ADDIS ABABA UNIVERSITY

COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCE

SCHOOL OF INFORMATION SCIENCE

Proposing Information System Adoption Framework for Effective Educational Service Delivery: The Case of Addis Ababa Tegbareid Polly Technique College

By

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Declaration

I, the undersigned, hereby declare that this thesis titled **"Proposing Information System Adoption Framework for Effective Educational Service Delivery: The Case of Addis Ababa Tegbareid Polly Technique College",** is my original work carried out under the supervision of Dr. Million Meshesha. This thesis is my original work and that it has not been submitted partially; or in full, by any other person for an award of a degree in any other university/institution and that all sources of materials used for the thesis have been properly acknowledged.

Candidate: TewodrosBelew

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This is to certify that the above declaration made by the candidate is correct to the best of my knowledge.

Advisor

Name of Advisor _____

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Date _____

Abstract

Information System (IS) is a critical asset for higher education institutions and support institutional strategic objectives. In developing countries where higher education is fraught with serious challenges at multiple levels, there is increasing pressure to ensure that a best information system adoption should be put in place in the context of educational needs. It is necessary for IS adoption to consider several important aspects, such as the direction of technological development in accordance with the strategic plan. The objective of this study is to propose information system adoption framework that enhances the effectiveness of IS for educational service delivery by Addis Ababa Tegebareid Polly Technique College. This study, however, only focuses on the two aspects of IS adoption; the effective educational service delivery and use of IS.

In order to find answers to the research questions, the study follows Design Science Research Methodology (DSRM). Interview, direct observation and questionnaire were employed in order to get information on the current practice of education IS adoption in AATPTC. Accordingly, the findings of the study shows that the organization is not implemented information system in suitable manner, and the IS adoption critical failure factors are identified and described in to three theoretical models: environmental theme, organizational theme and technological theme which are used in designing the proposed framework.

The study found that the current education IS adoption should be modeled to include the vital IS adoption framework. Policy, awareness, skill, resources, user involvement and top management support were suggested to improve the current education IS adoption practice.

Finally, the proposed education IS adoption framework were demonstrated and evaluated in terms of component's completeness, comprehensiveness and fitness to the organization through an evaluation questionnaire and expert interview. Accordingly, the framework has a 92.8% overall satisfaction.

Key words: *IS use, IS adoption framework, IS adoption for Educational service delivery*

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"All things were made by him: and without him was made nothing that was made."

John 1:3

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Acronyms

AATPTC	Addis Ababa Tegbareid Polly Technique College
DOI	Diffusion of innovation
DSRM	Design Science Research Methodology
ICT	Information Communication Technology
ICIS	International Conference on Information Systems
IS	Information System
IT	Information Technology
RFP	Request for Proposal
SLT	Strategic Leadership Team
TAM	Technology Acceptance Model
TOE	Technology Organization Environment
TVET	Technical and Vocational Education and Training

Chapter One

Introduction

1.1. Background

Information systems (IS) are defined as the complementary networks of hardware and software that organizations use to collect, filter, process, create, and distribute information. IS aims to support operations, management and decision making. In a broad sense, the term is used to refer not only to the (ICT) that organizations use, but also to the way in which employees interact with each other seeking to support business processes (Sharpe, 2013).

The term information system is widely used in the whole world today. Businessdictionary.com, (2009) defines information systems as "A combination of hardware, software, infrastructure and trained personnel organized to facilitate planning, controlling, coordination, and decision making in an organization." Management information systems have been in existence since 1960s when the mainframe computer began being used significantly in automating information based activities at large co-operations, the first MIS however was not very useful due to the equipment shortcomings and lack of computer literacy towards the intended users (Debrabander & Edström, 1977).

Today information systems are generally being used to generate routine reports for functional areas of a business for the success of a specific IS implementation the basic framework towards innovating, adopting and implementing. IS should be coherent so as to get the intended benefit and reduce failure (Choi, Kim, & Kim, 2011).

Ouma, Marlien, Herselman and Greunen (2009) explained that "developed countries have embraced the use of information system within the universities and colleges. A few examples of the use of IS include computerization of student records, electronic scheduling for annual programs, use of the Internet for the purposes of communication and grade release."

Ouma et al (2009) stated that, "the quality of education information is essential to all. The factors that are of significance in the provision of quality education System include timeliness, student centeredness, efficiency, effectiveness, equity and safety.

As Ethiopian government outlined in the Ethiopia Vision, provision of education is key to achieving the millennium development goals. Information Technology has been identified as one of the pillars that will help Ethiopia achieve its millennium development goal. The

Ministry of Education has identified ICT as one of its reform strategy to ensure effectively support service delivery.

Successful IS adoption deals with how well a system is adopted, and how it fits the required specification and fulfills the expectations of the stakeholders in an organization, including the ongoing benefit of using a system over expected periods of time (Debrabander_&_Edström, 1977).

Jones (2007) the challenges in IS adoption are organizational and technological difficulties. The identified four main categories of technological difficulties such as; interface usability, information fragmentation, task-technology misfit, and email overload.

Tegbareidpolly technique colleges' education system faces a challenge in understaffing of teaching staff, lack of knowledge to be active on the usage of information system and late reporting and inadequate integration between departments. The adoption of information system has shown to improve businesses performance since ICT is known as a tool that improves business competitiveness (Niang, 2009). Hence, this study focuses on the adoption of information system in Addis Ababa Tegbareidpolly technique colleges and set the direction to prepare an Effective education service delivery framework.

1.2. Statement of the Problem

In recent years, the pace of the advancement of society has been enhanced by uninterrupted growth in the spread of information and communication technologies and in ICT uptake by citizens, enterprises, and public organizations, as well as the increasing role of information in all spheres of life(Ziemba_&_Ziemba, 2017). Since Information system (IS) has the power to connect communities, share information and support economic development, Addis Ababa Tegbareidpolly technique colleges tried to sustain the use of IS and, make the development of information and communications technology one of its strategic priorities. But, to support IS applications the college did not establish IS development and capacity building center within the institution.

The TVET Agency has launched a series of high profile projects. Various technical and vocational institutions also launched several applications including a national web portal. To get an overall importance the college invested on different kind of technology, but the report of TVET Agency (2009), stated that the technology is not utilized by its intended users and it

cannot provide its intended use and still behind to use the IS infrastructure properly. Since IS has significant role in organizations success, Addis Ababa Tegbareidpolly technique colleges has to pay more attention to Information System implementation to be advantageous in teaching and learning process.

As the report of TVET Agency (2009), the problem observed with the current practice is critical. And we can start from the problem that comes from the loss of management control over the system. In the case of absence of a good management, every worker including teachers and students cannot share knowledge, important documents and files through the outlined network. There is a network with no user. Every member's should get the reliable information about college pedagogical and academic production but there is no management that facilitates the service. The most common problem recorded was that of "readiness for change". As the report of AATPTC (2011), all employees are not well trained on the system in order to prevent underutilization of the system. Also managers did not understand the implication of the system and the changes it will cause. If managers are not in agreement or cooperation, then there will be no "eagerness" or buy-in and this may result in resistance to change or lack of effective adoption of the new system (Davenport, 2000). On the other side the documents of AATPTC (2008), showed that there is a lack of integrating a New Technologies in staff members including students. Almost all members of the college are not interested to use the technology that is applied in the colleges. Because, somehow workers and students needs the easy and old technologies which are adapted and they do not want to lose their time in knowing new things. So, new technologies will remain without users.

There are works done elsewhere to explore the problem Filip (2017) build a platform to create modern information systems. There are several critical aspects, both the technical and non-technical, which should be taken into consideration. Also John (2015) attempted to identify the significant factors influencing the information technology adoption among faculty members.

Nebiyu, (2010) explores the general nature of Hawassa University IS innovation adoption and diffusion so as to show the different external and internal determinants of ICT use and utilization academic staff. Both researchers tried to solve the problem by creating a model and identify the problem.

The researcher has also recommended that a common framework and policies has to be prepared for IS adoption at national level as such a further investigation on IS at all government and non-governmental level is needed in order to provide best solution and a comprehensive framework in this area. Hence, this study has taken this as an input, and infers the Adoption and use of IS services in an eco-friendly manner is an important issue that needs further study.

Addis Ababa Tegebareid Polly Technique College is among the largest Educational institution in the country. It has made it clear that the use of IS is imperative to the organization's success. Hence much is being invested in IT there is a need to improve information and communication exchange in the campuses in order to accelerate knowledge diffusion and increase access to information. The adoption of information system has shown to improve businesses performance since IS is known as a tool that improves business competitiveness (Niang 2009). Hence proposing Information System adoption framework for effective educational service delivery in Addis Ababa Tegbareid polly Technique College is needed.

To address the aforementioned problem, this research has set out the below research questions for investigation and find a solution.

- ✓ How suitable is the current information system adoption for educational service delivery system in Tegbareid Polly Technique College?
- ✓ What are the challenges affecting the adoption of IS in Tegbareidepolly technique College?
- ✓ What information system (IS) adoption is suitable to enhance education service delivery?

1.3. Objective of the Study

1.3.1. General Objective

The general objective of this study is to propose information system adoption framework that enhances the effectiveness of IS for AATPTC educational service delivery.

1.3.2. Specific Objectives

To achieve the general objective of the study the following specific objectives are formulated.

- ✓ To show the suitability of current IS adoption for educational service delivery in Addis Ababa Tegbareid Polly Technique College.
- ✓ To identify the IS adoption critical failure factors in Addis Abeba Tegbareide polly technique College.
- ✓ To propose a framework for effective IS adoption to enhance education service delivery.
- ✓ To evaluate user acceptance of the proposed framework.

1.4. Scope and Limitation of the Study

The working definition of education information systems adoption in this thesis is the acceptance or the use or the adoption of information systems for educational service delivery. It is the linking of education service delivery with information system for effective and easy learning teaching process in an organization. Also explains how well education services are delivery to the student and open for public by the means of information system. Successful IS adoption as mentioned in the background section is a very broad concept. It deals with how well a system is adopted, and how it fits the required specification and fulfills the expectations of the stakeholders in an organization, including the ongoing benefit of using a system over expected periods of time. However, the scope of this study is limited to proposing education IS adoption framework that can address the issues for effective educational service delivery by Addis AbabaTegbareid Polly Technique College. Particularly focusing on the current IS adoption practice, awareness, skill, and management issues.

Finally, the proposed framework is demonstrated and evaluated based on expert interview, questionnaires and evaluation survey. This study is also bounded only in Addis Ababa Tegebareid Polly Technique College.

Furthermore, lack of reference documents and literature concerned with IS adoption framework for effective educational service delivery, lack of finance and materials were also other challenges. However to overcome those challenges the researcher was work with full tolerance and finance and material constraints were also solved by privately.

1.5. Significance of the Study

The main purpose of this research is to investigate the current IS adoption and implementation in Addis Ababa Tegbareid Polly Technique College towards designing a framework for creating a successful IS adoption and implementation process. The study is believed to benefit Tegbareid Polly Technique College's by providing the way to use information system effectively and deliver education service in teaching and learning process.

The study will serve as a source and have a benefit for practitioners, staffs, administrators and students to search more by providing a better understanding of IS adoption and make their future works easy in Tegbareid Polly Technique College. The study will also help the federal TVET Agency and a policy maker to enact IS adoption laws to enhance effective educational service delivery.

Since there was not enough research done on the title yet, it will serve as a source and standing point for those who will be interested to conduct further and similar investigation deeply on a wider scale.

1.6. Organization of the Thesis

This thesis report is organized in to six chapters.

Chapter one: Deals with the general introduction to the research. It includes the background of the study, problem statement and research questions, and objectives, defines the scope and limitation of the study and finally presents the significance of the study.

Chapter two: Is the part where a review of different relevant literatures is presented to create a theoretical foundation for the research regarding IS adoption, IS innovation process, information as a resource, infrastructure and adoption and organizational policies and adoption. This was accompanied by a review of related work so as to provide the distinction between this study and other research in the area.

Chapter three: This chapter presented research design and methodology which includes general insight on the existing research methods and discussed the research method that was employed in this thesis.

Chapter four: Deal with the data analysis and interpretation of the result as per the data collected through interview and observation and the findings from the analysis were discussed in each section providing inputs to the design process of framework.

Chapter five: Deals with the framework design and evaluation, where the proposed framework was designed and developed based on in depth discussion of the main findings in the fourth chapter. The demonstration and evaluation of the proposed framework is also discussed.

Chapter six: This is the final chapter that provides conclusions and recommendations of the study and perspectives of further studies are also suggested.

Chapter Two

Review of Related Literature

2.1. Overview

Information, according to Terry (2005), is what is conveyed or represented by a particular arrangement or sequence of things. Further, Terry defines information as facts provided or learned about something. Castell (2000) observes that information age is here with us and this has led to a shift in the global economy's focus from physical resources to the way information is manipulated.

As business organizations grow, the amount of information handled also grows.
This huge information gathered over time, will need sophisticated technologies to handle and manage it. People must be information literate for them to know what information is good for them. Pejova (2000) further said that without information literacy, developing nations may continue to underutilize the technology that is provided and this may result in a waste of resources with potentially serious repercussions for development.

According to Chrisanthi(2007), the academic field of IS originated from applied computer science studies which aimed at automating data processing in organizations. Since then studies in IS field broadened in scope to study the effect of technology in organization and organizations effort to include technology in their operation. Several studies have found Knowledge and IS are important in today's business activities. The researchers agreed, during the "information age", organizations have come to recognize that the importance of IS. In today's digital age recognizing the importance of IS as an educational asset become necessity since it is difficult to imagine a business that does not in some way rely on IS. Chiristiani(2008) and Lee (2015)stated that technology not only provides information processing mechanism for organizations but technology also change the basic way of how an organization operate. This implies an IS is not only automating the organizational operational process but also changing the very base of the operation itself.
When the usefulness of IS get recognized by an organization it is more likely that IS will be included into an organizational strategic plan. To meet the IS strategic plan and the

organizational strategic plan in general, it is important that organizations have a well thought procedure for the IS implementation. Apparently, there is no one definite source of IS implementation failure or success since organizations have limited knowledge of what contributes to the success or failure of IS practices. Although IS industries are capable of building systems, they often have difficulties in building systems that meet end users' needs and does not always deliver what business expects of them. In literature this is referred to as the "IS/business gap" or the "expectation gap". According to business and information system researcher organizational leaders started expressing doubts about the benefits their organizations are getting from huge investments in IS. In general, to get the full benefit of IS and the success factors of a satisfactory system, one has to have a successful organizational IS practice starting from the initiation to the overall implementation.

Information literacy has been defined by Bruce (2002), as the ability to access,evaluate, organize and use information in order to learn, solve problems, and make decisions in formal and informal learning contexts, at work, at home and even in educational settings. Doyle (2003) is of the same view with Bruce (2002). He explained information literacy as the ability to access, evaluate and use information from a variety of sources. There is need therefore for each organization to position itself at a good information literacy level for it to identify what information is relevant or irrelevant to their business dealings.
Plotnick (1999) defined information literacy as the ability to recognize when information is needed as well as the ability to locate, evaluate and effectively use it.

2.2.Understanding IS

Information systems (IS) involve a variety of information technologies (IT) such as computers, software, databases, communication systems, the Internet, mobile devices and much more, to perform specific tasks, interact with and inform various actors in different organizational or social contexts. Of general interest to the field of IS are therefore all aspects of the development, deployment, implementation, use and impact of IS in organizations and society (Alter, 2013). However, the IS field is not primarily concerned with the technical and computational aspects of IT. What matters to IS instead is how technology is appropriated and instantiated in order to enable the realization of IS that fulfill various actors' – such as

individuals, groups or organizations – information needs and requirements in regards to specific goals and practices. While this is widely recognized in the IS community, the term 'information system', which is foundational to the IS field, is rarely explicitly defined and examined, and is typically taken for granted (Lee, 2010). This lack of conceptual engagement with 'IS' motivated recent calls to the IS community to further its engagement with core concepts that are central to the field and its research (Baskerville, 2010).

Furthermore, this lack of engagement is problematic as it can lead to fuzzy and unclear use of the concept of IS, and can hinder the formulation of a clear identity for the IS field as well. "Whenever IS researchers and professionals have used the term 'information system,' one could substitute the term 'information technology,' 'computer system,' or simply, 'the computer' where the substitution would often make little or no difference. In retrospect, it is no exaggeration to describe most IS researchers as having used the term 'system' or 'systems' to refer to just about anything that involves electronic information technology" (lee, 2010). However, such usage of the term is questionable as it blurs the distinction between IT, as one defining notion, and IS as another defining notion of the IS field (e.g. lee, 2004). It also undermines the importance of human, social and organizational aspects of interest to IS Baskerville, (2010). And finally, conceptual advancements regarding 'IS' as a foundational concept for the fieldare hampered by the lack of conceptual clarity. If researchers are not clear what they mean when they talk about IS, it is difficult to compare research results and build on each other's work leading to cumulative research tradition. Taking all these concerns together, defining IS is identified as one of the main challenges for the IS field in an editorial by the European Journal of Information Systems: "It could be a surprise that what an IS is not established. On the other hand, since many people are studying IS from a variety of perspectives, maybe it should be no surprise that there are a variety of definitions. But then, how would Society know what IS is and what it can do if there is no clear understanding?" (Paul, 2007). Definitions of IS are therefore of interest to the IS community as they can help in establishing a common ground for understanding and researching IS, and distinguishing IS as a field of inquiry from other fields. What an IS is and what it entails has important consequences for recognizing IS as a distinct domain of knowledge and for understanding how different branches of IS relate to each other and what aspects are of concern to IS

researchers (Paul, 2007). Moreover, the concept of IS is central to the debate about the field's identity and its aims as understanding what an IS is has important implications for what IS researchers should research, what IS educational programs should contain and how they should be differentiated from IT programs or other business programs (Desouza, 2007). Therefore, there is a clear need to further examine what an IS entails. Thus, the key objective of this research is to advance understanding of IS, by critically reflecting on how IS are currently defined in the IS literature.

Apart from Alter (2008), we are not aware of an attempt to systematically collect and review different definitions of IS. Our aim is therefore to collect and analyze an extensive list of definitions of IS in order to contribute to a better understanding of how IS are defined in the literature, and to critically examine the contributions and limitations of dominant IS conceptions to IS theorizing. To achieve this aim we apply the hermeneutic approach for conducting literature reviews (Cecez-Kecmanovic, 2014). The following sections will first look at the process of identifying definitions of IS and then introduce these definitions, grouping them into four different views. We then discuss and exemplify the contributions made by different views for understanding IS. Critically reflecting on these views we argue that current definitions are commonly grounded in an ontological position seeing humans and technology inherently separated. Finally we point out that there is a potential for developing an alternative socio material conception of IS.

Over the past land, labour and capital were considered as key resources essential for any business establishment. This ideology changed and Information was added to the list of major resources to an organization. Any business establishment that aims at making sound progress must place information above all other resources. Information must be right in itself and must originate from the right people at the right time for better decision making. According to Guinea (2005), socio-economic systems are likely to perform more efficiently and effectively if it's planning, execution and monitoring are supported with timely, relevant and reliable information. Information Systems which are used in managing this important resource is as well a key resource just like land, capital and labour.

According to Terry (2005), a system is a collection of interrelated components or objects working collectively under some set rules to achieve a common objective.All organizations are systems therefore they have interrelated components that come to work together to achieve a common goal. Further, failure of one part of a system means a sick system and may not work effectively in attaining the core objective.

2.3.Information System for Higher Education Institutions

An Information System that complies with the current dynamics of Higher Education Institutions must include, among others (Yuhana, Saptarini, and Rochimah, *2015)*

- Integration of Databases, Which allows the interconnection of variables and indicators.
- Characterization of the Student Population: With information not only of basic data, but also demographic data, social and family situation, vulnerability, financial data, and others.
- Traditional Elements of the Organizational System: Human, financial, technological, material resources, data or archives supports, processing means and resulting information.
- Production of Dynamic Report: For decision of different levels that make up the Institution.
- Organizational Objectives and Strategy: Including the action plans for each academic and administrative unit.
- Possibility of Evolution of the System: To increase the analytical capacity.

An Information System is made up of components that carry out functions, such as collection, collection or collection of data, classification, compression, storage or archiving, administration, processing or transformation, transmission and recovery, exposure or presentation of data or information. The purpose of the System is to provide information in order to make decisions and to facilitate coordination between the various activities. The Information Systems, in a restricted sense, include all programmed information processing,

but in a broad sense it includes all the human and mechanical components involved in the coordination and decision-making (Singh, 2017).

For the Information to be efficient, it must meet a series of requirements, so that the utility it provides justifies the use of the resources that had been applied to produce it. In particular, the requirement of the temporary reference of the information must be met, so the Information of a certain period of time must be prioritized so that said information is really operative.

A characteristic of the Systems for the Institutions of Higher Education are the Management Indicators: "An indicator is defined as an observable manifestation of a feature or characteristic of one or more variables of interest, susceptible of evaluation, which provides quantitative information and/or qualitative about that characteristic" (Xiaoshan, Ligu, Qicong, and Dongyu, 2016). A System of indicators can be defined as the structured and coherent set of indicators combined or not, according to a System of variables and categories that represent the management or functioning of an analysis unit with respect to a specific function. For example, Financial Management, Teaching, Extension, Research or Institutional Service (Cabeza, 2004).

The development and use of Indicators as criteria for policy formulation, planning and decision making in Higher Education Institutions are associated with a very important change in the methodology traditionally used to manage, monitor and control Information. And they are intended to present the situation of an entity in a given period of time.

2.4.Information Needs and Information Flows in Higher Education

Frackmann (2007) identifies the flow of information in higher education institutions he said that One might regard higher education as an exchange process according to a market model. There is a service provider, the higher education institution providing services for the service receiver, i.e. the student. In exchange for the services the service provider receives funds from the service receiver.

There seem to be three identifiable flows of information involved in the exchange process:

Ex-ante information (information that flows before the service is provided):

- the service provider has to inform the potential service receiver about the services (e.g. information about the study program) and he has to collect information in

designing and shaping the services (curriculum) according to the needs (of society and labor market)

- the service receiver (students) might collect information about the institutions, the study programs and the respective teachers for his/her institution and program choice decisions

Accompanying information (information that accompanies the provision of the services):

- Besides the fact that the service itself in the case of education is an information transfer, the accompanying information consists of contract information (application, enrollment, registering for courses and exams, student records) and user manuals (i.e. the curriculum plan)

Ex-post information (information that flows and is handled after the service provision)

- Both sides might evaluate the service processes and results in order to decide whether they continue or make changes and adjustments with regards to the services (study programs).

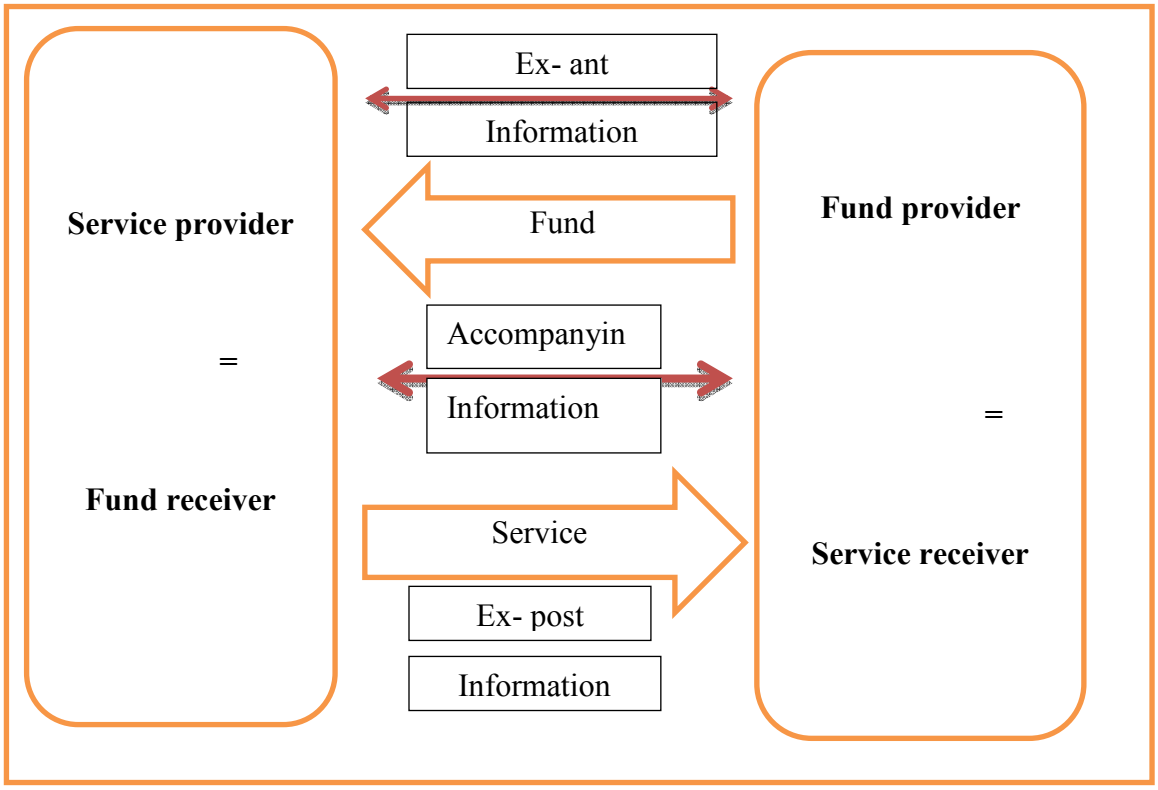

Figure 2.1 Exchange process model for higher education adopted from (Frackmann, 2007).

2.5. Information system Innovation

Swanson (2017) defines IS innovation as "any new way of developing, implementing and maintaining IS in an organizational context". IS innovations are expected to improve the quality and productivity of an IS. The IS from technical point of view can be defined as, collection of hardware and software capable of information storage, processing and communication that can serve some organizational functions. But IS innovations is not only technological changes like the use of new application or computerized systems, it is also organizational or administrative changes like new project management methods, communication mode, or new forms of organizational work operation. In Swanson's (2018), terminology, "IS innovations cover technological process innovations and administrative process innovation". In many situations the administrative change is not recognized and misunderstood as only technological change. Generally, IS innovation is not only about the "how" to do an operation but also "what" operation to do in organization. Thus, basic attributes of IS innovation can be technological innovation changes like new computing platform and organizational operational identification of how to effectively use the new technological innovation.

2.5.1. IS Innovation Process

For IS to be successful in reaching out the organizations goal and its intended use, the organization should have a clear and successful IS innovation, adoption and implementation process. According to Zaltman (2012), there are two general phases of the innovation process which are the initiation and implementation phases. This implies the innovation process require some sort of adoption process that bring the initiation to an implementation phase.

Organizational innovation process involves different organizational resources and goal(Lyytinen, 2001). The innovator or the innovation decision maker has to set the objective and different organizational attributes that can influence the innovation. The evaluation of innovation in organization should take into consideration the users' requirement and overall value of the innovation to the organization. For IS innovation process in organizational context, Thomas et al (2007) proposed a five step framework. The steps include identifying organizational operation, identifying change enablers, developing a business vision and objectives, understanding and measuring existing processes and designing a prototype. The

five stages mainly focus on operational change that the IS bring to the organization. Different studies suggest IS innovation should become a key determinant of how business is conducted by including IS in and encouraging management involvement in the innovation process to archive the desired result.

2.5.2. Factors affecting Information system Innovation

Tornatzky, (2009) and Prescott, (2011) found that several organizational, technological and environmental factors affect the innovation of IS. However, empirical research on IS process innovations is still lacking which implies practitioners still know little about the exact factors that influence IS innovation. Failure to address these factors leads to wasted investments and failed implementation process in an organization. Fitzgerald (2013) states "despite huge investments in system development methods and tools, some IS innovations are not widely used". In organizations a specific IS has to facilitate the organizational work operation and meet its intended use. And for the IS to be useful the adoption and implementation process should be organized and planned.

IS innovation, according to Mustonen-Ollila et al. (2014), can be classified into four categories based on their scope and purposes. The four categories can be classified in to two depending on the content of the innovation being technological or administrative. Administrative innovation includes two innovations which are project management and control procedures and description methods. Innovations with technological contents include development tools and baseline technology innovations. The first category includes rules and administrative procedures that help control, manage and co-ordinate development activities. Project management and control procedures innovation may include project management guidelines or organizational arrangements. Description methods Innovations include standardized modeling techniques like Data Flow Diagrams, methodologies like Unified Modeling Method and process modeling approaches like Capability Maturity Model. The third innovation category which is development tools include all productivity tools for systems development like CASE tools, documentation tools, data dictionaries, software configuration tools. The last category which is baseline technology consists of programming languages and database management systems. Based on an empirical analysis presented by

Friedman (2017), the more recent IS are more inclusive of the technological and administrative type of innovation rather than the older IS. This is because of the changes in the type of system being developed and the changes in type of user throughout the years.

2.6.IS Adoption

An IS adoption is a decision to use an IS innovation. Adoptions are made by decision makers, who have resources and the decision rights to use resources and change operational practices. Roger (2009) defined adoption as, "Making full use of a new idea as the best course of action available". In relation to this, Rogers (2017) define pro-innovation bias as a "tendency to assume that adoption of the innovation should be carried out by all possible adopters". In his other work, Rogers (2017) states IS adoption decision making process goes through five steps. The first one is knowledge, which is explained as possessing enough information about innovation to decide to go to the next step which is persuasion. In Persuasion step, users form an attitude toward the innovation and the easiness or difficulty of adopting it. Then on the third step which is termed as "decision", where users decide to adopt or reject. The fourth and the fifth steps are implementation of the technology and confirmation of the decision.

Rogers(2015) use different terms to explain the five stages of adoption decision making process, which are Awareness, Assessment, Acceptance, Learning and usage. Even though the terms vary the meaning and the process behind each stage is the same as explained by the previous researchers.

2.7.Information systems success

IS success is one of the oldest research traditions in IS research. At the first ICIS conference (International Conference on Information Systems) in 1980 questions regarding what is and what determines IS success were raised (Petter et al. 2013). The seminar paper by DeLone and McLean (1992) suggested that IS success should be the preeminent dependent variable for the IS field (DeLone and McLean 1992). They proposed taxonomy of six interrelated variables to define IS success: System Quality, Information Quality, Use, User Satisfaction, Individual Impact, and Organizational Impact. Since the original publication of their model in 1992, researchers have investigated, modified, or extended the concept of IS success (Dwivedi et al. 2013a; Larsen 2003; Petter et al. 2008, 2013; Rana et al. 2013a; Seddon 1997;

Seddon et al. 1999; Urbach et al. 2009). One of the major extensions is the service quality dimension of information technology (IT) departments (Petter et al. 2013), incorporated in an updated model published in 2003 (Delone and McLean 2003). The original and revised models are among the most cited frameworks in IS research (Lowry et al. 2007) and have been validated by numerous studies as good predictors of IS success (e.g. Iivari 2005; Kulkarni et al. 2007; McKinney et al. 2002; Petter et al. 2013; Rai et al. 2002; Seddon 1997). Several literature reviews have supported the explanatory power of the IS success model (Petter et al. 2013). Petter et al. (2013) identify 43 determinants that have been posited to affect one or more of the IS success variables. These 43 success factors are organized into three dimensions: tasks, people, and structure. These determinants, and the different dimensions of IS success as proposed by Delone and McLean (2003), can be described as the state-of-the art of IS success research.

2.8.Dimensions of IS adoption

IS allows information to move between functional areas and departments instantly, reducing the need for face-to-face communications among employees, thus increasing the responsiveness of the organization. According to Choe (2003), the sophisticated IS design provides information which has a high average level of information content in the four information dimensions in the organization and especially to the top management who are the decision makers. It provides information which is broad-scope, high coordinated, high reporting frequency, and integrated among different organizational functions.

2.8.1. Infrastructure and Adoption

Infrastructure has been defined by Choe (2003) as;

1. "Basic physical and organizational structures needed for the operations of an organization",
2. "The services and facilities necessary for an economy to function",
3. "A set of interconnected structural elements that provide a framework sup-porting an entire structure of development.

Information in itself cannot be utilized without the presence of the facilities that are used to collect it, manipulate, process, store and even transmit for consumption.

The absence of infrastructure in organizations may hinder the functioning of information systems. According to GOK (2008), some of the challenges still facing middle level institutions include inadequate facilities and capacities to cater for the large number of those who complete primary and secondary education and wish to undertake middle level courses. The Ethiopian government identified, lack of ICT infrastructure as a hindering factor in the provision of efficient and affordable ICT services in the country. Emphasis will be placed on: Provision of support infrastructure, such as, energy and roads, Supporting software development, Promotion of local manufacture and assembly of ICT equipment and accessories and Provision of incentives for the provision of ICT infrastructure. The researcher alludes that government is aware that there is a problem in the provision of ICT infrastructure countrywide and is therefore in the process of putting measures in place to rescue and save the situation.

2.8.2. Organizational Policies and Adoption

A part from the government policies, organizations also have their own internal policies. These policies must co-exist with the government policies to avoid conflicts and unnecessary competition for scarce resources (Devon, 2004). A good policy should support and be consistent with organizational strategies, objectives, should be practical and directly relevant to the business, be reviewed frequently and amended as needed, limit discretion of managers/employees, precise, easy to understand and apply, be in writing, be applied and enforced, cascaded and interpreted to the lowest level.

According to Kandere (2006), policies are rules and regulations put in place to control and regulate the organization and its environment but when AIS is in place, there is flexibility and it supports human's activities in order to increase productivity.

The design of these rules will determine the future of the organization. For instance, if the rules are rigid the organization is likely to be rigid whereas if the rules are flexible then the organization will also be flexible. In such scenario, incoming changes are easily adaptable.

2.8.3. Economic Status and Adoption

Economic status of an organization dictates the kind and quality of information systems to put in place (Terry, 2003). Due to this fact the success of an information system will determine

the quality of the system to be implemented; hence, the quality of services to be offered by that particular system. According to Douglas (2003), there is a need to understand the economic status of the organization in order to establish competitive strategies.

The concept of resource poverty provides one explanation to this uniqueness (Thong, 1999). Small and medium business enterprises, generally have limited resource compared with large business. Resource poverty refers to the lack of financial and human resource (Doolin, 2004). Because of the lack of financial resource, small and medium business enterprises has to make minimal commitments that are often spread out at different moment in time. For instance, the main perceived barriers to implementation computer technologies among Canadian small business.

2.8.4. Leadership

Doolin (2004) observed that although the implementation of new systems in organizations could be argued for with regard to efficiency and rationality, the social and political pressure inside the organization could cause the opposite effect and all these depends on the structures in place. Leadership is defined as the ability to influence others behavior. There is need for sustained high level ICT leadership and championship in all level institutions to provide oversight, inspiration and political goodwill. Effective leadership should facilitate the mobilization of resources needed to develop an ICT environment that is conducive to investments in the country. According to Sabherwal et al.(2006), Information is the same as blood which streams into the organization's vessels and brings it to life. Information systems' function in implementing processes that are mainly concerned with internal circulation of information and appears on environmental uncertainty phenomenon.

Information ambiguity is a situation in which problems couldn't empirically and explicitly be understood or analyzed and gathering more data about them is not possible. Another important matter that displays the role of information systems in implementing strategy is managers' need to reciprocal exchange of information. It means a system that transmits information up and downward. Information system is one of instruments that can collect and organize data for managers in order to do their tasks.

2.8.5. Government Policies and Adoption

According to Doolin (2004), a policy is a principle or a rule that guide decisions and aids in achieving rational outcome. Policy is a statement of intent or a commitment towards something to achieve at present or in the future.

Managers in all institutions are guided by policies that set basic principles and associated guidelines, formulated and needs to be enforced in order to achieve a desired objective. To achieve their goals, managers must follow policies but sometimes the policies in place from external environment might not be favorable.

As noted by Kandere (2006), although policies are formally put in place by governments, different stakeholders and in particular the private sector make inputs into the policy process and affect its out-comes. The government therefore provides an environment– this is providing resources eg time, money and logistics to start the process of an ICT policy development.

2.8.6. Stakeholders and Adoption

In order to win the competition across nation, a country should response its environmental change with increasing its ability of economics resource. Also, the globalization of the economy has forced many businesses to change in order to survive (Caldeira& Ward, 2002). The capacity of a national economy to adapt the changing demands has been linked and achieved by flexibility and responsiveness of small and medium business enterprises (Long & Hunter, 2003). Small and medium business enterprises as largest proportion of economics pillar in a country need to response competitive environment facing business. In many countries, small and medium business enterprises has important role in creating employment and supporting economic growth. According to Caldera et al., (2002), "One of strategies chosen was by increasing its competitive advantage, and decreasing production cost with adopting new technologies".

In spite of the availability of various government assistance programs including computer technology acquisition and skill enhancement program, the effectiveness of information technology adoption among organizations improve prospect for success. DeLone (2003) observes that employment of IT in organizations is the only way to increase its productivity. The study notes that, information technology that a few years ago was within reach of only

large companies can now be employed by a number of the smallest, thereby increasing their competitive advantage (Nyandiere, 2006). Information Systems provide an opportunity for business to improve their efficiency and effectiveness and even to gain competitive advantage (Chuang etal.2007) "with the availability of small and even more powerful user friendly personal computers and better software packages. Today, the benefits of information system are accessible even to smallest business (Douglas et al., 2003). Yet, while large business have been using computer for some time, small and medium business enterprises have been slow in adopting these technology innovation (Long et al, 2010). According to Sabherwal et al. (2006), information system usefulness is derived from four aspects of information system success including system quality, perceived usefulness, user satisfaction and system usage. Misko (2009) indicated that a system is deemed successful when the systems usage increase, when perception of system quality are favorable, or when users are satisfied with the performance of the system.

2.9. Related works

There are works in this area that have been conducted with a particular attention to IS adoption, readiness assessment and implementation barriers. Here presented are some notable studies.

In Ethiopia context the existence of IS adoption works in Educational context is limited. Nchunge,Sakwa and Mwangi (2012) noted that IS adoption in secondary schools in Kenya has remained low and limited. The findings shows that the pace of IS adoption in both public and private secondary schools in Kenya is very slow, as characterized by: user complexity perception, inadequate IT literacy, lack of psychological and technical readiness and insufficient policy guidelines. In their study on User's Perception on IS Adoption For Education Support in Schools: A Survey of Secondary School Teacher's in Thika District Kenya, whose main objective was to assess the users' perception in electronic mode of curricula delivery; complexity in use; IS refresher courses and job security on adoption of IS for educational support activities in secondary schools in Kenya, through a survey in Thika district. The study adopted a descriptive research design approach and targeted all the public and private secondary schools in Thika district in Kenya. The population of the study was the school management and the teachers involved in IS implementation in secondary schools in

Thika District. The sampling techniques adopted in the study included; Stratified, simple random and purposive techniques. Stratified techniques was used to group the target population (Thikasecondary schools) into two main strata namely; public and private schools. Then from each category, a 30% sampling computed to ascertain the number of schools to be sampled. The study targeted a total of 92 respondents; the study gathered a total of 86 responses which represented 93.5% response rate. These provided insights on the perception and the pace of IS adoption in secondary schools. The study recommended that; Psychological and technical skill readiness of teacher's needs. The research is limited to put the framework to solve the problem that occurred at the school of Kenya.

From the cited studies Florin Gheorghe Filip, (2017) build a platform to create modern information systems designing and implementing an information system form, in practical applications, a process which may include many decisions to be made, at deferent stages. The study came up with a theoretical platform. The study however, is only limited to prepare a frame work which enable IS adopted and the theoretical platform was not for educational organizations.

Nebiyu (2010) worked on a research with the objective of investigating the general nature of Hawassa university IS innovation adoption and diffusion considering its academic staff ICT usage and utilization for two core activities in higher learning institutions as indicator of the adoption and diffusion of IS innovation in the university. Roger's DOI theory was used and the five innovation characteristics and an external variable which is, ICT policy measured using a questionnaire and the survey was administered to a sample of 161 Hawassa university workers. As a result the analysis of the collected data confirmed that the Rogers's five innovation characteristics and the existence of ICT policy to have a positive impact on the use the technology in Hawassa University. However the research is limited to identifying the organizational and environmental factors and prepares a framework that determine IS adoption.

Also John (2015) Identified the significant factors influencing the information technology adoption among faculty members. And the findings of the study provide key information to the management of educational institutions to improve the rate of return of their IT

investments. Both researchers tried to solve the problem by identifying the problem, but not sufficient condition for the resultant outcome(s).

Kipssoi (2012) worked on Describing challenges facing adoption of information system for Challenges facing adoption of information communication technology in educational management in schools in Kenya. They used the descriptive approach and the study argues that ICT policies must be dynamic, cost-effective, adaptable, and differentiated between sectors and between the various segments of educational management in order to contribute effectively to education management. However the study was indicates only effective education management than indicating the way to improve the Adoption of IS in framework so,limited to putting the solution in framework.

Girmanesh (2015) worked on a research with the objective of Identifying technological, organizational and environmental factors that affect organizational IS adoption and construct a theoretical model for successful IS adoption. Theresearch incorporates both qualitative and quantitative approaches. The research findings state identifying different factors that affect IS adoption in Ethiopian organizations and construct a theoretical model for successful IS adoption. After extensive literature review organizational IS adoption factors and issues identified. Then using three prominent IS adoption models (DOI, TAM and TOE) the conceptual model constructed to guide the overall data collection mechanism and research direction. But the research is limited to direct to adopt at educational level.

The researchers has also recommended that a common framework and policies has to be prepared for IS adoption at national level as such a further investigation on IS at all government and non-governmental level is needed in order to provide best solution and provide a comprehensive framework in this area (Girmanesh, 2015 and John, 2015). Hence, both studies has taken this as an input, the literature and researches we can infer the adopting IS for effective educational service delivery in an eco-friendly manner is an important issue and needs further study. So as to leverage the opportunities and potentials of proposing framework to adopt IS, a comprehensive framework to be used as a guideline for proper use and Adoption of IS in various sectors is imperative, such that college can position itself in creating information system in a country. Table 4.1 below provides summary of related works.

Summary of Related Work

No	Title of the study	Purpose /objective	Approach	Key finding	Recommendation
1	NebiyuGetahun (2010)	Investigating the general nature of Hawassa university IS innovation adoption and diffusion	five innovation characteristics and ICT policy measured using a questionnaire	The result confirmed that the Rogers's five innovation characteristics and the existence of ICT policy to have a positive impact on the use the technology in Hawassa University	IS innovation and adoption in governmental and private higher learning institutions in Ethiopia
2	Fillip (2011)	Design and build modern information systems	Survey	A platform to create modern information systems	
3	Mwangi (2012)	assess the users' perception in electronic mode of curricula delivery; complexity in use; IS refresher courses and job security on adoption of IS for	Survey	The pace of IS adoption in both public and private secondary schools in Kenya is very slow, as characterized by: user complexity perception, inadequate IT literacy, lack of psychological and technical	Psychological and technical skill readiness of teacher's needs

		educational support activities in secondary schools in Kenya		readiness and insufficient policy guidelines.	
4	Kipssoi (2012)	Describing challenges facing adoption of information system	Descriptive	The study argues that ICT policies must be dynamic, cost-effective, adaptable, and differentiated between sectors and between the various segments of educational management	The study recommends the integration of ICTs in educational management in schools
5	Areaya (2015)	Identifying technological, organizational and environmental factors that affect organizational IS adoption and construct a theoretical model for successful IS adoption.	Quantitative and Qualitative	designing adoption model for decision makers in planning, evaluating and implementing IS	Investigating the effect of IT innovation in differentiating the factors that trigger IT innovation adoption

6	John (2015)	Identifying the significant factors influencing the information technology adoption among faculty members.	Survey	The findings of the study provide key information to the management of educational institutions to improve the rate of return of their IT investments.	

Table 4.1 Related work discussion

2.10. Research Gaps

Based on the literatures presented earlier, information system adoption is major concerns in organization development. However, the type of Adoption and use IS are varied from organization to organization. Consequently, it is reasonable to conduct information System for Effective Educational Service Delivery study to a specific environment. Therefore, this research addresses the information system Adoption in AATPTC, which is not addressed in earlier works.

Chapter Three

Research Design and Methodology

3.1.Research Approach

This section contains the research method that is adopted in this study. According to Hevner (2004), there are two paradigms which characterize much of the research in the information systems discipline: Behavioral science and Design science. The behavioral science paradigm "seeks to develop and verify theories that explain or predict human or organizational behavior." The design-science paradigm seeks to extend the boundaries of human and organizational capabilities by creating new and innovative artifacts. In their book "Design Science Research Methods and Pattern," Vaishnavi and Kuechler (2015) has described an artifact that can be constructs, models, frameworks, architectures, design principles, methods, instantiations and design theories. And the artifacts are designed to meet the identified business need.

As this research aims to propose a framework to address the identified gap and for the solution is approached as an artifact, to develop it, the Design Science Research Methodology (DSRM) is considered. According to Johannesson and Perjons (2014), the goal of design science research is not only to create an artifact but also to answer questions about them. There are different DSRM processes presented in literature. One of the common cited processes is Pefferset al.(2007), which presented a structured framework of the principles, practices and procedures needed in order to develop a research under the domain of the design science. The below figure 3.1 depicts DSRM process model.

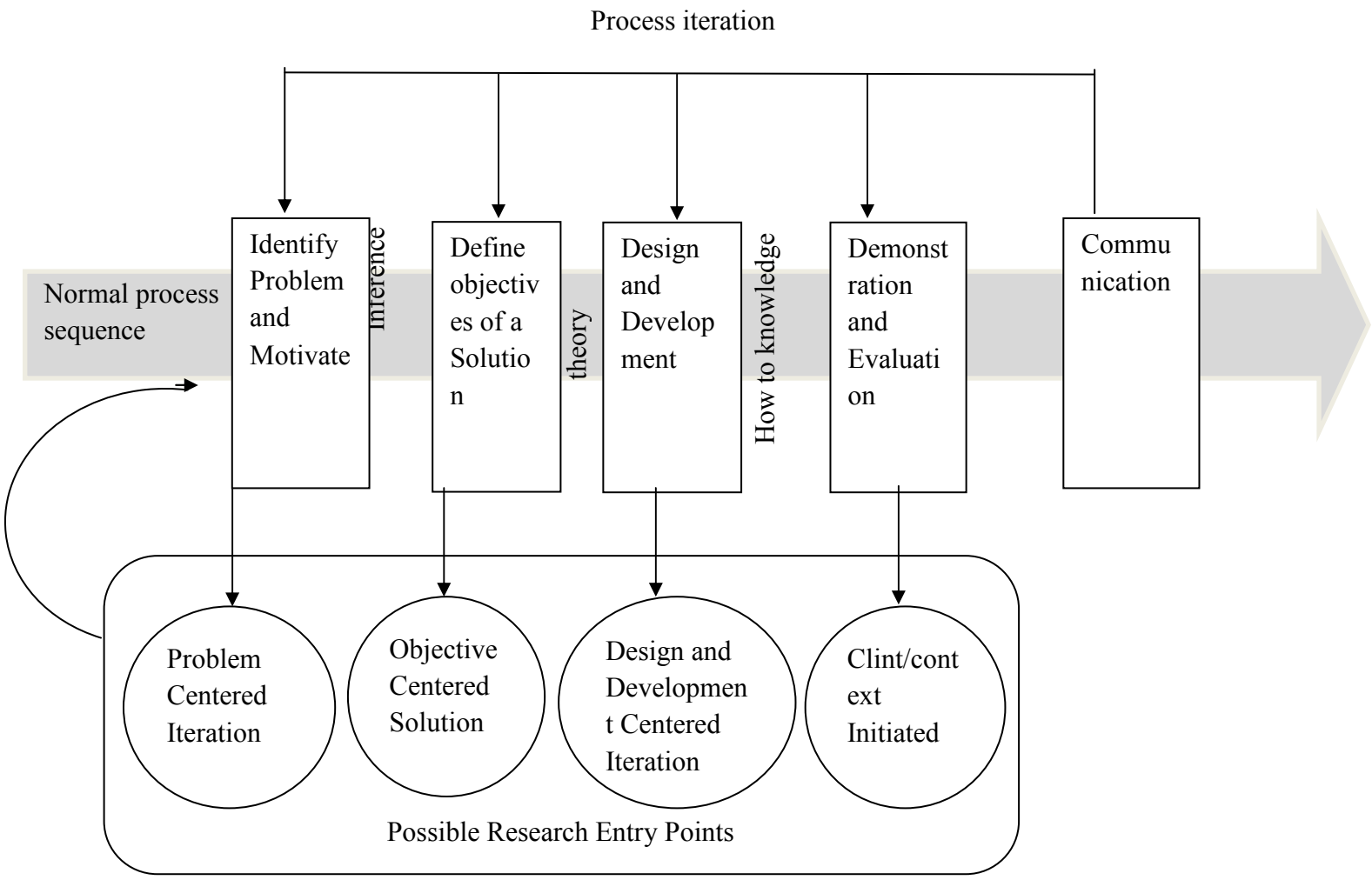

Figure 3-1.2DSRM process model adopted from Peffers (2007)

Johannesson and Perjons (2014, p. 88) contends design science researches which give the possibility to use different research strategies and methods across the process cycle. They say "it is possible to use any research strategy or method to answer questions about artifacts. In other words, there is no research strategy or methods that can be excluded in advance for a design science research, as any of them may be valuable, depending on the research's characteristics and goals. In large design science research, it is common to use several research strategies and methods, because different design science activities may require different approaches." Here below the methods used at each steps of the Peffers et al. (2007), design science process models are provided.

3.2. Problem identification and Motivation

Identifying the problem helps to motivate the researcher and audience of the research to devote to find a solution and helps understand the research reasoning. Literature review was conducted to have an insight on adoption of information system with a particular focus to Effective education service delivery. Observation of the current practices in use of IS in the organization was also done to understand the current practice.

The problem involves to study the use of IS practice, as stated in section 1.2 of the study, the use of IS in Ethiopia is growing. Thus, a guiding framework that can be used as a lens for proper use is imperative and needs to investigate and define requirement of the organization under study.

3.3.Objective setting of the Solution

The objective of a solution is inferred from the problem definition. Objectives can be qualitative (new artifact to support the problem) or quantitative (advancing the current artifact). In this study, this process is seen in terms of purpose, scope and function of the framework

In terms of Purpose: The main purpose is to develop a new prescriptive framework for adoption of IS based on the challenges identified for effective education service delivery. So that organizations can have a guide as they endeavor to bring about use of IS.

In terms of Scope: For successful IS adoption and effective educational service delivery, a framework is designed that encompasses the key variables, factors or attributes for each variables, and the relationship among them which can be used as a guide lens for organizations to identify how successful IS adoption and effective educational service delivery should look like.

In terms of Functionality: The Framework is sought to be functional to any TVET colleges.

Literature review was conducted to identify key concepts of IS so that they can be added in the framework

3.4.Design and Development of the solution

This is the phase where the actual artifact (Framework in this case) is developed. To develop the framework, it was imperative to look at the current practice in use of IS so as to identify factors affecting use of IS in the organization, hence to do so, questionnaire and interview

were prepared. Stated below are the sampling & sample size determination techniques, data collection and analysis methods employed in the study.

The design and development stage utilized the identified factors affecting use of IS from the analysis results of the qualitative findings, which also were mapped to the theoretical findings, derived from earlier stages (literature). The results were shared to all interview participants as part of the brain storming session conducted so as to come up with a participatory modeling. And the solution of the problem is presented as Effective education service delivery framework as depicted in the figure5.1.

3.4.1. Sampling Method

3.4.1.1.Qualitative Data Sampling

In this paper a qualitative approach is used to answer questions about experience, meaning and perspective, most often from the standpoint of the participant. These data are not amenable to counting or measuring. A qualitative research technique includes small group discussions or semi structured interviews to seek views on a focused topic or with key informants for background information or an institutional perspective. It focuses on words rather than numbers, depth rather than breadth. They seek to unearth the opinions, thoughts and feelings of respondents. It is most commonly used to help inform new concepts, theories and products.

For the qualitative study, as discussed in the interview process and questionnaire section here below, purposive sampling technique was used. Such technique gives the opportunity for the researcher to determine key informants who are believed to provide the required information. Accordingly the initial plan was to conduct interview with nine key informants, yet in the process it was reduced to eight due to the fact that almost no new information was acquired after completion of the eight interviews and also eight key informants were also selected purposively for questioning to support the response of the respondents. Scholars like Charmaz (2006) and Creswell, (2013) actually citing Charmaz in his book term this as saturation. It is the point where "gathering fresh data no longer sparks new insights or reveals new properties." Hence, three high level staffs were interviewed. The selected key informants were: ICT manager, student representatives and Administration coordinator since they are the main sources of data providers for this study.

3.4.1.2.Data collection Method and Procedure

The following data collection methods are used to gather the required information for the research. Mainly, two types of instruments, namely: interview and also questionnaire for demonstration and evaluation of the proposed framework were employed for the data collection.

- **Questionnaires**

The questionnaires are prepared as such a 5 point Likert scale questionnaires was designed to obtain data from Administration coordinator and ICT manager for demonstration and evaluation of the proposed framework with respect to its comprehensiveness, clarity, completeness, compatibility, correctness and applicability. Whereby, the scales ranged from 1=strongly disagree to 5=strongly agree (Likert, Rensis 1932).

- **Interview**

Creswell (2013) identifies interview as one of the basic data collection procedures for qualitative study. He notes that the main goal behind interview is to produce views and opinions from the participants. In this study, an interview is used for data collection so as to render some flexibility. Prior to the interview, the interviewees were selected purposively. Purposive sampling/ judgmental sampling allows the researcher to decide what needs to be known and sets out to find people who can and are willing to provide the information by virtue of knowledge or experience (Bernard, 2011).

The design of the interview questions was made in a manner to address management, policy and compliance issues. Accordingly interviews have been conducted with coordinators, student representatives and Manager to collect high level information on IS use. Interviews took place between March 01-05 and each session had different interview duration with an approximately 25 minutes each. Schedules were solely in the interest of interviewees.

3.4.2. Method of Data Analysis

For the qualitative data, a thematic content analysis method was employed. This method is used to identify common themes in text provided for analysis as they are categorized to be classified and summarized (Anderson, 2007).

- **Pilot Study**

So as to test and increase the validity and reliability of the study, a pilot study was conducted with a sample of 8 users randomly selected from each work unit divisions. Pilot study helps to identify potential problem areas and deficiencies in the research instruments and protocol prior to implementation during the full study. One to one discussion was held with the pilot study respondents prior to distributing the questionnaires. All of the participants filled the questionnaire, which indicated 100% response rate of the pilot study. Once the questionnaire was filled, the feedbacks were gathered from the participants. In accordance with the pilot test feedbacks, the questionnaire was amended to improve the clarity of the questions, delete redundant items, and increase the likelihood of success. Additionally a reliability test was run to measure internal consistency of the data with Cronbach's coefficient alpha was used as a criterion with the help of SPSS. Cronbach's Alpha is the most common measures of the reliability of the internal consistency. In view of that, the result (0.780) obtained is greater than 0.70 which is the minimal alpha value to prove the internal consistency and reliability. Hence, the Cronbach's alpha test is an indication that the survey questionnaire's reliability and internal consistency to use for the study.

Table 3. 1. Reliability Statistics based on the Pilot test data

Cronbach's Alpha	N of Items
.780	16

Reliability Statistics

3.4.3. Reliability of the research

Reliability measures internal consistency of the subjects in the survey items. In other terms, if an object is measured multiple times using the same instrument, nearly the same result should be found each time with little or no measurement error (Kerlinger and Lee, 2000). Cronbach's coefficient alpha is broadly used as reliability criterion.

A side to ensuring the reliability of the pilot study a full scale data reliability test was conducted for both questionnaires and generated (.801) and (.818) Cronbach's alpha

coefficient for the user questionnaire and ICT staff questionnaire respectively indicating the reliability of the questionnaire.

Table 3. 2. Reliability Statistics for users and ICT staffs

Cronbach's Alpha	N of Items
.801	16

Reliability Statistics of users

Cronbach's Alpha	N of Items
.818	22

Reliability Statistics Of ICT staff

3.4.4. Validity

So as to increase the validity of the research, we adhered to criteria set out by Hutchinson, Wilson; and Wilson, (1994) as cited by (Procaccianti and Routsis, 2016). As such during the interview, the interviewer tried to be open minded and to avoid showing any possible emotions or reactions and most importantly to not express any personal opinion so as to not mislead the interviewees. The interviewer also avoided to ask the questions in a way that would drive the interviewee towards specific answers. The meetings were scheduled whenever it was convenient for the interviewees, in order to avoid any feelings of pressure and for the interviewee to be relaxed. Finally, the transcripts were sent back to the interviewees in order to avoid any possible misinterpretation of their statements by the interviewer which can in turn cause biased data.

3.4.5. Construction, Demonstration and Evaluation

In this stage the artifact is constructed demonstrated and evaluated to prove that it solves the problem identified so that based on the results, the researcher can decide to iterate back to design and development stage. The framework constructed in reference to the findings of the study and its efficacy, completeness, organization fit, suitability of this framework is demonstrated to IT staffs who participated in the interview process, Admin staffs students and all interviewees.

According to Hevner (2004), an IT artifact can be evaluated by observational, analytical, experimental, testing, expert validation, and descriptive methods. These evaluation methods can be applicable depending to the type of the study at hand. In this study, expert validation via expert interview and evaluation survey were used to evaluate the proposed framework. Moreover, descriptive method is used to describe the utility of the proposed framework by building a convincing argument for the artifact's utility.

3.4.6. Communication

This is the process where the artifact, its utility & novelty, the rigor and effectiveness is communicated to the relevant audience. For communication the entire research process is documented and communicated as a thesis work.

3.4.7. Chapter Summary

This chapter presented the research approach selected for this study with a justification. As Peffers DSRM was chosen to guide the research process, details on each process discussing what they deal about, why each process was necessary and how each was used was discussed. DSRM was chosen as the framework development was approached as an artifact. And the process followed mirrored Peffers (2007) which presented a structured framework of the principles, practices and procedures needed in order to develop a research under the domain of the design science.

To address the first and second research questions, observation and interview were done. The design and development stage utilizes the theoretical findings, derived from the literature plus responses (analyzed) from the observations and interview conducted to investigate the current practice. The results were shared to all the interview participants and a brain storming session was conducted so as to come up with a participatory modeling. The efficacy of this framework was demonstrated to IT staffs who participated in the interviewees.

Chapter Four

Findings and Design Search Process

4.1. Overview

This chapter presents the research findings or results and based on the results gives an interpretation of the results. In order to present findings and discussions about the adoption of information system that enable IS for educational service delivery in Addis Ababa Tegbareid Polly Technique College; a different form of tables and figures were used. The results of the study are discussed by triangulating the different sources such as; interviews, direct observation, and document reviews.

To carry out the study, 8 key informants were selected purposively from Addis Ababa Tegbareid Polly Technique College. Accordingly, all the key informants who selected purposively for interview were explained their responses successfully.

4.2. Characteristics of the Respondents

To put the study in context and also bring out the validity of the data collected, it is prudent to discuss the characteristics of the people from whom information was sourced. This subsection, therefore, focuses on the characteristics of the respondents with emphasis on the professional qualifications, job positions and the fact that they were probably selected. Table 4.1 presents gender, educational background and job position of survey participants.

Table 4-1 Respondents characteristics

No	Institution	Gender	Educational Background	Job Position	Number of delegates
1	AATPTC	M& F	MSC in IT	ICT Manager	2
2	AATPTC	M	MBA in management	Administration coordinator	2
3	AATPTC	M	Students	Student representatives	4
				Total number of interviewee	8

Source: *Field Survey, 2020*

4.3. Findings

In this research a more deductive approach is employed for the data analysis as the data was grouped based on the research questions to look for similarities and differences. This approach is best suited when qualitative research is a smaller component of a larger quantitative study (Sunday, 2016). List of interview questions used in this study are depicted in table 4.2 below.

Table 4-2 Interview Questions

NO	Interview Questions	Dimension
1	Do you think AATPTC has information system leadership program in place, along with well-defined rules and a management system? And is there IS strategy in place?	Policy and Management
2	Do your top executives (National Directors, SLT, and Line Managers) make an explicit commitment to overall environmental sustainability initiatives? Providing a support for training, Procurement of information system, follow up on the implementation of policies?	Management
3	What are your considerations when you procure IS service?	Awareness, Practice and Policy
4	How do you get information through networks and how do you identify information's which concerns you?	Practice
5	Do you have a well-defined IS asset management system/program in place? If yes, what happens when an IT service down?	Practice
6	Does AATPTC have rules and processes in place for IS services and other internal assets by maintaining or changing their intended capacity, and these rules and processes are effectively implemented?	Policy

7	Do you supported by IS services provider? If yes, do you have a policy for receiving support from IS service providers?	Policy
8	Do you think all ICT staffs have enough skills and knowledge to perform initiatives such as retire energy inefficient systems, enforce internet management, server virtualization, information sharing, service down systems etc.	Skill and Management
9	If you were given the chance to make the adoption of information what could have you done?	A hypothetical question to gain deep insight
10	What are the challenges affecting IS adoption AATPTC?	Policy and Management
11	What are the ways that you are getting IS services from the college?	to gain Opinion

Source: Own source, 2020

Accordingly, the recorded interview data was organized and prepared for data analysis by typing it to notes and tried to acquire the general sense of the information. The coding was done by labeling words representing a category in the margins.

The first question presented to the interviewees was regarding the availability of information system leadership program/strategy in the organization, along with well-defined rules and a management system. We take the concept of Gole (2012), where information system leadership is "environmental excellence in your internal operations, your services, and community support".

A very similar response was presented by the interviewees. They all state that there is no information system leadership program and management system in place. In fact one of the interviewee, 'ICT manager' (on March 01, 2020) said,

"…One of our core values is stewardship which is focused on responsible use of IS not included. However, there is no a deliberate strategy in place currently to make our use or

information system environmental *friendly. Even though there are an attempt to include proper use of IS service in IT use policy and procure multifunctional service, these are not backed by a well-defined policies and procedures; we are lagging behind in that case."*

These findings are in total harmony with users and ICT staffs reflected on the policy metrics where they say there is no IS acceptable use policies, and aware if these policies requiring employees to use information system services and if there exists neither a management system to monitor compliance nor do they know on the existence of information system adoption policy.

The other Management question asked was if top executives (National Directors, SLT, and Line Managers) made an explicit commitment to overall information system sustainability initiatives by providing a support for training, Procurement of environmental friendly services. This question is based on the concept of information system management where the management gives a due attention to information system development, adoption procurement and others as decision makers. One of the respondents notes that

" In terms of top management support, the primary driving concern of trainings, procurement of services and others is not environmental friendliness, rather ensuring business continuity. For example while procuring services we look at our previous trends and identify which services have been not important and which have lasted long, which of the services were meeting the business requirements are the main concerns."

In this case two of the respondents share the fact that whenever the ICT departments propose training, the higher management has been helpful with giving the go-ahead as part, users and ICT staffs have been given different trainings.

"....however, aligning them with environmental friendliness or information system use has to be given due attention."

Next question deals with what the main considerations are when procuring IS services as this would help understand if environmental criteria are given due attention when preparing tender and RFP at organizational level. All respondents reflect a similar feedback noting the basic

driving factors when procurements are done business requirements, cost effectiveness, durability, user preference and if such services were in the office before, their track record or performance are not the major considerations. A respondent said

Hence inferring from the interview remarks there are no ways of including neither services energy efficiency certifications nor the supplier's environmental credentials.

In terms of the question How do you get information through networks and how do you identify information's which concerns you, the response provided by all informants portrays two approaches. One is through service contents, where there is a standard set time frame for given services. One of the respondents mentioned

"…for example the use life time for an internet is based on organizations payment."

Therefore, when the service payment time reaches or needs improvement the item can be categorized as a payment time. The second one is when there are services which are not functional; they don't categorize as maintainable items.

One of the interviewee included the below point when additional question was raised by the interviewer if all information system equipment's or services are maintained even are in good condition.

"let's take networks, it doesn't mean all networks maintainable*, if the ICT team believed that these are under good condition then they are given to other staffs to continue to use them or ICT can use these services as part maintenances, as ICT is part of the subcommittee for maintainable Items, When ICT gives the go-ahead for maintenance, Items are provided to professionals."*

When asked immediately if there is safe-installation for such maintainable services, one of the respondents said, *"All services are installed without keeping the rule of IS implementation process; there is no as such safe handling of system or framework"*

Regarding the availability of IS asset management system, all responded that there is no a system where each of the information system services are tracked from registration to adoption. For example

"There is no a web-based application that is accessible by the administration office and all staffs, where both parties can see which service are under the custody of each user while monitoring the users and service status."

Among the main factors affecting information system adoption and use in developing countries is lack of skill in the daily interaction with IS services. Accordingly one of the interview questions raised during the interview session was, if all ICT staffs have enough skills and knowledge to perform initiatives such as retire energy inefficient systems, enforce network management, server virtualization, information system devices optimization, internet down systems and etc.

Accordingly the responses show that the organization is trying to provide technical trainings to its IT staffs but there are some observations in the need for providing additional trainings. One interviewee interestingly put his observation and articulates it this way.

"…in our field monitoring visits (document reviewing), we sometimes observe IS services marked as un functional systems, yet with a miner maintenance they can be less used or their parts can be utilized, this indicates there is a need for skill enhancement."

Also noting the need of training is also due to *"… ICT staff turns out rate, where new staff needs to be capacitated immediately".* Other respondent noting that *"Capacity building as part of skill enhancement is needed as it should be a continuous process…."*.The final question asked was a hypothetical question to inquire more about what they could have done better in adoption of IS and use in their organization. One of the respondent said *"Everything we do should be governed by policies and guidelines…..as a national office; we need to include environmental criteria when assessing our IS services and infrastructure such that information sharing efficiency, idle time reduction and network management are looked at. These things have to be incorporated in our quarterly infrastructure assessment check list. Also there are needs for leveraging our intranets to inform users on proper and efficient use of services to raise their awareness and skills…"*

4.4.1. Factors affecting adoption and use IS service

The finding from interview have addressed the first research question which asks about the current practice in adoption and use of IS services in the organization. This paved away for the identification of the challenges in light of adoption and use. As literature has it, attaining IS use and adoption needs very intentional intervention from organizations from the very beginning of services. The evaluation showed gaps in adoption and use of IS services. Here below presented are factors affecting use and absence of proper adoption from both observation and interview findings.

4.4.2. Factors Affecting proper adoption and use

According to the interview data analysis and discussion, the overall respondent's feedback has shown issues hampering full-fledged adopt and use of IS services in the organization. Policy, leadership, Skill and resource limitations have been identified. Here below in table 4.3 is a summarized portray of factors vis-à-vis the corresponding evidence as extracted from the interview.

Table 4-3Factors affecting IS use and Adoption

No	Factors considered	Evidences Extracted from the interviews
1	Lack of policies and guidelines	*"There is no a deliberate strategy in place currently to make our use or adopting environmental friendly"*
2	Leadership Commitment and support	*"The primary driving concern of trainings, procurement of services and others is not environmental friendliness, rather ensuring organizational continuity."*
3	Skill enhancement issues	*"We sometimes observe services marked as obsolete and failed down, yet with miner maintenance or they can be their parts can be utilized, this indicates there is a need for skill enhancement."*

		"Capacity building as part of skill enhancement is needed as it should be a continuous process…."
4	Incomplete Infrastructure and resource Audit	*"As a national office, we need to include environmental criteria when assessing our IS services and infrastructure and network management are looked at. These things have to be incorporated in our quarterly infrastructure assessment check list."*
5	Data center inefficiency	*"Most of the focus in the design of the data center has not been on high availability, that's why some systems are not over utilized."*
6	Handovers with our proper guidance	*"Service providers are not solely made by the organization, but together with the IT organizations so they propose which materials or designs and so on need to be given these services." However further elaborating that "...the organization doesn't provide the manuals and recommendations though when providing the handouts."*

Source: Field survey, 2020

At this stage, the challenges affecting IS adoption and use in the organization have been identified addressing the second research question of the study inquiring about what the challenges affecting IS usage and adoption are at Addis Ababa Tegebareidpolly technique college. As discussed in the design and development section of the research methodology, the challenges are mapped with literature as part of the design process for the framework.

4.5.Discussion

As per the observation, interview and document reviewing, key findings are discussed here below against the research questions set out at the beginning of the study. The findings of the study and elements for the construction of a framework are grouped in to three themes; environmental, organizational and technological. In the three themes there are also found attributes such as, infrastructure and financial support, government regulations support, need of IT professionals, and policies and guidelines support.

The first research question was about the current IS adoption and practice at the organization. And one of the major findings in both the observation and qualitative assessment has been lack of comprehensive policy that ensures a full-fledged IS adoption and use of IS services. The findings showed that there is no IS Acceptable use policy in the organization yet which include issues like requiring employees to use IS services and procurement of energy efficient services. There is no a data center with a policy. While communication of available policies, procedures/guidelines for IS service use and adoption is also an area of improvement. Daniel (2018) also identified lack of policy as an important factor hampering IS adoption and use, although he didn't provide the list of policies required.

In terms of educating users about use of IS, the findings showed that there is a need for information creation methods. Another finding showed that there is an awareness gap between the users and ICT staffs on that issue as ICT staffs tend to be much more aware. Making the adoption and use of IS service important requires all parties to collaborate together, therefore all possibilities to create awareness shall be utilized. The issue with awareness impacts the skill and practice of user as well. Also as applied in the practice metrics most users forget to properly use the services when idle while any services that lie idle, for a significant period of time, fail down or put into a low speed as all the hardware in the organization are capable to survive these state changes without loss of function or reliability. In connection to this scholars also recommend awareness creation as a major factor to good environment (Freeman & Baa-acquah, 2017; Mahjabin , 2017).Hanne (2011) also states that developed countries are encouraging use of IS through raising awareness.

The second research question was about the challenges affecting IS adoption and use in the organization; in relation to this the most notable point has been failure on laying the foundation of service use and adoption in a comprehensive policy, lack of environmental considerations in procurement of IS service and lack of strategic Adoption plans by business units. Hence, this issue shall be addressed through an inclusive policy. Philipson (2011) points out IS re-new policy, IS operations and service policy and IS sourcing Policy as policies to be incorporated in good IS. Therefore, this policies set out by scholars should be prepared in the organization.

The other factor affecting IS adoption and use is the incomplete infrastructure and resource audit in the organization as it doesn't consider environmental criteria's. Hence auditing the existing physical equipment and services helps to establish what equipment/service is in place and what service(s) it delivers and accordingly identifies inefficient devices, hazardous materials, IS equipment/services that need to be decommissioned. An audit of employee's awareness, practice, and skill in light of environmental perspectives is also critical component lacking in the organization. An audit of rooms used to store IS components that need to be adopted are needed as IS service. The audit findings then can be used as an input to plan next action. This could be awareness creation, skill enhancement or providing technical support.

4.6.Framework Requirements

Based on the discussed factors affecting use and, adoption of information system identified via interview, questionnaire and direct observation help the researcher to generalize the research findings and develop framework. The requirements below in table 4.4 were generated for the framework design and development in this study.

Table 4-4 requirements for use and adoption of Information System

No	General Category	Requirement
1	**Environmental Theme**	**Competitiveness of an organization**
		• Infrastructure and resource support • Competition inter universities and colleges • Government regulations and support
2	**Organizational Theme**	**Organizational Readiness**
		• Resources (Financial support) • Handovers with proper guidance • IT professional
		Top Management Support
		• Leadership Commitment and support • policies and guidelines support
		User Involvement
		• Skill enhancement • Technical staff involvement for system training for other user`s • User`s knowledge of IT
3	**Technological Theme**	• Compatibility • Simplicity • Perceived ease of use by user`s • Perceived usefulness by user`s • Attitude towards usage

At this stage, the challenges affecting IS use and IS adoption in the organization have been identified addressing the second research question of the study inquiring about what the challenges affecting IS use and adoption are at Addis Ababa Tegbareidpolly technique college. As discussed in the design and development section of the research methodology, the challenges are mapped with literature as part of the design process for the framework.

Chapter Five

Design, Demonstration and Evaluation of the Artifact

5.1. Overview

Based on the results of the study via observation, interview and questionnaires as well as literature review identified the following framework is proposed for better adoption of information system and for effective educational service delivery in Addis AbebaTegbareid Polly Technique College.

Here under detailed discussed of the proposed framework and its demonstration for the concerned organization and evaluation by experts is given.

5.2. Proposed Framework

The proposed Framework model of successful IS adoption for educational service delivery in Addis Ababa Tegbareid Polly Technique College, is described below according to the order of its impact on successful IS adoption for educational service delivery are environmental theme, organizational theme, and technological theme respectively.

Environmental theme:

In the environmental theme which indicates that the factors have been identified as competitiveness of an organization. An organization with a competitive or/and partnership sense has more probability in IS adoption. In this case competitiveness is expressed in a sense of coping up with an international partner organization. So, to be able to work with their partners that are more advanced in the technology Addis Ababa Tegbareid Polly Technique College tend to adopt IS. In the environmental theme, three major factors have been identified as influential for successful IS adoption, these are Infrastructure and resource support, competition inter universities and colleges and governmental regulations and support.

Organizational theme:

In the organizational theme, three major factors have been identified as influential for successful IS adoption, these are organizational readiness, top management support and user involvement.

Organizational readiness is found to be more important when resources (financial support) which help making the organization ready for IS adoption are available, Handovers with proper guidance is found, and IT professionals are involved. Whereas, in the second attribute for organizational theme, top management support is found to be more important and need to have Leadership Commitment and support and should base on policies and guidelines support, unless and otherwise the support can be biased and lead to adoption of IS that does not meet users requirement. In the third major factors of organizational theme which is user involvement is also found to be more important when Skill enhancement in giving system training for other user's that will have positive perception towards system's usefulness, when user's knowledge of IS is available, experience and users active participation is needed.

Technological theme:

The last but not the list theme of the proposed framework is technological theme and in the technological theme the technology to be adopted has two attributes and these should have characteristics of compatibility and simplicity. These characteristics will help users' perceive the system as easy to use and as useful in their work operation and knowledge. User's positive perception on the technology in regard to perceived ease of use and perceived usefulness will make positive impact on user's attitude towards usage of the system, which is the final and ultimate goal of the technological attribute. To get positive perceived ease of use or perceived usefulness both the IS Adoption must have both compatibility and simplicity character. The framework also shows perceived ease of use and perceived usefulness both are dependent on each other while attitude towards usage is dependent factors and the result of positive perception of both perceived ease of use and perceived usefulness.

Generally, the framework of successful IS adoption for successful educational service delivery in Addis AbebaTegbareid Polly Technique College, the relationship can be expressed as, the independent variables which are environmental theme (competitiveness of an organization), organizational theme (organizational readiness, top management support and user involvement), and technological theme (compatibility and simplicity) respectively. Furthermore, developing more advanced framework and solving the causes of attributes of each framework is contributed for successful IS adoption for educational service delivery in Addis Ababa Tegbareid Polly Technique College.

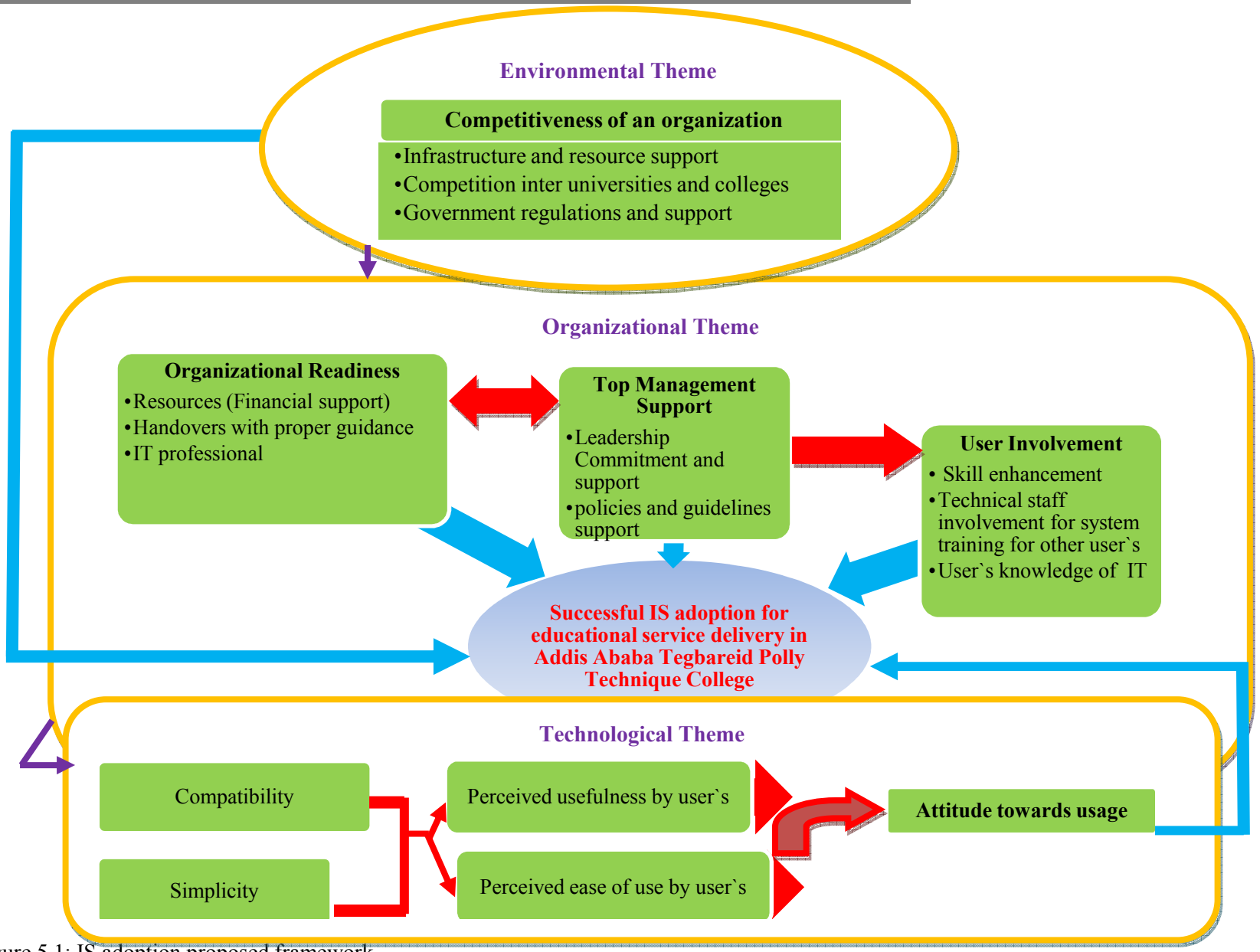

Figure 5.1: IS adoption proposed framework

5.2.Demonstration of the proposed framework

One of the defining characteristics of DSRM is demonstration and evaluation of the IS artifact designed. Pefferset al. (2007) noted that demonstration of an artifact's ability to solve the problem via experimentation, simulation, case study and other appropriate activities is necessary then after the artifact can be evaluated on how well it supports a solution of the problem, Hevneret al. (2004) as well described that the utility, quality and efficacy of a designed artifact must be rigorsly demonstrated. This includes functionality, completeness, consistency, accuracy, performance, reliability, usability and fit with the organization and other relevant quality attributes. The evaluators understand the framework for evaluation by forming discussion group.

Accordingly the proposed framework was demonstrated to five ICT staffs who participated in the interview process and three administrative staffs.

5.3.Framework Validation

Generally two types of evaluation was conducted, first was through expert interview and the other was through evaluation survey as attached in appendix D, E and F.

The expert interview was necessary as experts are believed to have the knowledge about the problem or its possible solution. In this study, the choice of an expert was done based on expert's past experience in working on IS researches.

5.3.1. Framework validation procedure using evaluation survey

Prior to the interview, a copy of the problem statement and the framework details were sent via e-mail so that a clear picture of the framework is available beforehand thenphone conversation was conducted to elaborate the framework in detail and provide a context on the issue.

Thereafter, an interview guide containing a list of questions was shared with a goal of verifying the four imperative's components, completeness and comprehensiveness. The interview guide and response are attached in appendix E and F respectively. This helped to obtain expert confirmation that the proposed framework would contribute towards IS adoption.

5.3.2. Framework validation procedure using evaluation survey

The next phase of the evaluation was done through evaluation survey adapted from Elsa (2015) as per the attached criteria in appendix D. Participants were purposively selected. Hence, it was done with all ICT staffs who participated in the questionnaire process and three administrative staffs who are positioned to know about IS adoption. This helped evaluate the completeness, clarity, comprehensiveness, understandability, suitability, correctness and applicability of the framework. All the eight participants completed the survey with a 100% response rate. As is presented below the evaluation results were analyzed.

5.3.3. Evaluation result of the proposed framework

In order to evaluate the consistency of the survey, Cronbach's alpha reliability test is applied and the result is depicted in table 4.5. The value for the Cronbach's Alpha is 0.912 indicating reliable survey for it is greater than 0.7.

Table 5.1.Reliability Statistics for the evaluation questionnaire

Cronbach's Alpha	N of Items
.912	11

Reliability Statistics

Here below in table 4.6 is presented a descriptive analysis of each of the evaluation questions to show user acceptance. Evaluation criteria used in this study is adapted from Elsa (2015) based on Hevner et al. (2004) evaluation guidelines.

The mean value for each is greater than 4 which clearly show the respondents strong agreement on the clarity, usefulness, completeness and correctness of the framework. The aggregate mean (mean of mean) is 4.64 which are very good.

Table 5.2.Mean and standard deviation of the Framework Evaluation Survey (Evaluation criteria adapted From Elsa (2015) based on Hevner et al. (2004) evaluation guidelines

Descriptive Statistics

Evaluation Criteria's	N	Min	Max	Mean	Std. Dev
The Proposed Framework is understandable.	8	4.00	5.00	4.87	.353
The proposed framework is comprehensive in terms of coverage.	8	4.00	5.00	4.50	.534
The organization and presentation of the framework is suitable.	8	4.00	5.00	4.75	.462
The objective of the four imperatives (Strategic, Tactical, Operational & continuous improvement) is comprehendible.	8	3.00	5.00	4.62	.744
The objective of the framework is comprehensible.	8	4.00	5.00	4.75	.462
The contents of the proposed framework are clear.	8	3.00	5.00	4.37	.744
The contents of the proposed framework are correct.	8	4.00	5.00	4.62	.517
The contents of the proposed framework are complete.	8	4.00	5.00	4.25	.462
The proposed framework is applicable.	8	4.00	5.00	4.75	.462
The implementation of the proposed framework fits with the organization.	8	4.00	5.00	4.75	.462
The applicability of the proposed framework is useful for IS Adoption success.	8	4.00	5.00	4.75	.462
Valid N (listwise)	8				

Source: Field survey, 2020

According to the evaluation result, the utility and applicability of the framework has the highest aggregate mean value of 4.75 indicating that the respondents agree the framework is applicable, fits the organization and is useful for IS adoption. The presentation of the framework being in a suitable manner, its comprehensibility and coverage scored second high

aggregate mean value of 4.69 which again demonstrates respondent's strong agreement on this matter. By comparison the content framework has the lowest mean value of 4.41 suggesting possible areas of improvement to ensure its completeness.

Chapter Six

Conclusions and Recommendations

6.1. Overview

This chapter presents the main conclusions of the research. Additionally, recommendations are put forward with potential research areas.

6.2. Conclusions

Organizations are continuing to rely on technology to perform their business, while on the other hand educational institutions are number one concerns across the globe. A literature show that IS is not implemented well at higher education institutions. Part of the problem as loss of management control over system connectivity and application integration challenges for organizational change requirements hidden costs of enterprise computing scalability, reliability and security while it is part of the solution for it to enable colleges to decrease the resource intensity in school society.

So as to solve the problematic role of IS in the college, adoption of IS was introduced as part of the adoption initiatives in various sectors. IS adoption refers to the study and practice of designing, manufacturing, using, and managing of Information systems in a friendly manner.

Especially for developing countries like Ethiopia, Where the government is highly determined to expand the use of IS across the country, one of the primary assignments is to make adoption and use of IS. This is what this research attempted to address by taking one of the major polly technique college as its case.

In order to address the research questions and design the framework, a DSRM with multiple data collection procedure was employed. The approach helped a rigorous design and development process to come up with the framework. After a thorough literature review, a conceptual framework was designed, identifying the areas that need to be investigated in the research. Hence, awareness, policy, practice, skill, management and technology factors were assessed in perspective of energy efficiency, eco-friendly IS management, corporate social responsibly were asked. As part of data collection interview and document review were employed. Aiming to assess the current IS uses were used and accordingly yielding factors

affecting IS use and adoption. The design of the framework passed through several steps, firstly the information found from the document and interviews were analyzed. Then it was mapped to the literature to come up with first level design. The interview session, the interview participants to better design the framework as participatory modeling was used. Finally the proposed framework was evaluated with a 92.8 % satisfaction.

The first research question was on how the current information system adoption is suitable for educational service delivery system in Addis Ababa Tegbareidpolly Technique College and the key findings have showed that the soft aspect of creating awareness about the issue needs attention. The finding showed that skill enhancement programs or periodic trainings are not being given and there's no periodic training on proper use of IS in the organization which is essential both to users and ICT staffs. In terms of Policy the results showed that the organization is not deliberate in embracing Information system adopting practices in a policy while the organization is doing well in terms of using IS.

The second research question poised was about the challenges affecting the adoption of IS in Addis Ababa Tegbareidepolly technique College. Accordingly, the below factors were identified. These are lack of comprehensive policy, skill gaps, lack of Management commitment, lack of strategic adoption plans by educational units, lack of user involvement, and absence of financial support.

Hence to solve the identified challenges, the study proposed a framework for IS adoption for Effective education service that can be used as a guide. As the factors identified were different in impact and need every staff engagement, the solution needed to be framed accordingly to address it. Therefore, the design of the framework was rigorously done to attain that goal.

6.3. Recommendations

In the course of this study, useful insight on how the adoption and use of IS in the AATPTC. These insights are helpful for the organization to act to address the gaps. The proposed framework can be used as a guideline to solve the challenges. Furthermore, the following recommendations are forwarded on how to adopt and use IS considering the major issues that this study addressed.

- There are awareness, skill and practices gaps among user on the issue, for successful implementation of IS, all staffs should come on board. Hence knowledge sharing platforms and capacity building tasks should be conducted.
- Management championship is needed to full-fledged implementation of IS which is of a great help in influencing other staffs to foster it.
- Available adoption and use policy need to include IT infrastructure readiness and that they need to be well communicated and managed.
- While procuring IS service, even though business continuity shall be given priority shall be considered for lasting IS and implementation.

Recommendation for Future work

Throughout this study, potential areas for further research have been identified. Here below are the researcher's suggestions for future work.

- The Framework is a high-level framework but each components of the framework requires detail guideline. Hence, developing implementation guideline is a potential research area.
- The impact assessment of the proposed framework is recommended to be researched in order to assess the consequences of the framework with respect to its contribution on the overall improvement and success of IS use and adoption. Based on the output of the assessment study, the framework can be enhanced by identifying improvement opportunity through impact assessment study.
- IS adoption for Polly Technique College is a fairly new concept and as many educational institutions which are capital intensive started working in Ethiopia, their readiness assessment need to be studied.

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Addis Ababa University

College of Natural and Computational Science

School of Information Science

Appendixes and Annexes

Appendix A: Interview Outline

Code: M&AdC,S

Preface

I would like to say thank you for your participation and cooperation for giving interview in this research. This research is being conducting as a partial fulfillment of the requirement for the award of the Degree of Masters of Science in Information System. The interviews you are going to answer to questions are as the aim of to collect data and information regarding to a research on Propose a framework for Effective education service delivery by using information system: The case of Addis Ababa Tegbareidpolly Technique College and used to provide appropriate suggestions to develop effective education service delivery by using information system for a better practice and adoption of IS in Addis AbabaTegbareidpolly Technique College.

Introduction

1. The interview comprises questions related with IS adoption in Addis Ababa Tegbareidpolly Technique College.
2. The information you provided on the behalf of your institution in the following interview part will be used only for academic purposes and all data gathered during the interview will be kept confidential.
3. May your institution wish to receive a copy of the final research report? If so, you are welcome to contact me to the following address.

Mr. TewodrosBelew

Phone: (0913) 39 14 94

Email:

General Information

Job Position; ICT manager and Administration coordinator

Institution; Addis Ababa Tegbareidpolly Technique College

Questions

Use;

1. Do you think your organization has information system leadership program in place, along with well-defined rules and a management system? And is there IS strategy in place?
2. Do your top executives (National Directors, SLT, and Line Managers) make an explicit commitment to overall environmental sustainability initiatives? Providing a support for training, Procurement of information system, follow up on the implementation of policies?
3. What are your considerations when you procure IS service?

Adoption;

4. Do you have a well-defined IS asset management system/program in place? If yes, what happens when an IS service down?
5. Does your organization have rules and processes in place for IS services and other internal assets by maintaining or changing their intended capacity, and these rules and processes are effectively implemented?
6. Do you supported by IS services provider? If yes, do you have a policy for receiving support from IS service providers?

General question;

7. Do you think all ICT staffs have enough skills and knowledge to perform initiatives such as retire energy inefficient systems, enforce internet management, server virtualization, information sharing, service down systems etc.
8. If you were given the chance to make the adoption of information what could have you done?
9. What are the challenges affecting IS adoption in Addis Ababa Tegbareidepolly technique College?

Thank you!!!

General Information

Interview questions for Student representatives

Institution; Addis Ababa Tegbareidpolly Technique College

Questions

1. How do you get information through networks and how do you identify information's which concerns you?
2. What are the ways that you are getting IS services from the college?

Thank you!!!

Appendix B: Proposed Framework Evaluation Questionnaire Outline

Code: M &AdC,

Preface

The objective of this study is to propose a framework for Adoption of information system for educational service delivery in Addis Ababa Tegebareidpolly Technique College based on the current practice in use and IS delivery service. As per our framework demonstration session on May 10 with you, some amendments have been done on the proposed framework. Since evaluation of the framework is among the necessary requirements of our research approach, therefore, this survey is to evaluate the proposed framework with respect to its comprehensiveness, clarity, completeness, compatibility, correctness and applicability.

All information you provide will be kept confidential and we would greatly appreciate you for taking the time to complete the questionnaire.

Introduction

1. The questionnaire comprises close ended questionnaires.
2. You can tick"√" in the box □appropriately in front of your choice and write in words to give explanation where necessary.
3. In case you have more than one response please provide as many response as you can for each questions.
4. May your organization wish to receive a copy of the final research report? If so, you are welcome to contact me to the following address.

Mr. TewodrosBelew

Phone: (0913) 39 14 94

Email:

No	Evaluation Questions	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
General						
1	The Proposed Framework is understandable					
2	The proposed framework is comprehensive in terms of coverage.					
3	The organization and presentation of the framework is suitable.					
4	The objective of the four imperatives (Strategic, Tactical, Operational & continuous improvement) is comprehendible.					
5	The objective of the framework is comprehensible.					
Regarding the content of the framework						
6	The proposed framework is applicable.					
7	The implementation of the proposed framework fits with the organization.					
8	The applicability of the proposed framework can improve Adoption of IS for service delivery success.					

Thank you!!!

Appendix C:Proposed Framework Evaluation Interview Outline

1. Do you think the objective of the four imperatives (Strategic, Tactical, Operational and continuous improvement) is comprehensible and necessary?
2. Do you agree on the components of the proposed framework?
3. Is the framework comprehensive enough?
4. Do you think the framework will contribute towards Adoption of IS?

Thank you!!!

Appendix D: Interview Transcripts

1. Do you think the objective of the four imperatives (Strategic, Tactical, Operational and continuous improvement) is comprehensible and necessary?

"The four imperatives are well put and I agree that they are necessary as they address the issue in a systematic approach. Given the type and volume of the problem, it is good that you identify what has to be done in each of the three imperatives. And adding Continuous improvement as a cross cutting imperative was also a great point."

2. Do you agree on the components of the proposed framework?

"Yes, I agree with the components of the framework, however, minor modification is needed in the layout. The framework in general shall be encompassed in a box and the other thing is the directions between the tactical and operational imperative shall be bi-directional. Because the audit findings are used as an input for the operational imperative and based on the gaps and experience identified in the operational imperative the plans in the tactical pillar can be adjusted."

3. Is the framework comprehensive enough?

"For a successful Adoption of IS, policies, plans, methods and support mechanisms are necessary covering the areas of awareness, practice, skill and technology."

4. Do you think the framework will contribute towards IS adoption?

"The Framework clearly shows what organization should do for a successful IS service delivery, it guides what to be done at what stage. Hence, it will definitely contribute towards IS Adoption"

Annexes: Interview Details

No	Code	Institution	Gender	Job Position	Involvement in research	Number of delegates	Date
1	M1	Tegbareid Polly Technique College	M	ICT Manager	Interview	2	March 01, 2020
2	C1	Tegbareid Polly Technique College	F	Administration coordinator	Interview	2	March 03, 2020
3	S1	Tegbareid Polly Technique College	M	Student representatives	Interview	4	March 05, 2020
Total number of interviewee						8	

Source: *Field Survey, 2020*