

**ADDIS ABABA UNIVERSITY  
COLLEGE OF BUSINESS AND ECONOMICS  
SCHOOL OF COMMERCE  
OFFICE OF GRADUATE STUDIES**



**IMPLEMENTATION CHALLENGES AND MITIGATION WAYS OF ICT  
PROJECTS: CASE OF INNOVATION FOR HEALTH CARE AND  
TRAINING SERVICE IN ALERT HOSPITAL AND TRAINING CENTER.**

**BY**

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**MARCH 2021  
ADDIS ABABA, ETHIOPIA**



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A Project work submitted to the School of Graduate Studies of Addis Ababa  
University in Partial Fulfillment of the Requirements for the Degree of  
Master of Art in Project Management (MAPM)

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## **Declaration**

This study has not previously been accepted for any degree and is not being concurrently submitted in candidature for any degree in any university.

I declare that this study entitled “IMPLEMENTATION CHALLENGES AND MITIGATION WAYS OF ICT PROJECTS: CASE OF INNOVATION FOR HEALTH CARE AND TRAINING SERVICE IN ALERT HOSPITAL AND TRAINING CENTER. ” is a result of my investigation, except where otherwise stated. I have undertaken the study independently with the guidance and support of my research advisor. Other sources are acknowledged by citations giving explicit references. A list of references is appended.

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

Advisor's Signature: \_\_\_\_\_

Adane Atara (Ph.D.)

## **ACKNOWLEDGMENTS**

This study would not have been easy above all without the almighty God's will and the backing and motivation that I got from my advisor, participant of the study, friends, and family members. Although many others supported me, I am grateful to forward my heartfelt thanks to the listed peoples as follow below:

Dr. Adane Atara: your constructive comments and input being an advisor was very valuable to finalize this study on time. Your continuous communication and responsiveness were also priceless from the start to the end of the study were indeed helpful to shape this project work.

Study participants: Thank you for your willingness to respond to my survey questionnaire and for your patience.

Wro. Ketetsela and Sr. Martha Fekadu, I am thankful for your cooperation to facilitate the study and particularly during study setting selection, permission approval, and data collection.

Thank you. All my loved family for the moral assistance you offered to me during my academic year. Above all, this will not happen without the help of almighty God. Thank you, God!!!

## ABSTRACT

*Implementation of technological innovation projects particularly Information Technology (IT) projects for health care and training service in developing countries faces challenges. ALERT hospital and training center currently implementing IT projects such as eHealth and eLearning to improve the quality of health care and deliver effective training to health professionals respectively. However, to develop and implement eHealth and eLearning in the healthcare and training system it is still challenging because the technological innovations by very nature are complex. These challenges of implementation include financial, infrastructure, knowledge, behavioral and social context, technological, leadership and governance, security, and stakeholders. The main purpose of this study is to assess the implementation challenges and understand mitigation ways. Under this imperative, the study answers the following question “what are the implementation challenges and mitigation ways to alleviate the implementation barriers?”. Qualitative and quantitative approaches have been employed in this study. The quantitative survey result shows that there are challenges of infrastructural, financial, behavioral, and social context, technology, stakeholders, and knowledge per their magnitude of prevalence. Other challenges such as the issues of COVID-19, staff turn-over, monitoring and evaluating, electric power availability, conflict of interest between stakeholders, accessibility, and language, and computer literacy of beneficiaries are also implementation challenges. Besides the qualitative study result identified that there is a good practice of mitigating the challenges of security and leadership and governance factors. In the future contemporary effects and issues of COVID on IT projects for health and training service implementation should further be investigated. Besides security, leadership and governance are not severe challenges in this study hence in the future, these factor variables should be more studied.*

**Keywords:** innovation, technological innovation, challenges of an innovation project, IT projects implementation

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## List of Acronyms

ICT	Information Communication Technology
WHO	World Health Organization
ALERT	All Africa Leprosy Rehabilitation and Training Center
IT	Information Technology
FMOH	Federal Ministry of Health
SMS	Short Messaging Service
ITU	International Telecom Union
UNCTAD	United Nations Conference on Trade and Development
HIT	Health Information Technology
HR	Human Resource
STI	Science Technology and Innovation
M&E	Monitoring and Evaluation
NGO	Non-Governmental Organization
HMIS	Health Information Management System
e-Health	Electronic Health
e-Learning	Electronic Learning
m-Health	Mobile Health
m-Learning	Mobile Learning

# CHAPTER ONE

## 1. INTRODUCTION

This chapter intends to discuss an overview of the project work which is about the challenges encountered in the implementation of innovative technology (IT) projects, considering the particular case of the Information Technology (IT) Project for health care and training services in the ALERT center. Besides it provides ways to mitigate implementation challenges. The next subsection of chapter one highlights how the implementation challenge is a burning agenda and needs to be addressed from the perspective of technological innovation in IT projects for health care and training services. This chapter also points out the motivation and statement of the problem of this study. Subsequently, the research questions are presented before the objectives of the project work and the scope of work. Finally, this chapter ends up by delineating the expected contributions of significance to the domain technological innovation implementation challenges.

### 1.1. Background of the Study

In today's rapidly changing organization and economic environment, there is a constant struggle for survival in fulfilling the demands of consumers, clients, and individual needs. Innovation is becoming the critical component of the development, growth, and survival of an organization. It is popular for innovation to be described as the value of new achievements" which involve "the development of new processes", ... "the opening up new business opportunities", ... "the searching for and the implementation of a new business organization and new supply tools" (Schumpeter, 1983). In other words, innovation always leads to new solutions, new ideas, and new ways of doing business. Extent pieces of literature from Ivana and Tamara (2019) evidenced that the basic competitive advantage of each modern organization is reflected in its ability to innovate its operation. Generally speaking, innovation in the organization offers value over the work environment. The resulting viable advantage contributes to improved returns.

One of the categories of the innovation project is technological innovation. Fernanda (2019) in his recent literature supported that technological innovation is an expanded innovation concept. While innovation is quite a defined concept, it has a wide significance for many particularly in academic science and the world of business.

According to PMBOK (2013), Project management is the use of knowledge, skills, tools, and techniques to project activities and initiatives to meet the required project objectives. Project management is accomplished through the appropriate deployment and integration of the forty-seven logically grouped project management processes, these are categorized into five key process categories: initiating, planning, implementing, monitoring and controlling, and closing. Project management is considered one of the most critical methods to increase the chances of success. In a similar context, Chan et.al. (2004) supported that most project initiatives fail to meet their targets, which is at the cost of the strategic edge of the organization due to poor project management in action. In this respect innovation project management practice has been the engine for developing project management strategies, relationships, and procedures to optimize project success and attain competitive advantage.

Project management for technological innovation is mostly applied to product, service, or process and can be carried out in stages or incrementally or through a radical transformation (Edval and Marcelo, 2004). Thus, technological innovation address issues that do not become an economically viable part of the organizational process. Innovation projects unlike regular projects must be dealt with in a distinctive way (Takeishi,2002). For instance, the most valuable aspect of understanding in a regular project is understanding of architectural components in regular projects that involves new tech, While, an innovative project requires new and advanced technologies, it is important that the organization has to have a high degree of knowledge of the particular component in solving undiscovered engineering problems or obtain solutions employing Information Technology (IT) innovations (Ireland, 1999).

In general implementation of the innovative project plays a pivotal role in success and faces challenges. For instance, Mezghan and Abbas (2012) in their study evidenced that, the only way to survive in a competitive organizational environment is through innovation and creativity, which play a significant role in the success of an organization. This intern means as compared with conventional projects, innovative projects are challenging and impose huge costs to companies and organizations. Hence classifying and breaking innovative projects can be worthwhile to reduce the risk of project failure. In other literature evidence from Delaney and Robert (2015) suggested that the appropriate time to deliver new technology training and the monitoring of technology changes once they have been fully implemented. There is a lack of

information on industry best practices for the timing to deliver technology training and handling technical advances. Hence organizations should be thinking about this essential field as a continuous process.

In general, the need to understand and managing innovation implementation becomes a burning issue, and to be prevalent in an organization. (Juan et al. 2011, Van De Ven, 1986). The management of innovation is one of the most central matters of concern in managing their businesses. That should be the concern of project managers and stakeholders as well.

## **1.2. Motivation**

The main motivation of the study is based on the fact that the challenges of implementing innovative IT projects in developing countries are becoming a burning agenda in academic as well as in the practical organizational environment. For example, the challenges of implementation, monitoring, evaluation, and learning still constitute a major issue for developing nations in Africa for various innovation policies, strategies, and projects (Rasigan & Erika, 2010). A recent piece of literature evidence also shows that globally there is a rising demand for an effective, efficient, and trustworthy innovation project in the healthcare delivery system, particularly in developing countries with large populations and significant remote or inaccessible areas (Arni et al., 2017).

Hence based on the literature evidence cited above, this study intends to examine how the challenges of implementation for innovative IT projects in health care and training service is viable and ways to mitigate the issue about such innovation project in the selected case organization.

## **1.3. Selected Project Overview**

According to FMOH (2015) regarding National Health Strategic Transformation Plan, the publication promotes the application of technology and innovation to augment the quality of health service as one of the critical strategic national objectives. This involves strengthening the use of the existing information technology, the introduction of new technology, increase the culture of technology transfer and development, and the consumption of locally available innovative technology. The strategic document also addresses finding better ways of doing

things in a new way through more effective products, processes, services, technologies, or ideas are important pillars to improve the service of the health sector. Innovation in the context of health care service in Ethiopia is considered as the process of ideation, appraisal, selection, development, and implementation of new or better-quality products, services, or programs. Technologies and innovations are critical for environmental impact assessments and planning for tailored mitigation (FMOH,2015).

Under this imperative, currently ALERT hospital and training center is adopting innovative IT projects for health care and training services. Among these are HMIS, the use of video conferencing for health care training and telemedicine, the use of self-administered online TB screening, automated SMS queue for patient's registration, and 99DOT's TB drug treatment, etc. (McKee et al.,2018, ALERT 2018). Hence this technological innovation requires the issues of implementation and needs to be treated with appropriate mechanisms for mitigating implementation challenges.

#### **1.4. Statement of the Problem**

The introduction section depicted that developing nations face implementation challenges concerning IT projects for health care and training services. Digital health and electronic learning platforms are the kinds of projects that are included under the category of IT project for health. In particular digital health automation and its sub-category innovative IT projects such as (e-health, e-learning for health care, m-health, HMIS, etc....), offers enormous potential to reduce costs, advance health information exchange, and improve healthcare access, as well as public and personalized medicine. However, it is still argued that developing nation also face specific challenges to develop and implement ICT projects in the healthcare sector, these constraints include “financial (i.e. investment, sustainability and operational & hidden cost), infrastructure (i.e. access, equity, and quality), knowledge (i.e. linking with research evidence and absence of knowledge management culture), leadership and governance (i.e. policy, support, and political stability), security (i.e. standard and unauthorized access), technology and social contexts” (Arni et al, 2017).

Besides Arni et al. (2017) recommends that the issue should be studied and yet is not well addressed. Hence being Ethiopia is one of the developing countries in Africa and the selected

project owner (i.e. ALERT hospital and training center) is currently implementing innovative IT projects, it is observed that the organization is facing practical implementation challenges.

### **1.5. Research Question**

As Ethiopia is one of the developing countries and ICT projects are being funded from donors and facing a domain problem and ALERT center is currently undertaking and using innovation IT projects for health, the implementation of innovation project, it is an issue that should be further explored.

The proposed project work attempts to answer the following research questions.

1. What are the challenges encountered in the implementation of innovative technology projects, considering the case of the IT Project for health care and training services in ALERT Center?
2. What are the ways to mitigate implementation challenges of IT Project for health care and training services in ALERT Center?

### **1.6. The objective of the Study**

#### **1.6.1. The general Objective**

The overall objective of the study is to examine the implementation challenges and mitigation ways of innovative IT projects for health and training. By doing so the study result provide a recommendation on how to better understand the best practice of innovation in IT project for health care and training service for an organization like ALERT hospital and training center in Ethiopia is managed.

#### **1.6.2. Specific Objective**

To address the general research objective, below are lists of specific objectives to be delivered in this study

- To examine the challenges of IT project implementation based on the literature gap.
- To identify other challenges of innovative IT projects other than the proposed research framework.

- To assess mitigation mechanisms employed to circumvent implementation challenges of IT Projects.

### **1.7. Scope of the Study**

The study is limited to innovative technological ICT projects for health care and training service. In other words the unit of analysis for this study projects (i.e. innovation), innovation project (i.e. technological), technological innovation (i.e. the use of IT), application sector, or industry (i.e. hospital and training center). The scope of the study is limited to the extent of identifying, describing and interpreting the challenges of implementation of e-Health and e-Learning areas by relating with literature-based findings and research gap. The mitigation ways are based on ALERT hospital and training center organizational context and project management experience.

Due to experience and time constraints, the project is evaluated based on the selected study setting on ALERT hospital and training center. The respondents, the methods, tools, and subjects used are to the extent of the study experience in health care and training fields. Hence the findings, conclusions, and recommendations are only limited to this hospital and training center organization for developing countries like Ethiopia.

### **1.8. Significance of the Study**

The finding of the study would enable ALERT hospital and training center to obtain the necessary feedback and take corrective measures to ensure the successful implementation of innovative IT projects. It might be an input for other similar organizations that are interested in implementing innovation project management and provides sufficient information to those who are interested to perform further research in a similar area. Besides, the output of the project work provided and broadens the knowledge of future study for the researcher about the subject matter with a range of practical applications.

### **1.9. Limitations of the Study**

Below are the limitations of the study:

- The boundary of the study is limited to the eHealth and eLearning project, not on another IT project in the ALERT center.

- Due to staff travel out of the intended 41 purposely chosen sample size in the design, only the study gathered data from 35 implementing staff.
- The usability of the conceptual research framework and instrument developed is specific to the organization in the context of developing countries like Ethiopia.

### **1.10. Organization of the Study**

This study is organized into five chapters. Chapter one introduces innovation, innovation project management challenges in developing countries, research background, and defines the statement of the problem, objectives, and significance of the research, scope, limitation, and significance of the study. Chapter two exhaustively reviews relevant domain knowledge of implementation practice and its challenges of innovative IT projects particularly for health care and training service. Also, chapter two ends up developing the research framework for assessing the implementation practice and challenges in innovative IT projects for health care and training services. Chapter three presents the methodology on how to arrive at the findings and a research method to collect and analyze data. Chapter four is the data analysis section. Chapter five is all about discussions of findings, conclusions, recommendations, and future works.

## **CHAPTER TWO**

### **2. LITERATURE REVIEW**

#### **2.1. Theoretical Literature Review**

The previous chapter outlined the study introductory of the intended purpose that is going to be investigated based on the evidence from the existing literature. Following this chapter provides an insight into the domain knowledge of innovation, classification of an innovation project, then go through the technological innovation project. In the middle the criteria for effective implementation and challenges of technological innovation project focusing on the particular case of (IT) Project for health care and training services. Finally, the related works done in this area are reviewed. The ultimate goal of this chapter is to develop a framework for understanding the challenges of implementation from the project management perspective. It ends up with developing an instrument for surveying response.

#### **2.2. Innovation**

Many scholars and organizations have given their definition of the concept of innovation. Some common central themes in the different definitions are a focus on newness, and improvement, and its practical implementation. It is also often seen as taking place through “the provision of more-effective products, processes, services, technologies, artworks” (Lijster,2011). or business models that innovators offer and avail for governments, markets, and society. In earlier literature was defined as means of the entry point into the economic environment to achieve competitive advantage. For example, Franklin and Perú (2009) contend that innovation is something original and more effective, and as a consequence, new, that "breaks into" the society or market.

Coming to the comparison between innovation versus invention, the central themes of innovation goes beyond the concept of the invention. For instance, Bhasin (2012) underlined that innovation is related to, but it is not the same as invention. innovation tends to more to include the practical execution of an invention in other terms access to “improved capability “or “achieving successful and sustainable impact” in the society. It means that not all innovations require the application of new inventions. Hence, we can argue that innovation instead can be considered as adopting existing technology. In a more related piece of literature, technological innovation is

considered as something that involves technology products such as ICT artifacts to solve problems scientifically. For example, Schumpeter (1939) identifies that the extent of technical innovation exemplifies the use of technology products through the engineering process if and only if when the particular problem being solved with the perspective of scientific or technical with its nature.

### **2.3. Innovation Project Classification**

It is important to classify innovation projects to understand the practical application. For example, Mozhgan and Abbas (2012) mentioned that the capacity to innovate is an important strategic means for many organizations and countries. The most popular approach that has been accompanied by these studies is the classification of innovation, which is both by the process and output of the process. The classification provides a framework for labeling all types of innovations. Besides their work evidenced that classification helps us to structure our understanding and knowledge in such a way that is more viable and transferable rather than simply listing the descriptions projects.

Mozhgan and Abbas (2012) supported that all projects fall into two categories: traditional or traditional and innovation projects. The purpose of this study is to focus on the similarity and/or difference of classifications of innovation present in the areas of economic, technological, and research fields. In a piece of prior evidence from Filippow & Herman (2007) to split innovation into several groups depends on its project complexity. Their work classified the following subcategories of an innovation project. These are discerned under the umbrella of innovation projects, such as technology, research, new product development, and other projects. It is depicted in Figure 1.

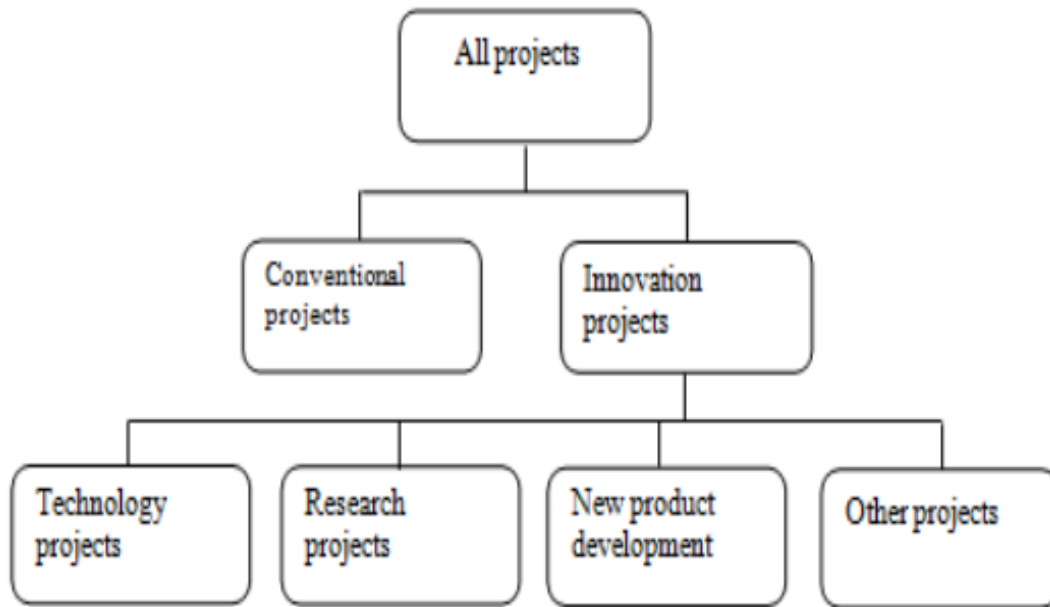


Figure 1 Classification of projects (Filippow&Herman,2007) sources (Mozhgan and Abbas,2012)

Subsequently, the next section discusses the technology innovation that involves the use of information technology artifacts or products for a particular selected project case in the health and training sector.

#### **2.4. Technological Innovation Project**

Technological innovation projects focus on product, service, or process and can be done either incrementally or through a radical transformation (Edval and Marcelo, 2004; Tidd et al, 1997). Thus, technological innovation addresses a matter that is not part of the organization's day-to-day activity and it must be implemented in an economically viable way. There is a need for a distinctive treatment of innovation projects and regular projects (Edval and Marcelo 2004, Takeishi, 2002). For regular projects, with known technology, the most important thing is to consider its architectural knowledge and the components technology, whereas when a project involves new technologies, the organization must have either a high level of knowledge about the specific component which addresses unexplored engineering problems or acquire solutions using IT innovations (Edval and Marcelo, 2004; Ireland, 1999; Takeishi, 2002) by employing

project implementer that has deep knowledge of the domain (Edval and Marcelo, 2004; Kamel, 2003).

## **2.5. Innovation Information Technology Projects For Health Care And Training Services**

Information and communication technology (ICT) plays a critical part in unifying communications, allowing people to access, process, store, and transmit data through fully integrated data communications, and electronic systems (Henriquez-Camacho et al., 2014). ICT has profound impacts across different sectors in society, including the healthcare sector (Henriquez-Camacho et al. 2014).

According to Arni et al. (2017), the most important innovation technology in the health sector are identified as electronic health (e-health), mobile health (m-health), electronic learning (e-learning), and mobile learning (m-learning). According to WHO (2012) and Kay et al. (2011) although m-health has become one of the most important sub-components of e-health, here we list some of the more common current operational definitions.

- Electronic health or e-health can be defined as “an emerging field in the intersection of medical informatics, public health, and business, referring to health services and information delivered or enhanced through the Internet and related technologies” (Arni et al. 2017; Eysenbach, 2001). Similarly, the World Health Organization (WHO) and the International Telecommunication Union (ITU) defined the term “e-health” as “concerned with improving the flow of information, through electronic means, to support the delivery of health services and the management of health systems”.
- Mobile health or m-health can be defined as the application of portable or mobile devices to deliver medical and public health services and it is the sub-components of e-health (Arni et al. 2017; Betjeman et al., 2013). Most studies in this field have focused on the use of mobile applications such as short messaging service (SMS), voice, and wireless network access (Wi-Fi) to collect or disseminate health records. Besides m-health to offer healthcare services (Vital Wave Consulting 2009).

- Electronic learning (e-Learning) and mobile learning (m-learning) are concepts used in educational and training areas. Again, these terms are sub-components of e-health, with intended services accessible through computing devices and portable devices such as smartphones, and tablets for health professionals (Wittet, 2012).

## **2.6. Technological Innovation Project Implementation**

According to Katherine and Andrew (2005) in the health of the community and society, an organization through innovation is critical. To achieve impact through technological innovation society must “grow and change: and “adopt and implement” technological innovations if they are to survive in a changing environment. In the other words of innovation researchers, innovation is a product or practice that is new to its developers, implementers, and beneficiaries. Innovation adoption is the decision to use technological innovation. In contrast innovation implementation is “the transition period during which implementers and benefices become increasingly skilled, consistent, and commit with the use of an innovation. The critical gateway between the decision to adopt the innovation and continuous use of the innovation is implementation (Klein & Sorra, 1996). The difference lies in adoption and implementation is critical in that beneficiaries may often adopt innovations however fail to implement them successfully.

As a general rule, adoption is easy even though it cost much than implementation. Many innovations, like the use of technology, are implemented ineffectively. Thus, innovation failure is unable to achieve the desired outcome by adopting it. It reflects the ineffectiveness of innovation as per the implementation process (Klein & Sorra, 1996). In short, innovation fails because it is not used with the consistency, skill, and care required to achieve its expected benefits.

Katherine and Andrew (2005) also evidenced that many innovation project implementation particularly technological innovations require critical consideration of the following factors. These are:

- One key factor is the availability of implementation policies and practices in an organization (Klein & Ralls, 1995). Implementation policies and practices include the training available to teach staff to use the innovation; the provision of technical assistance

to innovation users; the availability of rewards for innovation use; the technology being user-friendliness.

- The second critical factor is the team's or organization's climate for innovation implementation. That means the shared perceptions of the importance of innovation implementation by the employees. When a unit's climate for innovation implementation is strong and becomes optimistic, employees regard innovation use as a top priority, not as a distraction from or obstacle to the performance of their "real work." (Both Klein et al.,2001).
- The third important aspect is management issues. Managers play a critical role in the implementation process, so their support of the innovation in terms of convincing, influence, informed, and demonstrable means for implementation is critical (Katherine and Andrew,2005).
- The fourth factor is the availability of financial resources. Implementation costs much more than expected. It requires the investment of more money to offer training, to offer support for users, to pilot innovation to examine the challenges, and to see the outcome (Nord and Tucker,1987).
- The fifth necessary factor is learning: a strong learning orientation allows organizational members to overcome challenges, by experimenting, adapting, and keeping the benefit of innovation in use. According to Edmondson et al. (2001), leaders should create a shared team by articulating, inspiring, expressing the benefit, and communicating to team members about innovation.
- Lastly, the sixth critical factor is managerial patience. that is a long-term time orientation. According to Katherine and Andrew (2005), managers who are committed to achieving the long-term benefits of innovation implementation understand that the implementation can not be achieved in the short term.

Besides UNCTAD (2018) also advocates that in developing countries with innovation most stakeholders need to learn how to adopt, fully integrate new and existing knowledge of innovative technologies. This involves interaction and communication skills across all stakeholders, including when there are innovation intermediaries or information and technology providers. Another piece of evidence from UNCTAD (2018) shows that it can be seen naturally

but not active intervention from government or non-governmental stakeholders in particular in the fields of social and environmental issues.

Finally in recent evidence from UNCTAD (2018) most developing nation to have an effective technological innovation project implementation, they must require the attention of the following key factors or enabling environment: policy and regulatory framework, organizational leadership and governance, financing the initiative of innovation, skillful human capital and the development of technology and research & development infrastructure and ensuring affordable coverage of ICT to overcome geographical, gender, generational and income digital divide.

### **2.7.Implementation Challenges of e-Health and e-Learning**

There are many challenges faced by technological innovation projects particularly IT projects for health and training services in developing countries. For example, Arni et al. (2017) identify that funding needs, infrastructure and related factors, knowledge and research evidence, leadership and governance, security and interoperability, and sociocultural and technological environments are the most pertinent barriers in implementing such initiatives. Other literature evidence from Murad et al. (2009) also pointed out that the innovation process and technology management is an emerging field in the developing-world business and economic environment. Their work highlighted that innovation and technology environment in developing countries is by nature have poor organizational model, government conditions, low education level, poor management of technology, and poor condition of infrastructure.

According to Mohammad et al. (2019), it is evident that the challenges facing the application of ICT for health care services or eHealth implementation in developing countries are the lack of quality ICT Infrastructure; power supply, the basic skill of ICT information, resistance to accepting the use of new technology, access of quality internet service, financial and economic issues, security and privacy concern, knowledge of technology, protection, and confidentiality, the bottleneck of the legal and policy framework, and socioeconomic constraints and development.

According to Aregawi (2015), the major challenges of the Science, Technology, and Innovation (STI) implementation in Ethiopia STI are identified. Accordingly, most issues are common and shared by most developing countries as described by Padilla and Gaudin (2014). Both studies

supported that there is a common saying that a policy issue has equal weight as to have a successful implementation and it is identified that the significant barrier is found to be the failure of translating the policy into action.

Besides the studies of Aregawi (2015) and Padilla &Gaudin (2014) outline the barrier to the implementation of technological innovation in Ethiopia as:

- The poor awareness of the benefit of technology by the beneficiary.
- Unavailability of programs to convert the policy to practice.
- The lack of qualified employees or staff.
- Poor skills, knowledge, and attitude of implementing staff to discharge their obligation.
- Poor coordination and communication among stakeholders.
- The limited understanding and involvement of the beneficiaries.
- Constraints of financial resources.
- The lack of engagement and linking the private sector especially in revenue-generating.
- The absence of nationally developed guidelines.
- Absence of linking the innovation with research evaluation activity.
- The lack of information systems such as data warehouses, websites, etc.
- Poor infrastructure such as outdated computer laboratory, inadequate devices, and most importantly the low quality of telecommunication networks.
- The poor organizational culture to monitor and evaluate implementations.

## **2.8. Empirical Review**

According to the study by Harry (2015), the challenge of managing using Information and Communication Technology for health in both developed and developing countries have already shown some promising implementations of domain pieces of knowledge. However, his study pointed out that still there is a lack of research evidence on the major challenges of implementing eHealth solutions for Developing Countries. The study identified that IT projects for health such as eHealth implementation challenges in developing nations face the following barriers: the lack of skilled stakeholders, inadequate infrastructures, the lack of acceptance of technology, unavailability of resources, inadequate information system, inadequate implementation guideline. Based on the findings the study proposed the need for the development of theoretical

aspects to focus on three dimensions: 1) the importance of implementation guidance development, 2) exert more effort on the acceptance of technology, and 3) basic or fundamental requirements of innovation.

On the other hand, the empirical study from Nixjoen (2016) contends that the adoption rate of health information technology (HIT) remains low in developing countries, where healthcare institutions face much operating running cost and miss the opportunity of revenue-generating mechanism. This is the result of the ineffective implementation of such initiatives. The study identified the following are critical of ineffective implementation of ICT for health projects: (a) poor stakeholder involvement, (b) low concern of management buy-in, and (c) the low level of ICT literacy among healthcare workers.

Another related empirical review from Asemahagn (2015) also iterated that Information Communication Technologies (ICTs) play vital roles to enhance the effectiveness and efficiency of healthcare organizations not only for the developed nations but also for developing countries. Asemahagn (2015) also pointed that the utilization of ICT in developing countries is very limited. Accordingly, the study argued that improving the management, infrastructure, computer access and literacy, availability of internet connection and training on the use of ICT, and awareness creation is important to improve its utilization among the health professionals. Which in turn means a failure to incorporate such issues results in implementation failure.

In more related pieces of work from Yenework (2017) on the area of technological innovation such as IT project for training (i.e. the use of e-learning) is becoming more useful to learning institutions. Yenework (2017) argued that it is important to assess higher learning institutions' readiness before implementation. In conclusion, the study pointed that although there is an initiative of implementing eLearning, there are also factors that are not ready for implementation. The study from Yenework (2017) suggested that project owner and implementers or responsible bodies to do more on e-learning by improving the factors which are ready but need improvement. In other words, the factors which are not ready and demand more improvement need to be addressed. Most importantly the study concluded that government bodies such as (ministries, officials, etc.) should focus and give attention to e-learning readiness issues.

Yonas (2019) in his study also pointed out that the expansion of the internet and technological advancements in ICT is playing a vital role in almost all organizations that are engaged in learning activities. The study identified eight factors that determine e-learning systems success: institutional support, quality of e-learning systems quality, course content, learners' attitude, systems application, level of learners' satisfaction, and measuring the e-learning systems outcome. A failure to consider those determinants fails in implementation.

Robel (2013) iterated that, e-health may play a major role to improve the quality, efficiency, and access to health care services. However, numerous factors affect the successful deployment of E-health including political commitment, lack of collaboration, lack of standards and interoperability technologies, and lack of funds. The study pointed out that the successful implementation of ICT for health care services largely relies on policy and strategy implementation. The study results also showed that the limited participation of non-governmental bodies in the preparation of policy documents. Some of the policy components such as human resource (HR), technological infrastructure, and leadership governance were investigated in depth. Other policy considerations such as being responsible for discharging the obligation, cost, and private funding issues are not included in innovation policy documents.

Sandra (2014) justified that eHealth innovation meets the requirements of a highly developed society. However, in developing nations the issues such as the use of ICT in the healthcare system are challenging because the system by itself complex and fragmented. The study has also shown that involving users and collaborators is challenging as well. Further, the study has shown that there are technological challenges in realizing the benefit of eHealth in the healthcare system and there is a challenge to develop and implement information systems because of regulatory limitations.

Another related study from Elshalom (2019) concerning the importance of knowledge for implementation, the perceived knowledge management practice in IT Project in the case of the Ministry of Innovation and Technology was studied. It was identified that the knowledge gap among the project team in implementing the innovation is one of the significant barriers.

Another related work from Hewan (2015) also suggested that four perspectives, namely science, technology and innovation (STI) policy formulation process, the content of policy document,

monitoring and evaluation(M&E) effectiveness of policy formulation and implementation have been identified. The finding of the study indicated that science technology and innovation (STI) policy formulation was the most effective and enabling factor for implementation. The study recommended that the development of policy implementation strategy, good coordination mechanisms among stakeholders, and monitoring and evaluation (M&E) mechanisms should be devised to have a successful implementation. Hence it can be argued that a failure to incorporate such issues in policy documents will face challenges in the implementation of such project initiatives.

## **2.9.Summary of Implementation Challenges**

Annex one consolidates and summarizes the literature review and related work of the challenges of implementing technological innovation (IT) project for health and training services includes the following aspects: financial, infrastructure, knowledge, security, technological, behavioral, and stakeholders.

Concerning financial barrier, the following factors of needs to considered: unavailability of funding issues, poor consideration of cover operational cost, lack subsidizing the hidden cost, the requirement of high initial investment and poor linkage with the private sector. The infrastructure dimension of challenges was also identified as another aspect of implementation challenges. Infrastructure quality, coverage, and requirement of sustainable investment are the factors that need to be considered under infrastructure challenges. Concerning challenges of knowledge, lack of Standard knowledge, that absence of research link, lack of practice of sharing experience, absence of knowledge management culture, and involvement of unskillful project implementing team are factors that fall under the knowledge dimension.

Privacy and security are also the challenges of implementing an innovation project under this imperative absence of standardized security practice and unauthorized access is the central concern. The technological challenge dimension also considers the issues of interoperability, the newness of the technology, absence of localization of the infrastructure, poor consideration of customizability, and the low level of acceptance of the technology. Coming to the behavioral aspects the attitude towards technology, poor effort of collaboration, low perception of the benefit of the technology is the factors that need to be considered. Finally, the issues of

stakeholders are the other dimension of challenges of implementing such an initiative. Hence the qualification of stakeholders, low level of engagement, and coordination are the determinant barrier in this aspect.

### 2.10. Conceptual Research Framework

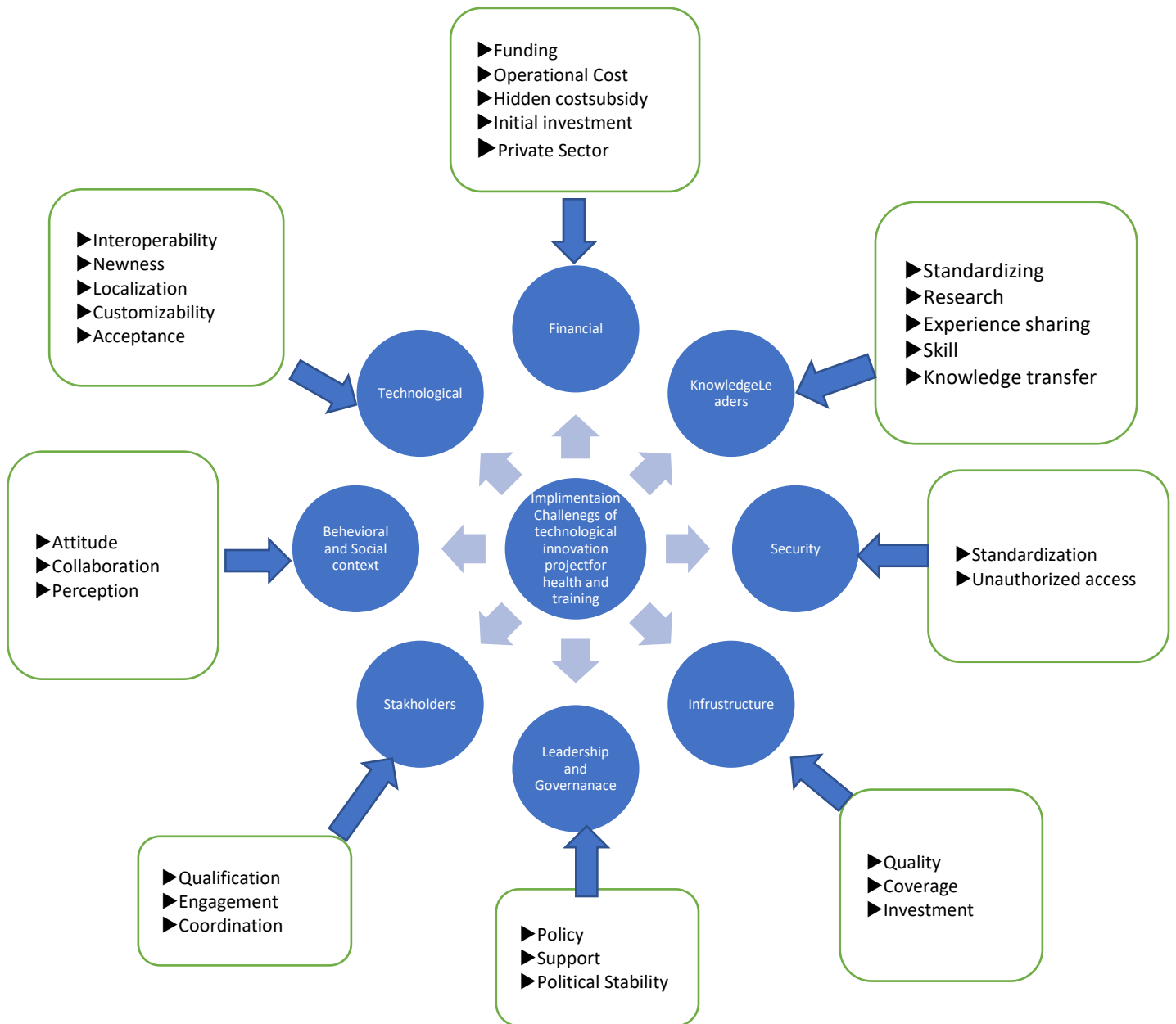


Figure 2 Framework for Implementation Challenges of a technological innovation project for health and training services: In developing countries (Sources: Arni et al., 2017; Aregawi, 2015; Murad et al. 2017; Aregawi, 2015; Hewan, 2015; Yenework, 2017; Yonas, 2019)

## **CHAPTER THREE**

### **3. RESEARCH METHODOLOGY**

#### **3.1.Introduction**

The goal of this chapter is to deliver an overview of the research methodology used to understand the challenges of technological innovation in IT projects for health. Subsequently, the subsection of this chapter focuses on the discussion of research philosophy, approach, reasoning theories, methods employed, data collection technique, and data analysis. Eventually, a reliability and validity test employed in the study indicates to ensure the quality of study output.

#### **3.2.Research Philosophy**

Existing literature from Tuli (2010) pointed out that selecting the design of research and methodology is determined by the philosophical perspective that directs the study of nature. Particularly the assumption towards understanding the nature of reality, phenomenon, and individual (i.e. ontology), the theory of body of knowledge that depicts the researcher (i.e. epistemology), and how the understanding can be obtained (i.e. through methodology). In similar literature evidence from Crotty (1998) evidenced that these three theories ultimately guide understanding of research questions, methods, and analysis & interpretation of results. These are termed to be positivist, interpretivism, and critical realism.

In this study, the positivist paradigm is used. Positivist retains and investigate social and physical thoughts, underlying theories, and is seeking to uncover the imbedded facts. This can be achieved irrespective of how others view the situation. In other words, positivists typically believe nature is empirically represented by measurable attributes that are independent of the researchers (Yin, 2002). Hence this study base on the positivist philosophy.

#### **3.3.Research Theory**

According to Bara and Bucciarelli (2000), in the field of research the fundamental categories of reasoning theories or are derived from the model of reasoning model: inductive and deductive (Bara and Bucciarelli, 2000). Pieces of literature evidence from Silverman (2005) contend that deductive approach application depending on the methods used. Deductive reasoning or theory

deduces a statement, which must then be investigated empirically according to what is established in a particular field (Bryman, 2008).

Thus, this study uses a deductive approach since the deductive approach was deployed by surveying using a questionnaire based on the interview findings to confirm the challenges, facts, known evidence, and theory based on the framework developed in a literature review.

### **3.4. Research Approach**

Evidence from Gorover (2015) classified that fundamentally there are three categories of research approaches: qualitative, quantitative, and mixed. This study focused on the descriptive research method of the quantitative approach. Primary data sources collected using survey questioner from employees involved in project work includes the technical experts, support staff, and top management or executives. Besides internal documents that could give information related to the project implementation practice of the project are used. Secondary data on the other hand were used from related journals, articles, books, and some project publications to support the evidence.

### **3.5. Research Strategy**

Johannsson (2014) contends that research strategy is the blueprint for the execution of the research or study. A research strategy provides a road map for planning, conducting, and monitoring, and evaluating the research output. According to his study, it was identified seven mechanisms as a strategy: experiment, survey, case study, ethnography, grounded theory, action research, and phenomenology. These are the most pertinent types of research strategies that guide the direction of the study.

According to Thomas (2001), the primary purpose of a survey as a research strategy is to map out some world, be it social or physical. A survey usually has broad coverage and provides a view of a helicopter of some area of research interest. In the social sciences, surveys are frequently used for gathering basic data regarding large groups of people, including their activities, thought, beliefs, and attitudes. Therefore, the strategy selected for this study is a survey type in nature.

### **3.6. Research Design**

According to Mcchester and Chinedum (2014), research designs provides an answer to some crucial concern or questions such as: “how was the data collected or generated?”, “how the data analysis is done?” and in other words, it shows the reader how the researcher obtained the results and why the research is done?”. Under this imperative Shaughnessy (2011) classified the types of research design. There are several different designs, or overall structures, that can be used in survey research. According to the study of Shaughnessy (2011), the three general survey designs are cross-sectional, successive independent samples, and longitudinal studies. In cross-sectional survey studies, samples of data are drawn from the relevant population. A cross-sectional study describes characteristics of that population at one time, but cannot give any insight as to the causes of population problem and nature because it is a predictive and correlational design (Shaughnessy, 2011). Hence for this study cross-sectional study design was used.

### **3.7. Sampling Technique**

According to Hair et al. (2010), the target population is said to be a specified target group of people or objects for which the questions can be forwarded or observation is made to develop the required information. The sampling technique could either be nonprobability or probability (Taherdoost,2016). For this study, a non-probability sampling technique was used. Since purposive or convenience sampling is a non-probability method that helps the researcher to select the department and the right people for which individual who is engaged in the implementation of technological innovation project particularly the use of ICT for health and training services.

Therefore, for this study, the target population includes employees involved in project work. 35 identified individuals who are involved in technologically innovative IT projects in health care and training services among the ALERT Center staff. The researcher used all identified target population of the project implementing staff as a complete sample size to conduct survey study and as they are few. The staff mix includes all the project coordinators, project managers, project members, and support staff. Besides, two key lead heads of ICT directorate director and Project manager are identified for the structured qualitative interviews to identify the mitigation ways

practiced. The identification is made based on the merit that their involvement is much related to circumventing the barriers of implementation.

### **3.7.1. Data Gathering Techniques**

According to Mcchester and Chinedum (2014), data gathering is the next step once the research question is formulated, the sampling plan is determined and the type of survey technique is selected. In their pieces of literature, it was identified that, although there are many techniques, the most essentially three techniques of data gathering in cross-sectional survey study are: face-to-face interview, self-administered questionnaire, and telephone interview. For this study self-administered questioner is used to gather responses from the study samples of an individual.

The individual response is measured and collected on a Likert scale. Most pieces of literature for example Michell (2014) and Singleton (1999) evidenced that a Likert scale is consists of a series of more than four more psychometric scales or representations to measure individual psychological attitudes. Likert-type items that represent similar questions combined into a single composite score/variable. Researchers developed several scaling to measure the relative strength, the degree of agreement, or degree of psychological phenomena, such as mental abilities and attitudes about the underlying facts. These degree of the responds attitude of level of agreement is measure as (5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, 1 = Strongly Disagree). Hence the instrument developed has the scale from (5 = Strongly Agree to 1 = Strongly Disagree)

### **3.7.2. Method of Data Analysis**

A quantitative data analysis method is applied based on the nature of the empirical data collected. The main variables were derived from the research framework and Annex two. These consist of questions regarding the challenges of innovation implementation challenges factor of financial, infrastructure, knowledge, security, technology, social or behavioral, stakeholders. These variables were also translated into sub-question under them based on the pieces of literature evidence indicated in Annex one. As is discussed at the beginning of this section, the study employed descriptive statistics. Therefore, the data obtained from the questionnaire respondents used to assess the performance innovation management system.

For all the scores of the seven factors or challenges, the questionnaire is distributed and data are gathered in a structured manner. The data entry and coding are done by using computerized software SPSS (Statistical Package or Social Science) statistics results. Data clean-up process is also done to ensure the consistency of response. The processed information from SPSS has been presented using frequency tables, percentages, necessary statements of mean value, and standard deviation. Correlational and factor analysis are also analyzed to understand the degree of factors contributing to implementation challenges.

Qualitative analysis is done on two key staff who are responsible for managing and leading the project and technical aspects. This involves interviewing the project manager and ICT director. During the interview, the field note is taken on the identified challenges themes of technological innovation project implementation. According to Braun and Clarke (2006) to conduct a qualitative analysis once the data is collected is to review at the level of the coded theme's data. This means, needs to read all the collated extracts for each theme and consider whether they appear to form a coherent pattern. Then to consider the validity of individual themes concerning the data set. Braun and Clarke (2006) also pointed that whether the candidate thematic description or interpretation accurately reflects the meanings of evidence in the data set area. The last step is producing and writing the description of each identified theme.

### **3.8. Validity and Reliability**

#### **3.8.1. Validity**

According to Brains (2011), validity is the extent to which a conclusion or measurement is well-founded and likely corresponds accurately to the real world. Validity is based on the strength of a collection of different types of evidence (e.g. face validity, construct validity, etc.) described in greater detail below. In psychometrics, validity has a particular application known as test validity: "the degree to which evidence and theory support the interpretations of test scores" ("as entailed by proposed uses of tests") (AERA,1999).

The validity of the instrument i.e. the questionnaire was developed through consultations and input given from the advisor. This was meant to create validity and avoid errors in the measurement scale used in the instrument. A pre-test or a pilot field test was performed to check whether the questionnaire gathers the same output. Besides the pre-test was done under the same

study setting. The participant on the pilot test used is not included in the actual study. In this project work, all the factor variables investigated by experts to confirm that the construct was adequately represented the implementation challenges of technological innovation project particularly IT project for health care and training services. To facilitate the final study instrument development, i.e. while deploying the pilot testing a coherent study questionnaire is synchronized with an in-depth examination of literature review.

### **3.8.2. Reliability**

Cortina (1993) suggested that reliability in statistics and psychometrics is the overall consistency of a measure. A measure is said to have high reliability if it produces similar results under consistent conditions. The reliability of the study has been taken into consideration. The study gave various care for issues of the data, variables, construct, the process, and the output of the research. The study employs a Cronbach's alpha test to check reliability, using SPSS 20. If the test of SPSS reliability is between 0.60 to 0.70 would be an acceptable level for instance. Hulin, Netemeyer, and Cudeck (2001) pointed that the universally accepted rule of thumb is when Cronbach's alpha value ( $\alpha$ ) of 0.60 - 0.70 indicates that an acceptable level of reliability. Besides most recent literature evidence from George et al. (2015) also contend that when Cronbach alpha test value falls within the range of 0.60 to 0.70 is generally acceptable.

## CHAPTER FOUR

### 4. DATA PRESENTATION AND ANALYSIS

#### 4.1. Introduction

This section presents data analysis. It starts by providing the demographic and general description of the respondents. The mixed qualitative and quantitative survey study is deployed, as previously discussed in the methodology chapter. Out of the interceded 40 sample sizes, a total of 33 questionnaires were distributed to ALERT staff and project stakeholders' staff who are based on the project owner organization ALERT center. The survey questionnaire I utilized is encoded into the SPSS statistical package to conduct quantitative analysis. The analysis is based on the framework developed in the literature section to understand the magnitude of the relationship and factors that contribute to the challenges of technological innovation.

#### 4.2. Analysis of Demographic Information

The demographic information of the respondents who were involved as study participants in the study is analyzed by using descriptive analysis of the SPSS statistical package. Accordingly, the result of the survey is depicted in a summary Table 4.1 as follows:

##### 4.2.1. Sex

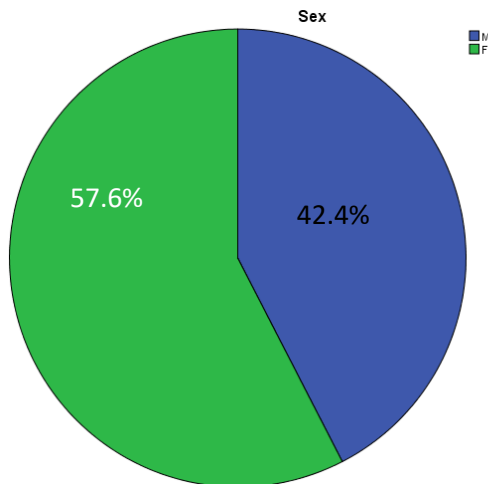


Figure 4. 1 Distribution of Gender (Source: SPSS output of Survey Result 2020)

#### 4.2.2. Age

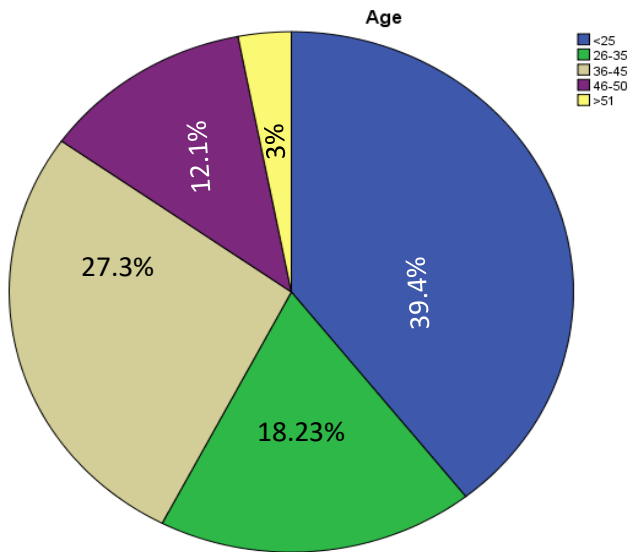


Figure 4. 2 Distribution of Age (Source: SPSS output of Survey Result 2020)

### 4.2.3. Other Demographic Information

Demographic variable	Category	Frequency	Percentage
<b>Level of Education</b>	High School or Certificate	1	3.0%
	Diploma	8	24.2%
	BSc / BA Degree	10	30.3%
	MSc / MBA / MA	9	27.3%
	MPH	3	9.1%
	MD	2	6.1%
	<b>Total</b>	<b>33</b>	<b>100%</b>
<b>Field of Study</b>	Computer Science or IT	9	27.3%
	Management	5	15.2%
	Clinical or Medicine	2	6.1%
	Accounting	5	15.2%
	Public Health	4	12.1%
	M&E	1	3.0%
	TEVT	3	9.1%
	Nursing	2	6.1%
	Health Officer	2	6.1%
	<b>Total</b>	<b>33</b>	<b>100.0</b>
	<b>Current Position</b>	Project Manager	1
Department Head		3	9.1%
Administrative Staff		5	15.2%
IT Support Staff		5	15.2%
Consultants		2	6.1%
General support / Network / infrastructure		1	3.0%
Technical Assistant		1	3.0%
Site Level ICT Coordinator		2	6.1%
Data Clerk		1	3.0%
Health Care Professional		2	6.1%
Project coordinators		3	9.1%
Training Coordinators		1	3.0%
Trainer		3	9.1%
Others Staff		3	9.1%
<b>Total</b>		<b>33</b>	<b>100%</b>
<b>Years of Experience</b>	<1 Year	0	
	1-3 Year	8	24.4%
	3-6 Year	17	51.5%
	6-9 Years	2	6%
	>9 Years	6	8.1%
	<b>Total</b>	<b>33</b>	<b>100%</b>

Table 4.1 Summary of Demographic Distribution (Source: Survey result 2020)

The result of demographic information analysis of respondents that are involved in the survey study, shown in Table 4.1 evidenced that 46.4 % are male on the other hand 57.4% are female. This shows that most of the respondents' samples are Female out of the selected population.

Moreover, the demographic information of the study participant age divulges that amongst the 33 samples of respondent 39.4% whose age falls below 25, 18.2% of the samples fall in the range of 26-35, respondents whose age ranges from 36 to 45 are found to be 27.3%, 12.1% of the respondents fall from 46 to 50. The rest 3% are above 50 years of age. The most pertinent age range here enables us to understand that the youngest are below 25 that are participated in the study.

Concerning the academic status of the respondents in the study, the majority of the participant are academically qualified. It the lion share of the respondent have a first and second degree. The output reveals that diploma holders are 24.2%, first-degree holder respondents are 30.3%, second-degree holders are 27.3%, a medical doctor and public health specialist are 9.1% and 6.1 % respectively.

Regarding the years of experience, the study results indicate that the lion share of the respondents (i.e. 51.51% of the employees selected in the sample are between 3 to 6 years of experience. This is then followed by 24.24 % whose years of experience are from 1 to 3, the respondents with work experience between 6-9 years are 18.18 % of respondents, 8.1% of the sample representative have more than 9 years of experience. This means that majority of the study participants have adequate work experience in the organization.

### **4.3.Challenges of Technological Innovation Projects Implementation**

This section of the project work discusses the analysis and result of the factors that contribute to the implementation challenges of IT projects in ALERT hospital and training. The questions consist of nine different variable factors. The ranking of factors is done based on the level of importance of factors that are attributed to implementation challenges are:

### 4.3.1. Infrastructure

Infrastructural challenges	Strongly Agree Frequency %	Agree Frequency%	Neutral Frequency %	Disagree Frequency%	Strongly Disagree Frequency %
There is poor ICT infrastructure in terms of quality, up-to-datedness.	54.5%	33.3%	9.1%	3.0%	0.0%
Limited distribution or equitable access to infrastructure such as the internet, Wi-Fi, Cellular network coverage exists in the organization.	6.1%	69.7%	15.2%	6.1%	3.0%
There is a lack of investment in infrastructure or the absence of long-term financial viability.	18.2%	45.5%	24.2%	12.1%	0.0%

Table 4.2 Summary of Infrastructure Challenges (Source: Survey result 2020)

As per the result obtained from the survey of the respondents' staff concerning the infrastructures quality item, it is found that 54.4% and 33.3% respondents strongly agree and agree respectively concerning the poor ICT infrastructure in terms of quality, up-to-datedness of the existing ICT infrastructure.

Concerning the limited distribution or equitable access to infrastructure such as the internet, Wi-Fi, cellular network coverage exists in the organization, the staff responded affirmatively 6% and 69.7 % strongly agree and agree respectively.

Coming to the lack of investment in infrastructure or the absence of long-term financial viability the staff responded positively by 18.2 % and 45.5 % as strongly agree and agree respectively.

From these responses, all the factors mentioned under infrastructure are contributors to innovation project implementation challenges however most of the infrastructure issues were primarily poor ICT infrastructure in terms of quality, up-to-datedness, and poor infrastructure coverage. These two issues are the main reason for the innovation project's difficulty to implement in ALERT hospital and training center.

### 4.3.2. Financial

<b>Financial challenges</b>	<b>Strongly Agree Frequency %</b>	<b>Agree Frequency%</b>	<b>Neutral Frequency %</b>	<b>Disagree Frequency%</b>	<b>Strongly Disagree Frequency %</b>
There is a lack of constant and sustainable sources of funding from the donor. Or Funding is short-term in the organization.	36.4%	33.3%	24.2%	3.0%	3.0%
There is the absence of a dedicated local or government budget to cover the operational costs in the organization.	3.0%	66.7%	21.2%	3.0%	6.1%
There is a lack of consideration and subsidizing of hidden costs such as part replacement.	15.2%	51.5%	21.2%	9.1%	3.0%
The innovation projects in the organization require high initial investment during the initial implementation of innovation.	45.5%	30.3%	15.2%	9.1%	0.0%
Poor engagement and linking with the private sector to use from internal revenue is a challenge for implementation in the organization.	36.4%	33.3%	24.2%	3.0%	3.0%

Table 4. 3 Summary of Financial Challenges (Source: Survey result 2020)

The analysis and output of the study evidenced that there is a lack of constant and sustainable sources of funding from the donor. In other words, funding availability is short-term in nature. This has been argued by 36.4% and 33.3% of respondents as strongly agree and agree respectively.

Concerning the absence of a dedicated local or government budget to cover the operational costs in the organization. The respondents positively answered by 3% and 66.7 % as strongly agree and agree respectively.

Regarding the lack of consideration and subsidizing of hidden costs such as part replacement of ICT equipment, the respondents affirmatively replied by 15.2 % and 51.5 % as strongly agree and agree respectively.

The requirement of high initial investments of innovation projects in the organization the study participants argued positively by 45.5 % and 33.3 % as strongly agree and agree respectively.

In relation to the poor engagement and linking with the private sector to use the innovation facility for internal revenue is also a challenge for the implementation of innovation projects in the organization. This is supported by 36.4 % and 33.3 % of respondents as strongly agree and agree correspondingly.

From the above analysis of financial challenges responses, all the factors mentioned are challenges however the most pertinent and existing challenges of the financial challenges were primarily is that the innovation projects in the organization require high initial investment during the implementation of innovation. This is the sole reason why innovation projects are difficult to implement in ALERT hospital and training center.

#### 4.3.3. Behavior or social context

<b>Behavior and Social Context challenges</b>	<b>Strongly Agree Frequency %</b>	<b>Agree Frequency%</b>	<b>Neutral Frequency %</b>	<b>Disagree Frequency %</b>	<b>Strongly Disagree Frequency %</b>
The low attitude of personnel exists at all levels of the system regarding the technology.	36.4%	45.5%	15.2%	3.0%	0.0%
Poor collaboration exists among implementing staff.	24.2%	21.2%	33.3%	15.2%	6.1%
Poor perception of the benefit of the technology by the beneficiaries or old way of thinking hinders the implementation.	15.2%	57.6%	15.2%	9.1%	3.0%

Table 4. 4 Summary of Behavioral and Social Context Challenges (Source: Survey result 2020)

As per the analysis result gained from the survey of selected respondents regarding the low attitude of personnel exists at all levels of the system regarding the technology. The respondents answered by 36.4% and 45.5% as strongly agree and agree consecutively.

Concerning the poor collaboration or involvement of the society or beneficiaries. The staff replied affirmatively by 24.2% and 21.2 % as strongly agree and agree respectively.

Concerning the poor collaboration or involvement of the society or beneficiaries. The staff answered by 15.2% and 57.6 % strongly agree and agree consecutively.

From these, we can find that the factors behavior and social context mentioned the low level of attitude and old way of thinking about the benefit are contributors to innovation project implementation challenges. Hence the barrier for implementing innovation project in ALERT are due to the low attitude of personnel exists at all levels of the system regarding the technology and the poor perception of the benefit of the technology by the beneficiaries or old way of thinking hinders the implementation.

#### 4.3.4. Technology

<b>Technological challenges</b>	<b>Strongly Agree Frequency %</b>	<b>Agree Frequency %</b>	<b>Neutral Frequency %</b>	<b>Disagree Frequency %</b>	<b>Strongly Disagree Frequency %</b>
There is a lack of open platforms available to use, work, and connect with several portable devices and operating platforms.	36.4%	42.4%	15.2%	3.0%	3.0%
The newness of technology makes the system user difficult to implement in the organization.	12.1%	51.5%	33.3%	3.0%	0.0%
There is a lack of the use of technological and or adopt organizational inputs from developed countries in the organization.	15.2%	39.4%	27.3%	12.1%	6.1%
There is a lack of customizable features so that the applications work by user needs and preferences in the organization.	30.3%	36.4%	24.2%	6.1%	3.0%
There is a difficulty in accepting the perceived usefulness of the technology in the organization.	12.1%	36.4%	30.3%	21.2%	0.0%

Table 4. 5 Summary of Technological Challenges (Source: Survey result 2020)

The analysis result gained from the survey study regarding the lack of open platforms available to use, work, and connect with several portable devices and operating platforms, the staff responded positively by 12.1% and 51.5% as strongly agree and agree consecutively.

Concerning the newness of technology that makes the system user difficult to implement in the organization, the participant replied affirmatively by 9% and 42.4.7 % strongly agree and agree respectively.

Coming to the lack of the luck of the use of technological and or adopt organizational inputs from developed countries in the organization the participant replied affirmatively by 15.2 % and 39.4 % as strongly agree and agree consecutively.

Coming to the lack of customizable features so that the applications work by user needs and preferences in the organization. The staff answered arguably by 30.3 % and 36.4 % as strongly agree and agree respectively.

About there is a difficulty in accepting the perceived usefulness of the technology in the organization. The staff asserted by 12.1% and 36.4% strongly agree and agree consecutively.

From these responses, no all the issues mentioned under the technology factor variable are contributors to innovation project implementation challenges however the primary technological issues are due to the platform compatibility issues and the newness of the technology.

#### 4.3.5. Stakeholders

Stakeholders challenges	Strongly Agree Frequency %	Agree Frequency %	Neutral Frequency %	Disagree Frequency%	Strongly Disagree Frequency %
unskillful and unqualified stakeholders exist in the organization.	18.2%	6.1%	24.2%	39.4%	12.1%
The level of stakeholders' engagement during implementation is low.	18.2%	57.6%	15.2%	9.1%	0.0%
There is no good coordination and communication among the stakeholders.	27.3%	45.5%	21.2%	6.1%	0.0%

Table 4.6 Summary of stakeholder Challenges (Source: Survey result 2020)

As per the analysis result gained from the survey of selected sample respondents regarding the existence of unskillful and unqualified stakeholders in the organization. The participants responded by 18.2% and 6.1% as strongly agree and agree consecutively.

Concerning the level of stakeholders' engagement during implementation is low, the staff answered affirmatively by 18.2% and 57.6% strongly agree and agree respectively.

In relation to There is no good coordination and communication among the stakeholders, the study participant positively answered by 27.3% and 35.5 % as strongly agree and agree consecutively.

From the above analyses of stakeholder challenges, we can say that the issues mentioned under stakeholder's engagement and coordination are contributors to innovation project implementation challenges. Hence the barrier to implementing innovation projects in ALERT is due to the low level of stakeholders' engagement during implementation and due to the poor coordination and communication among the stakeholders.

#### 4.3.6. Knowledge

<b>Knowledge challenges</b>	<b>Strongly Agree Frequency %</b>	<b>Agree Frequency%</b>	<b>Neutral Frequency %</b>	<b>Disagree Frequency%</b>	<b>Strongly Disagree Frequency %</b>
There is a lack of standardizing knowledge when implementing innovation.	33.3%	27.3%	27.3%	6.1%	6.1%
There are poor linking and collaboration of innovation with academic and research institutions and activities in the organization.	9.1%	42.4%	42.4%	6.1%	0.0%
There is a lack of sharing experience regarding the benefit of innovation for the public and beneficiaries.	15.2%	30.3%	33.3%	21.2%	0.0%
There is a lack of trained and skillful professionals during implementation.	15.2%	36.4%	15.2%	33.3%	0.0%
There is a lack of knowledge management practice and culture in the organization.	24.2%	27.3%	36.4%	12.1%	0.0%

Table 4.7 Summary of Knowledge Challenges (Source: Survey result 2020)

As per the result obtained from the analysis survey questioner regarding the lack of standardizing knowledge when implementing innovation. The selected staff replied favorably by 33.3% and 27.3% as strongly agree and agree consecutively.

In relation to the poor link and collaboration of innovation with academic and research. The staff supported positively as 9% and 42.4.7 % strongly agree and agree consecutively.

Coming to the lack of sharing experience regarding the benefit of innovation for the public and beneficiaries the study participant responded as 15.2 % and 30.3 % as strongly agree and agree consecutively.

Concerning the lack of trained and skillful professionals during implementation, the study participant responded by 15.2 % and 36.4 % as strongly agree and agree consecutively.

Lastly from the challenges of the knowledge factor variable. the lack of knowledge management practice and culture in the organization. The staff replied as 24.2% and 27.3% strongly agree and agree respectively.

From the above analysis of knowledge, perspective challenges all the issues mentioned are fairly contributors of innovation project implementation challenges however most of the knowledge issues was primarily due to the lack of proper practice of knowledge management of innovation projects, The main reason why technological innovation project face challenges to implement in ALERT hospital and training center concerning knowledge since there is no well-defined knowledge management framework adapted to the system.

### 4.3.7. Security

Security challenges	Strongly Agree Frequency %	Agree Frequency %	Neutral Frequency %	Disagree Frequency %	Strongly Disagree Frequency %
There is a lack of integrating standard security mechanisms to ensure the privacy and confidentiality of patients in the organization.	9.1%	39.4%	18.2%	27.3%	6.1%
There is unauthorized access to information such as the availability of records, passwords, and contents online or via email on portable devices.	18.2%	18.2%	18.2%	42.4%	3.0%

Table 4.8 Summary of Security Challenges (Source: Survey result 2020)

As per the result of analysis gained from the study respondents regarding the lack of integrating standard security mechanisms to ensure the privacy and confidentiality of patients in the organization. The participant arguable convinced as 9% and 39.4% strongly agree and agree respectively.

About the unauthorized access to information such as the availability of records, passwords, and contents online or via email on portable devices. The staff responded positively as 9.1% and 18.2% strongly agree and agree consecutively.

From these responses, all the factors mentioned under security are not contributors to innovation project implementation challenges. Hence, we can argue that the security issue is moderately the challenge for innovation in IT project implementation.

#### 4.3.8. Leadership and Governance

Leadership and Governance challenges	Strongly Agree Frequency %	Agree Frequency%	Neutral Frequency %	Disagree Frequency %	Strongly Disagree Frequency %
There is a lack of policy, regulatory framework during innovation in the organization.	9.1%	27.3%	36.4%	24.2%	3.0%
There is a lack of initiative, engagement, commitment, and involvement of organizations or governments in bodies overseeing, assisting, and regulating during implementation.	15.2%	27.3%	27.3%	30.3%	0.0%
The prevalence of political instability and governance conditions is a challenge for implementation in the organization.	15.2%	42.4%	42.4%	0.0%	0.0%

Table 4.9 Summary of Leadership and Governance Challenges (Source: Survey result 2020)

As per the result of the analysis gained from the survey of respondents' staff regarding the lack of policy, regulatory framework during innovation in the organization. The study participant affirmatively responds by 9% and 27.3% as strongly agree and agree respectively.

Concerning the lack of initiative, engagement, commitment, and involvement of organizations or governments in bodies overseeing, assisting, and regulating during implementation. The study participant convinced by 15.2% and 27.3% strongly agree and agree consecutively.

Coming to the prevalence of political instability and governance conditions is a challenge for implementation in the organization. The sample selected participants argued by 15.2 % and 42.4% as strongly agree and agree consecutively.

From the above analysis of leadership and governance challenge variable, all the factors mentioned are fewer contributors of innovation project implementation challenges except the prevalence of political instability and governance conditions is a challenge for implementation in the organization. The main reason why the innovation project is difficult to implement in

ALERT hospital and training center in relation to leadership and governance issues was the existing turbulent political situation in the country is a barrier to implement the innovation project.

#### 4.4. Summary of Challenges of implementation of innovation projects

	Challenges descriptions	5-SA	4-A	3-N	2-D	1-SD	(1+2)> 50%
1	Infrastructure	26.27%	49.50%	16.17%	7.07%	1.00%	75.77%
2	Financial	27.30%	43.02%	21.20%	5.44%	3.02%	70.32%
3	Behavior or social context	25.27%	41.43%	21.23%	9.10%	3.03%	66.70%
4	Technology	21.22%	41.22%	26.06%	9.08%	2.42%	62.44%
5	Stakeholders	21.23%	36.40%	20.20%	18.20%	4.03%	57.63%
6	Knowledge	19.40%	32.74%	30.92%	15.76%	1.22%	52.14%
7	Security	13.65%	28.80%	18.20%	34.85%	4.55%	42.45%
8	Leadership and Governance	7.90%	19.40%	21.22%	10.90%	0.60%	27.30%

Table 4. 10 Summary of All Challenges (Source: Survey result 2020)

#### 4.5. An Assessment Of Open-Ended Interview Question

##### 4.5.1. Other Challenges

Most of the challenges mentioned in an open-ended question are itemized as follows: due to the current COVID issues, the project implementations require physical proximity, isolation, and make less involvement of project implementers staff and requires restrictions and blending practical application health care service with technological innovation. The second listed challenges are the limited link between monitoring and evaluating the progress of implementation. The third most pertinent identified themes of the challenge are frequent staff turnover and organizational structure change. The fourth challenge identified is the prevailing economic inflation and macro-economic situation. The fifth listed challenge is also regarding the availability of equipment in the market. The electric power issue is also the sixth identified theme of technological innovation project implementation challenge, on the seventh rank, the conflict of interest between stakeholders is also an implementation challenge. Lastly, issues such as the lack of accessibility or disability features on the e-learning and e-health application make it difficult to be accessible by people living with a disability, the low level of computer literacy

of the users for computing device such as the use of a smartphone, the use of computer application and marginalizing the language setting of the beneficiaries are mentioned as challenges of IT project implementation in the ALERT center.

#### **4.6.Implementation Challenges Mitigation Ways**

From the in-depth qualitative interview based on the structured interview questionnaire, the thematic response is written and coded from the field note while the interview is being conducted. This means the review from the field note on the mitigation ways is articulated into an action verb. If the collated extracts for each theme by considering whether they appear on both respondents in a coherent pattern are derived into a description. As per the qualitative interview analysis of the two senior key staff of project manager and IT Director below is the summary and description themes extracted on ways to mitigate implementation challenges. The explanation is built for the above-identified challenges of technological innovation particularly IT projects for health care and training services in the ALERT center.

<b>Challenges' category</b>	<b>Mitigation ways identified themes</b>	<b>Description of Themes</b>	<b>Reference Total</b>
Infrastructure	Increase network coverage	Link each workstation and office via network cable connectivity and Wireless network.	2
Financial	Income-generating mechanism	Use the innovation facility for income-generating mechanisms but not all the innovation facility.	2
	Allocate local budget.	-Search for another donor to cover other operational costs. -At the end of each planning year the organization should plan the local budget to cover some operational and hidden costs but it is limited.	1
	Initial investment	Searching for other donors to cover part of the initial investment cost.	1
Behavioral and Social context	Increase Collaboration	-There is a regular meeting for implementing staff organized by the project manager and other department heads. -There is organizational support so that the project teams are motivated to work.	2
	Attitude	-Show evidence about the benefit of technology. -Employing young implementing staff who are motivated to understand the benefit of technology.	2
Technology	Increase interoperability	Implement easily interoperable systems such as technological platforms co-exist only specific to the health system.	1
	Adopt input	-Select, evaluate and adopt other developing similar industry or organization innovative technology implementation practice. -Adopt technology that is already selected by the implementing partner.	1
	Localization	The organization uses all available local ICT technological infrastructure such as national service provider services of SMS, internet, and Woredanet technologies.	1
Stakeholders	Improve engagement	The organization is using project status communication such as conducting a regular meeting.	2

	Increase collaboration	Actively involve stakeholders in the implementation phase of the innovation project.	1
	Improve stakeholder's qualification	Actively engage skilled and qualified stakeholders.	1
Knowledge	Adopt standards	Identify, select, evaluate and adopt standard knowledge of implementation technology during project implementations of local.	2
	Increase research activities	Twin the project initiatives with that of locally academic initiatives to increase the efficiency of technology utilization.	2
Security	Standard	Implementing appropriating information security features To ensure the privacy and confidentiality of patients', learners' data in the organization.	1
	Prevent Unauthorized access	Sufficient user privilege is given to use the security devices, passwords, and access mechanism	1
	Improve early detection	There are security mechanisms and systems that prevent and early detect security threats.	1
Leadership and Governance	Policy	There is an organizational policy, implementation guideline that aligns with national objectives, and regulatory framework when implementing the projects.	2
	Support	The organization actively supervises and shows commitment towards meeting the project objective by aligning with the national strategic health transformation plan.	2
	Political	There are political advocacy and public relation activity towards digitalizing the health and training service under the bigger picture of the ministry of health digital health initiative and ministry of innovation direction.	2
	Partnership	Partnership for Public Service with nonprofit, private organizations by inspiring new and innovative ways implementing innovative technological projects.	2

Table 4. 11 Summary of Challenges Mitiation ways (Source : Qualitative Interview 2020)

#### 4.6.1. Reliability Test

Challenge Items	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Financial	0.636	0.615	5
Infrastructure	0.619	0.617	3
Knowledge	0.627	0.630	5
Security	0.616	0.621	3
Leadership and Governance	0.805	0.824	3
Technology	0.662	0.650	5
Behavior	0.616	0.621	3
Stakeholders	0.651	0.686	3

Table 4. 12 Summary of Test of Reliability (Source: Survey result 2020)

Since the value of Cronbach alpha of SPSS output is between 0.6 to 0.7, we can say that the response is reliable if the study is repeated.

## **CHAPTER FIVE**

### **5. DISCUSSION OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS**

#### **5.1.Introduction**

The study is aimed at assessing the challenges of implementing the technological innovation projects in ALERT hospital and training center, through adopting a mixed research approach. Accordingly, this chapter presents the conclusions drawn from the results of the analysis of the data collected through SPSS statistical package techniques and then make recommendations and further study area that needs to be explored in the future.

#### **5.2. Discussion and Major Findings**

##### **5.2.1. Challenges of Implementation**

According to the objective of the study, a mixed research approach was employed. That means the research design has employed the below techniques: A self-administered survey questionnaires distributed to 33 employees of the ALERT hospital and training center. An open-ended question is also included to list other or additional challenges of implementing IT projects that were not included in the instrument. Although the ALERT center has implemented IT projects for health care and training services since the year 2012, the rate at which the technology is being implemented and utilized seems to be slow. Even though various benefits that e-health and e-learning systems bring to the nation, hospitals, training centers, and individuals, it has also been a challenge until now. The factors variables as discussed in this project work show that there are eight groups as a challenge of technological innovation (IT) project implementation. Among the eight factors the study identified only infrastructure, financial, behavioral, knowledge, leadership, and governance, and stakeholders are challenges of IT Project implementation.

The results of the study conducted evidenced that infrastructure challenge has been identified as main challenges of implementation particularly the poor ICT infrastructure in terms of quality, up-to-datedness, and the lesser distribution or equitable access to infrastructure. Of course, the issue of investment is also a challenge from an infrastructure perspective due to the absence of long-term financial viability.

The second highest-rated challenge concerning implementing IT projects in the ALERT center for health care and training services is the challenges of financial. Under this imperative, the most critical ranked and agreed challenges under financial is the requirement of high initial investment during the initial implementation of innovation projects. The next agreed challenges under the financial dimension are the lack of engagement and poor linking with the private sector's lack of sustainable sources of funding from the donor. Lastly, the absence of a dedicated local or government budget to cover the operational and hidden costs are the equivalently rated issues from financial constraints.

The third-ranked challenges that the study identified are from the perspective of behavioral and social context. Under this imperative, the issues of the low attitude of personnel the organization currently employing a project staff that are motivated and young enough to understand the benefit of the technology.

On the other hand, the implementation challenges variable factor of technology, knowledge, and stakeholders are found to be the fourth, fifth, and sixth-ranked respectively. Under technology, the low level of interoperability of the technology is the most agreed issue. The next agreed issues under technology are the lack of customizable features so that the applications work by user needs and preferences makes it difficult to implement. The newness of technology makes the system user difficult to implement in the organization. Lastly, the lack of the use of technological and adopt organizational inputs from developed countries is an agreed challenge under technology.

In relation to stakeholders' challenges variable factor, the low level of stakeholders' engagement during implementation, and the poor coordination and communication among the stakeholders are the issues that are agreed as an issue.

Finally, in relation to the knowledge challenges standardizing the knowledge of technology is a critical concern i.e. there is a lack of standardizing knowledge when implementing innovative IT projects. Besides the poor linking of project activity with academic and research institutions, and the lack of knowledge management culture in the organization are also the last agreed concern under knowledge.

According to the finding of qualitative analysis of the open-ended question, the study identified that the contemporary issues of COVID, staff turn-over, monitoring and evaluating, electric power availability, conflict of interest between stakeholders, accessibility and language, computer literacy level of user and beneficiaries are also a barrier for technological innovation (IT) project implementation.

### **5.2.2. Challenges Mitigation Ways**

Implementation challenges of infrastructure for instance the issue of infrastructure quality the study did not investigate any current practice of improving the quality of infrastructure. However, the study identified that due to the increasing nature of the staff, offices, the new building currently the organization increasing network coverage of ICT infrastructure can be by interlinking each workstation and office via network cable connectivity and wireless network. Concerning minimize the initial investment the is there is no current practice of minimizing the initial investment cost of the ICT infrastructure.

The current practice for alleviating the barrier for finance is by searching for other donors to cover part of the initial investment cost and other operational and hidden costs. Besides, the study identified that by using the innovation facilities for generating revenue the organization is trying to link the new private medical care facility to use the innovative technology facility. Allocation of the local budget, the result shows that there is limited budget allocation practice of covering the hidden cost or subsidizing and allocating for operational cost. The study did identify any current practice of mitigating the challenges about the sustainability of funding sources.

The third-ranked challenges that the study identified are from the perspective of behavioral and social context. To increase the collaboration of staff, there is a regular meeting for implementing staff organized by the project manager and other department heads and there is strong organizational support so that project teams are motivated to work. Regarding the themes of the low attitude of personnel the organization currently employing a project and shows staff who are young enough to understand the benefit of technology.

ALERT hospital and training center considers the technology pace of change given the fact that technology becomes obsolete the more time goes. Implement easily interoperable systems such as open-source technological platforms only specific and limited to the health system. On the

other hand, the organization is selecting, evaluating, and adopt other similar industry or organization innovative technology implementation practice and the technology that is already selected by the implementing partner. Besides the organization uses all available local ICT technological infrastructure such as national service provider services of SMS, internet, and WoredaNet technologies. The study did not identify the issues of the mitigation ways for usefulness, newness, and customizability features technology aspect.

In order to address the issues of stakeholders, the organization is practicing activities such as using project status communication at a regular meeting, actively involve stakeholders in the implementation phase of the innovation project, and involve skilled and qualified stakeholders only during implementation.

Finally, the challenges in relation to knowledge currently mitigated by identifying, selecting, evaluating, and adopting standard knowledge of local technology during project implementations. On the other hand, twinning, the project initiatives with that of local academic and research initiatives are currently practiced on a limited basis. The study did not identify any themes regarding the use of a knowledge framework to transfer knowledge or knowledge management system during project implementation.

Finally coming to governance and leadership, the study investigated that there is an organizational policy, implementation guideline that aligns with national objectives, and regulatory framework when implementing IT projects. Besides the organization actively supervise and shows strong engagement towards meeting the project objective by aligning with the national strategic health transformation plan. There is also political advocacy and public relation activity towards digitalizing the health and training service under the bigger picture of the ministry of health digital health and ministry of innovation technology direction irrespective of the turbulent nature of the political situation. The study identified a new theme in addition to what has been stated in the framework is that there are leadership and government initiatives that promote partnership for public service with a nonprofit organization (NGO) and private organization by inspiring new and innovative ways implementing technologically innovative projects.

### 5.3. Conclusions

The project implementation challenges factors absence governs the success of the technological innovation project implementation in ALERT hospital and training center. In other words, the presence of challenges factor leads the IT projects implemented in a state of failure. Hence, we can argue that the six-challenge factor variable listed under the findings (i.e. Infrastructure, financial, behavioral, and social context, stakeholder, and knowledge) are barriers or disablers for successful implementation of IT projects in ALERT hospital and training center.

As the prevalence of challenges can cause failure, mitigating the challenges results in success in the implementation process. Hence, based on the above section of discussion of the major findings, it can conclude that: -

Technological innovation project implementation challenges factors such as (Infrastructure, financial, behavior or social context, technology, stakeholders, and knowledge are found the critical challenges factors of the technological innovation (IT) project implementation in ALERT Hospital and training center. Only security and leadership and governance are not much emphasized barriers or challenges in this study.

Concerning infrastructural challenges, the study identified and concluded that the quality, coverage, and investment of infrastructure are issues of such challenges. In relation to the financial investment cost, linking with the private sector and sustainability of funding, operational and hidden cost subsidy are found issues in financial challenges in the order of the severity. The behavior and social context also found significant challenges. That means the attitude of personnel and the perception of system users are also found significant challenges. Regarding the technology, perspective challenges the issues of interoperability, newness, customizability, level of acceptance are also the barriers from a technology perspective in their order of magnitude of the severity of challenges. The issue of localization is not a concern under technological challenges. The issues of stakeholders' engagement and coordination or communication are the barrier concern under the stakeholder challenge dimension. Finally, the knowledge dimension of challenges supported that the issue of standardizing, research link, absence of experience sharing practice, and knowledge transfer are issues that hinder implementing innovation projects in their respective of the magnitude of prevalence.

Regarding the challenge's mitigation ways, the study identified based on the qualitative study that there is a good practice of mitigating the challenges of security and leadership and governance factors. Besides their additional practice of such as considering the issues of early security threat detection and partnership imitative of leadership and governance with the non-profit organization, civil society and private organization during implementation of IT projects.

#### **5.4.Recommendations**

The implementation challenges for technological innovation (IT) project factors may vary based on the project size, nature of innovation project type, and internal and external environment situation in which the project is implemented. As per the findings and conclusion from the analysis of the study, the following recommendations were forwarded.

To mitigate infrastructural challenges, the organization's department particularly the ALERT IT department should work to improve the quality and coverage of ICT infrastructure by upgrading the back-bone network connectivity using up-to-date connectivity links such as fiber. Besides installing a central data center facility that is equipped with adequate ICT infrastructure and searching for an alternative cost-effective to minimize initial investment.

The project challenges factors such as finance can be addressed by searching and alternative and cost-effective technological investment to solve the requirement of the high initial investment. The internal budget allocation limit for covering some operational and hidden costs should be increased. Above all ALERT center which is the owner of the project, should ensure the sustainability of financial and funding sources. This is also accompanied by integrating the issues of sustainability at the initial phase of the project initiation. The issues of financial sustainability should not be thought at the end of the project or during project close-out. Rather all stakeholders that have financial concerns should have to develop the sense of "begin with the end in mind" from the inception of the project phase, design, implementation, and closure.

Not only the ALERT center but also concerned stakeholders should themselves engaged in increasing the awareness regarding the benefit of the technology to mitigate the challenges from the behavior and social perspective. Since although there is the practice of mitigating but still it is not enough. One best way that such challenges can be mitigated is to prepare a hands-on technology workshop and training and prepare a manual.

In order to address the issues of stakeholders, the organization should leverage communication and collaboration. The level of stakeholders' engagement and mitigating conflict of interest can be enhanced by establishing appropriate communication mechanisms such as email, regular project status reports, and creating a common platform for managing the progress of project implementation. One mechanism that this can be achieved is with the use of project management software such as Jira online communication of project management platform. Devising such mechanisms can also avoid and reduce the conflict of interest among stakeholders.

The organization should involve benchmarking other international industry standards. i.e. considering other countries' practice. Linking the project activity with international research and academic intuition can also be considered as one option of solving the challenges in relation to knowledge. The link should not only be limited to local institutions. Last but not least the organization should also adopt a knowledge management framework as an integral component of project management to ensure the transfer of knowledge. For instance, implementing a knowledge management system makes sustainable the skill and knowledge transfer even if a key project implementing staff leaves.

Finally concerning the electric power issues ALERT center should increase the accessibility of a stand-by generator not only for hospital facilities but also for IT project sites and the progress of the technological innovation project should be monitored and evaluated as on-going progress.

### **5.5.The Direction of Future Work**

This project work is limited to project implementation challenges for Technological innovation projects particularly IT projects for health care and training services. Some of the suggested future work should be tailored to studies such as the contemporary effects of issues of COVID on project implementation should further be investigated. Since the challenge factor of security, leadership and governance are not that much over-emphasized factor variable in this study. This is due to the fact that the current initiative of the government promotes the technological innovation project. However further issues of security and leadership and governance should be explored using rigorous review and be studied in another study setting.

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# APPENDICES

**Appendix I – List of literature evidence Challenges of technological innovation (IT) project for Health Care and Training Services**

<b>Challenges</b>	<b>Description</b>	<b>Literature Sources</b>
<b>Financial</b>		
Funding	Lack of constant and a sustainable source of funding from a donor. Or Funding is short-term.	Arni et al., 2017; Aregawi, 2015; Butler,1999
Operational Cost	Absence of local or government budget to cover the operational cost.	Arni et al., 2017
Hidden cost subsidy	Poor consideration and subsidizing of hidden cost such as part replacement	Wittet2012; Arni et al., 2017; Aregawi, 2015
Initial investment	The requirement of high initial investment during the initial implementation of innovation.	Murad et al.,2009
Private Sector	Poor engagement and linking with the private sector to use from internal revenue.	Aregawi, 2015
<b>Infrastructure</b>		
Quality	Poor, underdeveloped, unavailability of quality, and lack up-to-date infrastructure.	Arni et al., 2017; Aregawi, 2015; Asemahagn,2015
Coverage	Limited distribution or equitable access to infrastructure such as the internet, Wi-Fi, Cellular network coverage	Arnaut al., 2017; Aregawi, 2015; Asemahagn,2015
Investment	lack of investment in infrastructure, an absence of long-term financial viability	Arni et al., 2017; Braun et al. 2013

<b>Knowledge</b>		
Standardizing	lack of standardized knowledge when designing and implementing.	Arni et al, 2017; Vesel et al. 2015; Elshalom ,2019; Elshalom, 2019
Research	Lack of linking and collaboration of innovation with academic and research institutions and activities.	Arni et al, 2017
Experience sharing	Luck of integrating evidenced-based initiative and sharing experience regarding the benefit of innovation for public and beneficiaries.	Arni et al, 2017; Aregawi, 2015
Skill	Luck of trained and Skillful professional during implementation.	Arni et al, 2017; Aregawi, 2015
Knowledge transfer	Luck of knowledge and skill management practice and culture.	Aregawi, 2015; Elshalom ,2019; Elshalom ,2019
<b>Leadership and Governance</b>		
Policy	Luck of policy, regulatory framework during innovation.	Arni et al, 2017, Hewan ,2015; Robel, 2013
Support	Luck of initiative, engagement, commitment, and involvement of organization or government in bodies overseeing, assisting, and regulating during implementation.	Arni et al, 2017, Murad et al 2017, Aregawi, 2015; Hewan,2015; Yenework 2017; Yonas,2019; Robel ,2013
Political Stability	Prevalence of political instability and governance conditions.	Murad et al, 2015; Robel, 2013

<b>Privacy and Security</b>		
Standardization	Lack integrating standard security mechanisms to ensure the privacy and confidentiality of patients.	Arni et al ,2017; Gleason 2015; Robel, 2013
Unauthorized access	unauthorized access to information such as availability of records, passwords, and contents online or via email on portable devices.	Arni et al, 2017; Olla and Shimske, 2015
<b>Technological</b>		
Interoperability	The lack of open platform available to use, work, and connect with several portable device and operating platform.	Arni et al., 2017; Kalkov et al. ,2012
Newness	The newness of technology makes it the system user difficult to implement	Arni, 2017; Zapata et al, 2005
Localization	In a real sense, innovation is often born out of the blending of indigenous knowledge with technological and organizational inputs from developed countries	Murad, 2017; Jean-Eric Aubert. 2004
Customizability	The lack of customizable feature so that the applications works by user needs and preferences	Arni, 2017; Zapata et al, 2005
Acceptance	Difficulty in accepting the perceived use of technology	Harry,2015; Yonas,2019; Sandra ;2014

<b>Behavioral</b>		
Attitude	The low attitude of personnel at all levels of the system regarding the technology.	Arni et al., 2017; Aregawi, 2019
Collaboration	Poor collaboration among the implementing staff and stakeholders	Arni et al., 2017
Perception	Poor perception of the benefit of the technology by the beneficiaries or old way of thinking.	Arni et al., 2017
<b>Stakeholder</b>		
Qualification	Lack of skillful and qualified and knowledgeable stakeholders	Harry,2015
Engagement	Poor level of stakeholders' engagement during implementation	Harry ,2015; Salifu et al.,2014; Sandra ,2014
Coordination	Lack of good coordination and communication among the stakeholders	Hewan, 2015

## Appendix II – Survey Questionnaire

**Addis Ababa University, School of commerce**

**Department of Project Management, MAPM Program**

Dear Study Participant.

Thank you for your interest to participate in this study. My name is Andualem Aklilu (MSc), and I am a postgraduate student at Addis Ababa University, School of Commerce. Mob.: +251911628955, email: [andualem.aklilu@gmail.com](mailto:andualem.aklilu@gmail.com), I am conducting a study on the area of implementation challenges of technological innovation projects on the particular case the use ICT for healthcare and training services area as partial fulfillment of Masters of Art in Project Management.

In this study, you don't need to identify yourself for the sake of ethical issues. The response you provide will be the primary data for this study assuming that your honest and transparent answers will add greatly to the accuracy of the results of this report. I would like to ask you to politely and patiently complete this questionnaire, as concisely as possible. The responses you give will be kept confidential.

The purpose of this study is:

- The overall objective of the project work to examine the implementation challenges of innovative IT projects for health and training services. By doing so the study result provide a recommendation on how to better understand the best practice of innovation in IT project for health care and training service for an organization like ALERT hospital and training center in Ethiopia is managed.

The interview has three sections.

- *Section 1: General and demographic question.*
- *Section 2: Survey questions on implementation challenges of IT Project for health and training services.*
- *Section 3: Open-Ended questions*

Thank you again for participating in this study.

**General Instruction**

- You don't need to write your name or identity.
- Write "X" mark or in a circle your preference
- For section three i.e. for open-ended i.e. provides a brief and concise answer.

**Section one: Demographics and General Questions**

- **Demographic characteristics**

- 1) Sex: Male  Female
- 2) Age: Below 25 , 26-35 , 36-45 , above 46-50 , above 50
- 3) Level of Education PHD  MSc / MA / MBA  BSc/BA  Diploma  High School completed  If other, please specify \_\_\_\_\_
- 4) Field of Study (Eg. Computer Science, IT, Medicine, Public Health, Accounting, etc....) ---  
\_\_\_\_\_
- 5) Current position in you organization, Project manager  Project Member  Project Coordinator  Support Staff , Administrative Staff , other supporting staff from stakeholder  Specify if others \_\_\_\_\_
- 6) Years of experience in this organization preferably related projects \_\_\_\_\_

**Section two: implementation challenges questions.**

Based on your experience in the ALERT about the technological innovation project particularly the use of ICT for health care and training services, please provide to the extent in which the following list of challenges of implementation that are constraint or barrier in your organization. Please use the following reference.

**(Put X mark on the corresponding column of 5 if you Strongly Agree, 4 if you Agree, 3 if you are Neutral, 2 if you Disagree, 1 if you Strongly Disagree).**

Challenges Description		Response Scale				
		5	4	3	2	1
<b>No</b>	<b>Financial</b>					
1	There is a lack of constant and sustainable sources of funding from the donor. Or Funding is short-term in the organization.					
2	There is the absence of a dedicated local or government budget to cover the operational costs in the organization.					
3	There is a lack of consideration and subsidizing of hidden costs such as part replacement.					

4	The innovation projects in the organization require high initial investment during the initial implementation of innovation.					
5	Poor engagement and linking with the private sector to use from internal revenue is a challenge for implementation in the organization.					
	<b>Infrastructure</b>					
1	There is poor ICT infrastructure in terms of quality, up-to-dateness.					
2	Limited distribution or equitable access to infrastructure such as the internet, Wi-Fi, Cellular network coverage exists in the organization.					
3	There is a lack of investment in infrastructure or the absence of long-term financial viability.					
	<b>Knowledge</b>					
1	There is a lack of standardizing knowledge when implementing innovation.					
2	There are poor linking and collaboration of innovation with academic and research institutions and activities in the organization.					
3	There is a lack of sharing experience regarding the benefit of innovation for the public and beneficiaries.					
4	There is a lack of trained and skillful professionals during implementation.					
5	There is a lack of knowledge management practice and culture in the organization.					
	<b>Leadership and Governance</b>					
1	There is a lack of policy, regulatory framework during innovation in the organization.					
2	There is a lack of initiative, engagement, commitment, and involvement of organizations or governments in bodies overseeing, assisting, and regulating during implementation.					
3	The prevalence of political instability and governance conditions is a challenge for implementation in the organization.					
	<b>Privacy and Security</b>					
1	There is a lack of integrating standard security mechanisms to ensure the privacy and confidentiality of patients in the organization.					

2	There is unauthorized access to information such as the availability of records, passwords, and contents online or via email on portable devices.					
<b>Technological</b>						
1	There is a lack of open platforms available to use, work, and connect with several portable devices and operating platforms.					
2	The newness of technology makes the system user difficult to implement in the organization.					
3	There is the lack of the use of technological and or adopt organizational inputs from developed countries in the organization.					
4	There is a lack of customizable features so that the applications work by user needs and preferences in the organization.					
5	There is a difficulty in accepting the perceived usefulness of the technology in the organization.					
<b>Behavioral</b>						
1	The low attitude of personnel exists at all levels of the system regarding the technology.					
2	Poor collaboration exists among implementing staff.					
3	Poor perception of the benefit of the technology by the beneficiaries or old way of thinking hinders the implementation.					
<b>Stakeholder</b>						
1	unskillful and unqualified stakeholders exist in the organization.					
2	The level of stakeholders' engagement during implementation is low.					
3	There is no good coordination and communication among the stakeholders.					

**Section three:** Open-ended question.

1) Please list or describe any other challenges that are not listed in the above question

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

-----**Thank you very much for taking your time**-----

### **Appendix III Guiding Key Project staff interview question**

1. How do you overcome the Infrastructural Challenges of IT projects implementation in relation in terms of quality coverage and investment? If there are other aspects of the infrastructural challenge how do you address them?
2. How do you overcome the financial challenges of IT projects implementation in relation to funding availability, operational cost, hidden cost subsidy, initial investment, and private sector linkage? If there are other aspects of financial challenges how is your organization address them?
3. How do you solve the behavioral challenges of IT projects implementation in relation to the issues of attitude, collaboration, and perception of the implementing staff? If there are other aspects of behavioral and social context barriers how is your organization handle them?
4. How do you solve the technological challenges of IT project implementation concerning the issues of Interoperability, newness, localization, customizability, and user acceptance? If there are other aspects of technology barriers for implementation how is your organization handle them?
5. How do you mitigate the knowledge challenges of IT project implementation in relation to the issues of standardizing, research linkage, experience sharing, skill, and knowledge transfer? If there are other aspects of technology barriers for implementation how is your organization handle them?
6. How do you solve the stakeholders' challenges of IT project implementation in relation to qualification, engagement, and coordination? If there are other aspects of stakeholders' challenges how is your organization mitigate them?
7. How do you solve the security challenges of IT project implementation in relation to the issues of standardization and unauthorized access? If there are other aspects of security challenges for implementation how is your organization handle them?
8. How do you solve the leadership and governance challenges of IT projects implementation in relation to the issues of policy, support, and politics? If there are other aspects of governance and leadership barriers how is your organization handle them?

**Appendix IV – Supporting Letter for Research Ethics**



አዲስ አበባ ዩኒቨርሲቲ በ.ብ.ህ.ሰ. አ.ኮ.ም.ኪ.ሰ. ኮ.ሪ.ጅ.  
የጥገና ሥራ ት/ቤት  
ADDIS ABABA UNIVERSITY  
College of Business and Economics (CoBE)  
SCHOOL OF COMMERCE

Date Dec 7, 2020  
Ref/ No Dis/0017/2020

**To: - Whom It May Concern**

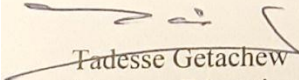
The Addis Ababa University School of Commerce currently runs five Masters level programs and one Doctoral Program: Human Resource Management (MA), Project Management (MA), Marketing Management (MA), Supply Chain and Logistics Management (MA), Business Leadership (MA, PhD) In addition to this, the School is also Preparing itself to launch some more expedient Programs very soon.

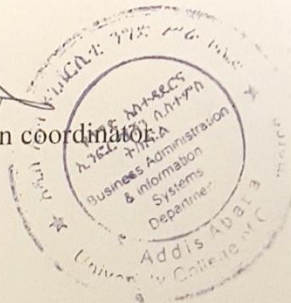
As an immediate and direct stakeholder to this socioeconomically pragmatic move, we would like you to cooperate with us by way of assisting our students to conduct academic researches and case analyses in your organization. As such, we kindly request your esteemed organization to provide student Name Andwalem Akwid ID No. GSD/0361/10 With information pertaining to implementation of ALERT Hospital & training center Challenges of technological innovation project: Case II project

A copy of the paper produced may be provided to you if so demanded.

Thanking for your earnest Cooperation, we remain

Sincerely Yours

  
Tadesse Getachew  
Distance Education coordinator



Dec-22-2020

ALERT Center  
Addis Ababa

Subject: Request for permission to conduct research.

I am currently pursuing MA. in Project Management in Addis Ababa University. As a part of partial fulfilment for the award of my Master's degree the thesis proposal was accepted by the School of Commerce. The title of the research is "Challenges of technological innovation project implementation: Case of IT projects for health care and training services in ALERT hospital and training center". Hence in this letter I would like to request your esteemed organization to provide me a permission to conduct a study on the selected area. I have attached letter of request for cooperation from Addis Ababa University.

Thank you in advance for considering my request.

Thank you,



Andualem Aklilu (MSc.)

CC: TDA  
IcT

DICT 9/14  
ምዕራፍ 7ኛው ክፍል  
የፕሮጀክት ማስፈጸሚያ  
አካል  
14/10/20

