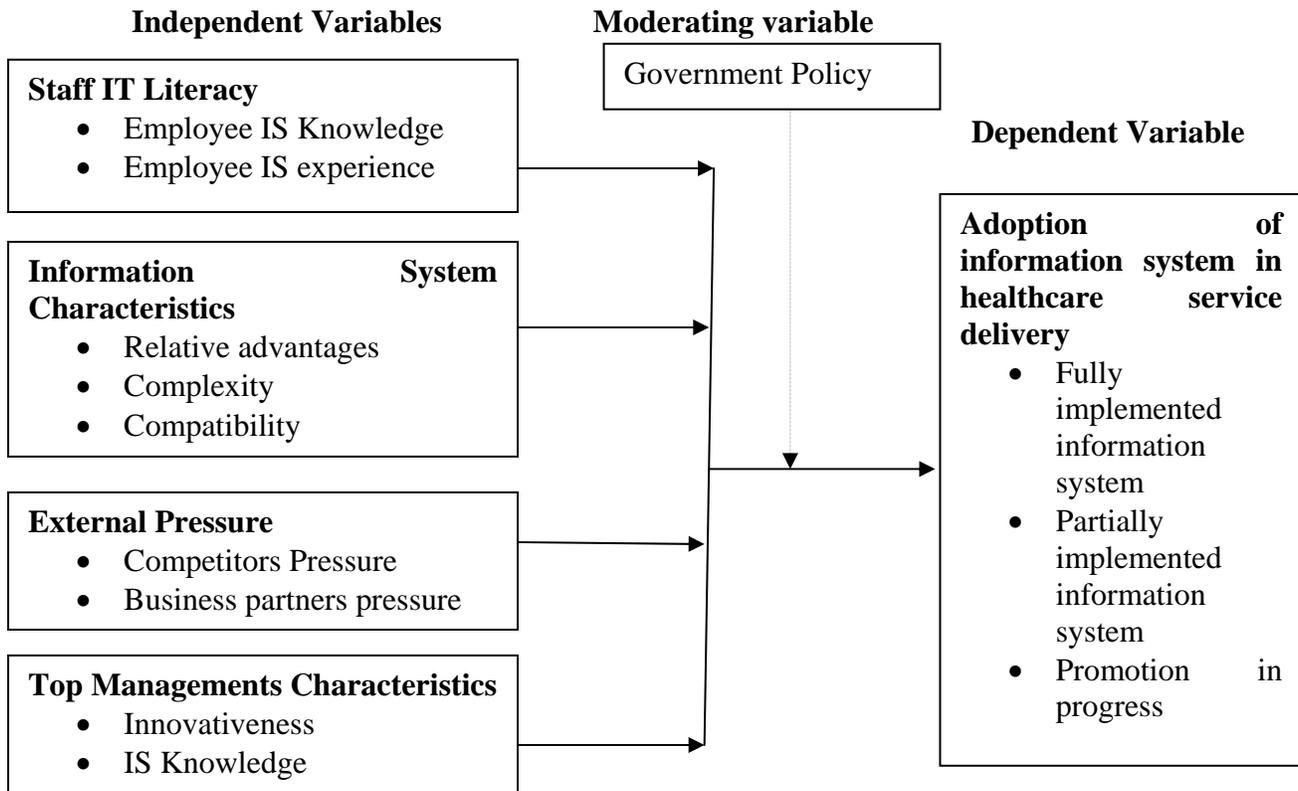


Figure 2. Conceptual Framework

The conceptual framework illustrates how staff IT literacy influences adoption of information systems in terms of the number of staff with basic computer training and the availability of an IT support staff. The information system characteristics influence on information systems adoption has been illustrated in terms of relative advantages and complexity. The influence of external pressure on the adoption of information systems has also been shown in terms of competitor's pressure, suppliers and the business partner's pressure and the influence of top management's innovativeness on the adoption of information systems has been illustrated.

### **2.10 Knowledge Gap**

The studies that have been done on the adoption of information systems in healthcare I,e (Niang2009,(Rahimi,Moberg and Timka,2008),(Khoumbati 2005),(Hung,Tsai and Jiang 2010)) were done in developed countries which have better information technology infrastructure as Compared to developing countries. Kenya is a developing country and the factors that drive information systems adoption are different from those that drive adoption in developed world. This research sought to fill this knowledge gap through investigating the factors that influence adoption of information systems in healthcare service delivery.

### **2.11 Summary of Literature Reviewed.**

The literature review looked at the literature on the various factors that influence adoption of information systems in hospitals was reviewed which included; The Staff information and communication technology Literacy, top managements innovativeness, Information Systems characteristics and External pressure.

The theories that have been used in the past studies of information systems adoption were also reviewed. They included the TOE framework, Diffusion of innovation (DOI) and the institutional theory. A conceptual framework of the study was also shown indicating the variables looked at during the study and how they were operationalized.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter presents the research design to be used, target population for the study and the sample size that will be used. It also explains the data collection procedure, analysis and research instruments the study will adopt. It has also focused on validity and reliability of instruments and ethical issues.

#### **3.2 Research Design**

This study was conducted using Survey Research Design. Sapsford (2007) defined survey research method as a technique in which detailed information concerning a social phenomenon is gathered by posing questions to respondents. The survey has proven to be a powerful tool in gathering information about the opinions, attitudes and intentions of people concerning different social, cultural, economic and political issues (Michell and Jolley, 1988). The study used both quantitative and qualitative approaches. Quantitative approach was used for data collected using questionnaires from the participants. The qualitative approach was justified because it allowed studying issues in-depth.

#### **3.3 Target Population**

The target population was the private healthcare institutions in Kiambu County that are already using information systems in the healthcare service delivery. This study focused on the 25 private healthcare institutions in Kiambu County that have adopted information systems in the delivery of services. The accessible population of this study was 100 participants who consisted of administrators, heads of nurses, heads of ICT and medical officers in charge. The target population was 100 participants who were chosen because they were privy to the information that influenced the decision to adopt information system in their work place.

### 3.4 Sample Size and Sampling Procedure

Sampling is the process of selection of appropriate number of subjects from a defined population (Chalmers, 2002). Mugenda and Mugenda (2003), states that it is advisable to take the whole population where the sample is small to make the study meaningful, such as is the case in the present study. Kiambu County has 25 private hospitals that have implemented information systems. Therefore, Census was adopted in gathering the information from all the hospitals in the target population. To choose the participants from each hospital, purposive random sampling was applied to select one hospital administrator from each hospital, one nurse office in charge from each hospital, one medical officer in charge from each hospital and one head of ICT department from each hospital. The sample size will be  $1 * 25 = 25$  hospital administrators,  $1 * 25 = 25$  medical officers in charges,  $1 * 25 = 25$  heads of ICT department and  $1 * 25 = 25$  nurse's officer's in charges. The design is preferred since the target population is small and manageable. The table below shows the number of participants in the study.

**Table 3.1 Sample Size**

<b>Sample</b>	<b>Number per Institution</b>	<b>Number of institutions</b>	<b>Total Number of Participants</b>
Hospital Administrator	1	25	25
Head of IT department	1	25	25
Nurse In charge	1	25	25
Medical officer In charge	1	25	25
<b>Total</b>			<b>100</b>

### 3.5 Data Collection Instruments

Data was collected through the use of questionnaires administered in the field to the sampled respondents and an interview schedule. The questionnaire was divided into six parts. The first part of the questionnaire was introduction and it explained the purpose of the questionnaire stating clearly that data obtained will be for pure academic purpose. It also explained the instructions on how to answer the questions and also contained the

questions eliciting the basic information of the participants and the hospital. The other parts contained the questions used for examining the factors which the hospital considered concerning the adoption of information system.

### **3.5.1 Piloting of the Instrument**

To ensure that the questionnaire was understood by the respondents and that there was no problem with the wording of the instrument, a pilot questionnaire was administered to a group of 10 respondents selected on convenience. The participants were selected from healthcare facilities that were not part of the study. After the pilot study the main survey followed.

### **3.5.2 Validity of the Instrument**

Mugenda and Mugenda (2000), defines validity as the accuracy and meaningfulness of inferences, which are based on research results. Content validity is the extent to which a measuring instrument provides adequate coverage of the topic under study. If the instrument contains a representative sample of the universe, the content validity is good. Its determination is primarily judgmental and intuitive. It can also be determined by using a panel of persons who shall judge how well the measuring instrument meets the standards, but there is no numerical way to express it (Kothari, 2004). Borg and Gall (1985) points out that validity of an instrument is improved through expert judgment. To ensure content validity the researcher prepared the document in close consultation with the supervisor who gave an expert judgment. The instrument was also reviewed by researcher's peers.

### **3.5.3 Reliability of the Instrument**

Mugenda and Mugenda (1999) defines reliability as a measure of the degree to which a research instrument yields consistent results or data after repeated tests when administered a number of times. This measures the extent to which a research is replicable. It also refers to the situation where “the results of a study can be reproduced under similar methodology” (Joppe, 2000). In this study, the main instrument of measure was a questionnaire that was administered in the private hospitals in Kiambu County.

The test – retest method was employed to establish the reliability of the questionnaires. The technique involved administering the same instrument twice to the same group of subjects (Gregory, 1992). The questionnaire was administered to the same hospitals used in the pilot study within an interval of one week. Pearson Product Moment Correlation Coefficient (r) was calculated for each questionnaire. In social sciences, acceptable reliability coefficient ranges from 0.6 (Nunnally and Bernstein, 1994; Gall and Borg 1996; Mugenda and Mugenda, 1999). Therefore a correlation coefficient(r) value of 0.70 and above is acceptable. The reliabilities were found to be 0.8 and 0.74, which were higher than the recommended one at 0.70 (Mugenda and Mugenda, 1999). Thus the instruments were reliable.

### **3.6 Data Collection Procedure**

The researcher applied for a permit from the council of national science and technology to conduct the research. The questionnaire was then distributed through drop and pick method and post office mail. The respondents were given a period of one week to answer the questions after which the questionnaires were picked from the respondents.

### **3.7 Data Analysis Techniques**

The research data was subjected to coding and editing after the actual collection of data was done. . Qualitative data analysis was used for data obtained from the interview. The questionnaires was sorted and classified on the basis of the group. This involved screening the data with the view of checking the consistency and correctness of information collected. The data concerning the staff IT literacy was measured using five points likert scale and was analyzed using descriptive statistics, The research data about Information systems characteristics, External pressure and Top management characteristics was measured using the five point likert scale and analyzed using descriptive statistics. Statistical Package for Social Sciences (SPSS version 20.0) and Microsoft excel were used to aid the processing and analysis of the data collected. The researcher analyzed descriptive data and presented them in form of frequency tables. This was done according to objectives. The analyzed data was reported on three main

classifications which included summary of main findings, conclusions and recommendations.

### 3.8 Ethical Considerations

The researcher ensured that the research ethics were observed. The respondents were informed that participation in this study was voluntary and they were requested to sign a voluntary consent before being presented the questionnaire. Confidentiality and privacy was also observed. This was done by not revealing the identities of the respondents. The researcher also respected the respondents' decisions on what information to give. In this case, the researcher did not coerce the respondents to give any information or doctor their feedback. The objective of the study was explained that it was for academic use only. Finally, the researcher explained to the participants that he was more than willing to share or give feed back of the research findings to the respondents.

### 3.9 Operational definition of variables

Objective	Variables	Indicator	Measurement scale	Methods of data analysis
To examine the influence of the staff Information and Communication Technology literacy on the adoption of information system in healthcare service delivery in Kiambu County	Staff IT Literacy (Independent)	Perceived employees IS knowledge	Ordinal	Descriptive
		Perceived IS experience	Ordinal	Descriptive
To establish the influence of information system characteristics	Information Systems Characteristics	Perceived Relative advantages	ordinal	Descriptive

on the adoption of information system in healthcare service delivery in Kiambu County	(Independent)	Perceived complexity	Ordinal	Descriptive
To establish the influence of the external pressure on the adoption of information system in healthcare service delivery in Kiambu County	External Pressure (Independent)	Perceived External pressure from Competitors  Perceived External pressure by suppliers & business partners	Ordinal  Ordinal	Descriptive  Descriptive
To establish the influence of the top managements characteristics on the adoption of information systems in healthcare service delivery.	Top Management Characteristics (Independent)	Perceived top managements innovativeness  Top managements information systems knowledge	Ordinal	Descriptive

## **CHAPTER FOUR**

### **DATA ANALYSIS, PRESENTATION AND INTERPRETATION OF FINDINGS**

#### **4.1 Introduction**

This chapter presents data analysis, presentation and interpretation of the data on the study. It will focus on the response rate and the factors influencing the adoption of information systems in healthcare service delivery which will be organized according to research questions.

#### **4.2 Questionnaire Response Rate**

Out of the 96 questionnaires distributed, 66 were correctly filled and returned. In addition, 1 hospital administrator, 1 head of nurses, one doctor and one head of ICT were interviewed, which represents a response rate of 70 percent. Mugenda and Mugenda (2003) argued that a response rate of 50 percent is adequate, a response rate of 60 percent is good, and a response rate of 70 percent is very good. Therefore, the 70 percent response rate reported for this study formed an acceptable basis for drawing conclusions.

#### **4.3 Demographic Characteristics of the respondents**

This section focuses on the gender, participants job title, years worked, number of beds in the hospital the participant works, location of the hospital and number of employees in the facility the participant works.

##### **4.3.1 Distribution of the respondents by Gender**

An item was included in the questionnaire which sought information on the gender of the participants. The studies revealed that majority of the participants were male. Table 4.1 represents the participants by gender.

**Table 4.1 Distribution of the respondents by Gender**

<b>Gender</b>	<b>Frequency</b>	<b>Percentage</b>
Male	38.0	54.3
Female	32.0	45.7
<b>Total</b>	<b>70.00</b>	<b>100.00</b>

The study revealed that 54.3 % of the respondents were male while 45.7 % of the respondents were female. As shown in table 4.1, both genders were visible in the study.

#### **4.3.2 Distribution of the participants by the number of years worked**

An item was included in the questionnaire which sought information on the number of years the participant has worked in the organization under study. The study revealed that majority of the participants represented by 52.9 % had a worked in the organization for more than 10 years.47% of the participants had worked in the organization for a period of 1 – 3 years. This showed that the participants were better placed to provide information about the adoption of information system in their institution.

**Table 4.2 Distribution of the participants by the number of years worked**

<b>Years Worked</b>	<b>Frequency</b>	<b>Percentage</b>
1 - 3 years	33	47.1
10 years or more	37	52.9
<b>Total</b>	<b>70</b>	<b>100.0</b>

#### **4.3.3 Number of Beds in the hospital**

An item was included which sought information on the number of beds that the hospital where the participant works has. The study revealed that 58.6% of the hospitals had a bed capacity of between 50 and 100. The study also shows that 14.3 % of the hospitals had a bed capacity of between 100 and 150 while 27.1 % had a bed capacity of above 150. The study therefore revealed both small and large hospitals have adopted information system.

**Table 4.3 Number of Beds**

<b>No of Beds</b>	<b>Frequency</b>	<b>Percentage</b>
50 - 100	41	58.6
100 - 150	10	14.3
150 and Above	19	27.1
<b>Total</b>	<b>70</b>	<b>100.0</b>

**4.3.4 Location of the hospital**

An item was included in the questionnaire which sought information about where the participant's institution is located. The study revealed that 41 participants represented by 58.6 percent of the respondents worked in institutions that were located in urban areas while 29 participants represented by 41.4 % worked in institutions located in rural areas. As presented in table 4.4, the study revealed that hospitals information systems has been adopted in both urban and rural areas.

**Table 4.4 Location of the hospital**

<b>Location</b>	<b>Frequency</b>	<b>Percentage</b>
Urban	41	58.6
Rural	29	41.4
<b>Total</b>	<b>70</b>	<b>100.0</b>

**4.3.5 Number of employees in the hospital**

An item was included in the questionnaire that sought information on the number of employees that the hospital where the participant worked has. As shown on table 4.6 above, the study revealed that majority of the participants represented by 50% worked in institutions with over 200 employees. 41.4% worked in institutions where the number of employees was between 101 and 150 while 8.6% of the respondents indicated that that they worked in institutions where the number of employees was between 51 and 100.

**Table 4.5 Number of employees in the hospital**

<b>Employees</b>	<b>Frequency</b>	<b>Percentage</b>
51 - 100	6	8.6
101 - 150	29	41.4
Above 200	35	50.0
<b>Total</b>	<b>70</b>	<b>100.0</b>

**4.4 Influence of staff information communication technology literacy on the adoption of information system in the healthcare service delivery**

To achieve this objective, the participants were asked to react to several statements which were about the influence of information and communication technology literacy on the adoption of information systems. Every respondent was requested to indicate whether each of the statement was extremely likely, likely, moderately likely, slightly likely or not likely to influence adoption of information system. The responses were rated on a five point scale. Table 4.7 illustrates the findings on this objective.

**Table 4.6 Influence of Staff Information and Communication Technology literacy**

<b>Responses</b>	<b>Frequency</b>	<b>Percentage</b>
11 - 21	12	17.1
22 - 32	11	15.7
33 - 43	35	50.0
44 - 55	12	17.1
<b>Total</b>	<b>70</b>	<b>100.0</b>

The research revealed that majority of the respondents scored between 33 and 43 as shown by 50.0%. Thus majority of the respondents perceived staff ICT literacy as moderately likely to influence the adoption of information system.

An item was included in the interview schedule which sought information on the challenges faced when implementing information system. All interviewees conceded the existence of user dissatisfaction and rejection of the new technology at its initial transition stage, and regarded it to be one of the major barriers to information systems successful adoption. The main reasons for the users' resistance include reduction in work efficiency due to the unfamiliarity with computers and difficulties in typing. The strongest user resistance came from the old nurses and physicians with limited or no computer skills, which significantly increased difficulties for system dissemination across the organization. As the head nurse recounts the initial stage of information systems adoption:

“... of course there were a lot of problems, in the beginning the system was not accepted by the physicians...they had no idea how to use the keyboard and the mouse, let alone being able to type...It was really difficult.”

This therefore means that staff information and communication technology literacy is an important factor in the adoption of information system. Staff with ICT skills easily learn how to work with new information systems and also makes implementation faster and more successful thereby making the organization to start realizing the benefits of information systems early.

#### **4.5 Influence of information systems characteristic the adoption of information systems in Healthcare service delivery**

The study sought to establish whether the information systems characteristic influences information systems adoption. The respondents were asked to indicate their views about whether the information systems characteristics were extremely likely, likely, moderately likely, slightly likely or not likely. Table 4.7 represents the findings on this variable.

**Table 4.7 Influence of Information systems Characteristics**

<b>Responses</b>	<b>Frequency</b>	<b>Percentage</b>
13 - 25	0	0.0
26 - 38	0	0.0
39 - 51	20	28.6
52 - 64	50	71.4
<b>Total</b>	<b>70</b>	<b>100.0</b>

Table 4.7 shows that majority of the participants as shown by 71.4% scored between 52 – 64. This means that majority of the respondents perceived information systems characteristics as likely to influence information systems adoption.

An item was also included in the interview schedule which sought information on the reasons for support of information system. When asked about the main reasons for their support or even enthusiasms about information systems; “convenience”, “easy to use” and “improved work efficiency” were frequently mentioned by all respondents. Information systems drastic simplification of medical practitioners’ work routine and its user friendly design have won praises all around. As the hospital staff got increasingly used to the new technology and operation methods, the information system demonstrated clear advantage over that of the manual system. Consequently, the perceived relative advantage directly lead to widespread user acceptance of the information system.

The findings of this study show that the perceived benefits that an information system is likely to bring to an organization plays a big role in persuading the management to make a decision towards adoption of information systems.

#### **4.6 Influence of external pressure on the adoption of information systems in healthcare service delivery**

To achieve this objective, the respondents were asked to indicate their view on several questions about the influence of external pressure on the IS adoption. The participants were required to indicate whether they strongly agreed, agreed, neutral, disagreed or

strongly disagreed with the statements. The findings of this variable are presented in table 4.8

**Table 4.8 Influence of external Pressure**

<b>Responses</b>	<b>Frequency</b>	<b>Percentage</b>
9 - 17	28	40.0
18 - 26	17	24.3
27 -35	14	20.0
36 -45	11	15.7
<b>Total</b>	<b>70</b>	<b>100.0</b>

The findings revealed that majority of the respondents as shown by 40% scored between 9 and 17. This means that they strongly disagreed that external pressure influences adoption of information system. The study further reveals that 24.3 % of the respondents scored between 18 and 26 which means that they disagreed that external pressure influences adoption of information system. This shows that 64.3% of the respondents disagreed that external pressure influences adoption of information system. These findings mean that adoption of information systems is rarely influenced by forces external to the organization.

#### **4.7 Influence of the top Managements Characteristics on the adoption of information systems in healthcare service delivery**

The study also sought to establish whether top managements characteristics influences adoption of information system. To do this, the researcher requested the respondents to react to several questions that were about the influence of the top managements characteristics on information systems adoption. Table 4.9 represents the findings on this variable

**Table 4.9 Influence of Top Management Characteristics**

<b>Responses</b>	<b>Frequency</b>	<b>Percentage</b>
9 - 17	0	0.0
18 - 26	0	0.0
27 -35	37	52.9
36 -44	21	30.0
45 - 53	12	17.1
<b>Total</b>	<b>70</b>	<b>100.0</b>

The results of the findings revealed that 52.9% of the respondents scored between 27 and 35. This means that they perceived top management’s characteristics as moderately likely to influence adoption of information system. 30% of the respondents scored between 36 and 44, this shows that they perceived the top management characteristics as likely to influence adoption of information system while 12% of the respondents perceived top managements characteristics as extremely likely to influence adoption of information systems. This means that 100% of the respondents perceived the top managements characteristics as likely to influence adoption of information systems.

An item was also included in the interview schedule which sought information on the characteristics of top executives that were likely to influence adoption of information systems. The interviewees unanimously named executive commitment as the most important factor in driving information system adoption. Given the hospitals are responsible for making the information systems investments, the decisions of whether and how to adopt information systems solely rest on the hospital executives. Strong commitment from the executives ensures the deployment of adequate financial and human resources as well as the careful implementation of the information systems adoption plan. It is also able to influence the other adoption factors such as “User ICT literacy” to improve the chance of successful system adoption. As a result, information systems adoption projects are commonly initiated by the executive and as the IT manager revealed:

“... If a hospital failed to adopt information system, there must be some problem with their hospital executives, if you have strong executive commitment, you normally will be able to do this...”

This means that organizations whose top managements are innovative and are knowledgeable on information systems are more likely to adopt information systems. This therefore shows that all the respondents indicated that top managements characteristics are an important factor in the adoption of information systems.

**CHAPTER FIVE**  
**SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND**  
**RECOMMENDATIONS OF THE STUDY**

**5.1 Introduction**

This chapter presents the summary of findings, discussions, conclusions and recommendations. It is divided into five sections; the first section presents the summary of findings, the second section presents discussion of findings as per study objectives, the third section presents conclusions of the study, the fourth section presents recommendations of the study while the fifth section presents suggestions for further research.

**5.2 Summary of findings**

The aim of this study was to investigate the factors that influence the adoption of information systems in healthcare service delivery in private healthcare facilities in Kiambu County. Four research objectives were formulated to guide the study. Research objective one sought to establish the influence of the staff information and communication technology literacy on the adoption of information system. Research objective two sought to establish the influence of information systems characteristics on the adoption of information systems, research objective three sought to establish the influence of external pressure on the adoption of information systems while research objective four sought to establish the influence of the top management characteristics on the adoption of information systems. The study employed survey research design. The sample for the study was 100 participants drawn from 25 private healthcare facilities in Kiambu County. The study relied on a self-administered questionnaire and interviews. Data was analyzed using frequency tables and percentages. From the data analyzed the following were the findings of this study.

On the research objective one which was to establish the influence of information and communication technology literacy, the study revealed that majority of the respondents scored between 33 and 43 as shown by 50.0% in table 4.6. This means that majority of the respondents perceived staff ICT literacy as moderately likely to influence the

adoption of information system. Thus information and communication technology literacy is an important factor in the adoption of information system.

The findings on the research objective two which was to establish the influence of information systems characteristics on the adoption of information systems was that as presented in table 4.7, majority of the participants as shown by 71.4% scored between 52 – 64. This means that majority of the respondents perceived information systems characteristics as likely to influence information systems adoption.

The research objective three sought to establish the influence of external pressure on the adoption of information systems. The study revealed that majority of the respondents as shown by 40% in table 4.8 strongly disagreed that external pressure influences adoption of information system. The study further reveals that 24.3 % of the respondents disagreed that external pressure influences adoption of information system. This shows that 64.3% of the respondents disagreed that external pressure influences adoption of information system. These findings mean that adoption of information systems is rarely influenced by forces external to the organization.

As presented in table 4.9, the findings on research objective four which was to establish the influence of the top management characteristics on the adoption of information systems revealed that 52.9% of the respondents perceived the top management's characteristics as moderately likely to influence adoption of information system. 30% of the respondents perceived the top management characteristics as likely to influence adoption of information system while 12% of the respondents perceived top managements characteristics as extremely likely to influence adoption of information systems. This means that 100% of the respondents perceived the top managements characteristics as likely to influence adoption of information systems. Thus the management plays a crucial role on the adoption of information systems.

### **5.3 Discussion of Findings**

This section gives a discussion based on the research questions on the factors influencing adoption of information systems in healthcare service delivery in private healthcare facilities in Kiambu County.

#### **5.3.1 Staff Information and Communication Technology Literacy**

The findings of this study show that the staff information and communication technology literacy is an important factor in the adoption of information systems. This is in agreement with Thong (1999) who suggested that the higher the information systems capabilities the staff have, the higher their potential in the use of information systems, and thus the higher percentage of adopting information technology. The literature reviewed also asserted that lack of knowledge on how to use technology and low computer literacy are factors that affect the adoption of ICT (Arendt 2008, Attewell 1991, Johnson 2001 and Mutula 2001).

The results of this study show that the hospital staff with higher IS capabilities are more likely to adopt information systems. Therefore, the key for adoption of information systems is the Information Systems capabilities. When a hospital is aware that most of its staff has adequate IT knowledge, it will be inclined to adopt information systems. Therefore enhancement of information systems literacy of hospital staff and information technology capability will increase the possibility of adoption of information systems.

#### **5.3.2 Information Systems Characteristics**

According to the results, information systems characteristic significantly influences the information systems adoption. The results obtained in the study are supported by Hung et al (2010) on their research on the adoption of CRMS in hospitals who concluded that the more the benefits seen to be gained from adopting information systems, the more willingness the hospital would have to adopt information systems. The findings are also in agreement with Cragg and King (1993) who found a positive relationship between perceived benefits and Information systems adoption.

The variable information systems characteristics discussed in this research shows that the perceived relative advantages influences the decision to adopt information systems. In other words the more the perceived benefits gained from adopting information system, the more willingness the hospital will have towards adopting information system.

### **5.3.3 External Pressure**

The findings on this variable indicated that majority of the respondents perceived that information systems does not influence adoption of information system. Porter and Millar (1985) suggested that, by adopting IS, businesses will be able to compete in three ways. IS can change the industry structure and, in so doing, alter the rules of competition. Information systems can also create competitive advantage by giving businesses new ways to outperform their rivals. Finally, information systems spawn new businesses, often from within existing operations of the business. Therefore, a small business in an environment that is more competitive would feel a greater need to turn to IS to gain a competitive advantage. On the other hand, a small business in a less competitive environment would not be faced with a push to be innovative. Most of the literature argued that the greater the competition among similar organizations, the more likely the organization considers IT adoption to gain a competitive edge (Iacovou et al., 1995).

The results on this variable disagreed with the literature reviewed which had indicated that external pressure plays a significant role on the adoption of information system. One possible reason is that the healthcare management makes individual decisions and are therefore not influenced by the peers. The other possible reason could be that the hospital; business is not global, due to this there is not much pressure from customer or suppliers to adopt ICT in their business operation.

### **5.3.4 Top Management Characteristics**

This study found that the top management's characteristics significantly influence adoption of information systems. This is in agreement with Thong (1999) research which discussed the adoption of information systems in small businesses and showed a positive relationship between the innovation of senior executives and the adoption of information systems. The results were also supported by Hung et al (2010) who found that

preferences of innovation among executives will increase the willingness in adopting information systems. When hospital top management is familiar with the characteristics of innovation, the hospital reduces the uncertainty concerning the use of information systems and increases the willingness of adopting information systems.

#### **5.4 Conclusions of the study**

The purpose of this research was to identify the factors influencing the adoption of information systems in healthcare service delivery in Kiambu County. A review of prior information systems adoption literature provided support for the proposal of an empirical model of information systems adoption, and this model has been empirically verified by the results of a survey of 25 private hospitals in Kiambu County. The findings revealed that three factors; Staff ICT literacy, information systems characteristics and top management characteristics significantly influences adoption of information systems in healthcare service delivery. One factor the external pressure was found to have no significant influence on the adoption of information system. The factors identified by this research can hopefully provide substantial help to the hospital managements and academics.

The results of this study have implications for information systems adoption in hospitals. First, the study highlights the importance of raising the information systems literacy of the organizations employees, employees who understands information systems easily learn new information systems and are able to work with it with ease. Second, the information system must offer a better alternative to existing practices in the organization. If the information system is not perceived as beneficial to the small business, there is no reason to adopt them. Thirdly, having innovative and IS-knowledgeable top management. An organization whose top managements understands the benefits of information systems adoption and is willing to invest scarce resources in the information systems project will be able to take advantage of the promised benefits of information systems adoption.

### **5.5 Recommendations of the study**

Based on the findings, this research recommends that healthcare facilities should train their employees on the information systems prior to their adoption. This will ensure that the staff will easily understand the functionality of information systems and will also serve to reduce resistance to information systems.

Secondly, this research also recommends that it is important for the government to incorporate information systems training in all courses as it is an important factor that facilitates adoption of information technology.

This study also recommends that the government formulates a policy of assisting small healthcare facilities who may not have adequate finances for adopting information systems, this will go down well in improving the quality of healthcare service delivery to all citizens.

### **5.6 Suggestions for further research**

This study focused on four factors that were considered to influence the adoption of information systems, this research recommends that future research should look into more factors that may influence adoption of information systems.

This study was done on Kiambu County only, therefore this research recommends a research be done on a wider area to allow for more generalizability.

This study also recommends that multiple case studies or quantitative surveys to involve more hospitals in the study to further improve the generalizability of the findings can also be conducted. Through contrasting the responses received from large number of hospitals, the information systems adoption situation can be explored more fully and new insights into the information systems adoption practices can be acquired.

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## APPENDIX 1

### Letter of Transmittal

Francis Macharia  
P.O BOX 3365 ,  
THIKA

To whom it my concern,

Dear Sir/Madam,

**Re: Letter of request to conduct research.**

I am a postgraduate student at the University of Nairobi pursuing a Masters of Arts degree in Project Planning and Management. I am currently undertaking a research on the adoption of information systems in healthcare service delivery in Kiambu County.

I am pleased to inform you that you have been selected to participate in the study. I therefore request you to provide information through the provided questionnaire. Kindly answer all the items in the questionnaire provided. Your identity and information given will be treated with utmost confidence and data provided will be used for academic purposes only.

Thank you in advance for participating,

Yours faithfully,

Francis Mucheru Macharia.

L50/70661/2011

## APPENDIX 2

### QUESTIONNAIRE FOR THE HOSPITAL ADMINISTRATORS

I am a student pursuing Master of Arts degree in project planning and management at the University of Nairobi and I am carrying out a research on the factors influencing adoption of information systems in healthcare service delivery. This questionnaire is purely designed for academic purposes. The information given by any respondent will be kept confidential and will not be used for any other purposes without the consent of the respondent. I request for your honesty as this will make the overall data useful hence the whole meaning of this study.

#### Instructions

1. Kindly answer all the questions in the questionnaire.
2. Note that you are not required to indicate your name on the questionnaire.
3. Please tick the relevant box

#### Section A

*(In answering the following questions, please tick the relevant box).*

1. Gender                      Male                       Female
2. What is your job title?  
Hospital Administrator     Head of Nurses     Head of IT                       Doctor   
Other.....
3. How long have you been working in this institution  
Less than 1 year     1 – 3 years     4 – 6 years     7 – 9 years     10 years or   
more
4. How many beds does the hospital have?  
50 – 100     100 – 150     150 and above
5. Location of the hospital  
Urban                       Rural
6. How many employees does the hospital have?  
50 and below     51 – 100     101 – 150     151 – 200     Above 200

**Section B**

*(for the following items, indicate your opinion on the influence of the following attributes on the adoption of information systems depending on whether it is Extremely likely, Likely, Moderately likely, Slightly likely, or Not Likely).*

		Extremely likely	Likely	Moderately likely	Slightly likely	Not likely
	<b>Influence of staff ICT Literacy</b>	5	4	3	2	1
7	The employees computer training certification influences information system adoption					
8	The employees experience on the use information systems in other hospitals influences information systems adoption					
9	The employee’s ability to work with computer applications influences information systems adoption.					
10	Employees ability to easily learn new technology influences adoption of information systems					
11	Employees tendency to use computers frequently influences information systems adoption					
12	Employees knowledge on the internet influences information systems adoption					
13	Employees continuous training on computer information systems influences					
14	Employees knowledge on computerized laboratory operations influences information systems adoption					
15	Employees knowledge on computerized patients billing influences information systems adoption					
16	Employees knowledge computerized ward operations influences information systems adoption					
16	Employees experiences on computerized work environments influences adoption of information systems					

**Section C**

*(for the following items, indicate your opinion on the influence of the following attributes on the adoption of information systems depending on whether it is Extremely likely, Likely, Moderately likely, Slightly likely, or Not Likely).*

		<b>Extremely likely</b>	<b>Likely</b>	<b>Moderately Likely</b>	<b>Slightly likely</b>	<b>Not likely</b>
	<b>Influence of Information systems characteristics</b>	5	4	3	2	1
17	Tendency of Computerized systems to increase quality of service delivery					
18	Tendency of Computer information systems to increase organizational profitability					
19	Tendency of Information systems to provide timely reports					
20	Tendency of Information systems to improve communication within the organization					
21	Tendency of information systems to improve employees efficiency					
22	Compatibility of the computer systems with clinical work					
23	Compatibility of with the nurses work					
24	Compatibility of computer systems with laboratory operations					
25	Compatibility of computer systems with radiology operations					
26	User Friendliness of the information systems					
27	Complexity of the skills needed for our employees to use information systems					
28	Tendency of new technologies difficulty to integrate with our current work					
29	Concerns about risk of technology failure					

**Section D** (In answering the following questions, indicate your opinion on the influence of the following attributes on the adoption of information systems)

		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
	<b>Influence of External pressure</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
29	The customers preference on computerized systems influences adoption of information systems					
30	The risk of our customers drifting to our competitors influenced adoption of information systems					
31	Use of information systems by neighboring hospitals influenced our decision to adopt information systems in our hospital					
32	The suppliers pressure on the use of computerized systems influences technology adoption					
33	The risk of our customers drifting to our competitors influenced adoption of information systems					
34	Use of computer systems by the suppliers influences adoption of information system					
35	The intensity of competition in the market influenced our decision to adopt information systems					
36	The intensity of competition in the market influenced our decision to adopt information systems					
37	The pressure by our business partners on the use of information systems influenced our decision to adopt information systems					

**Section E**

*(In answering the following questions, indicate your opinion on the influence of the following attributes on the adoption of information systems)*

		Extremely likely	Likely	Moderately Likely	Slightly likely	Not likely
	<b>Influence of the top management characteristics</b>	5	4	3	2	1
38	Tendency of the top management's ability to have original ideas influences adoption of information systems					
39	Recognition of innovative employees by the top management influences adoption of information systems					
40	The tendency of top managements to take a risk of doing things differently influences adoption of information systems					
41	The tendency of senior executives to support new ideas of doing things influences adoption of information systems					
42	Tendency by the top management to trust innovative employees influences adoption of information systems					
43	Top managements tendency to give autonomy to innovative individuals and teams influences adoption of information systems					
44	Top managements understanding of the benefits of information systems influences information systems adoption					
45	Top managements understanding of computer software's influences information systems adoption					
46	Top managements knowledge on emerging healthcare information system technologies influences information systems adoption.					

**Section F** (*In answering the following question, Tick where appropriate*)

47. Indicate the status of information systems adoption in healthcare service delivery in your institution by ticking the appropriate option.

Fully Implemented  Partially Implemented  Promotion in progress

## APPENDIX 3

### INTERVIEW SCHEDULE FOR QUESTIONNAIRE FOR THE HOSPITAL ADMINISTRATORS

#### 1. Opening

A. (Establish Rapport) [shake hands]

My name is Francis, a postgraduate student of University of Nairobi. I am carrying out a research on the adoption of information system and I thought it would be a good idea to interview you.

#### B. (Purpose)

I would like to ask you some questions about your background, your job title, some experiences you have had, and some information about this institution.

The interview should take about 20 minutes. Are you available to respond to some questions at this time?

(Transition: Let me begin by asking you some questions about your job)

#### A. General demographic information

1. What is your job title?
2. How long have you been working in this institution?
3. What is the bed capacity of this facility?
4. Location of the hospital
5. How many employees does the hospital have?

#### B Influence of the staff ICT literacy

1. How would you rate your employees computer knowledge
2. Did you encounter any problems with the users at the time of implementing the information system
3. Did the users have prior experience with information systems at the time of implementation
4. Did you have IT support personnel to train the users

**C Influence of information system characteristics**

1. Has the information system brought any benefits to your organization?
2. What were your main reasons for supporting information systems?
3. Did you fear that the new technology may fail at some point?

**D. Influence of external pressure**

1. Are the neighboring hospitals using information systems
2. Did you fear that your patients might migrate to neighboring hospitals
3. Did you get any external pressure to adopt information system
4. Who introduced you to information systems

**E. Influence of top management characteristics**

what would you say are the characteristics of top management that facilitates adoption of information system?

**F. Status of Information system Adoption**

What is the level of information system adoption?

APPENDIX 4

Research Permit

PAGE 2 PAGE 3

**THIS IS TO CERTIFY THAT:** **Research Permit No. NCST/RCD/13/013/52**

**Prof./Dr./Mr./Mrs./Miss/Institution** **Date of issue**

**Francis Mucheru Macharia** **3<sup>rd</sup> June, 2013**

**of (Address) University of Nairobi** **Fee received**

**P.O. Box 92-0902, Kikuyu.** **KSH. 1000**

**has been permitted to conduct research in**

**Location**

**District**

**Kiambu** **County**

**on the topic: Factors influencing adoption**

**of information systems in private healthcare**

**facilities in Kiambu County.**



*Francis Mucheru Macharia*

**Applicant's Signature**

*[Signature]*

**For Secretary**

**National Council for**

**Science & Technology**

**for a period ending: 31<sup>st</sup> July, 2013.**

## APPENDIX 5

### Research Authorization Letter

REPUBLIC OF KENYA



## NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telephone: 254-020-2213471, 2241349, 254-020-2673550  
Mobile: 0713 788 787 , 0735 404 245  
Fax: 254-020-2213215  
When replying please quote  
secretary@ncst.go.ke

P.O. Box 30623-00100  
NAIROBI-KENYA  
Website: www.ncst.go.ke

Our Ref: **NCST/RCD/13/013/52**

Date: **3<sup>rd</sup> June 2013**

Francis Mucheru Macharia  
University of Nairobi  
P.O Box 30197-00100  
Nairobi.

### **RE: RESEARCH AUTHORIZATION**

Following your application dated **21<sup>st</sup> May 2013** for authority to carry out research on "*Factors influencing adoption of information systems in private healthcare facilities in Kiambu County.*" I am pleased to inform you that you have been authorized to undertake research in **Kiambu County** for a period ending **31<sup>st</sup> July, 2013.**

You are advised to report to **the County Commissioner and County Director of Education, Kiambu County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

**DR. M. K. RUGUTT, PhD, HSC.**  
**DEPUTY COUNCIL SECRETARY**

Copy to:  
The County Commissioner  
The County Director of Education  
Kiambu County.

*"The National Council for Science and Technology is Committed to the Promotion of Science and Technology for National Development".*