Journal of Information Systems and Informatics
Vol. 3, No. 2, June 2021 e-ISSN: 2656-4882 p-ISSN: 2656-5935
http://journal-isi.org/index.php/isi Published By DRPM-UBD

Developing an Improved ITSM Framework for Ethio Telecom

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Abstract

Telecom service providers are engaged exhaustively in providing various kinds of IT services for their customers. These IT services should be customer-oriented, and quality-based to be competitive in the market. To this end, organizations should manage their IT services effectively and efficiently by introducing various Information Technology Service Management (ITSM) mechanisms. However, improving or developing optimal ITSM mechanisms is a subject of great concern that needs further investigation academically. Hence, developing an improved and customized ITSM framework to manage the various IT services delivered by the IT service provider is important. To the best of the researcher's knowledge, little or no research has been conducted to design and develop ITSM frameworks for the telecom sector in Ethiopia. Previous studies focused on the implementation, adoption, tailoring, and system or model development for selected ITSM processes within the Ethiopian context. Ethio telecom (ET), the sole telecom service provider of Ethiopia, has a gap in the existing ITSM practices. Hence, this research study intends to investigate the current ITSM practice of Ethio telecom and propose an ITSM framework based on ITIL best practices that ensures the quality of IT services and improve customer satisfaction. Design science research methodology was employed to design and develop the ITSM framework. Furthermore, a qualitative research approach was followed to gather and analyze the primary data. Semi-structured interviews, observation, and document analysis were employed to collect different kinds of data. Also, thematic analysis was used to analyze the data that was collected from the respondents. A triangulation technique was applied to keep the validity and reliability of the research study. The findings of the research revealed that the existing ITSM practice did not address the needs of the organization. Finally, a new ITSL framework was proposed by incorporating the needs of the organization and demonstrated to selected respondents after passing through rigorous design, development, and evaluation stages. The proposed framework was evaluated by various IT staff through validated evaluation models. Consequently, the evaluation result disclosed that the proposed framework can help to improve the current ITSM practice of the company by maximizing the quality of IT services and customer satisfaction.

Keywords: ITSM, ITIL, ITSM framework, Improved ITSM framework, Service components, Continuous incremental improvement, Ethio telecom

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

1. INTRODUCTION

Information Technology (IT) is playing a substantial role in different organizations. In past times, a lot of IT organizations concentrated on technical activities but nowadays they are shifting towards providing high-quality services,(Talla & Valverde, 2013). As per the findings of (Mangalaraj, Singh, & Taneja, 2014; Spremić, 2009), IT has been shifted from supporting the business to adding a competitive advantage. (IT Governance Institute (ITGI), 2003) stated that IT is necessary to manage transactions, information, and knowledge that are mandatory to maintain social and economic tasks. IT has many opportunities for organizations and these are having a competitive advantage, higher productivity, and performance. (Chan, 2000) strengthens this fact that IT was acting as a supporting tool of the business but nowadays this concept has changed. Nowadays most organizations exhaustively depend on IT to meet their vision, objectives, and business strategy, (Mourad & Johari, 2014). One of the IT organizations that use IT as their key asset for their business transaction is the telecom sector. IT has created an enormous opportunity for telecom sectors in achieving their business goals and objectives. According to (Jäntti & Cater-Steel, 2017) most IT service provider organizations are engaged in improving their IT support processes by introducing IT management frameworks. IT Service Management (ITSM) is part of the service science discipline that focuses on IT operations, (Galup, Dattero, Quan, & Conger, 2009). To effectively manage several IT services organizations tried to adopt and implement well-known or customized ITSM frameworks. As a sole telecom service operator, Ethio telecom (ET) is providing various services and products. By the means of advanced IT, the company is trying its best effort to deliver several products and services to its customers.

In Ethiopia, even though the IT service is emerging dramatically but there are little research works. According to (Daniel, 2015) findings, due to weak management of IT and lack of skilled human power, the company is experiencing different kinds of challenges, among these, some of the research works focused on measuring and assessing user perception in relation to the IT services that are provided by the IT service provider, specifically Ethio telecom. (Tesfaye, 2013; Yeshewas, 2017) suggested that the company should assure all its services are quality based and customer-oriented. Those research studies only showed how the service quality can impact customer satisfaction and what kind of activities the organization should do to provide a better IT service to its customers. However, concerning the ITSM domain, there are few studies in this area. A study that was conducted by (Alemeye, 2015) assessed the factors that are responsible for the success and failure of ITIL implementation in ET. The author empirically studied the critical success factors that are determinants while implementing the ITIL framework. According to the study, the company has faced different barriers while implementing the framework. Some of the unique company-specific barriers that are identified by the study are; difficulty in process governance and management,

process misalignment, weaknesses in organizational change management, rigid organizational structure, and complexity of integrating ITIL to the existing system. Thus, to get rid of those barriers, the company should focus on its specific issues and introduce an improved method. (Melikte, 2016) designed and developed an ITIL based service desk system that assigns tasks to technicians automatically with the intent to improve the ITSM practice of Ethiopian Airlines. The developed system aligned with the ITIL standard and it helps to solve the issues that were observed while providing various solutions to internal customers of the company. (Tadesse, 2017) introduced a tailored ITSM framework based on ITIL best practices for Bunna International Bank. The study assed the existing ITSM practices of the organization and proposed a tailored ITSM framework. However, the study only focused on tailoring the ITIL processes and gives more emphasis on processes rather than including the remaining ITIL functions.

Overall, this indicates that the domain area is still open for further research works since the aforementioned studies only focused on the implementation, adoption, tailoring, and system or model development for selected ITSM processes within the Ethiopian context. Moreover, to address poor service quality and customer discontent, IT organizations should work on their internal needs and capability while designing, developing, and improving their ITSM frameworks. Ethio telecom, has undergone various organizational changes since 2018/19 which resulted in the establishment of new divisions, departments, and sections. The organizational change is aimed at creating an agile and responsive structure that serves the business need and customer expectations. To this end, a new strategic plan was introduced in order to make the company a competitive business firm. As a result, the strategic plan is expected to improve the IT service quality, address changing customer demand, enhance network availability, and fortify infrastructure management. Even though the company is undertaking various measurements to improve its IT services, it is facing difficulties to provide quality services and satisfy customer demand. Furthermore, the researcher's preliminary investigation indicated that there are repetitive service interruptions, continuous customer complaints on the service quality and demand, reactive service handling, vendor dependency, inadequate service planning, and scarcity of service management methods.

This entails that a mechanism should be brought in to address the existing ITSM issues of the organization by taking the organizational changes, and strategic plan into consideration. Therefore, proposing a framework can be taken as a prominent endeavor in this regard. However, to the best of the researcher's knowledge, little or no research work has been conducted to design and develop ITSM frameworks for telecom sectors of Ethiopia. This proposed research attempts to fill the gap that has been seen in the telecom sectors of Ethiopia since telecom sectors are exhaustively engaged in providing various IT services to their customers. More specifically, the study seeks to find a solution after examining the current ITSM

practice of ET and proposes an improved ITSM framework based on the ITIL best practices. In order to address the above research problems that are discussed thoroughly, the researcher has formulated the following research questions.

1) What is the current status of ITSM practice in Ethio telecom?
2) What ITSM Framework can best fit Ethio telecom based on the ITIL best practices?

The main objective of this study is to propose an ITSM framework based on ITIL best practices for Ethio Telecom that will ensure the quality of IT services and improve customer satisfaction. In order to meet the general objective of the study, the following activities will be done throughout the study.

- Examine the current ITSM practices of the company.
- Review various ITSM frameworks and more specifically ITIL-based ITSM frameworks.
- Propose an ITSM framework based on ITIL best practices that best fit ET's specific context.
- Evaluate the applicability of the proposed framework.

2. METHODS

This study intended to design and develop a framework based on the prior works of literature, the organization's existing status, and business needs therefore, the researcher adopted the design science research methodology (DSRM) as a research approach. Several scholars proposed a DSRM process model that helps to guide the overall research flow, and this study adapts (Hevner, 2007; Peffers, Tuunanen, Rothenberger, & Chatterjee, 2007) DSRM models together. The adapted model provided a road map through its principles, practices, and procedures that were helpful to conduct a design science research. The process model had six basic steps that help to design and develop the framework. Moreover, the model was organized into three basic categories and these are relevance, design & evaluate, and knowledge base. The model was customized to fit the research study as shown in Figure 1.

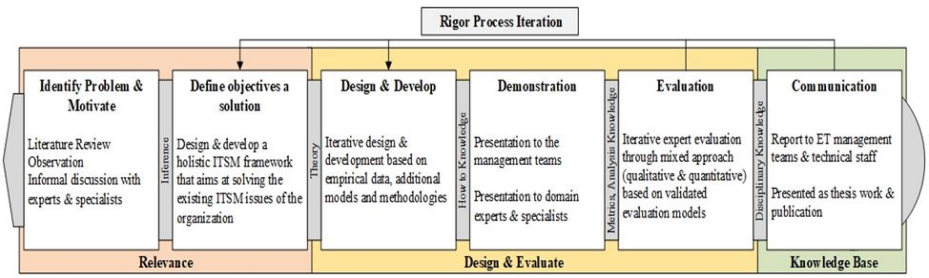

Figure 1. Research model

In this study, primary and secondary data sources were employed to gather the necessary data. The primary data was collected through semi-structured interviews with selected respondents, and an observation checklist. The secondary data was gathered through document analysis that was linked with the theoretical foundation, and the primary data sources. Moreover, a standard assessment model was applied to investigate and assess the maturity of the existing ITSM practice. The application and utilization of various data sources enhance the quality and increase the credibility of the research, (Patton, 1999, p. 1193). The population of the study included all employees of the organization who utilized ITSM in their daily activities. Furthermore, it included the respondents who participated during the ITIL implementation phase including ex-staff. Additionally, the participants who craft and monitor the processes of the organization were also incorporated. Based on the current structure of the organization; employees of the Information Systems Division including ex-staff, Information Security Division, and Customer Experience and Quality Management Division were incorporated as a target population for this research. A purposive sampling technique is used to select information-rich respondents. This way, the researcher picked 15 knowledgeable and experienced respondents who have better and deep knowledge of ITSM. In addition, a qualitative thematic analysis technique was adopted to clearly understand the themes and patterns of the phenomenon under study.

2.1. Research Methods

2.1.1 Problem Identification and Motivation

The previous study that was conducted in the company indicated that the ITIL implementation was hindered by company-specific barriers. Thus, proposing a suitable and relevant ITSM framework for the case company could be decisive to get rid of those barriers. Having this in mind, various pieces of literature was reviewed to grasp a firm knowledge of the areas of ITSM. Also, observation of the current practices of ITSM in the organization was supportive in order to visualize the problem in detail. Informal discussion with experts and specialists was crucial to get a better overview of the phenomenon. As a result, the researcher planned to improve the existing ITSM practice of the organization by designing and developing the ITSM framework based on the ITIL best practices.

2.1.2 Objectives of a Solution

The purpose of the research was to design and develop a framework that aims at solving the existing ITSM issues of the organization. Hence, the framework was expected to improve and maximize the IT service management of the organization.

2.1.3 Design and Development

In this phase, the actual framework came into existence through the help of different techniques and methods. Those techniques and methods were interviews, observation, document analysis, and assessment that help to investigate the current practices of ITSM within the organization. The techniques and

methods were mainly adopted from prior works of literature that have similarities with the domain and they were customized in order to fit the area under study. Thereafter the empirical data was analyzed qualitatively in a rigorous manner, and then the current issues of the company were distinguished. Lastly, by applying additional techniques and methodologies, the framework was designed and developed.

2.1.4 Demonstration

In this phase, the developed artifact which is the framework was presented to the respondents of the research study and selected staff of ISD. In order to demonstrate this framework, the researcher adopted the Agile Software Development Life Cycle (SDLC) methodology. The Agile method focuses on process adaptability and customer satisfaction. It is the result of iterative and incremental process models.

2.1.5 Evaluation

The final output of this research study was evaluated qualitatively by specific domain experts based on ISO/IEC 25010:2011 'quality in use' model through interview. In addition, the research study employed (Prat, Comyn-Wattiau, & Akoka, 2014, 2015) evaluation model to measure the proposed framework through the survey method. The evaluation survey was conducted by employing a five-point Likert scale data measurement technique. The implementation of iterative qualitative and quantitative evaluation methods throughout the research process helped to strengthen the research output. This argument is also in line with (Cleven, Gubler, & Hüner, 2009) perspective, they stated that a mixed evaluation approach (qualitative and quantitative) allows them to get an in-depth understanding of the quality of the artifact that is being evaluated. The final evaluation results of the study were presented through descriptive logical reasoning. (Hevner, March, Park, & Ram, 2004) indicated a descriptive informed argument used relevant research works to develop persuasive justification for the IT artifact.

2.1.6 Communication

The applicability and the usability of the framework on the subject area were finally communicated with ET management and technical staff. The report was well organized with the intent to justify the benefits that the organization will earn by applying the newly developed framework. Furthermore, as a research study, the overall research process was well documented and communicated as a thesis work. In general, the research output was expected to add new knowledge to the domain.

3. RESULTS AND DISCUSSION

The data has been collected through the semi-structured interview from the respondents of the research study that have deep knowledge about the subject area. The researcher has picked various respondents with different job roles and profiles for the study area. The respondents are directors, managers, experts, specialists, and supervisors. This entails that the research is more concrete since it

accommodates and includes the perspectives of various professionals. Additionally, among the respondents, some of them are certified in IT governance and ITSM fields. The researcher interviewed 13 respondents out of 15 samples; this is because data saturation was reached. The same or no new information has been found from the selected respondents. Besides the interview, the study has used document analysis and observation as additional data collection methods to enhance and enrich the research study. The triangulation technique is also applied to ensure the trustworthiness and credibility of the research study. Moreover, the ITSM assessment model has been applied to assess the current practices of ITSM within the division. The model assessed 26 processes along with the functions of ITSM. The empirical data together with the assessment model result is analyzed based on the thematic qualitative analysis techniques. In due course, the findings that resulted from the analysis are interpreted and discussed in relation to the current practices of ITSM within the division. The findings aimed at answering the research questions of the study and are used as inputs to design and develop the ITSM framework.

The data that was collected from 13 respondents (out of the total 15) had been analyzed based on the thematic analysis technique. The researcher had become familiar with the data that is conducted from the respondents to get a deep understanding of the subject matter. Through rigorous analysis, four basic themes are identified from the interview.

- Theme 1: ITSM orientation
- Theme 2: ITIL perspectives
- Theme 3: Assessment of the existing ITSM practice
- Theme 4: Perspective of the proposed framework

Each of the themes were supported by the available company's documents and the researcher's observation of the current ITSM practice of the division.

A) Theme 1: ITSM Orientation

The respondents were asked if they are familiar with the concept of ITSM before they are asked questions which required more deeper understanding of ITSM within their organization. This helped the researcher to get their general concept of ITSM and to shape the research. The feedback from the respondents was almost similar and the interviewees had a good understanding of the overall ITSM concept.

According to the commentary of Expert1, the concept of ITSM is narrated in connection with the gap of the company.

"It is the entirety of activities directed by policies, organized and structured in processes and supporting procedures that are performed by an organization to ensure that the appropriate mix of people, processes, and technology are in place to provide value. Ethio telecom is more or less in line with ITSM but more works should be done to satisfy the customer demand."

Director2 indicated the role of integration for better service delivery.
"…….. ITSM encompasses integration as one of its elements and this is because IT systems should come together while delivering an effective service to our customers."
The interviewee also highlighted the value of steady service through the customers' eyes.
"……Additionally, customers should get various IT services without service interruption."

Transcribed data extracted from the semi-structured interview	**Codes (subthemes) extracted from the transcribed data**	**Main Theme**
ITSM efficiently manages internal IT processes as per the standard to deliver satisfactory service for the end-user	Customer satisfaction	**ITSM Orientation**
The objective of ITSM is to design, deliver, manage, control, and improve IT services to meet the needs and expectations of customers that are aligned with meeting the objectives of the organization	Quality of IT service Business-IT alignment Service management	
ITSM encompasses integration and local context as one of its elements and this is because IT systems should come together while delivering an effective service to our customers	Service Integration	

The researcher found out that the employees had a better knowledge of ITSM and its related concepts. The respondents stressed the connection of customer satisfaction and quality of service with the objective of ITSM. They reflected their views that the objective of ITSM should be aligned with the company's business objective and vision. Figuerola (2012)[1] stated that ITSM supports the business objective and vision of the company, even it improves the services the company is providing. According to the company's three-year strategic plan which was announced in August 2019, it aimed at increasing the company's competitiveness and efficiency. The strategic plan which is also called BRIDGE has six themes and these are; best customer experience, reputable brand, innovative products/services, and technology excellence, develop a people-oriented learning organization, growth in financial capacity, and excellence in operation.

The company documentation also revealed that the organization is striving to satisfy a customer need, business demand, and high quality of IT services. In addition to this, the company plans to bring operational excellence, ensure affordable and quality services to the customers, (Ethiopian Press Agency[2], 2019).

[1]https://docplayer.es/2295631-Itil-v3-por-donde-empezar.html Accessed on Sep 15, 2019
[2] https://www.press.et/english/?p=10627# Accessed on Nov 05, 2019

Furthermore, the company's vision is to become a world-class telecom service provider. So, these factors should be mapped with the goal of the ITSM in order to achieve a quality of service and increase customer satisfaction. According to (Alqahtani, 2017), the objectives of ITSM can be different based on the organization's needs, directors, system, and other stakeholders who are susceptible to the organization's policies. Hence, the company should align its strategic plan based on the purpose of ITSM.

B) Theme 2: ITIL Perspectives

The other dimension that the interviewees were asked about was their level of ITIL knowledge and experience within the division.

The feedback from Manager3 manifested ITIL as a best practice that comprises various processes and functions.

"It can be taken as a set of best practices that helps an organization to achieve its business objectives. With regard to ET, we have implemented ITIL v3 later in 2011……. Some of the ITIL best practices which are processes and functions are followed very well in comparison to the others."

Expert1 pointed out the purpose of ITIL in relation to the structure of the division.

"……its objective is to create a service-oriented IT organization. The division's structure is crafted from the ITIL V3 phases and some of the section names are directly coined from the functions……"

Table 2. ITIL Perspectives

Summarized transcribed data extracted from the semi-structured interview	**Codes (subthemes) extracted from the transcribed data**	**Main Theme**
It is one of the IT Service Management frameworks since it helps an organization to achieve its business objectives by aligning the IT services	ITSM Framework	**ITIL Perspectives**
It can be taken as a set of best practices that helps an organization to achieve its business objectives	Best Practices	
ITIL is a framework for the governance of IT and continually measuring the performance of the IT services	Governance of IT	
It is a collection of prescriptive principles that helps an organization to improve its IT services	Prescriptive Principles	

The respondents stated the need for ITIL in relation to the division's mission. They indicated that ITIL is one of the ITSM frameworks and a collection of best practices. They attempted to show the benefit the division has gained in some areas. However, they also showed that the division needs a lot of improvements in several domains. The researcher examined that the four perspectives of ITIL were still not matured enough. Furthermore, they indicated that the division

implemented ITIL 2011, but it was not successfully addressed the initial consideration which was ensuring the quality of service. As per the findings of (Iden & Eikebrokk, 2014), there is a tendency of achieving better IT governance by implementing the ITIL framework.

The statement of (Mehravani, Hajiheydari, & Haghighinasab, 2011) indicated that ITIL goes beyond best practices within ITSM but also yields a framework for governing IT. They noted that the division structure resembled the ITIL V3 life cycle since it incorporated the four ITIL phases, and functions were taken as section names. The reflection of the respondents was also confirmed by various company documents. According to Figuerola (2012)[2], ITIL informs what an organization does rather than how to do it. Therefore, it is the responsibility of the given organization or division to examine the ground for successful implementation or improvement of ITIL.

C) Theme 3: Assessment of the Existing ITSM Practice

The existing ITSM practices of the company were assessed and investigated to identify the status of the overall ITSM practices. Furthermore, the researcher employed a validated capability model besides conducting an interview. This helped to know the current status of each ITSM process and function. Based on the outcome of the capability model the company's ITSM practice was placed on level 2. This means that some of the processes and functions have the tendency to be repeated but they are not performed according to the principle of ITSM. The result of the capability model was also supported by the respondents' feedback, documents, and physical observation.

According to the supervisor1 point of view, ITSM tools should be capable to provide efficient IT services.

"…… However, some of our services are not fully supported by the ITSM tools. We have used HP tools earlier but later it was changed to Microsoft without our consent and the new tool has a lot of gaps. Therefore, it should be customized to fit our current service delivery……"

Manager1 indicated the benefit of continuous and incremental service improvements.

"During the ITIL implementation phases there was a dedicated section which will monitor and examine the overall ITSM status but after some time the section vanished. It is necessary to continuously improve and add incremental changes. Improvements and dynamic changes are necessary for the division since we are the one who is responsible for managing and delivering IT services for our customers……"

Speciliast2 stressed the benefits of proper role assignment within ITSM.

"……the employees are not informed about their roles and responsibilities, and these have a major impact on the division."

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

Table 3. Assessment of the existing ITSM practice

Transcribed data extracted from the semi-structured interview	**Codes (subthemes) extracted from the transcribed data**	**Main Theme**
The current ITSM practice is hindered by organizational change, process or function misalignment, and local context issues	Process or function misalignment	**Assessment of the existing ITSM practice**
There is no standard metrics and measurements within each section that measure the overall status of ITSM	Organizational change	
Improvement and dynamic change are mandatory within the division	Continuous incremental improvement	
Only limited processes and functions are supported by ITSM tools, and they are not fully automated	ITSM tools utilization	
Most of the activities are performed without guidelines and there is high vendor involvement	Metrics and measurements	
	Supplier management	

The researcher incorporated two methods to know the maturity of the ITSM practice within the division. One of the methods that were employed was a semi-structured interview with other supportive techniques. The other employed technique was ITSM capability assessment model. The researcher adjusted the model to fit the area under study. The researcher investigated the pros and cons of (Mehravani et al., 2011) assessment findings and then incorporated them together to align with the existing ITSM practice of the division. The evidence that had been gained from the assessment model was supported by the respondents' feedback and it was also analyzed with the available company's documents. This helped to know the business need of the organization with regard to ITSM and then based on that the division can craft its processes or functions from scratch, or redesign old processes or functions that do not fit the current business need or improve the current processes or functions that are partially implemented or available or continue with the current processes or functions that are aligned with the current business objectives. The respondents indicated that even though there are promising activities with the current ITSM practices of the organization, there are major areas that need basic improvement. Some of the issues are listed as follows, inappropriate project management, repetitive service interruptions, reactive service handling, inadequate service maintenance and delivery, vendor dependency, lack of skilled human power, improper service planning, inappropriate resource utilization, and lack of integration.

D) Theme 4: Perspective of the Proposed Framework

The researcher observed that the current ITSM practice needs improvement in order to address the gaps that are hindering the division. The respondents had raised and discussed important points that should be included in the proposed framework. They articulated the issues that they had observed through their

experience and some of them even stressed the impact in relation to service quality, business-IT alignment, and customer satisfaction.
Expert1 emphasized that a feasibility study is helpful to know the existing gaps in the division.
"……it will be better to assess the current practice of ITSM or evaluate the maturity since the initial feasibility study is not performed during the ITIL implementation phase."
Ex-staff1 of the company that participated during the ITIL implementation phase strengthens the above point.
"……we just entered into the implementation phase with a hurry and without a clear plan……"
Specialist2 stressed the benefit of internal needs while thinking about a given ITSM framework.
"In my opinion, one of the ITIL implementation failures in the division raises from lack of local context and customization. ITSM frameworks should base on the internal needs of the company rather than fully adopting or implementing everything as it is. Therefore, I suggest that we should look inward to benefit the outward, basically our customers."

Table 4. Perspective of the proposed framework

Transcribed data extracted from the semi-structured interview	**Codes (subthemes) extracted from the transcribed data**	**Main Theme**
The company should learn from other company's experience and check the pros and cons of their ITSM frameworks	Customization & localization	**Perspectives of the proposed framework**
ITSM frameworks should base on the internal needs of the company rather than fully adopting or implementing everything as it is	Competitive advantage	
Current customer need, business requirement, technological advancement, and other related factors should be considered	Capacity empowerment	
We do not have an innovation center that helps to continuously address the latest issues and emerging technologies	Learning organization	
	Incremental assessment	

The respondents indicated their future suggestions on what the division should have to do to enhance or improve the existing ITSM practice. They informed that a better and improved ITSM framework is expected to address the issues that are discussed in the above section. As per (Alshamy, Elfakharany, & ElAziem, 2012), a given company should build and implement its ITSM which can effectively govern its IT services. Moreover, they stressed performing a feasibility study before rushing on adopting everything even they indicated that it was one of the reasons that make ITIL implementation unsuccessful. The feasibility study helped to understand the internal needs of the division and overall capacity towards ITSM. The researcher observed that ITSM components have not adhered, and

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

some limited procedures or policies support the ITSM practice. On the other hand, metrics and measurement techniques helped to evaluate or improve the ITSM activities. The respondents also reflected those lessons should be taken from other similar telecom companies that effectively use other ITSM frameworks. Other responses indicated that staff empowerment should be considered as one element within the ITSM practice. Another important issue that was raised by the interviewees was the misalignment of process and function in the current ITSM practice. Furthermore, the five-year strategic roadmap of ISD has identified six basic pillars that are expected to improve telecom service productivity until 2024. The pillars are focused on IT initiation, IT development and improvements, and building the division's internal capacity.

3.1. Framework Development

A) **The high-level framework**

The proposed framework (See Figure 2) can be considered as a descriptive conceptual framework that guides how the current ITSM practice of the division will be improved. This framework is built by incorporating the findings of the semi-structured interview, assessment model, company's documents, and researcher's observation, Additionally, several methods, techniques, and methodologies are included besides the empirical data. The proposed high-level framework has four basic phases, and these are plan, implement, control, and govern. The govern phase is responsible for managing and controlling the overall framework.

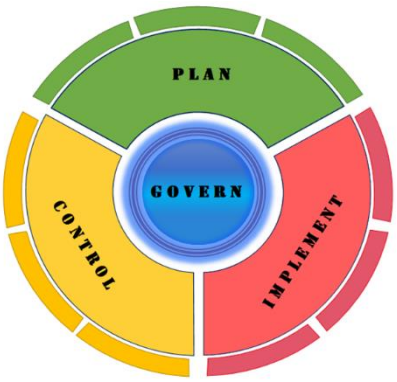

Figure 2. The proposed high-level framework

Plan: the planning phase is responsible for crafting high-level strategic plans and managing resources that are aligned with the business objectives of the company and customer needs.

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

Implement: the implementation phase focuses on designing and deploying different kinds of IT services. It performs several IT projects as per the strategic plan and delivers them to the operation team.
Control: this phase manages and controls every IT service throughout the lifecycle. It maintains and operates various services. It is the core of the division since a single point of failure will impact the overall service delivery and quality. It provides proactive service management rather than reactive. (Jäntti, 2016) stressed that IT service provider organizations should divert their focus from reactive problem handling to proactive service management. Various service issues are handled within a given service level agreement or metrics.
Govern: this central phase examines the service management activities and controls the structure of the proposed framework. It also secures the overall service management by employing various security policies. It integrates the framework with other IT governance frameworks of the organization. It stays up to date with the current business demand and changes through time to answer what is expected of the dynamic telecom environment. It checks the health status of every service and reports back to the planning phase.

B) **The low-level components of the proposed framework**
Each of the phases has interlinked service components. The phases and service components are interconnected with each other. The proposed low-level framework has 14 service components as shown in Figure 3. The activities are derived from the research findings and strengthened by incorporating concepts of ITIL-based ITSM frameworks.

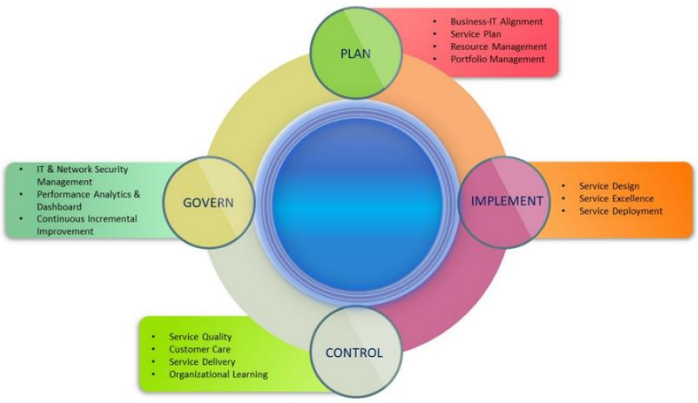

Figure 3. Low-level components of the framework

3.2. Framework Evaluation
The proposed framework was demonstrated pictorially to the respondents of the study and selected ISD employees through the agile SDLC methodology. The selected employees were chosen based on their deep knowledge of the subject

matter. The staff provided comments that should be incorporated into the proposed framework.

The researcher employed an expert evaluation method to evaluate the proposed framework through qualitative and quantitative approaches. In connection with this, two evaluation models were adapted to facilitate the evaluation activity. ISO/IEC 25010:2011 'quality in use' model was used to evaluate the proposed framework qualitatively in terms of effectiveness, efficiency, satisfaction, freedom from risk, and context coverage. Additionally, the model of (Prat et al., 2014, 2015) was applied to evaluate the framework quantitatively in terms of goal, environment, structure, activity, and evolution.
The qualitative evaluation findings show that some service components should be included like lesson learning from incidents. This component helps to improve the system to prevent future incidents that disrupt the service. The respondents also stated that the proposed framework should be inclusive, complete, and contextual. On the other hand, the evaluation survey was undergone through a Cronbach's alpha test to check the reliability or internal consistency of the instrument before conducting the actual evaluation. Based on that, the survey achieved a value of ~ 0.92, as shown in Table 1. This implies the question items have high collinearity, redundancy, and interrelation to measure the same concept or construct. According to (Tavakol & Dennick, 2011) findings, a high value of Cronbach's alpha (>0.90) indicates redundancy and less measurement error.

Table 5. Reliability test

Reliability Statistics	
Cronbach's Alpha	**N of Items**
.922	**23**

Consequently, the results of the categorical variables which are used to evaluate the framework are all above 4 as shown in Table 2. This entails the respondents agreed that the framework fulfilled the requirements of goal, environment, structure, activity, and evolution. Moreover, to achieve the maximum benefit of the framework, improvement areas are also noted from the survey evaluation.

Table 6. Descriptive statistics for the evaluation survey

Descriptive Statistics					
Evaluation Criteria	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Goal	12	3.50	4.75	4.0625	.41458
Environment	12	3.00	5.00	4.0278	.54045
Structure	12	3.40	5.00	4.2167	.55569
Activity	12	3.67	4.67	4.1250	.28538
Evolution	12	3.60	4.80	4.1167	.38573
Total score of the framework	12	3.70	4.57	4.1196	.32910
Valid N (listwise)	12				

Lastly, the overall evaluation result indicated that the proposed framework is efficient to address the current ITSM gaps of the division.

3.3. The Proposed Framework Versus ITIL-Based ITSM Frameworks

- The proposed framework can be considered as one of the academical outputs since most of the well-known ITSM frameworks are the results of the industry. The framework tried to answer what, when, who, and how to do the service management activities. On the contrary, ITIL tried to answer what to do whereas MOF answers what and how to do the activities. HP ITSM includes when and where to do.
- This proposed framework gives much concern to both the processes and functions of ITSM and then assumed that both elements should be combined to achieve better performance. Most of the scholarly articles gave greater concern to single or multiple processes rather than combining processes and functions together.
- The proposed framework combines three basic techniques, methodology, and model together with PDSA whereas the other ITIL and ITIL-based ITSM frameworks still consider PDCA as their central technique.
- The proposed framework not only improves itself continuously but also adds new changes both horizontally and vertically. Incremental continuous improvement helps to adapt to the dynamic telecom environment, customer needs, and technological advancements.
- The proposed framework also incorporates the RACI matrix or model. It helps to classify the roles and responsibilities of each team.
- Working as a team on each task helps to have good communication, coordination, knowledge transfer, and quick delivery of assignments. On the other hand, ITIL V3 and other ITIL-based frameworks give prior concern for individuals than teams.
- The proposed framework introduced three types of repositories that work parallelly with each other. The first is the service repository, which logs any kinds of system issues, user feedback, and service performance, and system information. The second is a resource repository, which records any resources of the division, business-IT plans, and high-level strategies, and different agreements. The third is a knowledge management repository, that records training documentation, organizational structures, frameworks, and governance documents, and also manages other portals. However, ITIL and ITIL-based frameworks did not indicate the purpose of repositories in their frameworks.
- In the proposed framework, the processes and functions go hand in hand, and thus, they are termed as service components. The proposed framework has fourteen service components; however, these are called processes or functions in ITIL 2011. In the proposed framework, the service components are interconnected with each other, and they are also interlinked with other service components across the phases. It has four phases and each of the phases are

interconnected. On the contrary, ITIL V3 is built on 26 processes within five service lifecycle stages. Additionally, it has four basic functions.

3.4. RACI Matrix for the Proposed Framework

The model helps to assign roles and responsibilities. It is also termed as a responsibility matrix. According to Adam (2018), the model or matrix indicates explicit responsibility and accountability within ITSM. The author also stressed that the matrix should be updated based on the ongoing changes in the organization. The proposed framework gives greater concern for teamwork and collaboration. Therefore, the researcher assigns basic tasks for teams to get fruitful and enhanced functions. The proposed framework explicitly listed the activities that will be performed in each of the phases and service components. However, the structure of the framework will change depending on the internal and external factors besides adopting the Agile SDLC methodology. Hence, those listed activities within the framework are subject to this change. The proposed framework answers four basic questions and these are:

- What to do: lists activities that should be done within the phases and service components
- When to do: indicates that activities should be performed continuously but indicates the initial activity should start from the planning phase
- How to do: provides general guiding principles and high-level ITSM framework to do every service management functions
- Who will do: provides a high-level RACI (Responsible, Accountable, Consult, and Inform) matrix

The tasks that will be performed by the employees are classified into four basic categories after analyzing the current structure of the division and these are:

- Teams: are employees who execute the activities within their section or department
- Manager: is an official who manages his/her section or department
- Coordinator: is an employee who facilitates the activities within and across his/her section or department. He/she also organizes the teams within his/her section.
- Expert: is a skilled employee who has deep knowledge of a specific domain

In the matrix, every employee is actively involved throughout the lifecycle. The employees are not confined within a limited section rather they have excessive freedom to do their work within and across the boundary. Thus, the division can get an enormous benefit from its employees and then achieve its business objectives. Furthermore, it maximizes the agility of the division's structure along with the working environment.

4. CONCLUSION

This research assessed the existing ITSM activities through a semi-structured interview together with an assessment model. Additionally, the research findings

are also supported by the company's documents and on-site observation. The results of the research are presented by answering the research question (RQ)s as follows:

RQ1: **What is the current status of ITSM practice in Ethio Telecom?**

The following are the major findings in regard to the current ITSM practice at Ethio Telecom.

- Some ITSM processes and functions are utilized very well, and others still need major improvement. Among the processes, incident management and change management are sufficient to handle the current IT services. The service desk, one of the ITSM functions, is well managed. On the contrary, transition planning and support, knowledge management, supplier management, and seven-step improvement processes are not implemented in the division. The remaining processes and functions are partially utilized and need a redesign.
- There is a gap in aligning the business objectives with the current IT services. The pillars and themes of the business objectives of the organization are not addressed in the current ITSM practices. It asserted that improper management of the IT services will create a negative impact on customer satisfaction, and quality service delivery.
- There is a need for an agile-based organizational structure to accommodate the dynamic telecom environment. It helps to sense and respond to the competitive market while delivering various IT services to the customers.
- The employees of the organization who utilized the ITSM do not have sufficient knowledge of the subject matter. Moreover, employees should be well informed about their roles and responsibilities while managing various IT services.
- Some procedures are crafted and updated but they are not pursued accordingly. These procedures should be adjusted and mapped with the objectives of ITSM.
- Service activities are not measured or monitored daily. Thus, there should be a mechanism that should check and evaluate the status of ITSM practices.
- After project completion and service handover, the operation teams find it difficult to handle the IT services. This is due to a lack of service management documents, service integration, and insufficient training. Moreover, improper service validation and testing activities impacted the service operation jobs.
- There is reactive service management due to insufficient training, improper tools, unavailability of the service manual, and dependency on the vendor. Therefore, proactive service management should be practiced to handle repetitive service interruptions. Solving those issues will help to ensure the quality of the IT services and provide sustainable services.
- There is improper service planning at the organization. As a result, resources are wasted and expired before use, and customer demands are not fulfilled.

RQ2: **What ITSM Framework can best fit Ethio Telecom based on the ITIL best practices?**

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

The following are the major findings in regard to the best-fit ITSM framework.

- The improvement areas that are identified should be included and addressed in the proposed framework. Thus, the proposed ITSM framework was developed to solve the challenges of the current ITSM practices. Besides, the proposed framework is believed to improve and maximize the ITSM practices of Ethio Telecom.
- The proposed framework incorporates improved processes and functions, and new service components. The processes and functions which are well-managed are included without any major adjustments, whereas the remaining processes and functions are modified to fit the needs of the organization.
- The proposed framework is organized into four phases: plan, implement, control, and govern. The framework is managed and controlled by the govern phase. Each of the phases has its service components. Among the service components, business-IT alignment, service excellence, customer care, service quality, organizational learning, and performance analytics and dashboard are the newly introduced service components. IT and network security management, service plan, service deployment, and service delivery are included without any major adjustment. On the other hand, the remaining service components are redesigned and improved. Evaluation results indicated that the proposed framework has included the pillars and themes of the business objectives of the organization.
- The proposed framework indicated the activities that each service component should perform. The activities are derived from the research findings and then reinforced by incorporating the concepts of other ITIL-based ITSM frameworks.
- Three basic repositories are included in the proposed framework. These are service, resource, and knowledge management repositories. The repositories help to log and record various ITSM activities. Due to this, the organization and the employees can get service documentation easily, refer to prior activities, enhance lesson learning, improve knowledge management, and increase organizational memory.
- The proposed framework combines people, technology, organization, and process. It then added a new concept called integration, which will harmonize those listed ITSM components together.
- The proposed framework incorporates the RACI matrix to demarcate the roles and responsibilities of the employees who utilize ITSM. It promotes teamwork and collaboration throughout the lifecycle to enhance the daily ITSM activities.
- The proposed framework can be taken as an improved solution to address the long-lasting ITSM issues of the organization, specifically in ISD. In addition to the empirical data, it also incorporates state-of-the-art concepts to go in line with the dynamic business and telecom environment. Besides, the proposed

framework promotes operational excellence, cost-effective service management, customer-centricity, and quality service delivery.

Taking this into account, the researcher argued that ITSM frameworks should be designed, developed, or customized based on the context of the given organization. Otherwise, adoption or implementation of the whole or some parts of a given ITSM framework without any firm consideration of the existing phenomena will have an enormous negative impact on the organization.

3.5. Recommendation

Recommendations are forwarded for practice at Ethio-telecom and for further research.

A) **Recommendation for practice**

- The findings of the research provide support and direction for the employees of the division in their daily activities. The proposed framework states a general guiding principle for managing the services that the division is delivering to its customers. It can be used as a top-level framework to manage, control, monitor, and update the ITSM of the organization. Moreover, it lists specific activities that need to be performed in each service component.
- The proposed framework incorporates the RACI matrix to show the roles and responsibilities that the employee will have within and across the phases and service components. It encourages teamwork and collaboration throughout the lifecycle. Hence, the active involvement of every employee as a team is required to achieve the intended objectives of the organization. Teamwork and collaboration help to build a strong commitment and a sense of ownership.
- The findings indicated that there is a knowledge gap which means the organization must provide continuous training for employees of the company. A well-informed and trained staff helps to provide and manage the IT services efficiently and effectively. Furthermore, the company should facilitate various mechanisms for successful knowledge management and organizational learning trends. The division should also develop and manage various repositories for successful resource utilizations.
- The ISD must perform a continuous service improvement activity. That is, IT services need to be improved, redesigned, and developed to provide sound service delivery and have a satisfied customer. The organization should also employ a measurement technique to evaluate and improve the performance of IT services.
- The empirical findings showed that the organization should align the business and IT throughout the lifecycle of the ITSM. If there is a gap between the two elements, the organization will lose its competitive advantages. Thus, the organization should regulate business-IT alignment daily.
- The findings illustrated that agility helps to keep the organization up to date with the dynamic telecom environment. The organization should have an agile structure aligned with the overall ITSM activities and vice versa. Hence, the

organization should sense and respond as quickly as possible while providing IT services to its internal and external customers.

B) **Recommendation for future work**

The research study has added an important body of knowledge for the domain area. Nevertheless, it leaves additional settings to explore and investigate the subject matter. Hence, future works should consider the following potential research areas that are not addressed by this research. This study focuses on a few knowledgeable and experienced IT professionals and did not incorporate the perspective of other employees of the division. Accordingly, it could be useful to combine the perspective of all sides to get the full picture of the area under study. In addition, the research study used ITIL V3 as its benchmark to design and develop the ITSM framework for Ethio telecom. Other well-known and validated ITSM frameworks can be investigated to cross-check the results.

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