Addis Ababa University

College of Natural Science

School of Information Science

Factors influencing ICT Adoption in Public Healthcare organization: the Case of Yekatit 12 Hospital

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June, 2017

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Name and Signature of Members of the Examining Board

Name	Title	Signature	Date
Temtim Asefa (PhD)	**Advisor**	_____	_____
_____	**Examiner**	_____	_____
_____	**Examiner**	_____	_____

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I also would like to thank to the staff and management of all the Yekatit 12 Hospital for their response to research questionnaire and interview.

DECLARATION

I declare that the thesis is my original work and has not been presented for a degree in any other university.

MOHAMMED ESSA

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JUNE, 2017

This thesis has been submitted for examination with my approval as university advisor.

Temtim Asefa (PhD)

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JUNE, 2017

DEDICATION

To the almighty (ALLAH).

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ABBREVIATIONS AND ACRONYMS

CITL	Center for Information Technology Leadership
E-health	Electronic health
EHR	Electronic Health Record
EHMIS	Electronic health
GDP	Gross Domestic Product
HIS	Health Information Systems
HRIS	Human Resource Information system
HSDP	Health Sector Development Program
ICT	Information and Communication Technologies
MoH	Ministry of Health
SPSS	Statistical Package for Social Sciences
TOE	Technology-organization-environment
WHO	World Health Organization

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ABSTRACT

The purpose of this study was to investigate the factors influencing ICT adoption in public healthcare organizations the case of Yekatit 12 Hospital. The populations of this study included Administrators, Doctors, nurses, ICT directors, finance officers, record keepers, procurement officers, radiologists and laboratory technologists, emergency podiatrist, system experts.

For a better understanding of the situation a mixed (Quantitative and Qualitative) research approach was employed. Questionnaire and Interview were used as means of data collection. The quantitative data generated was analyzed using descriptive statistics with the help of Statistical Package for Social Sciences (SPSS) version 20. Frequency and mean were used for analyzing the quantitative data while the qualitative data were thematically organized, categorized and examined to understand the emerging patterns of responses. The study was guided by Technological-Organizational-Environmental (TOE) theory.

The study found that, employees are not skillful in operating the computers. Many of them do not understand how to use the IT service in the Hospital. Therefore, skill capacity building program should be considered by the management of the Hospitals to improve the ICT service. The lack of ICT training and lack of knowledge on troubleshooting computer is considered to be among the problems that negatively affects the adoption of ICT in Hospital.

The study found that availability of ICT infrastructure is a major factor that negatively influence the ICT adoption ICT in the Hospital. The study further revealed that, top management, lack of employees ICT skill, and lack of regular ICT training are the main factors influencing ICT adoption in Yekatit 12 Hospital.

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

1.2

Healthcare is a sector that is experiencing a significant number of internal, but also external pressures. Progress in medicine Information and communications technology has increased productivity in many sectors of the economy, and economic growth rests more and more on the contributions of ICT. However, even though the investments in ICT have been growing, the adoption information and communication technology has been relatively slow in health care sector [2].

Healthcare is a sector that is experiencing a significant number of internal and external pressures. Progress in medicine and also in information and communication technologies (ICT), are resulting in new methods and new opportunities to support or even enable new types of health care services. ICT development are not of particular breakthrough technologies, but rather those of rapid and continuous improvement in price-performance of both computing and communications, the explosion of bandwidth capacity in fixed and mobile networks, and the emergence and development of the Internet and Internet-based applications. Perhaps the most important development is the convergence and compatibility of technologies, which is opening up new possibilities in a number of fields e.g. bioinformatics which is a branch between biology, computer science, mathematics, and engineering that develops and improves methods for storing, retrieving, and analyzing biological data that develops software tools to generate useful biological knowledge [3].

Health care systems are under constant pressure to improve productivity as the already struggling industry will face serious challenges due to the ageing population. As the population is ageing, the demand for health services will increase and the labor force decrease. Thus, to be able to provide good quality health services to the citizens, the productivity needs to increase and it is widely believed that ICT will be playing a major role [3].

Health care has not essentially changed in at least half a century, but in one generation or less, every element of it, every assumption behind it, will be changed or gone. He identified three forces

for transformation: biology (particularly genetic and immunological developments); technology (particularly ICT); and health management. Information and Communication Technologies (ICT) play an essential role in supporting daily life in today's digital society; they are used everywhere now and play an important role in the delivery of better and more efficient healthcare services [77].

1.2 Statement of the problem

Developed countries have embraced the use of information communication 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, and use of the Internet for the purposes of communication and the use of magnetic cards [4].

Many managers believe implementation of ICT projects within budget and schedule as a success. ICT integration in the organization has different phases. Starting from initiation phase, adoption, implementation and assimilation. Organizations can exploit the benefit of ICT only when they reutilized ICT functionalities in their daily routine activities. Hence this study has focused on investigating the factors that influence the adoption of information system in the healthcare industry [5].

Healthcare is a sector that is experiencing a significant number of internal, but also external pressures. Progress in medicine and also in information and communication technologies (ICT), are resulting in new methods and new opportunities to support or even enable new types of health care services [5].

Due to the impression and acceptance of technology improvement concept has been increasing in the last periods, has intensified the importance of giving right decision for organizations. Decision makers have encountered the fact of using proper scientific methods instead of using intuitive and emotional choices in decision making process. In this context, many decision support models and relevant systems are still being developed in order to assist the strategic management mechanisms. There is also a critical need for automated approaches for effective and efficient utilization of massive amount of data to support corporate and individuals in strategic planning and decision-making. Consequently, the rapid growth and integration of information technologies, digital networks, software and database systems and the availability of massive amount of electronic data provide people with a vast new resource that can be

analyzed to optimize organizational systems, uncover financially valuable patterns, minimize investment risks, make successful strategic decisions [6].

Poor documentation, loss of data, lack of access to knowledge, ineffective dissemination of information, reliance on human memory for the retrieval of data; all these are factors that impede the delivery of high quality health care services. Many public and private health service providers experience challenges linked to data and information management. Inability to retrieve, and share critical information quickly hinder many healthcare institutions and hinder effective monitoring. Many man hours are wasted by personnel moving from unit to unit in search of or for purposes of getting information [62].

To ensure effective and efficient delivery of health services ICT‟s can thus be adopted; this is due to their potential to bring about extreme changes within the healthcare sector, i.e. bringing about effective communication between clinicians, sharing of resources and proper management and administration of the institution [62].

1.3. Research questions

- How ICT is adopted in Yekatit 12 Hospital?
- What are the challenges for the successful ICT adoption in Yekatit 12 Hospital?

1.4. Purpose of the Study

The purpose of this study is to assess/investigate the factors that influence the adoption of ICT in public healthcare Hospital, with reference to Yekatit 12 Hospital in Addis Ababa Ethiopia. The research will explore how ICT is adopted in healthcare organizations, which is not extensively researched in Ethiopia.

1.5. General objectives

The general objective of this research is Investigate the factors influence ICT in Yekatit 12 Hospital

1.6. Specific objective

The study was guided by the following specific objectives-:

1. To identify existing ICT infrastructure in the Yekatit 12 Hospital.
2. To identify main challenges to use ICT for health care services.
3. To identify factors that influence ICT adoption in Yekatit 12 Hospital
4. To provide conclusion and forward the recommendations.

1.7. Significance of the Study

Health care organization like Hospitals needs to achieve its better health care delivery, the overall organizational functions should be supported by information technology. The finding of this research provide to Yekatit 12 hospital a ground for transforming the paper based health service to IT enabled system. Furthermore, the research will create the idea of considering and using the identified factors influencing ICT adoption in the hospital. The study is vital in saving huge cost and to increase employee's satisfaction. The research findings will be used to review, improve and strengthen ICT utilization in Hospitals. The study will also benefit hospitals as an effective management system as they shall benefit from networked system which shall explain the factors that influenced the adoption of ICT.

1.8. Limitations of the Study

This research result will only be applied for Yekatit 12 Hospital. This makes the research limited in the sense that the findings cannot be generalized to other public healthcare organizations.

1.9. Definition of Significant Terms

Adoption: It is a process of taking up or starting to use or following

E-health: is the use of emerging information and communication technology, especially the Internet, to improve or enable health and healthcare.

Factors: Elements contributing to a particular result or situation

Funds: Financial resources, usually in the form of money, or other values

ICT: Information and communications technology is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems, as well as the various services and applications.

Infrastructure: The basic physical and organizational structures and facilities needed for the operation of a society or enterprise

Public Hospitals: are a Hospital which is owned by a government and receives government funding. In some countries, this type of Hospital provides medical care free of charge, the cost of which is covered by government reimbursement.

Training: Is teaching, or developing in oneself or others, any skills and knowledge that relate to specific useful competencies.

1.10. Organization of the study

Chapter one of the study contains introduction, giving a background of the study while putting the topic of study in perspective. It gives the statement of the problem and outlines the objectives, limitations, delimitations, and the assumptions of the study. Chapter two reviews the relevant literature on factors influencing adoption of ICT. It critically looks at the availability of funds, training and adoption, ICT Infrastructure and ICT staff attitude .It also outlines empirical review as well as the conceptual framework variables. Chapter three consists of research methodology which was used in the study. It covers the research design, target population, sample design, data collection, validity and reliability of data collection instruments, data analysis techniques, and ethical considerations. Chapter four consists of data analysis, presentation and interpretations and discussions. Chapter five consists of summary of the findings, discussion, conclusion and recommendation based on the study.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

The purpose of this chapter is to review the literature in the area of ICT adoption in public healthcare organization and basically comprise ICT Adoption, Factors influence ICT adoption in healthcare organizations, ICT in healthcare services, and building the Conceptual framework for ICT adoption in healthcare organizations.

2.2. Definition of Information Communication Technology (ICT) Adoption

ICT is a technology that supports activities in information management. Such activities include gathering, processing, storing and presenting data. Increasingly these activities also involve collaboration and communication. Hence IT has become ICT: information and communication technology [7]. Information and communication technologies (ICTs) encompass all digital technologies that facilitate the electronic capture, processing, storage, and exchange of information. ICTs have the potential to address many of the challenges that healthcare systems are currently confronting. For the purposes of this study, ICTs are defined as tools that facilitate communication and the processing and transmission of information and the sharing of knowledge by electronic means. This encompasses the full range of electronic digital and analog ICTs, from radio and television to telephones (fixed and mobile), computers, electronic-based media such as digital text and audio-video recording, and the Internet, but excludes the no electronic technologies. This does not lessen the importance of non-electronic technologies such as paper-based text for sharing information and knowledge or communicating about health [8].

Improving the health of Individuals and communities, and strengthening health systems, disease detection and prevention are crucial to development and poverty reduction. ICTs have the potential to impact almost every aspect of the health sector. In public health, information management and communication processes are pivotal, and are facilitated or limited by available ICT's [8].

2.3. Information and Communications Technology Adoption

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, it can enhance the effectiveness of the care provide patient safety, increase workforce productivity and satisfaction, streamline payment-billing and administrative systems, and meet consumer expectations for service and access to information [28].

Competitive market analysis often shapes public policy, including healthcare policy. Those well versed in policy know how market forces create incentives to adopt valuable new technologies. Specifically, consumers in a market economy comparison shop and "vote with their feet" pressuring producers for lower prices, higher quality and more desirable products. Consequently, producers adopt any technology that enables them to lower production costs. Producers also adopt technology to create new higher quality products if the additional amount consumers are willing to pay exceeds new production, adoption, implementation and transition costs. In the long-run, market forces result in the best use of all inputs, including new technologies, through investment, entry, and exit. Of course, those well versed in policy also know the traditional ways that competitive market forces do not produce the best outcomes for society, such as when monopolies prevail or externalities exist like pollution [28].

Adopting ICT is also more complicated than adopting other technologies in several other ways. First, using new technology generally requires training, which significantly increases short-term costs, particularly due to workers being pulled away from productive tasks. Second, other large switching costs are the norm in the ICT market [9]. Translation of information, for instance, is required when new electronic storage or communication technologies replace old paper records, or old electronic systems. Third, because, information is stored, manipulated, and communicated using inter-linked technologies, i.e. a "system" of multiple pieces of hardware and software, the various technologies must be interoperable to work with one another. The need for interoperability can raise switching costs from training and translation if switching one technology causes changes in how another technology is used.

Fourth, switching costs may be so high that users are effectively locked-in to a specific form of ICT, either at the system or vendor level, and new technologies may never be adopted. Depending on the industry, the risk of system disruption or breakdown makes the risk of using a new vendor or technology, especially an unproven one, potentially huge. Such breakdown may imply irreversible damage to the company or individual user. Because adopting a new technology cannot be easily reversed, adopters of ICT need to think carefully about the added value of adopting the technology far into the future. When there is uncertainty about the future requirements of the technology, ICT users may be very reluctant to adopt a new technology [9].

Fifth, switching costs are non-linear. For instance, persuading five independent, yet highly inter-dependent, banks to switch to a new ICT platform is more than five times as hard as getting one bank to switch, yet all five of the banks need to switch as no single bank wants to be the first to give up network externalities. Finally, in order not to lose the value of existing ICT, the ability to integrate old and new ICT (backwards compatibility) may be critical for adoption. For example, long after the development of superior CD and jump drive storage technologies, many computers continued to have floppy disc drive readers. Backwards compatibility is also important as it lowers switching costs. Replacing CD players with MP3 players, for instance, was not that costly because the music on CDs could be "ripped" for MP3 players. In contrast, the costs of switching from vinyl record players to CD players were much greater because entire music collections were not compatible. However, backwards compatibility can reduce the performance standard of the new technology below its potential, e.g. a word processing program that accepts documents in their old format will not run as quickly. The trade-off between better technology and backwards compatibility is one example of the general conflict between innovative technologies and network externalities and their associated switching costs [9].

The adoption of even vastly superior technologies can be delayed for a long time, due to the need for backwards compatibility. To summarize: network effects and positive feedback can delay or inhibit ICT adoption and limit the diversity of products available. Switching costs and the need for interoperability inhibit adoption or even result in complete lock-in to suboptimal technologies. Technical standards can address many of the barriers to ICT adoption, yet history tells us that these do not necessarily emerge automatically in the market place [9].

2.4. Brief History of healthcare in Ethiopia

Ethiopia is located in the horn of Africa with a total area of about 1.1 million square kilometers. It borders with five countries: Eritrea in north, Djibouti in the east, Sudan in the west, Kenya in the south and Somalia in the south east. Ethiopia's economy largely depends on the agricultural sector which accounts for 83.4% of the labor force, 43.2% of the Gross Domestic Product (GDP) and 80% of exports. Despite numerous challenges, Ethiopia had been showing a significant economic growth over the last decade [6].

Health care system of Ethiopia is three tier systems: Primary level serving 60,000-100,000 people, General Hospital serving 1-1.5 million people and comprehensive specialized Hospital serving 3-3.5 million people. Decision making process is more decentralized to woreda level and the Federal Ministry of Health (FMOH) is more concerned to policy issues and technical support [2]. Communicable diseases and nutrition are the primary health problems of Ethiopia. About 58% of child deaths are related to malnutrition and HIV, and the major causes of maternal death are: obstructed labor, severe preeclampsia/ eclampsia, and malaria [6].

Currently FMoH is implementing Health Sector Development Program (HSDP IV) and one of the components is introducing and implementing e-Health. FMoH is implementing different Information and Communication Technology (ICT) projects to support the health care systems and most projects are at pilot levels. The current projects which are implemented by FMoH are: Tele-Education, electronic-learning, Human Resource Information system (HRIS), Health Integrated Financial Information System (HIFIS), and Smart Care Ethiopia [6].

2.5. Hospitals in Ethiopia

The background of health center in Ethiopia that was established the first hospital in 1908, which is during Emperor Menelik II well-known the 1 St Governmental public health services, now known as ministry of public health, which is established in 1948. In 1909, the first hospital Menelik II was built in Ethiopia. Later on his imperial majesty Haile silassie established different Hospitals in deferent regions including Addis Ababa. The first clinic was established at the hot spring at Eilet near Messwa in which sick people used to come for bathing. The Dejasmatch Balcha Hospital was established in 1948 under the agreement with Soviet Red Cross. Ethiopian government provided the building. The Princes Tsehai memorial Hospital was opened in 1951, as a tribute initially from

the British people as friendships with Ethiopia and with strong Ethiopian participation as memorial to late princes Tsehai now known as Army Hospital. Next Princess Tsehai, the emperor youngest daughter was the first graduated national nurse from Ormand street hospital London [6].

Yekatit 12 Hospital and Medical College is one of the oldest and most important public hospitals in Ethiopia it established in 1923, it provides services for the city's population of approximately 4 million. In 1948 the Ethiopian Red cross nursing school established by imperial majesty in the private Hospital Bet-Saida which later changed to Hales lassie I Hospital. Then during the Derg regime, this hospital is changed its name to Yekatit 12 hospital [6].

2.6. Benefit of ICT adoption in healthcare organization

According to [8] in practice, the use of ICTs in the health sector has tended to focus on three broad categories that incorporate these pillars. The first, improving the functioning of health care systems by improving the management of information and access to that information, this includes: Management of logistics of patient care, Administrative systems, Patient records, and ordering and billing systems. The second, improving the delivery of health care through better diagnosis, better mapping of public health threats, better training and sharing of knowledge among health workers, and supporting health workers in primary health care, particularly rural health care, includes: biomedical literature search and retrieval, continuing professional development of health workers, telemedicine and remote diagnostic support, diagnostic imaging, critical decision support systems, quality assurance systems, and Disease surveillance and epidemiology. The third, Improving communication about health, including improved information flows among health workers and the general public, better opportunities for health promotion and health communication; and improved feedback on the impact of health services and interventions, includes: patient information, interactive communication, media approaches, health research, and advocacy to improve services.

Health systems are very complex. So too are the types of processes and information needs that are handled in health care systems. To be useful, information systems must capture and process data with broad diversity, scope, and level of detail. The nature of health care systems, particularly as regards information, is markedly different from most other sectors. In banking, for example, there are limited terms used, limited transaction possibilities, and simple information needed about

customers, and well established standards for data exchange among banks so that most transactions can be performed at automated terminals by the customers themselves.

The options for information systems within health care are much more complex due to the array of data types. For example, the automation of patient records must deal with a variety of data requirements and specification problems found in many health care data types which are exacerbated by the size and complexity of the medical vocabulary, the codification of biomedical findings, and the classification of health conditions and interventions. Nomenclature issues include concepts such as procedures, diagnoses, anatomical topography, diseases, biological agents such as classification of micro-organisms, drugs, causes for health care contact, symptoms and signs, and many others. Possible combinations and detailing represent a staggering number of possible identifying coding requirements.

Information systems within the health care system – patient records, tracking of disease prevalence, monitoring drug supplies, maintaining ordering systems for supplies, billing procedures – all stand to benefit from the use of ICTs. ICTs are the basis for the development and operation of information systems and enable the creation and application of knowledge.

It is important to note that the role and potential of ICTs in improving the functioning of health care system may be valuable in the following manner: An effective approach to setting up information systems is to explicitly identify the objectives of the system and determine the expected results, For maximum potential success, an ICT project requires all participants (from the developers of the system to the users and beneficiaries) to view the innovation as adding value to existing systems. If the people using the system do not like, want, or support it, it will likely fail, Information systems should never become static or they will lose their value.

Integrating the use of ICTs into existing health systems has helped to improve the delivery of health care in a number of ways. These include: The use of telemedicine to improve diagnosis and enhance patient care, Improvements in the continuing professional development of health workers and better sharing of research findings; and Efforts to extend the reach and coverage of health care to make an impact on specific conditions [8].

Health Information Technology

Information technology in health sector is spreading globally. Use of health information technology is offering evidence-based practice to endorse health and human prosperity. Globalization of health information system is inevitable for establishment and promotion of healthcare sector in developing societies. Present health systems in developing societies are inadequate to meet the needs of the population. Health sector of developing societies is facing a lot of barriers in establishment and promotion of health information system. These barriers include lack of infrastructure, cost, technical sophistications, lack of skilled human resources and lack of e- readiness of medical professionals [26].

Health Technology

The term health technology covers a range of methods used to promote health services, prevent diseases and treat them appropriately. With the use of health technology short-term care (rehabilitation) and long term care which include drugs, devices and procedures can be improved. There are few examples of health information technology used in different health setups which include the computerization of medical records in Hospitals and clinics, use of Internet for document delivery, information exchange and communication, development of e-cards for patient identification, development of electronic scheduling system to give appointments, Hospital labs and Hospital admission examination and computerized protocol for diagnosis and giving treatment support. HIT system provides improved decision-making and appropriate use of diagnostic laboratory tests and therapeutic agents [27].

Health Information Technology save money

Researchers for the RAND Corporation published a highly influential article on the estimated benefits of HIT. The RAND researchers claimed that HIT could potentially save up to $77 billion per year, 15 years after implementation.27 Similarly, the Center for Information Technology Leadership (CITL) estimated savings of $78 billion annually, if the system is interoperable (that is, if all system components are able to communicate with all other components [28].

Health Information Technology Improve Information Sharing

HIT advocates believe it will improve clinical medicine. They argue that integrating databases of patient treatments across large populations will enhance outcomes research, yielding information on which treatments work best. So-called "best practices" are a Holy Grail of sorts for advocates of nationalized health care systems, and some private insurers and providers as well. They hope that information gleaned from analysis of the entire population over time will identify the efficacy of various therapies [28].

Health Information Technology Improve Quality

A small but growing number of health care providers and independent services offer patients the ability to store and manage their own records securely online, so that they are accessible to the patient and his physicians. Private records management services are already used by people with complex medical conditions [17].

Advocates also hope that EMRs will enhance safety by allowing providers to easily spot adverse drug interactions and to compare a particular patient's treatment against standard protocols using specially designed software. This type of software already exists and many retail pharmacies use HIT to check for contraindicated drugs. It is too early to definitively say that EMRs contribute to patient safety [21].

Health Information Technology Improve patient outcomes

The jury is still out on whether HIT improves patient outcomes. A review of computerized clinical decision-support systems found that such systems are beneficial, but the reviewers concluded that the effects on patient outcomes are inconsistent and research is lacking. Preliminary evidence from research conducted at the Harvard School of Public Health found limited quality gains from EMRs. For instance, facilities with advanced HIT systems met federally approved best-practice standards for treatment of heart failure patients 87.8 percent of the time, compared with 85.9 percent for firms with no HIT system [22].

2.7. Theoretical Framework.

This section examines the various theories used to inform the study on the factors influencing ICT adoption in public healthcare organizations. The study is guided by the following theories; diffusion of innovation theory, technology acceptance theory and contingency theory and technology-organization-environmental theories.

2.7.1. Innovation- Diffusion Theory

This theory 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. The theory sees innovations as being communicated through certain channels over time and within a particular social system. 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. 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 [32]. 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.

The study identifies five attributes upon which an innovation is judged. These are relative advantage, compatibility, complexity, triability and observability. Relative advantage refers to the degree to which an innovation is perceived as better than the practice it replaces. Relative advantage is often expressed in terms of economic, social or other benefits. Compatibility refers to the degree to which an innovation is perceived by potential adopters to be consistent with their existing values and practices. Compatibility with what is already in place makes the new practice seem less uncertain, more familiar and easier to adopt. Complexity refers to the degree to which an innovation is considered as a difficulty to understand and use. If potential adopters perceive an innovation as complex, its adoption rate is low. Triability refers to the extent to an innovation may be subjected to limited experimentation. Finally, observability refers to the degree to which the results of an innovation are visible to others [33].

This theory has been applied to study the adoption of various information communication technologies in healthcare. However, it does not provide information on how to assess innovation characteristics. Furthermore, this theory has been criticized for its lack of specificity [49]. This theory posits that innovation spreads gradually over time and among people resulting in various adopter categories.

2.7.2. Technology Acceptance Theory

Technology acceptance theory was introduced by is an adaptation of the theory of reasoned action specifically tailored for modeling user acceptance of information systems. The goal of the theory is to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified. Ideally one would like a model that is helpful not only for prediction but also for explanation, so that researchers and practitioners can identify why a particular system may be unacceptable, and pursue appropriate corrective steps. A key purpose of the theory, therefore, is to provide a basis for tracing the impact of external factors on internal beliefs, attitudes, and intentions. Technology acceptance theory was formulated in an attempt to achieve these goals by identifying a small number of fundamental variables suggested by previous research dealing with the cognitive and affective determinants of computer acceptance [34].

The technology acceptance theory has also been used by researchers to explain why a particular system may or may not be acceptable by the users. It hypothesizes that there are two beliefs, perceiving usefulness and perceiving ease of use, which are variables that primarily affect the user acceptance. The theory is relevant to the study because it suggests that the external variables indirectly affect individuals‟ attitude toward adoption of information communication technology acceptance by influencing perceived usefulness and perceived ease of use. External variables might include individual user attributes, social factors or those related to their job tasks. A series of studies found that the theory is the best model in examining Physicians‟ acceptance of telemedicine technology because it is specialized in information technology, it is well-researched, it uses psychometric measurements, and it is a dominant model for investigating user technology acceptance [35].

2.7.3. Contingency Theory

This theory postulates that an effective organization should have a structure which is consistent with its environmental needs [36]. 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 [37]. Therefore, decision makers should take in to account technology, organization, and environment factors that affect technology adoption.

A fundamental idea behind contingency theory is that organizational viability is dependent on a fit between the organization and its environment. An organization is considered an open system, which stresses the complexity and variability of the individual parts, individual participants and subgroups as well as the looseness of connections among them. In order for the organization to be viable, it must be able to visualize and incorporate the contingencies of its environment into its premises [37]. Moreover, to have success in a rapidly changing and dynamic environment, the organization must be flexible, internally dynamic and have the capability to renew and innovate.

The theory is applicable to the study since organizations operate in different markets, have different management styles and an individual composition of staff etc. Hence, to follow the idea behind contingency theory, each organization must monitor its own environment and realize that organizations have to deal with different situations in different ways. The technology, organization, and environment 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 [38].

2.7.4. Technology-organization-environment (TOE)

Technology-organization-environment (TOE) framework uses three elements that influence technological adoption. The environmental context, the organization context, and the technological context. Using the TOE framework to develop ICT adoption model can provides an understanding of healthcare organizations' new innovation adoption behaviors. The TOE framework is an appropriate theoretical lens for understanding ICT adoption because it studies organization adoption behavior by taking technological developments and its personnel's

responses to it into account, while incorporating the organizational factors that drive the behavior and while accounting for environmental factors that influence adoption behavior. To this end, this research study integrates a number of TOE factors in a generalized model, to provide an understanding of the factors that influence an enterprise's inclination to adopt technology [50].

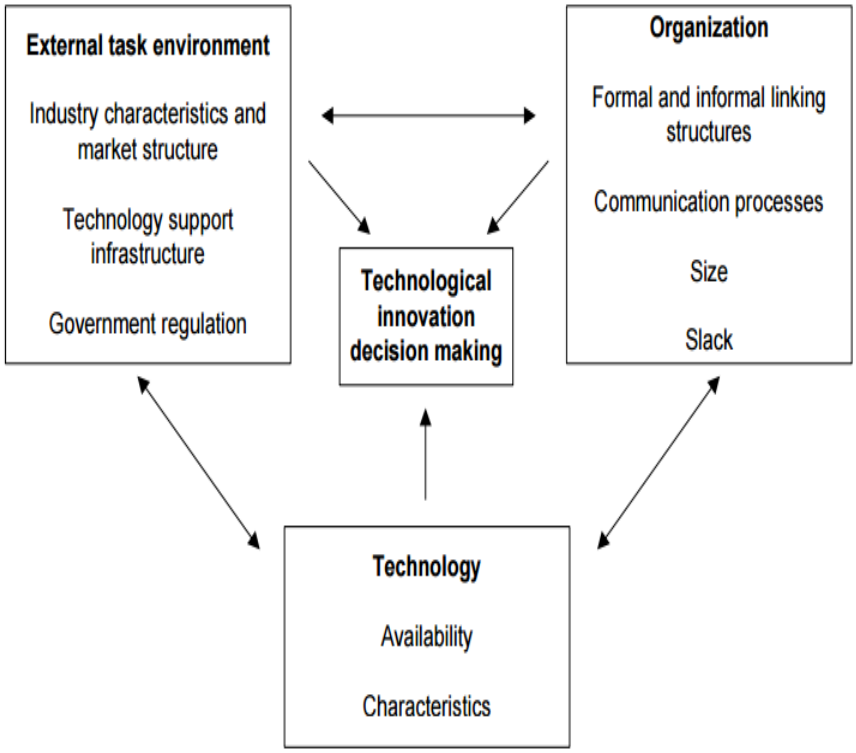

Figure 2.1: Technology-Organization-Environment framework (Tornatzky and Fleischer 1990)

Technological Context

The TOE framework suggests a method of implementing a technology innovation which will be referenced in the analysis of the deployment of the sustainability initiative by 7G. The following steps described below comprise the "systems design" perspective depicted by [50], which incorporates the best aspects of the following methods used in implementing technology solutions technocentric, sociocentric, conflict/bargaining, systems life cycle, and socio-technical systems approaches.

Environmental Context

The environmental context is the arena surrounding a firm, consisting of multiple stakeholders such as industry members, competitors, suppliers, customers, the government, the community, etc. They can influence how a firm interprets the need for innovation, its ability to acquire the resources for pursuing innovation, and its capability for actually deploying it. These stakeholders could either support or block technological innovation. Changing market and competitive conditions prod firms to use various forms of innovation. Government regulation is also another powerful tool for constraining a firm's operational activities, increasing costs of production, and instigating an investigation of technologies that must meet specified criteria. Finally, dominant customer firms could exert their power to shift their suppliers' production activities to comply with its requirements [50].

Organizational Context

The external environment context is defined as the arena in which a firm conducts its business, its industry members, knowledge producers, regulators, customers and suppliers [50]. These external factors may stimulate innovation adoption and diffusion within an organization as the organization responds to competitive pressure, regulatory actions and customer satisfaction requirements [53]. Companies may adopt a technology voluntarily or due to influences exerted by partners or competitors [54, 55, 56, and 57]. Hospitals that are linked into multi-Hospital systems, regularly exchanged resources with related Hospitals and aggressively built institutional affiliations were more likely to adopt innovative services and technologies". In general, medical enterprises form part of a healthcare network and not adopting a technology may exclude them from this network. Exclusion from such networks may result in enterprises failing to maintain a competitive position [58].

2.8. Factors influencing ICT Adoption in healthcare organizations

ICT helps for companies and other institutions to increase productivity and create attractive products to be sold on the world market. It improves the quality and decreases lead-times and costs. ICT technology has also fuelled sustainable development by reducing the environmental impact of business activities. There are several factors influencing adoption of ICT in public healthcare organizations [39].

2.8.1. Availability of Funds on Adoption of ICT

Cost refers to an amount paid or to be paid for a purchase to acquire, produce, or maintain goods or services. Adoption according to this study refers to the application of ICT in Hospitals. The cost of ICT training materials is considered to be among the problems that could negatively affect the implementation of ICT in most health facilities. The higher the cost of computers and their accessories, the fewer computers one can buy with the limited resources [39].

According to [40], the cost of computerized equipment's is often prohibitive for most Hospitals in developing countries and for those who can afford them, routine maintenance and servicing, is yet another problem that is not easily manageable by the first generation computer users. Compared to traditional forms of Hospital treatments, technology facilitates has proven to be quite expensive in all areas [39].

Additionally, paper-based systems have limited functionality; many people cannot easily view the same record at the same time. Having electronic medical records can support medical professionals in their decision-making and also improve operating efficiency, thus improving medical care quality [42].

In attempts to lower the costs, improve the quality and expand the access to health services many developing countries' governments put much hope in electronic health records and ICT based Health Information Systems (HIS). The migration to electronic medical records is necessitated by limitations in paper based records that include temporal, spatial, and monetary constraints associated with continued paper-based record accumulation and compression over time [44].

2.8.2. Training and Adoption of ICT

Technological innovation has implications for employees of various institutions. Typically, health institutions are lacking in specialized IS knowledge and technical skills. As [44] puts by mentioning the finding of Thong's work, suggested that the higher IS capabilities the staff have, the higher 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 health institutions should provide employees with computer education and training courses. IT acceptance among users of IT who form part of a firm employee's base will impose positive impacts on IT adoption [45].

The lack of knowledge on how to use technology and low computer literacy are factors that affect the adoption of ICT. 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 [46].

In addition, there is the general issue of skills and training. The skill deficiencies appearing in institutions like Hospitals include not only technical abilities but also management skills generally, institutions do not develop training plans. In most institutions, 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 [46].

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 [46].

2.8.3. Influence of Infrastructure on the Adoption of ICT

Despite the immense benefits of ICTs as a means of delivering quality health care services, the potential of ICTs have not been fully harnessed by health professionals especially in developing countries. This is due to problems of infrastructure access (slow or unreliable Internet connectivity). A good ICT infrastructure, therefore, is a condition for enhancing the well-being of a country [44].

The Internet has become an important component of the electronic services in health institutions and has permeated all aspects of life, breaking down barriers to communication and information access worldwide. The Internet is a particularly valuable resource for information relating to health care [47]. However, in spite of the potential contributions of ICTs to the activities of health workers, some constraints exist that prevent their widespread utilization. Some of the more obvious constraints common to developing countries include the limits of physical access to ICTs, the high cost of providing access for nations trying to balance multiple financial priorities, and the exclusion from access of large segments of the population due to inadequate infrastructure [48].

2.8.4. ICT staff attitude and adoption of ICT

Attitude is a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration that has worked well enough to be considered valid therefore, to be taught to new members as the correct way you perceive, think, and feel in relation to those problems. Thus the impact of organizational culture is extensive and intense in organizations where it is manifested in concepts such as „the way we do things around here or certain rights and rituals of the company, the company climate the common practices and norms and core values [44].

In the era of globalization and information age, healthcare industries are intensely promoting and adopting ICT to improve patient care. When more and more patients as health consumers seek and prioritize quality in their lives through enhanced healthcare treatments and services, it places great demands on the health care industry's information-handling abilities and infrastructure and reliable information and effective communication are crucial elements in public health practices [45].

The attitude of the developer of the ICT and the users who either adopt or reject the technology that is used in an organization affects the performance of organizations. IS attitude can be defined as the set of values and practices shared by the members of an organization involved in information activities; this includes people like IT professionals, managers, and end-users. IS attitude is thus a subset of an organizational culture, with unique values that are attached to the IT department. IS attitude might resist technologies which threaten to change their current status, power, and working habits, especially when they may violate some of the groups‟ shared values. IS culture may also be more or less compatible with certain forms of IT; when that is the case, the result can be resistance to IT changes, failure in ICT adoption, and lack of implementation. In other words, the way people perceive the usefulness and ease of use of a given ICT will be impacted by the existing national attitude. Beside the above mentioned factors, there are also different factors that influence the information technology adoption in public healthcare organizations [52].

2.8.5. Problems with Health Information Technology

Over-Reliance on the Accuracy of EMRs

A case recorded by the Agency for Healthcare Research and Quality illustrates how new errors fostered by an EMR led to an inaccurate diagnosis at an academic medical center. Three days passed before the patient's care team realized the results entered into his electronic record were for a biopsy they did not order of a lesion he did not have. Various sources cited as contributing to the error were: weak linkages among computer systems, insufficient safeguards against patient misidentification, data fragmentation and poor Hospital work processes. Because no single person was responsible for this patient's care, each person who provided care had come to rely unquestioningly on the (erroneous) EMR [30].

Physician Order Entry System Errors

Due to their relatively rapid adoption by academic teaching Hospitals, Hospital-based computerized physician order entry systems have been extensively studied. They have been widely credited with reducing medication errors and adverse drug events. They also improved adherence to guidelines. However, recent literature reviews note that few studies examined changes in error severity or the effect of the introduction of new errors like mistakenly choosing the wrong drug on drop-down pick-lists. Nor did they discuss the possible catastrophic effects of rare events such as

being completely unable to access critical medications when an electronic system fails. Physician Order Entry System Errors. Due to their relatively rapid adoption by academic teaching Hospitals, Hospital-based computerized physician order entry systems have been extensively studied. They have been widely credited with reducing medication errors and adverse drug events. They also improved adherence to guidelines. However, recent literature reviews note that few studies examined changes in error severity or the effect of the introduction of new errors like mistakenly choosing the wrong drug on drop-down pick-lists. Nor did they discuss the possible catastrophic effects of rare events such as being completely unable to access critical medications when an electronic system fails [24].

Problems with Government- Mandated Systems

HIT used by clinicians must be well-suited for one of the most "complex and varied work setting[s] that IT has tried to support with attention to subtleties and complexities of the real world that are unforgiving in their consequences. Successful HIT systems must be tailored to the needs of users, and this increases the odds that systems imposed by governments will fail. Medicare has empanelled several commissions to investigate the possibility that structured physician records could be configured for reimbursement purposes. The problem is that patient medical records have historically been used to record what individual physicians needed to know about the treatment of individual patients, and therefore the information contained in them is not the same as the information that would be needed for billing, pay-for-performance or utilization controls [31].

2.8.6. Conceptual Framework

The framework illustrates the interrelationship between dependent and independent variables. The independent variables for the study are factors influencing adoption of ICT. The independent variables include: relative advantage, usability, complexity, management support, ICT infrastructure, ICT skill, donor support, and government support, while the dependent variable is the adoption of ICT.

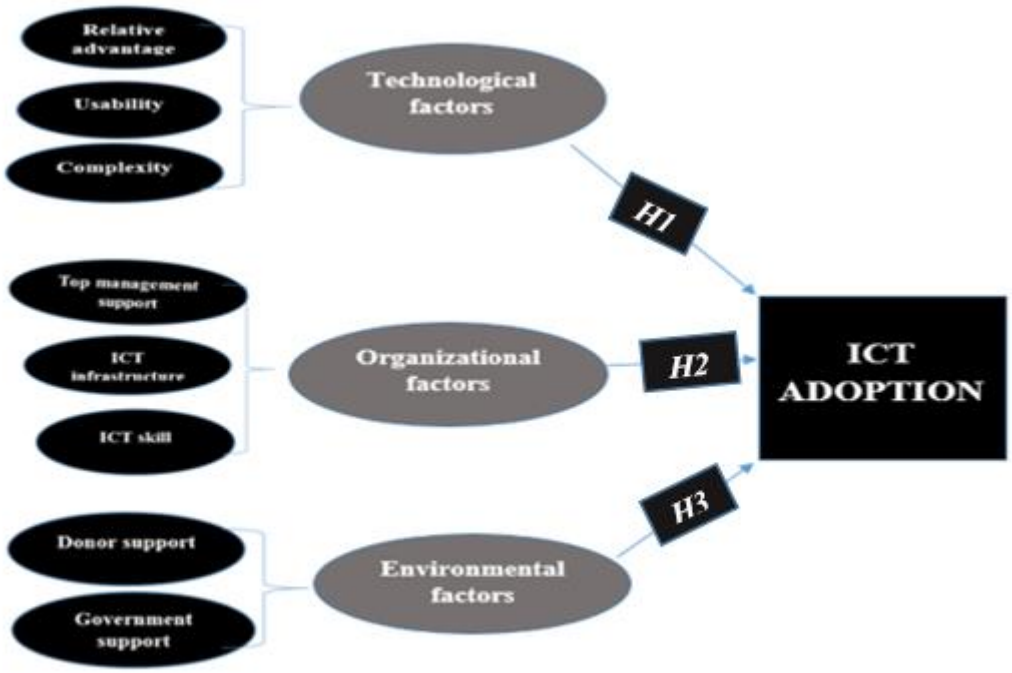

Figure 2.2: conceptual framework (Tornatzky and Fleischer 1990)

2.8.7 Hypothesis

Based on the above conceptual framework the researcher formulate three hypothesis for factors influencing ICT adoption in public healthcare organization.

Null hypothesis: No factors influenced the adoption of ICT in the Hospital.

Hypothesis 1: Technology has an influence on the adoption of ICT at Yekatit 12 Hospital.

Hypothesis 2: Organization has an influence on the adoption of ICT at Yekatit 12 Hospital

Hypothesis 3: Environment has an influence on the adoption of ICT at Yekatit 12 Hospital.

CHAPTER THREE: METHODOLOGY

3.1. Introduction

This chapter details with the overall methodologies that were used in the study. This is organized into research design, population of the study, sampling procedures, data collection methods, research procedures, method of data analysis and ethical considerations.

3.2. Research Design

This study focused on factors influencing adoption of ICT in public healthcare organizations in Yekatit 12 Hospital. The study used qualitative and quantitative research design as it involves the investigation of factors influencing ICT adoption. The study uses descriptive analysis. Descriptive analysis analysis enabled the researcher to describe the characteristics of the variables of interest due to its suitability in data collection to answer the research questions [59]. Descriptive is the collection of information from a group through interviews or the application of questionnaires to a representative sample of that group [60]. It is therefore justified that descriptive design is most suited and justifiably method for this study. Surveys are useful in describing the characteristics of a large population. Additionally, high reliability is easy to obtain by presenting all subjects with a standardized stimulus which ensures that observer subjectivity is greatly eliminated.

Methodological framework

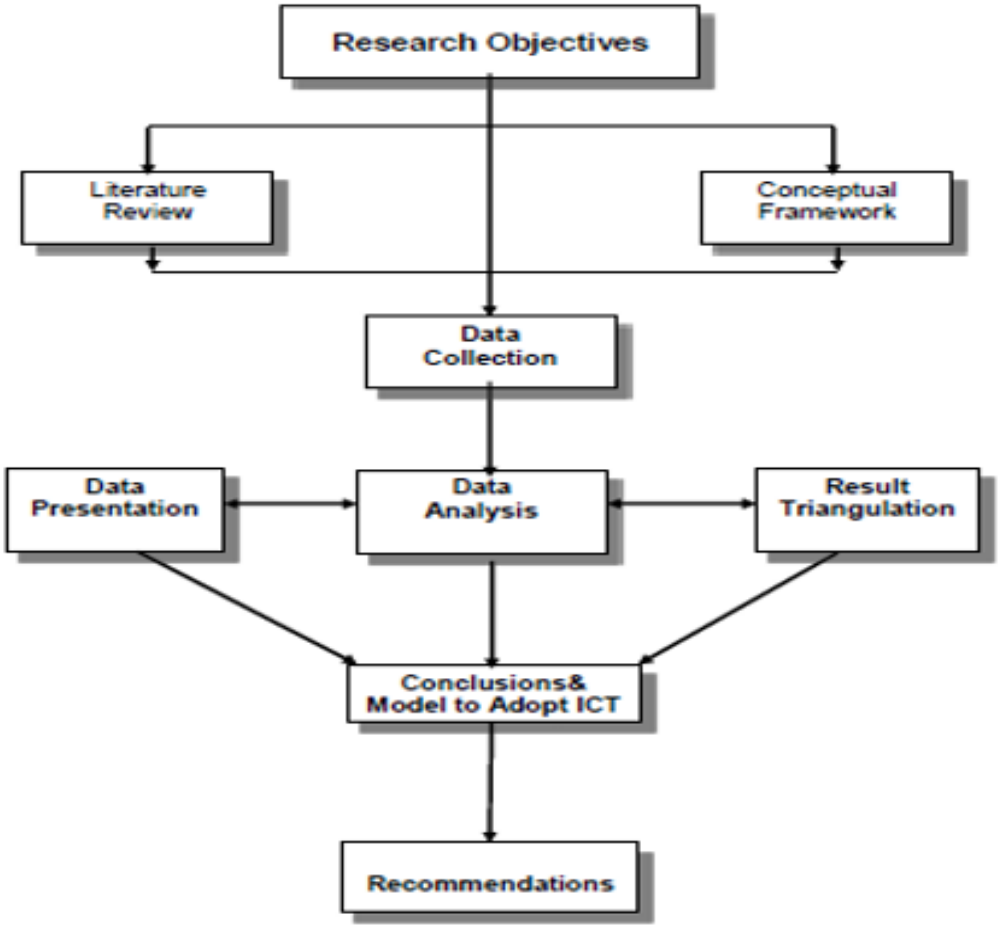

Figure 3.1: Methodology of the study

3.3. Research procedure

The purpose of this study was to explore the factors that influence ICT adoption in public healthcare organization in case of Yekatit 12 Hospital. And the study tries to explore the potential forces for adoption of ICT to increase the best and satisfactory healthcare service. The participants of the study are employees of the Hospital ICT directors, ART experts, EHMIS experts, Doctors, nurses and staff of the Hospital was purposely selected. The researcher purposely selected employee who worked in the current Hospital. These groups are targeted because the research

believes that they are appropriate people to provide appropriate information and answer of the research questions.

3.4. Target Population

Target populations of the study are employees of the Hospital (ICT directors, finance officers, record keepers, nurses, Doctors, procurement officers, radiologists and laboratory technologists, emergency podiatrist, system experts, Smart Care experts, EHMIS experts). The researcher purposely selected employee who worked in the current Hospital. The researcher believes that they are appropriate people to provide appropriate information and answer of the research questions. Population refers to the entire group of people, events or things of interest that the researcher wishes to investigate [60]. A study population can be defined as the entire collection of some cases or units about which the researcher wishes to draw conclusions.

Table 3.1: Interview respondents' demographic characteristics

ID No	Job title	Gender	Qualification	Year of exp	Institution
P1	Child Podiatrist Doctor	Female	Bachelor	2 year	Yekatit 12 Hospital
P2	Adult emergency Doctor	Male	Bachelor	3 year	Yekatit 12 Hospital
P3	System Administrator	Male	Masters	10 years	Yekatit 12 Hospital
P4	Head of ICT department	Male	Masters	13 years	Yekatit 12 Hospital
P5	Child Smart Care DB expert	Female	Bachelor	1 year	Yekatit 12 Hospital
P6	EHMIS expert	Female	Bachelor	3 year	Yekatit 12 Hospital
P7	Major war Surgery adept	Male	Bachelor	4 year	Yekatit 12 Hospital
P8	Secretary of the provost	Female	Bachelor	2 year	Yekatit 12 Hospital
P9	Child Smart Care DB expert	Male	Bachelor	2 year	Yekatit 12 Hospital
P10	Major war Surgery	Female	Bachelor	2 year	Yekatit 12 Hospital

3.5. Sample size and sampling procedure

This study used stratified sampling method which is a probability method. It further helped in the process of identifying the respondents for data collection. The sample size was established and the procedure for establishing is explained as follows.

3.5.1. Sample size

A total of 46 respondents launched. 10 for the interview and 36 for the survey The sample size therefore comprised of; ICT managers, ICT support staff, finance officers, record keepers, nurses, Doctors, procurement officers, radiologists and laboratory technologists, emergency podiatrist, and system experts.

3.5.2. Sampling procedure

Sampling procedure refers to the technique or design the researcher adopts in selecting items for the sample. It is the process of laying down the number of items to be included in the sample, for instance, the size of the sample. Being that this study required specific information from certain respondents. For this research the purposive sampling method was used. Purposive sampling implies the selection of the sample based on the subjective judgment of the researcher. The researcher deliberately includes respondents in the sample if they have information required. The researcher purposively selected administrators and senior managers from departments that would provide the required information. Convenient sampling was used to select nurses, Doctors and some administrators. Convenient sampling means that the researcher selects units that are convenient to him. The respondents in the sample are picked depending on proximity and accessibility.

The qualitative research method was most appropriate for this study because this method involves collecting and analyzing qualitative narrative data to explore a specific research question [72]. In qualitative research, sample size is not as significant as it is in quantitative research; however, a sample size between five and 25 is ideal for qualitative research data collection [73]. The participants for this case study were 10 participants were selected from Yekatit 12 Hospital from different department and they were in different position.

The interviewed participants were Doctors, ICT department inYekatit 12 Hospital (one system administrator and one senior lecturer of ICT and department head), nurse, Smart Care database professionals, EHMIS system experts, secretary of the provost. With a total of 10 participants interviewed for the study. Each participant received an agreement form which explaining the purpose of the study, the procedures, the nature of the study, their rights, and risks and benefits of

participating, and each individual consented to participate in the study prior to starting the interviews. Each interview was conducted with one participant at a time in a private setting at his or her respective work site. When the researcher conduct the interview the audio digital recorded was used and later the Microsoft Word was used to transcribe the data collected from interviews and observations.

3.6. Research instrument

The study is mainly based on the primary data source. Semi structured interview was conducted to top managements, Doctors, nurses, ICT administrators, system experts, Managers of the selected four branches. Furthermore, to triangulate, a qualitative result questionnaire distributed to respondent who have been working in the selected Hospital. The questionnaire was designed based on previous empirical literature and its consistency was pre- tested. The factors influencing the adoption if ICT in the public healthcare organization items were measured on Likert- scale ranging from 5 (strongly agree) to 1 (strongly disagree). The research respondents were asked to indicate the degree of agreement or disagreement on factors that influence the ICT adoption. Some demographic questions were also forwarded. Every questionnaire is personally handed and instructions were given to each participant before completing the questionnaire.

3.7. Data Collection

This study used questionnaires as method of triangulation tool for data collection. The questionnaires contained both structured and unstructured questions. The questionnaires were used in this study because respondents are assumed to be literate and quite able to answer questions asked adequately. [64], terms the questionnaire as the most appropriate instrument due to its ability to collect a large amount of information in a reasonably quick span of time. It guarantees confidentiality of the source of information through anonymity while ensuring standardization [65].

Triangulation refers to the use of multiple forms of qualitative research, not the combination of qualitative and quantitative (mixed) methods to study a phenomenon. The purpose of triangulation is to secure an in depth understanding of a research question by confirming data accuracy and completeness [77]. The four types of triangulation in a case study are data triangulation,

investigational, theories, and methodological triangulation [71]. Data triangulation methods include interviews, participant observation, direct observation, physical artifacts, document review, and archival records [71]. I applied methodological triangulation method in this study and brought in data collected from interviews, member checking, and participant observations.

3.7.1. Piloting

Pre-test

The survey instrument was subjected to pre-testing to enhance face validity. Modifications to the questionnaire were made based on their suggestions. Ambiguous questionnaire items were identified and clarified i.e. unclear statements were rephrased. Although items were added for some variables and deleted for others, total number of questionnaire items was reduced as the questionnaire was regarded as too long. Minor changes were made to the design, structuring and ordering of the questionnaire.

Pilot test

Pilot tests are conducted to further improve the scales, to determine problems in completion of the instrument and to estimate the time required to complete the questionnaire [66]. Pilot test participants are required to have an organization profile similar to that of the main study's participants. The paper-based data collection strategy will be used in the follow-up process. Questions about the questionnaire were posed to the respondent to identify weaknesses in the survey design. Respondents were given the opportunity to provide qualitative comments about the instrument items and to suggest ways to improve it.

3.8. Validity of instrument

Validity is 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 [69]. Validity of an instrument is improved

through expert judgment. To ensure content validity the researcher instruments in close consultation with the supervisor who gave an expert judgment. The instrument was also reviewed by researcher's peers [70].

3.9. Data collection Procedure

Permission to collect data from public healthcare Hospitals was required from the Yekatit 12 Hospitals, after the approval letter from the university to carry out the research. The researcher attached a transmittal letter in each questionnaire. The researcher will be visited Hospital at different times and sought for permission to collect data as pertains the different ways discussed above.

3.10. Method of data analysis

Three principles of data collection that are applicable to all data evidence sources are using multiple sources of evidence in a study, organizing and documenting research evidence, and maintaining a chain of study evidence to increase the reliability of the information presented in the study [71]. The technique of organizing research data is important, particularly in a case study, due to the volume of information and evidence. Microsoft Word was the tool used to transcribe the data collected from interviews and observations. Securing data in filing cabinets provided additional protection of participants' information, and using codes to replace names of participants or the organization they represented ensured participants' confidentiality. Using codes and terms also helps identify common themes in collected data [74].

Grouping the codes that emerge based on constructs that reflect different views expressed by the participants ensured the proper categorization of these themes. Codes such as P1, P2, P3, and so forth represented individual participants, and T1, T2, T3, and so forth represents the categories and also C1, C2, C3, and so forth represents the codes. In this research, I identified three categories and eight codes.

In this study, the researcher asked semi structured interview questions (see Appendix B) with the goal of obtaining in-depth information to address the central research question. The researcher analyzed the data using Thematic analysis is a method for identifying, analysing, and reporting patterns (themes) within data. It minimally organises and describes your data set in (rich) detail.

In the study, Codes such as P1, P2, P3, and so forth represented individual participants, and T1, T2, T3, and so forth represents the categories and also C1, C2, C3, and so forth represents the codes. Other codes identified characteristics within the data such as the different factors that influence ICT adoption decisions, not limited to the effect of culture. These codes allowed for easy categorization, analysis, and interpretation of the data. The data collected helped provide a snapshot of the cases studied, and from this data, the researcher identified themes that emerged, with the goal of answering the central research question.

3.11. Ethical consideration

Throughout this study the researcher strived to adhere to ethical research considerations and professional guidelines. This involved avoiding acts of misconduct in research, such as data fabrication, falsification and plagiarism. Permission to conduct the study was obtained from the relevant authorities before commencement of data collection. 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.

CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION

4.1. Introduction

This chapter presents the findings of the study on the factors influencing ICT adoption in public healthcare organization: the case of Yekatit 12 Hospital. Data were collected through two types of data collection instruments. In this chapter the researcher presents the results of the research. The data was collected using qualitative and quantitative data collection methods. In order to answer the research questions the data was analyzed in the following manner. Both qualitative and quantitative data were presented to triangulate the finding of one data source by another data source. The quantitative data collected were fed into the Statistical Package for Social Sciences (SPSS) version 20 was used as data analysis tool.

Gender distribution

The study establish the gender distribution of the respondents, from the research findings the study revealed that majority of the respondents as shown by 66.7% were males whereas 33.3% of the respondents were females. This implies that respondents were fairly distributed in terms of their gender.

Table 4. 1: Gender Distribution

		Frequency	Percent
Valid	male	24	66.7
	female	12	33.3
	Total	36	100.0

Age of respondent

The study establish the age distribution of the respondents, from the research findings the study revealed that majority of the respondents are between the age of 20 to 30 as shown by percent of 66.7%. Whereas 44.4% of the respondents were found in between the age of 31 to 40 and very few respondents were found in between 41 to 50 as shown by percent of 2.8 %.

Table 4.2: Age Distribution of respondent

		Frequency	Percent
Valid	20-30	19	52.8
	31-40	16	44.4
	41-50	1	2.8
	Total	36	100.0

Level of Education

The study establish to what level the respondents were educated (See Table 4.2). With regard to the level of education the study revealed that most of the respondents as shown by 27.8 % had college diploma or whereas 63.9 % of the respondents had attained bachelor degree and only 8.3% of the respondents had master degree. This implies that respondents were well educated and therefore they were in position to respond to the research question with ease.

Table 4.3: Level of Education

		Frequency	Percent
Valid	college diploma	10	27.8
	bachelor degree	23	63.9
	master degree	3	8.3
	Total	36	100.0

Period of Service

The study sought to establish the period which the respondents had served in the Hospital (See Table 4.3)

Table 4.4: Period of Service

		Frequency	Percent
Valid	less than one year	6	16.7
	two year	6	16.7
	thee year	1	2.8
	four year	4	11.1
	five year	7	19.4
	more than five year	12	33.3
	Total	36	100.0

From the research findings, the study revealed that majority of the respondents as shown by 33.3% had served the Hospital for more than 5 years whereas 19.4% of the respondents had served the institution for a period of 5 years, 16.7% had served the institution for 2 years and also less than 1 years at the same time. 11.1 % of the respondents had served the institution for a period of 4 years. This implies that majority of the respondents had served the institution for a considerable period of time and thus they were in a position to give credible information rating to this research.

4.2. Factors that influence ICT adoption

4.2.1. Technological factors that influence ICT adoption.

This part has been answering on how the technological factors influence the ICT adoption in the organization. The finding of unstructured interview response was presented in the following manner.

Participants' responses to Interview Questions 3, 4, 9, (see Appendix A) provided the framework for the theme ICT adoption factors. While analyzing the participants' responses, the research identified four distinct codes were identified from which the ICT adoption factors emerged (see Figure 4.1). The codes were relative advantage, compatibility, usability, and complexity.

The participants each responded to nine semi structured interview questions. Data analysis was conducting using highlighters or coloured pens to reduce bits of data in to categories and themes. First concepts were identified and then we compare data extracts that demonstrate that concept. The analysis produces eleven distinct codes or concepts that are further categorized into three major themes: Technology factors, Organization factors, Environmental factors. The categorized themes that emerged provided a structure through which to examine the participants' views on the central research question. For the first theme technology, Benefits, Usability, Compatibility, and complexity are the sub themes. (See Figure 4.1).

Participants provided different examples of the technology influence to ICT adoption in their respective organizations. Adoption is dependent variable and other factors as independent variable.

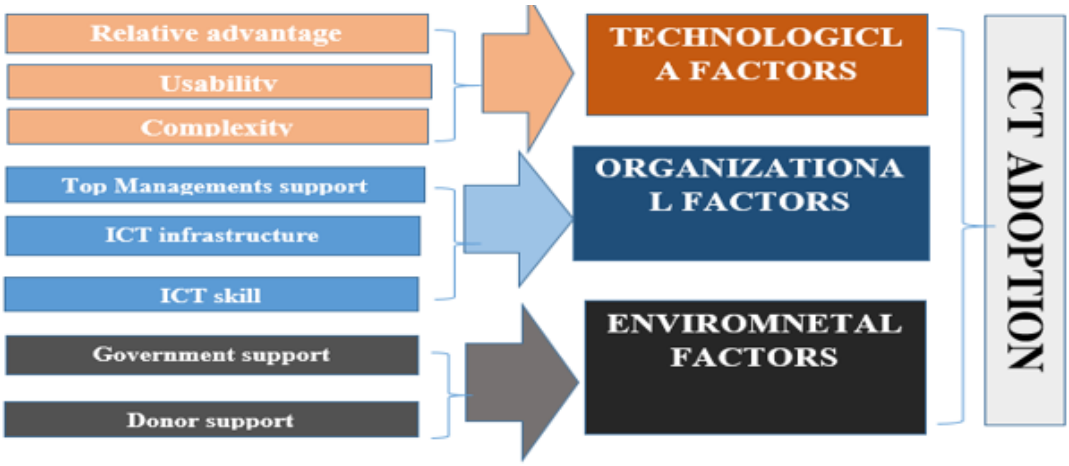

Figure 4.1 Technological Organizational and Environmental themes with their code

All the participants agree that ICT adoption in the Hospital is motivated by the relative advantages of newly deployed technologies. Most of participants emphasized that ICT adoption led to increased productivity and efficiency within their respective department satisfactory healthcare delivery in Yekatit 12 Hospital.

All participants responded positively to using ICT to gain relative advantage for the Hospital. The participant was confirmed that the relative advantage of the new ICT adoption have a lot of benefits which influence the service delivery. Most participants indicated that the perceived benefits of ICT adoption also played a critical role in their decision to adopt ICT. As a respondent (P1) explained:

> *"Provision of medications to this organization is done by considering the status of the monthly report generated by the Smart Care system. Help to store the patient information in a database so that anyone who is authorized can access. The system make tasks semi –automated. Having those systems make the Hospital healthcare delivery systems contemporary and helps to give fast efficient and effective"(P1).*

Other participants expressed the importance of ICT adoption for the data access and its relevance for smooth management of the Hospital. As respondent (P3, P4) explained:

"Due to the adoption of ICT, data can be easily accessed no need to get the patient physically "(P3).

"It is also important for management which means the system can manage employee's data centrally. In addition it make the patient history being confidential from unintended loss of data" (p4).

The triangulated quantitative finding also support that, ICT adoption brings better and efficient healthcare delivery, save resource and time. This enables the healthcare organization to adopt ICT in their organization (See Table 4.1).

Table 4.5: Relative advantage

	N	Mean	Std. Deviation
delivery of ICT can create better and efficient healthcare servise	36	4.58	.554
ICT save resource and time	36	4.22	1.456
ICT improve the qualityof laboratory servise	36	4.06	1.330
ICT provide better access for patients in healthcare facilities	36	3.89	1.369
ICT make link to the outside donors	36	3.86	1.175
ICT support in decision making to improve medical care quality	36	3.83	1.207
ict helps to share thier knowledge between employees	36	3.78	1.436
Valid N (listwise)	36		
Average mean		**4.03**	

Respondents also asked to what extent they agree with the above statements relating to relative advantage of the technology. Most of the respondents agree that; delivery of ICT can create better and efficient healthcare service as shown by a mean of 4.5, ICT adoption save resource and time as shown by a mean of 4.22, which is the second most important factor for ICT adoption in the Hospital. Adoption of ICT in the Hospital helps to share their knowledge among employees as shown by a mean of 3.78 is the least important factor.

Technology compatibility with the existing system is a determinant factor that influences IT adoption. In the data collected through interview, most participants also mentioned the challenge of ICT adoption in the Hospital. The participants confirm their views by giving different examples. As respondent (P1, P2, and P3) explained:

"The incompleteness of the adopted ICT functionalities is a constraint to use full opportunities of the existing system. It does not to include all the physical forms" (P1).

"Healthcare supporting applications are not developed in our country. This makes the local user always to be stranger for new applications". (P2).

"The technology itself is not sometimes compatible with the existing system. Due to this problem employee who hired for converting the manual patient history to the computer are not willing to do the task" (P3).

Almost all the participant expressed their view on the user's ability of using the technology and the user's resistance in accepting the technology as shown below.

"Employees who hired in doing ICT tasks they even cannot properly encode the patient history to the computer" (P4).

The quantitative finding also shows that the ability of the user to operate the system is very low as shown by mean 2.89. The study sought to establish the extent to which respondents agree with the above statements relating to usability of the technology from the research findings, majority of the respondents strongly agree that; memorability of the ICT features when using the system as shown by a mean of 3.52, is the dominant factor that influence the adoption ICT in the public healthcare organization. Efficiency of ICT system to accomplish the task as shown by a mean of 3.56 is the second most factor for ICT adoption in the Hospital. Ability of the user to operate the system as shown by a mean of 2.89 is very low which affect the ICT adoption in the Hospital (See Table 4.2).

Table 4.6: Usability of user up|on technology

	N	Mean	Std. Deviation
memorability of the ICT features when using the system	36	3.92	1.079
efficiency of ICT system to accomplish the task.	36	3.56	1.157
learnability of the adopted ICT	36	3.56	1.182
departments are exchanging data by using ICT	36	3.47	1.464
free of error while using ICT system	36	3.06	1.013
ability of the user to operate the system	36	2.89	1.545
Valid N (listwise)	36		
Average mean		**2.8**	

One of the factors influencing the ICT adoption in the category/theme of technology is complexity. As respondent (P2, P10) explained:

> *"Since the systems are deployed by external professional, we cannot easily learn the technologies" (P2).*
>
> *"There is a tendency of resist to accept new technologies as they introduced by the organization. User's resistance to adopt new technology" (P10)*

Similarly the questionnaire survey with regard to complexity of the technology showed that most of the respondents strongly agree that even if the opportunity of learning to operate ICT would be easy for staff as shown by a mean of 3.08, it is difficult to understand ICT technologies as shown by a mean of 2.83. Employees are not clear what systems is doing, innovations are difficult to understand easily and at the same time system adopted in the Hospital are not clear as shown by a mean of 2.53. Technology complexity related attributes are negatively influencing the ICT adoption in the Hospital.

Table 4.7: Complexity of technology

	N	Mean	Std. Deviation
learning to operate ICT would easy for staff	36	3.08	1.156
difficult to understand ICT technologies	36	2.83	1.082
employees understand what ICT doing	36	2.75	1.079
innovated technology are difficult	36	2.67	1.014
system adopted in the hospital are not clear	36	2.53	1.183
Valid N (listwise)	36		
Average mean		**2.77**	

Some of the participant forwards their view on this issue. Respondents have a the perception that, the technology being deployed by the foreigner and the lack of well skilled and qualified man power in operating ICT infrastructures deployed in the Hospital make the technology being complex and this resulted to the delay of ICT adoption in Yekatit 12 Hospital.

Researchers in these studies analyzed the participant's perception and made some points about the proposed theme that is technology. Relative advantage of the technology, compatibility of the technology with the existing system, the capable of the user using the technology and the complexity of the technology were the codes which constitute the major theme so called technology.

After analyzing the view of the participant's perception of ICT adoption, the researcher made the following points. Among the attributes of technology relative advantage is the one which has strong influence on the adoption of ICT in the healthcare organization. All the participant also confirmed that the relative advantage motivated them to adopt ICT.

Nearly all participants indicated that the perceived benefits of ICT adoption also played a critical role in their decision to adopt ICT. Unfortunately the other three codes proposed for technology theme, compatibility, usability, and complexity are negatively influence the adoption of ICT in healthcare organization specifically in Yekatit 12 Hospital.

4.2.2. Organizational factors that influence ICT adoption.

Participants' responses to Interview Questions 5, 6, 7, and 8 (see Appendix A) provided organization factors for ICT adoption factors. While analyzing the participants' responses, three distinct codes were identified as organizational factors that influence ICT adoption. (See Figure 4.2). The codes were Top management characteristics, quality of human resource, resource availability, and internal communication. To triangulate the qualitative finding, the researcher collected qualitative data on management support, ICT skill, and ICT infrastructure as an organizational factors that influence ICT adoption.

In this research several participants indicated that the decision to adopt technology in healthcare organization is highly depends on the top management characteristics. Though the top management play the leading role for the ICT adoption in public health organization, most participants identified several factors as influencing their decision to adopt ICT in particular in Yekatit 12 Hospital top manager are the one who negatively influence the adoption if ICT in Hospital.

ICT adoption factors identified by participants in their responses include the need for ICT training that promotes awareness about the benefits of ICT adoption and increases the availability of ICT skilled resources. Some participants noted the issue of trust or distrust of technology played a role in their decision to adopt technology.

According to the participant interviewed, the major factors identified for top management are,

> *"Top management are not dedicate to provide the skill building training to the low level employees"* (P5).

This top management particular weakness brings a consequence of making employee too worried to operate the computers and other ICT technologies. As respondent (P6) explained:

> *"Many of the top management does not give weight to the importance of ICT and the top management has also deficiency of understanding and give value to ICT professionals" (P6).*

The awareness of the top management up on the ICT technology in particular and ICT adoption in healthcare organization is critical. According to the study participants, top managements are stacked on the manual or traditional task processing system. As respondent (P3) explained:

> *"Generally they are following the traditional way of perception about the ICT adoption" (P3).*

Most participants agree that the top management had common characteristics on ICT adoption in healthcare organization. This character negatively influences the ICT adoption in public healthcare organization. These are: they are not concerned about ICT infrastructure, they could not build convenient environment for ICT infrastructure. There is no common understanding on ICT between the top management and employees. Top management is not committed to provide the skill building training to the low level employees. But many of the top management does not give weight to the importance of ICT and the top management has also deficiency of understanding and give value to ICT professionals.

One of the major and frequently identified factors that influence ICT adoption is availability of quality of human resources. This is identified as one theme from the empirical data.

According to the study interviewed participant, Ministry of Health (MoH) and health bureau are scheduled to the implementation of ICT in the Hospital but this skill building training does not reach to the right person and because of this, employees does not have initiation to use ICT. The absence of well-trained human resource in the field of ICT is even be the frustration issue for future ICT adoption in the public healthcare organization specifically in Yekatit 12 Hospital.

The researcher continues to find the other organizational factors for ICT adoption in the public healthcare organization. According to the respondent resources available (ICT skilled man power, ICT devices, and computers) are the factor that influence ICT adoption in healthcare organization. As respondent (P5) explained:

> *"To make the Hospital competent, contemporary, efficient and effective there should be ICT skill building trainings given at the right time and adequate computers must be purchased. But in our office, for example there are no enough computers are available for employees" (P5).*

Limited and unreliable internet service wired and Wi-Fi network, broken cables due to the construction of new building and other infrastructural services not readily available were some of the examples participants cited as influencing their decision to adopt technology.

Other ICT adoption factors identified by participants in their responses include the need for ICT training that promotes awareness about the benefits of ICT adoption and increases the availability of ICT skilled resources. The top management of Yekatit 12 Hospital must offer all the resources mentioned by the participant for the Hospital so as to facilitate the ICT adoption in the Hospital. So the current low level ICT adoption rate will increase.

Internal communication is a significant code that emerged within the factors that influence ICT adoption in public healthcare organization in Yekatit 12 Hospital. Most of the participants who were interviewed mentioned that internal communication on ICT adoption is critical. As respondent (P3, P4, and P6) explained:

> *"No communication between the ICT professional and healthcare professionals" (P3).*
>
> *"There is no collaboration between different maintenance departments, like ICT maintenance professionals, electric maintenance professionals. So that all the tasks are expected from us, because of this the ICT adoption process becomes late" (P4).*
>
> *"The number one tricky and main problem is the complex chain of purchasing process" (P6).*

The study quantitative study also shows similar result with the above statements relating to complexity of the technology from the research findings, majority of the respondents strongly agree that; top management are weak in hiring a qualified person that provide training related to ICT as shown by a mean of 2.92 which affect the adoption of ICT in the Hospital. The finding shows that the top management initiative, encouragement and motivation was not strong to promote ICT adoption is the for healthcare service delivery.

Table 4.8: Management support

	N	Mean	Std. Deviation
top management are innitiative for ICT	36	3.89	1.141
top management are commettied to improve and use ICT	36	3.61	1.337
ICT device are purchased at the right time	36	3.36	1.334
employee(puplic) of hospital have lacking management skill on ICT	36	3.31	1.261
organization have qualified person that provide trianing related to ICT	36	2.92	1.296
Valid N (listwise)	36		
Average mean		**3.4**	

In terms of ICT infrastructure in the Hospital, the study revealed that, expert and consultants who manage ICT as shown by a mean of 2.47, ICT equipment and accessories in the Hospital as shown by a mean of 2.26, ICT material provision at the right time 2.25, internet connectivity 2.25, Computer connected to internet in the Hospital as shown by a mean of 2.00 all the infrastructures' need to be improved to adopt ICT well in the Hospital (See Table 4.5).

Table 4.9 ICT infrastructure

	N	Mean	Std. Deviation
internet connectivity of the ospital	36	2.25	1.422
ICTequipment and accessories in the hospital	36	2.33	1.242
all the healthcare processes are performed by computer	36	2.19	1.238
computer connected to internet in the hospital	36	2.00	1.219
ICT material delivered at the right time	36	2.25	1.461
hospital has functional website	36	2.06	1.351
Valid N (listwise)	36		
Average mean		**2.18**	

The qualitative finding shows that the main factor that influence ICT adoption in the Hospital is lack ICT skill. Similarly the quantitative finding revealed that lack of troubleshooting is a problem they face in using the computer. The employees are not skillful in operating the computers, many of them do not understand how to use the IT service in the Hospital. Therefore, skill capacity building program should be considered by the management of the Hospitals to improve the ICT service.

Table 4.10: ICT skill

	N	Mean	Std. Deviation
lacking in specialized ICT knowledge	36	3.31	1.064
staffs are capable of information technology know how	36	2.83	1.134
sufficient skill of employee to operate ICT	36	2.58	1.156
troubleshoot the problem they face in using the computer	36	2.50	1.183
Valid N (listwise)	36		
Average mean		**2.8**	

4.2.3. Environmental factors that influence ICT adoption.

Interview Questions 5, 7, and 8 (see Appendix A) asses the role of environmental factors that facilitate ICT adoption

in Yekatit 12 Hospital. The analysis of the participants' responses on the three questions revealed three concept off environmental factors these are government regulation, supplier and organizational culture.

Several participants responded that the government regulation is playing the leading role in ICT adoption in public healthcare organization. These participants noted that organizations, specially the non-government organizations and international healthcare organizations who are working in the health sector are facilitating the ICT adoption.

According to these participants, the government regulation towards ICT adoption is inspirational and this is reflected by different ICT adoption activities. According to the participant, provision from Ministry of Health and health provide new computers to the medical college students in the

Yekatit 12 Hospital. Since the government regulation is supportive of the healthcare sector, this Hospital is also getting different supports especially for ICT adoption in Yekatit 12 Hospital. As respondent (P4) explained:

> *"In addition the government gives the skill building trainings but this is limited to the health sector only" (P4).*

Other participants noted that the government should do more than infrastructure provision. It should provide managerial support for public healthcare in Yekatit 12 Hospital to promote ICT adoption in the Hospital. As respondent (P4) explained:

> *"The newly established digital E-library for student and for staff is deployed and managed by Ethiopian Ministry of Health (MoH)" (P4).*

All participants explained that the donor's provision of different ICT material for public healthcare organization like Hospital is critical in order to encourage ICT adoption in Hospital. As respondent (P1) explained:

> *"It is known that our country does not cover all the healthcare facilities so, different NGO's (CDC) are supporting this healthcare needs" (P1).*

> *"Rather Ministry of Health frequently allocates the trainings for the employees who are working on the systems" (P8).*

Organizational culture is a significant factor that emerged from the empirical data it influence ICT adoption in Yekatit 12 Hospital. About half of the participants who discussed the influence of organizational culture on ICT adoption contended that organizational culture had influence on the decision to adopt ICT in their respective organizations.

As the researcher discussed earlier, these participants argued that other factors, such as top management characteristics, available ICT skills, unreliable public infrastructure, availability of fund from external healthcare organizations and government support are the critical factors that influence the decision to adopt ICT, in the Hospital.

The quantitative finding also strengthen the qualitative data (See *Table 4.7)*. Donors does not arrange regular training on ICT usage, troubleshoot and maintenance as shown by a mean of 2.58 this negatively influence the ICT adoption in public healthcare organization. The qualitative finding stress that the outside donors financial support, necessary in implementing new technology in Hospital. So as the researcher triangulate with the quantitative data all the above mentioned points are at low level. The current ICT adoption level is very low. And require more effort to improve the Hospital s ICT service (*See Table 4.7).*

Table 4.11: Donor support

	N	Mean	Std. Deviation
donors help the hospital by providing and implementing new technology	36	2.81	1.064
the help of donors is crucial on ICT adoption for the hospital	36	2.61	1.379
financial support of donors to acquire the necessary ICT facility	36	2.61	1.050
donors arange regular trianing on ICT	36	2.58	1.105
Valid N (listwise)	36		
Average mean		**2.65**	

The study sought to establish the extent to which respondents agree with the above statements relating to government support from the research findings, majority of the respondents strongly agree that; motivation of government to facilitate the successful implementation of ICT in their organization facility as shown by a mean of 3.42. Government encourage Hospitals to adopt new ICT as shown by a mean of 3.19, and the awareness are in good position but they government does not put the above points in to practice by providing ICT resources to the Hospital. This is shown in Table 4.8. The government does not consider the importance of ICT in the public healthcare organization (See Table 4.8) government support the attention of government on Hospitals ICT as shown by mean is 2.86.

Table 4.12: Government support

	N	Mean	Std. Deviation
motivation of government to facilitate the successful implementation of ICT in your facility	36	3.42	1.079
government encourage hospital to adopt new ICT	36	3.19	.980
awareness of government to create ICT in the hospital	36	3.06	1.241
attention of government on ICT in your organization	36	2.86	1.222
ICT material supported by the government to your organization	36	2.67	1.309
Valid N (listwise)	36		
Average mean		**3.04**	

Furthermore to the above variables the researcher is trying to see the indicator variables how they are fitting the proposed conceptual framework. So that, the researcher is described each ICT indicator variables output in the following sections.

The researcher identifies the following dependent variables which are the indicators of ICT adoption in public hectare organization. Is the Patients' healthcare information is stored and accessed by a database system, Is the Electronic Medical Records (EMR) use for administration and management purpose, does the human resource department implement payroll, purchasing, and other financial information systems, does employees always troubleshoot the problems they face in using the computer, does video conference, and other communication media are working well, does the healthcare processes are performed by the computer, does the hospital has fully functional website, is there good internet connectivity in the hospital, does adoption of ICT improve the quality of laboratory services, and does the adoption of ICT has helped to make link to the outside donors.

The Relationship between processes performed by computer and ICT adoption is described below.

Table 4.13: variables entered for regression analysis

Model	Variables Entered	Variables Removed	Method
1	sufficient skill of employee to operate ICT, expert and consultants who manage ICT, ICT material delivered at the right time [b]	.	Enter

a. Dependent Variable: processes are performed by the computer

b. All requested variables entered.

The linear regression revealed that, the independent variables ICT skill, availability of ICT consultant and delivery of ICT material at the right time has an influence on ICT adoption. The ANOVA provide the 0.265 significance (See Table 4.13).

Table 4.14: ANOVA result for processes done by computer

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.631	3	1.877	1.385	.265[b]
	Residual	43.369	32	1.355		
	Total	49.000	35			

a. Dependent Variable: processes are performed by the computer

b. Predictors: (Constant), sufficient skill of employee to operate ICT, expert and consultants who manage ICT, ICT material delivered at the right time

As shown below in coefficient linear regression result all the independent variables (expert and consultant who manage ICT, ICT material delivered at the right time to the hospital, and employees sufficient ICT skill has an influence for ICT adoption in public healthcare organization.

Table 4.15: coefficients result for independent variables

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.760	.515		5.363	.000
	expert and consultants who manage ICT	.373	.191	.430	1.958	.059
	ICT material delivered at the right time	-.190	.187	-.234	-1.012	.319
	sufficient skill of employee to operate ICT	-.164	.202	-.160	-.812	.423

a. Dependent Variable: processes are performed by the computer

The other dependent variable taken a as an indicator of ICT adoption in public healthcare organization is the patients information accessed and stored using the database system. For the dependent variable storage and accesses of patient information, the corresponding independent variables are not significant for ICT adoption in public healthcare organization. As shown in table 4.17, the ANOVA significant is 0.743 which is above the 0.5 estimated error. But particularly the lack of specialized ICT knowledge in the public healthcare organization is significant factor for ICT adoption.

Table 4.16: ANOVA storage and accesses of patient information

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.638	3	.546	.416	.743[b]
	Residual	42.001	32	1.313		
	Total	43.639	35			

a. Dependent Variable: storage and acces of patient informatio

b. Predictors: (Constant), sufficient skill of employee to operate ICT, lacking in specialized ICT knowledge , staffs are capable of information technology know how

The coefficient result also revealed that lack of specialized ICT knowledge is significance of 0.4 this independent variable is significant for ICT adoption in public healthcare organization. Staff know how in regard to the information technology is significant 0.96 this variable is not determinant factor for ICT adoption in public healthcare organization. Sufficient ICT skills of employee to operate technologies is also not factor of ICT adoption in public healthcare organization (See Table 4.17).

Table 4.17: coefficient result of storage and accesses of patient information

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.480	.788		3.146	.004
	lacking in specialized ICT knowledge	.158	.186	.151	.848	.403
	staffs are capable of information technology know how	-.010	.234	-.010	-.044	.965
	sufficient skill of employee to operate ICT	-.108	.228	-.112	-.474	.639

a. Dependent Variable: storage and acces of patient informatio

One of the most ICT adoption predictor in the public healthcare organization is the implementation of information systems like, payroll, and purchasing by human resource department. The linear regression result shows for the dependent variable implementation of information systems like payroll and purchasing systems are fit to the independent variables, government encourage hospital to adopt new ICT, donor arrange regular training on ICT, and financial support of donor. Generally the model is fit because the ANOVA significance is 0.259, which is not exceed expected error 0.5 (See Table 4.18).

Table 4.18; ANOVA result of information system implementation

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.840	3	2.280	1.406	.259[b]
	Residual	51.910	32	1.622		
	Total	58.750	35			

a. Dependent Variable: the implementation of information systems like, payroll, and purchasing by HR dep't

b. Predictors: (Constant), government encourage hospital to adopt new ICT , donors arange regular trianing on ICT, financial support of donors to acquire the necessary ICT facility

The linear regression coefficient result show that for dependent variable described above all the independent variables are not fit to the model. Example financial support of donor to acquire the necessity ICT facility is not as such significant as shown coefficient sig. 0.48 which is above the expected level of error 0.5 (see Table 4.19). Other two independent variables, regular trainings arranged by the donor and government encouragement to the Hospital to adopt new ICT

technology fit to the model because their coefficient sig. is 0.53 and 0.454 respectively. So for adoption of ICT in public healthcare organization, regular trainings arranged by the donor and government encouragement to the Hospital to adopt new ICT technology are influencing ICT adoption in public healthcare organization. Whereas for ICT adoption in public healthcare organization the financial support of donor to acquire the necessity ICT facility is not as such the influencing factor.

Since both independent variables, regular trainings arranged by the donor and government encouragement to the Hospital to adopt new ICT technology are influencing factor for ICT adoption, the Hospital need to take an action (See Table 4.19).

Table 4.19: coefficient result of information system implementation

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.350	.816		4.106	.000
	financial support of donors to acquire the necessary ICT facility	.109	.236	.088	.461	.648
	donors arange regular trianing on ICT	-.440	.219	-.375	-2.012	.053
	government encourage hospital to adopt new ICT	.183	.242	.139	.758	.454

a. Dependent Variable: the implementation of information systems like, payroll, and purchasing by HR dep't

Discussion

Technological factors on adoption of ICT

The study revealed that among the factors influencing the adoption of ICT in public healthcare organization, the relative advantage of the technology is the main factor. According to the finding of the research, most of the respondent revealed that, delivery of ICT can create better and efficient healthcare service. This are the main factor for ICT adoption in public healthcare organization as shown by a mean of 4.58 (See *Table 4.5).* Other technological factors include learnability, memorability, and efficiency of efficiency of ICT system to accomplish the task. *(See Table 4.6*). According to the quantitative study most participant strongly agree that learning to operate ICT would easy for staff when they are being used by the user as shown by a mean of 3.08 as shown in Table 4.7. So the problem of unable to be familiar with the system make the ICT adoption unsuccessful in the public healthcare organization and it hinders the technology from value adding task.

Organizational factors on adoption of ICT

As the literature part stated that organizational factors are among the factors that influence ICT adoption in public healthcare organization. The study revealed that top management support, availability of ICT infrastructure, and ICT skill are identified as dimension of organizational factor that influence ICT adoption in public healthcare organization**.** The study revealed that the top managements are initiative for ICT adoption as shown by a mean of 3.89. Availability of qualified person that provide training related to ICT is shown by a mean of 2.92 which is the least factor that influence the ICT adoption in the Hospital. The study underlined that based on the quantitative study, organizations need to have qualified person that provide training related to ICT to have a good ICT adoption in the public healthcare organization. The second organizational factor that influence the ICT adoption in public healthcare organization is the availability of ICT infrastructure in the Hospital like full internet connectivity, computers, ICT expert and ICT consultant, functional website, and different accessories. The research revealed that Computers connected to internet are small in the Hospital as shown by a mean of 2.00. The availability of the computers connected to the internet is necessary requirement for public health care organizations.

Doctors should access external knowledge sources to update themselves with latest development. Under the organizational factor that influence the ICT adoption is ICT skill. Employees of IT staff lack specialized ICT knowledge as shown by a mean of 3.3. Therefore training should be provided on specialized knowledge in ICT to improve the healthcare service delivery. Troubleshooting is the main problem they face when using the computer as shown by a mean of 2.50. It is also considered the organizational factor that influence on ICT adoption in the Hospital. Lack of knowledge on troubleshooting is the determinant factor that influence ICT adoption. This calls top management to seek something to overcome the problem related to the user's ICT knowledge.

Environmental factors on adoption of ICT

The study revealed that, under the donor support categories, the most significant factor that influence the ICT adoption in public healthcare organization is donors support. Donors provide support to implement new technology in the Hospital as shown by a mean of 2.8. The Hospital has good relationship with outside donors. Even though the donor provide different fuds to the Hospital, the lack of supervision and lack of regular training on ICT make the donor support less important factors for ICT adoption as shown by a mean of 2.58

The study access the extent to which respondents agree with the above statements relating to complexity of technology, most of the respondents agree that; motivation of government to facilitate the successful implementation of ICT as shown by a mean of 3.42. Government pressure to adopt new ICT is high as shown by a mean of 3.19. ICT important support by the government to organization as shown by a mean of 2.57 is the least factor that influence the ICT adoption in the Hospital.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

This chapter discusses presentation of the conclusion of research findings and recommendations for further studies. The study findings encompassed several factors that influence the ICT adoption in public healthcare organizations. These are technological, organizational, and environmental factors. The qualitative findings according to the majority of the research participants research finding revealed that the top management lack of awareness about the value of ICT adoption, the lack of continues training about ICT to the healthcare and ICT proficient, lack of the reliable infrastructure, availability of ICT skilled resources, the role of government, the attitude toward technology, the complexity of the ICT technology adopted are identified as the main factors that influence the ICT adoption in public healthcare organization.

On the influence of ICT Infrastructure in adoption of ICT, the study found that installation of ICT infrastructure is a major drawback to the adoption of ICT. The study further found that lack of adequate ICT infrastructure has hindered delivery of efficient and reasonable ICT services in the hospital. There is therefore need to put more emphasis on provision of support infrastructure, such as, connectivity, supporting software development and assembly of ICT equipment and accessories and Provision of incentives for the provision of ICT infrastructure in the hospital.

To make the qualitative findings more trusted and reliable, the researcher triangulated the qualitative data with the quantitative data. The triangulated findings to this study reveal that the factors influencing the ICT adoption in public healthcare organizations. Are, the potential of delivery of ICT can create better and efficient healthcare service. Efficiency of ICT system to accomplish the task, top management support, availability of ICT infrastructure, and ICT skill are identified as influential factors that influence ICT adoption in public healthcare organization**.**

The study revealed that the top managements the leading factors that influence ICT adoption as shown by a mean of 3.89. Top managements are higher level decision makers in the organization to allocate resources for the sustainability of ICT system. They can also influence other employees what they want to be performed. The Hospital should work more in the area. The research also revealed that, the Hospital has qualified staff that provide basic training to end users as shown by

a mean of 2.92 this shows the Hospital need to take action on this area. The Hospital can arrange other facility to improve its employees IT skills.

Organizational factor that influence the ICT adoption in the Hospital is the availability of ICT infrastructure in the Hospital like internet connectivity, computers, ICT expert and ICT consultant, functional website, and different computer accessories. The quantitative research result mean shows that the Hospital doesn't work much on the ICT infrastructures development. As the finding, relatively the organization was perform on the expert and consultants who manage ICT as shown by the mean of 2.47. But all the ICT infrastructures like ICT equipment and accessories in the Hospital, ICT material delivered at the right time, internet connectivity of the Hospital, all the healthcare processes are performed by computer, functional website, computer connected to internet in the Hospital require the direct action to have an ICT adoption in the Hospital.

In general the quantitative research finding shows that, the complexity of the technology being used, the unavailability of adequate ICT infrastructure in the Hospital, low level of ICT skill of the overall employees, and the external donor support are is seen under the expected level. The organization must action to improve problems in the above mentioned areas so as to improve ICT adoption in the Hospital.

5.2. Limitation of the study

Yekatit 12 Hospital has been selected as the center for my research to help in investigating the factors that influence ICT adoption in public health care organization. The limitations of this study might arise from: (1) the unwillingness by respondents to give information, the provision of inadequate information and suspicion, which might lead to partial disclosure of crucial information to this study, (2) a researcher's bias in interpreting research data was another limitation that had the potential to influence the outcome of this study, and (3) the design may limit the generalizability to other public health care organization.

5.3. Recommendations

The purpose of the study was to explore the factors influencing the ICT adoption in public healthcare organizations in Yekatit 12 Hospital. The study applied both qualitative and quantitative research approach. Based on the conclusions drawn above the following recommendations are forwarded for the concerned bodies:

Hospital management should train their employees on the information systems prior to the ICT 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 adoption.

The study recommends adoption of internet connectivity in the health institution to empower resource sharing among the Hospitals. The Hospital should reconsider its policy target of ensuring all public Hospitals have affordable internet access. This should be done through use of strong and effective servers that are able to transfer data at high speed or use of the recently launched internet through the use of fiber optic connection for improving the connectivity efficiency, learning.

5.4 Suggestions for Further Studies

The present study focused on factors influencing ICT adoption in public healthcare organization. Additional research into other mechanisms would be beneficial in further understanding the full scope of factors influencing ICT adoption in Hospital. Future research could benefit from the observation, focus group discussion. Farther more future research can be extended in extending the study to examine the factors influence ICT adoption in different size organizations would produce a greater and varied understanding. This research recommends that future research should look in to quantitative surveys to involve more Hospitals in Ethiopia in the study to farther improve the generalizability of this research findings.

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APPENDIXCES

APPENDIX A: INTERVIEW QUESTION/DATA COLLECTION INSTRUMENT

This section consists of interview question that aligns with my Doctoral research study. The response from these questions would provide insight on the study of "factors influencing ICT in public healthcare organization: in case of Yekatit 12 Hospital"

General demographic information

1. What is your job title?
2. How long have you been working in this institution?
3. Experiences you have had?

How ICT is adopted in the Hospital?

1. What ICT Infrastructure is used in Hospital?
2. When ICT infrastructure was introduced and who introduce?
3. In what way ICT adoption benefit or contribute to the Hospital?
4. How ICT adoption helps he employees in the Hospital?
5. What role can government play in promoting, introducing and maintaining the system?
6. In your opinion how would you see the support of top management for ICT System implementation and sustainability?
7. What challenge are encounter while introducing and using ICT technologies?
8. Does the Hospital providing training on the use of the ICT system and how?
9. What do you recommend for future ICT adoption?

APPENDIX B: INTERVIEW RESPONDENTS PROFILE

ID No	Job title	Gender	Qualification	Year of exp	Institution
P1	Child Podiatrist Doctor	Female	Bachelor	2 year	Yekatit 12 Hospital
P2	Adult emergency Doctor	Male	Bachelor	3 year	Yekatit 12 Hospital
P3	System Administrator	Male	Masters	10 years	Yekatit 12 Hospital
P4	Head of ICT department	Male	Masters	13 years	Yekatit 12 Hospital
P5	Child Smart Care DB expert	Female	Bachelor	1 year	Yekatit 12 Hospital
P6	EHMIS expert	Female	Bachelor	3 year	Yekatit 12 Hospital
P7	Major war Surgery adept	Male	Bachelor	4 year	Yekatit 12 Hospital
P8	Secretary of the provost	Female	Bachelor	2 year	Yekatit 12 Hospital
P9	Child Smart Care DB expert	Male	Bachelor	2 year	Yekatit 12 Hospital
P10	Major war Surgery	Female	Bachelor	2 year	Yekatit 12 Hospital

APPENDIX C: COVERING LETTER ACCOMPANYING QUESTIONNAIRE

Dear Respondent,

I am a post-graduate student in the School of Information Science at Addis Ababa University, currently working on a thesis research on the topic "Factors influencing ICT adoption in public healthcare organization the case of Yekatit 12 Hospital" in partial fulfillment of the requirements for the Master's degree.

The purpose of this self-administered questionnaire is to collect data in order to investigate the factors that influence the ICT adoption in the selected healthcare organization. Your responses will be kept confidential and anyone be able to determine that in which organization you are. All responses that you provide would like to request you to fill this questionnaire carefully. The information that you provide me through the questionnaire would be of paramount importance to the research I am undertaking as well as to your organization.

Thank you in advance for taking some of your valuable time in completing the questionnaire.

Sincerely,

Mohammed Essa
School of Information Science
College of Natural Science
Addis Ababa University,
Mobile: +25191 827 11 54

APPENDIX D: QUESTIONNAIRE

Instructions:

Kindly answer the following questions fully by ticking the appropriate response in one of the boxes provided. Do not write your names anywhere in this questionnaire. Please be as honest as possible.

SECTION: A: DEMOGRAPHIC INFORMATION

1. Gender Male [ ] Female [ ]

2. Your age bracket (Tick whichever appropriate)

20– 30 Year [ ] 31 - 40 Year [ ] 41- 50 year [ ] Over 50 [ ]

3. What is your educational level?

College Diploma [ ] Bachelors‟ degree [ ] master's degree [] PhD []

4. Years of service/working experience in the organization

Less than **1** year [ ] **2** year [ ] 3 year [ ] **4** year [ ] 5year [] more than **5** year []

SECTION: B. FACTORS INFLUENCING ADOPTION OF ICT

5. Indicate your level of agreement with the following statements relating to Factors Influencing Adoption of ICT Key Use a scale of 1-5, where:

5= strongly agree

4=agree

3=moderately agree

2=disagree

1=strongly disagree

	Technological factors						
	Relative advantage related questions	**1**	**2**	**3**	**4**	**5**
Q1	ICT adoption leads to the delivery of better and efficient healthcare services					
Q2	Adoption of ICT to improve the quality of laboratory services.					
Q3	Adoption of ICT has helped to make link to the outside donors.					
Q4	ICT adoption can be one solution to provide better access to healthcare facilities for patients					
Q5	The ICT adoption is required by limitations of monetary constraints associated with continued paper-based record accumulation time.					
Q6	Adoption of ICT help to save resource and time.					
Q7	ICT adoption, support medical professionals in their decision-making leading to improved medical care quality.					
	Usability related questions					
Q8	learnability of ICT system					
Q9	Efficiency of the ICT system to accomplish a task					
Q10	Memorability of the ICT features when using the system					
Q11	Free of errors while using the ICT system					
Q12	The technology developer of the ICT that is used in an organization					
Q13	The ability of the user of ICT in the Hospitals affect the performance of the Hospital.					
	Complexity related questions					
Q14	The ICT technologies are relatively difficult to understand and use.					
Q15	Technology innovations in the organization are difficult to understand and use					
Q16	Employees always easily understand what ICT technologies are doing.					
Q17	Learning to operate ICT systems would be easy for our clinical staff.					
Q18	The system adopted in the Hospital are not clear in doing the tasks.					
	Organizational factors					
	Management support related questions					
Q19	Top managements are committed to import and use ICT technologies					
Q20	Top management is always ready to implement new technologies					
Q21	ICT equipment's are purchased as per the request at the right time.					
Q22	Public Hospital are lacking management skills on the adoption of ICT					
Q23	The organization have qualified personnel that provide training needed in the use of ICT.					
	ICT Infrastructure related questions					

Q24	The Hospital has fully functional website, so that patient, government and donor can access it.					
Q25	The Hospital have good internet connectivity.					
Q26	All the healthcare processes are performed by the computer.					
Q27	Everyone has a computers to perform regular tasks in the Hospital.					
Q28	Internet has become an important component of the electronic services in health institutions.					
Q29	ICT materials like, software, cables, computers, are purchased and delivered at the right time.					
	ICT skill related questions					
Q30	Employees of the Hospital have sufficient skill to operate the ICT technologies					
Q31	The employees always troubleshoot the problems they face in using the computer					
Q32	Members of the institutions are lacking in specialized ICT knowledge and technical skills.					
Q33	Many of the staffs are capable of information technology know how.					
	Environmental factors					
	Donor support related questions					
Q34	Donors provide financial support to acquire the necessary ICT facility in the Hospital.					
Q35	Donor are arrange regular training on ICT skill building for employees of Hospital.					
Q36	Donors are helping the Hospital by providing and implementing new technologies					
Q37	The help of donors is regular and very crucial for the Hospital healthcare service.					
	Government support related questions					
Q38	Government has strategies or initiatives that encourage Hospitals to ICT adoption.					
Q39	Government has a motivation to facilitate the successful implementation of ICT to your organization. .					
Q40	The government creates awareness to the employee on the use of ICT in Hospitals.					
Q41	The government give attention to your Hospital's ICT.					
Q42	The government is supporting different ICT materials to the Hospital					

APPENDIX E: INDICATORS OF ICT ADOPTION

Indicators of ICT adoption

Indicate your level of agreement with the following statements relating to indicators of ICT adoption Key Use a scale of 1-5, where:

5= Strongly Agree

4= Agree

3= Moderately agree

2= Disagree

1= Strongly disagree

		5	**4**	**3**	**2**	**1**
1	Electronic Medical Records use for Administration and management purpose					
2	Patients' healthcare information is stored and accessed by a database system					
3	Healthcare processes are performed by the computer.					
4	Human resource department implement financial information systems, payroll, purchasing					
5	The hospital have good internet connectivity.					
6	The hospital has fully functional website					
7	Employees always troubleshoot the problems they face in using the computer					
8	Video conference, and other communication media are working well					
9	Adoption of ICT to improve the quality of laboratory services.					
10	Adoption of ICT has helped to make link to the outside donors.					

Thank you

APPENDIX F: PERMISSION LETTER

አዲስ አበባ ዩኒቨርሲቲ
የተፈጥሮ ሳይንስ ኮሌጅ
የኢንፎርሜሽን ሳይንስ ትምህርት ቤት

ADDIS ABABA UNIVERSITY
College of Natural Science
School of Information Science

Date January 16, 2017

Ref: SIS/26/2017

To: Yekatit 12 Hospital

Student Mohammed Esaa (ID. No. GSR/0930/08) is a graduate student at the School of Information Science, Addis Ababa University. He is currently conducting a MSc. Project under the title of "Factors Influencing ICT adoption in Public Healthcare Organization: in Case of Yekatit 12 Hospital".

I would like to thank you in advance for all the assistance that you would provide to the student.

With Regards,

Martha Yifiru (PhD)
Head, School of Information Science

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