ADDIS ABABA UNIVERSITY
COLLEGE OF NATURAL SCIENCES
SCHOOL OF INFORMATION SCIENCE

An Integrated Framework for IS Change Management in Commercial Bank of Ethiopia

By

Lewam G/silassie

June 2018

Addis Ababa, Ethiopia

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A Thesis Submitted to the School of Information Science of Addis Ababa University in Partial Fulfilment of the Requirements for the Degree of Master of Science in Information Science

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Name and signature of Members of the Examining Board

Name	Title	Signature	Date
_____	Advisor	_____	_____
_____	Examiner	_____	_____
_____	Examiner	_____	_____

DECLARATION

I declare that this thesis is my original work and has not been submitted for any Degree in any other University. I have undertaken the study independently with the guidance and support of the research advisor.

Signature: _____

Lewam G/silassie

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

Advisor: _____

Wondwossen Mulugeta (PhD.)

DEDICATION

This thesis is dedicated to my lovely mother Medhin Beyene, my dad G/silassie Atsbeha and my two-little sister's Eyerusalem G/silassie and Hewan G/silassie who encourages me in every moment of my life!

And above all, to the Almighty God!

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ABSTRACT

Information system change management has become top concern of banks in order to improve customer confidence and remain competitive in a world of rapid technological evolution. Information systems (IS) are subject to frequent modification due to the continuous change of business requirements affected by internal and external factors. As in any organization, keeping up with IS change in the banking sector is also challenging. IS change, by nature, should be properly planned and control for its success. Several international methodologies, standards, and frameworks (ITIL, COBIT, TOGAF etc.) describe IS change management aspects from the viewpoint of their particular enterprise resource management focus. The integration of those methodologies is also important for providing unified and controlled methodological support for holistic IS change management. In this study, an IS change management framework is proposed by revising the existing integrated IS change management framework found in the literature. The framework consists of guidelines for IS change control by integrating the following significant resource management areas – information technology (IT) governance, change management and enterprise architecture (EA) change management. The approach is based on re-use and fusion of principles used by related methodologies as well as on empirical observations about typical IS change management challenges in CBE. Even though, Commercial Bank of Ethiopia adopted change management process based on ITIL so far step by step plans to changes and controls across the enterprise architecture not clearly defined. This study employed a qualitative, single case study approach by combining with design research method. Data was collected from CBE IS Departments. Through semi-structured interviews, this study explored the perspectives of IS staff on their experience of change management process through various IS project implementations. The interview outline contents were reviewed by IT professional and the research advisor. Written and electronic documentations as well as observations also served as important triangulation and complementary sources in understanding the phenomenon being studied and as a means of gaining additional perspectives and further insights on key issues. Based on the research findings, a solution framework has been proposed and presented. In this study, expert validation was also conducted using focus group discussion to evaluate the proposed framework of the study.

Keywords: IS, IT, IS change management, ITIL, COBIT, TOGAF

LIST OF ACRONYMS

ATM	Automatic Teller Machine
ADAKAR	Awareness Desire Knowledge Ability Reinforcement
BI	Business Intelligence
CAB	Change Advisory Board
CBE	Commercial Bank of Ethiopia
CRM	Customer Relationship Management
COBIT	Control Objective for Information Technology
EA	Enterprise Architecture
ERP	Enterprise Resource Planning
IS	Information System
IT	Information Technology
ITIL	Information Technology Infrastructure Library
ISO	International Organizations for Standardization
ERP	Enterprise Resource Planning
TOGAF	The Open Group Architecture Framework
RFC	Request for Change

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CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Currently, financial institutions are in the battle for improving their ability in order to survive in the competitions of the new century global market. Thus, they have concerned with a cycle of progressive investments in and adopted new information systems components. Since the Banking sector is strictly dependent on IT systems, it is not an option to have more offers that are wider and more sophisticated, which requires IT solutions (Karim, 2011). Therefore, due to the adoption of new information systems and technology advancements organizations are facing changes. Some organizations proactively decide to change to take advantage of new growth and opportunities; others are forced to quickly change to survive. Moreover, dynamic business environment usually has the effect of requiring many organizations to change their IT systems. Change is something that moves from the current state into a transition state then to the future state; for example, moving from point A to point B in any setup is a change (Piirainen, 2016). Change in its broadest sense is a planned or unplanned response to technological, economic, social, regulatory, political, and competitive forces and also pressures that provoke change can be considered either obstacles or challenges, either threats or opportunities (Omitto, 2013).

Information system change is a change that could be initiated by the implementation of IS projects which has become common on the financial sectors nowadays (Zoran Ćirić and Lazar Raković , 2010). Since the banking operations are becoming digitalized to gain the market advantage financial sectors are implementing IS projects. Companies also understand that long term strategies will not be effective since the external environment is simply too changeable. Companies will therefore launch even more projects with even tighter deadlines and which are business critical. Information system management is a set of process to ensure efficient and prompt handling of all IS changes with minimum disruption. Therefore, a successful information system projects will depend on the successful IS change management. Documented and functional change management is a decisive factor of project success, as changes are inevitable, especially in a complex, formative and evolving information system development project (Zoran Ćirić and Lazar Raković , 2010).

In today's marketplace, change is a requirement for continued success, and competent change management is also most coveted practice. IS Changes can happen throughout the enterprise architecture and if those changes are not properly controlled it will affect the business operation. Information systems changes need to be controlled by the IS groups. Change management includes all activities that are highly related with the interaction of technology, processes, and people. IS/IT changes due to implementation of projects are normal and difficult organizational concept. Although IS projects was carefully defined in the meantime of initiation phase. And also, it is argued that no matter how carefully the project is defined through the initiation phase it is assured to be changed before its end. These changes may cause a change to the business processes and procedures, responsibilities leading to organizational restructuring (Dammas, 2016).

The result of academic research has revealed that organization success will not be achieved by the technology that they are implementing rather the integration of technology into an organizational change management process (Ewa Ziemba and Iwona Obłąk, 2015). Since the world that we are living is becoming digitalized the banking sectors should leave the manual operations and automate all the services to stay on the competition. Therefore, CBE has go through radical changes and improvements in the last few years by implementing a lot of IS projects to accommodate an ever-growing business requirement.

There are IT based projects that are being implemented and, on the process, to be implement. Integrated banking solution (CORE banking), E-banking services, ERP, BI, CBE birr are already implemented and the rest CRM, ITIL are on process to be implement. CBE has been continuously passing through change process targeting at reaching its Vision "To become world-class commercial bank by the year 2025". CBE change management policy states that IS change control practice shall be in place to make sure that IS changes are being properly handled, controlled, authorized and documented. The bank is undertaking various change initiatives which require unreserved involvement of IS change control sub-process and buy-in at all level of the bank through properly managing the human nature of resistance. When CBE starts to manage change the department was under quality assurance and play a vital role in reviewing the changes made to existing processes and products.

1.2 Statement of the Problem

In recent financial sector transformations, information technology has become the basis to make the banking operations reliable and meet customer expectations. Since the absence of information technology could result in poor decision and business failure, it has become a critical business resource. Therefore, implementation of information systems may result in many changes to the organization. Despite the recognized benefit of information systems many studies stated that their development and implementations end to failure if organizations didn't consider to have functional change management (Zoran Ćirić and Lazar Raković , 2010). Furthermore, organizations are spending huge amount of money on change efforts such as reengineering and information technology installations, yet not obtaining their intended return on investment due to poor change management (Marković, 2008). Due to this, organizations have persisted to emphasize that the adoption of IS change management framework can bring a wide range of potential benefits such as reduced errors in new or changed services and faster, more accurate implementation of changes (Philipp Küller, Mariusz Grabowski, PetrSameš and Marcus Vogt, 2010).

These days, the IT environment of CBE is also constantly changing in response to business need, growth, and changes in technology. Internet banking, point of sale, mobile banking, ATM, ERP, and recently CBE birr are the list of technology products which have been implemented by CBE. There are also additional IS projects that are on their implementation phase. Due to technological advancements, CBE is facing frequent IS changes and the change of one technology product may affect the other. Therefore, in order to implement those IS changes successfully CBE adopt Change Management Process basis on ITIL best practice. More ever, the ITIL documentation explain the change management process but it doesn't tell us how that implementation should be made.

CBE IS changes are managed by change management team which is under application department. In addition, the process starts by creating RFCs when there is new or modified information system to implement then the team assess the RFCs completeness and schedule for the CAB meeting to authorize the change to be develop. However, CBE IS change management process still lacks to plan for change and control across the enterprise architecture.

Before IS changes are going to be implement the existing enterprise architecture should be assessed if it is going to be affected otherwise it will be hard to achieve the expected benefit from the change. This will lead to unsuccessful IS change management. Furthermore, the existing process does not have controls and there is insufficient integration with the existing enterprise architecture. It has to be recognized that, successful businesses are non-stop changing organisms competing on both the domestic and global stage, in delivering innovative products that solve specific problems or needs. Therefore, CBE should also work on how to get more value from IT investments via better IT governance and IS change management in the firm's strategic context. Implementation of IT Governance structure requires organizations to embrace and manage change to ensure desirable behavior in the use of IT. Hence, effective IS change management will be affected by the performance of the IT governance to provide the end-to-end control of changes within IT. It is impossible to manage changes successfully without considering how the other enterprise resource management areas will be affected.

There exist multiple change management methodologies in the IS community for example, ADAKAR, ITIL, TOGAF phase H, and COBIT BAI06… However, no single methodology or framework address all the issues regarding IS change management. Therefore, IT best practices need to be aligned to business requirements and integrated with one another and with internal procedures (Institute, 2005). The integrated framework will facilitate the creation of a holistic view for managing information system changes to minimize cost in preventing repetitive efforts of separating different frameworks.

Previous studies have shown that different methodologies are governed separately and coordination was limited based on the investigation on public sectors and finally introduced integrated change management methodology (Ruta Pirta and Janis Grabis, 2015). Nelson et al also adopt a change management methodology by integrating ITIL and TOGAF practices. Their research was focused on updating the enterprise architecture (Nelson Gama, Pedro Sousa and Miguel Mira da Silva). However, a study conducted by Ruta Pirta and Janis Grabis (2015) proposed a framework that integrates ITIL change management process, COBIT BAI06 process, TOGAF Phase H process, ISO 42010 and Transform change mangement methodology for better management of IS changes.

Moreover, their proposed framework has five phases (asses, design,construct,implement and review) and list of controls in each phase. Even though, the framework includes significant phases to manages IS changes efficiently it miss to have an important phase which forces to test IS changes before the implimentation to minimize the negative impact on the real environment and controls regarding to assess the urgency of changes. Since their study ephasize the integration of bestpractices specially their process on change management there should be a test phase because ITIL and COBIT recommend IS changes to be tested before implimentation to minimize the negative impact on the enterprise architecture and if there is any potential risk on the bussiness operation.

Thus, the goal of this study was to identify the gaps on the existing CBE IS change management process and addressing the IS change management issues. Moreover, the study proposed IS change management framework which helps to minimize possible negative outcomes and increase smooth transition from existing to new state in an organization. Hence, this research explores and answers the following research questions:

1. What are the gaps on the existing CBE IS change management process?
2. How the IS change management framework be designed to address the gaps on the existed methodology and improve IT service operations?

1.3 Objective of the Study

1.3.1 General Objective

The general objective of this study is to investigate the existing IS change management methodology gap in the context of Commercial Bank of Ethiopia and design IS Change Management framework that combine change management process from different best practices.

1.3.2 Specific Objectives

To achieve the general objective the following specific objectives are identified

- To realize the concepts, processes, models, current knowledge about IS change management process from different best practices perspective

- Investigate the issues on CBE change management process
- Investigate multiple frameworks to include in the IS change management framework integration
- To identify issues and components of IS change management framework
- To design IS change management integrated framework for addressing the identified issues
- To evaluate utility and effectiveness of proposed framework
- To draw conclusions and forward recommendations for further study

1.4 Significance of the Study

In the today's business complex environment IS changes are becoming so fast due to the technologies advancements. In addition to that financial institution are adopting a lot IT based system to be a better competitor. Since CBE is also one of the most well-known and have a high contribution on the development of the country there should be a method to control the IS changes. This research help commercial bank of Ethiopia IS departments to see different frameworks for IS change management and how the integration will be effective. This thesis work is believed to propose an effective framework for IS change management that outfits the enterprise business goal.

1.5 Scope and Limitation of the Study

The scope of this study is limited to information system changes which is business changes are not included. This case study research is bound only in one organization, Commercial Bank of Ethiopia. The reason for choosing only one enterprise is the methodology that will be proposed is concerned to meet the CBE goal. Even the features that will be include and selected from existing methodologies according to the business requirement of CBE. So, the study will work only for CBE.

1.6 Organization of the Thesis

This thesis report is organized into six chapters. Chapter one includes a brief description of the research question and research problem, the aim and objective of the research. It also justifies the significance of the research. Chapter two aims to build a theoretical foundation for the research through a review of the existing relevant literature. It gathers the existing studies on change management, IS changes, multiple frameworks for IS change management. Chapter three outlines the methodology used in this research. The chapter also explains the data analysis techniques used in this study. Chapter four reports the key finding of the empirical investigation of the case study and presents the case study analysis. This chapter also offers an in-depth interpretation and discussion of the main findings of the research. Chapter five, the proposed IS change management integrated framework is presented along with the evaluation of the proposed framework. Finally, chapter six presented general conclusions and recommendations made based on observations and results from the study.

CHAPTER TWO

LITERATURE REVIEW

This chapter is a review of literatures that are related to change management where IS change management is the main focus of the study. The chapter provides insights into changes of information system, the various best practices that help to manage IS changes, the reason for information system change and the aim for integrating different methodologies that help to manage IS changes.

The content of the literature is organized as follows: overview of information system, change, different types of change, information system change and its reason, types of information system change and enterprise resource areas, why to integrate them.

2.1 Information System

Information system is a set of the entire infrastructure, organization, personnel, data and components that used to collect, process, store, transmit, display, maintain, use, share disseminate and act on information (V.Hayden, 2003). Even though the term is similar IT is the methods and equipment's used for automatic information transferring and sharing in order to improve the performance of people in the organization. Information systems have huge impact on the organizations performance specially these days it is not an option to cop up with IT they are already aligned with the business. IT makes pervasive changes in the structure and operation of work, business practices and organizations (Jern, 2009).

Since the market competition is becoming high most organizations in all sectors of industry, commerce and government are deeply dependent on their information systems (IS) and should keep up by introducing new technologies (J. Peppard and J. Ward, 2004). Even though it needs high budget companies are now decide to invest in information systems (IS) to improve the quality of services or products to stay in business competition and to cop up with the change environment (Paul Legrisa, John Ingham and Pierre Collerette, 2003).

2.2 Change

A change is defined as modification of system application structures. Changes can also express as node creation and deletion, and connection establishment and removal. This day's major challenge in the development and maintenance of information systems is the management of IT services specially management of changes (Jeff Kramer and Jeff Magee , 1990). In today's environment change, cannot be a background activity but a way of organizational life. Since our world becoming digital and the interaction of information technology with human being and organizational users increase organizational changes also evolving dynamically. (M. Lynne Markus and Daniel Robey, 1988)

Changes can be also described as a range that starts by evolutional change then grow into strategic change. So, those two ranges of changes can be discussed as follows. Evolutionary, incremental, or first order changes are changes that are small and a little modification on the features. The second type of changes are strategic, transformational, and revolutionary or second order ones. Hutt, Walker and Frankwick as cited in (Pardo et al.) they are fundamental transformations, where the organization totally changes its essential framework, looking generally for a new competitive advantage and affecting the basic capabilities of the organization (Pardo del Val, Manuela & Martínez Fuentes, Clara).

2.3 Information System Change

This day's organizations are investing a lot on the information systems to facilitate the business operation and to improve the firm performance. Changes are happening in systems and network infrastructure due to fast technology advancement and changes in technology. Therefore, organizations should keep pace in order to stay the competition. Since the business environment is becoming unpredictable and continuous innovation companies are forces to work on how to manage the changing business environment (Esther Cameron and Mike Green, 2012).

Changes in the organization can be emerged due to the adoption of new information and communication technologies. Information system changes are changes that are initiated by adoption, replacement, modification of information systems. Changes to the information system are becoming one of the greatest challenge to the organizations.

Information system changes involves four sequential phases and each phase output will affect the actions of the other succeeding phase. The first phase is also called the chartering phase of the IS change and it includes a list tasks about the goal of the change and how to design the change process. The second phase is where the new system will be configured and rolled out. This phase is so called the project phase. The third phase which is called shakedown phase when the organization align the new system with the operational procedures. The change is finally ends with the onward phase, in which the firm uses the new IS and captures most of the benefits of the change (Katharina Krell , Sabine Matook and Fiona Rohde, 2008).

Most researches show that changes are imposed by the technology throughout the organization levels. When organizations implement information systems the way that the business operates will be changed. Therefore, information systems will bring out change in the organization so that firms should treat those changes as change projects. Changes that are IT related is about process change because it involves people doing different things in different ways with different inputs and different outputs. Rather to automate the existing working trend organizations brought new or sometimes improved IT systems to enhance the efficiency and to help innovations to happen. Even though IT systems are too significant in today's business environment their change should be managed properly. In addition, IT people should have the knowledge on how to manage it and understand what IT based changes are in the organization (Esther Cameron and Mike Green, 2012).

These days the business environments are aligning with the information technology so the management figuring out and implementing new software's in order to facilitate the operation efficiently. Therefore, information management has to be brought closer to other areas of management, for example business management and change management. As per the finding result report of an authors who are called Williams and Williams cited at Roy et al 2006 show that if organizations need to get the benefit from implementing IT projects is only likely when the implementation project is supported with change management. But although many organizations would need a better acknowledgment of change management it should be remembered that only bigger IT projects which affect routines in several places need comprehensive change management.

According to Markus (2004) organizational changes that are technology-driven are called techno change. The author discusses that changes that are technology-based change cannot be managed using only IT project management in a traditional way therefore such kind of situations highly needed for change management methods. As per the idea of Markus it is not good enough to align those IT project management and change management fields since neither of them addresses the key risks of techno change; risk of IT-non-use, misuse, and non-benefits as well as the risk of a bad IT-solution. Instead a special iterative so-called techno change prototyping approach is needed; i.e. integrated technical and organizational management. The idea follows the traditional prototyping approach which means that something is first realized and tried out and then on the basis of that trial a decision about what to do next is taken. In the techno change both the technical solution and the organizational change are prototyped on the same time (Markus, 2004).

Due to the complexity of the information system, the change management has to be a continuing process required throughout system implementation. Some researchers believe that information system implementations will be successful if and only if the firm put a change management in parallel with implementation; otherwise, the organization would not be positioned to best use the new system. That is why the implementation of a new information system is an expensive process; and so far, most of the organizations that have implemented new information systems were mostly over budget and behind schedule.

As the researcher, Tryphosa cited the report that mention the findings by the authors Michael D. Williams and Janet Williams show that business is investing on ICT based services however to get benefits from IT are only likely when the implementation project is supported with change management. Depending on the system which the organization trying to implement change management will become critical. For example, ERP (Enterprise Resource Planning system), change management become a crucial component to manage the changes systematically. However, if it is in minor environment change can be done quite easily. In addition to that many organizations should have a better acknowledgment regarding change management, it should be remembered when a bigger IT projects which might affect all over the business operation need comprehensive change management.

Tryphosa as cited in (Markus 2004) on his research work and Markus gave his own name for technology base organizational changes which is called: techno-change. He claims that technology base changes cannot be managed in merely a traditional IT project management way, but that the situation calls for change-management methods. But Markus believes that it is not good enough to have a combined management method that are change management and project management to manage techno changes.

Instead, the author proposes a special iterative the so-called techno-change prototyping approach. This approach is integrated technical and organizational management. Therefore, this idea follows the traditional prototyping approach, before any decision takes place has to be first realized, and tried out, and finally based on the trial what to do on the next phase will be decide. In the techno-change process, both the technical solution and the organizational change are prototyped on the same time-frame (Boikhutso, 2013). Change is happening everywhere and its complexity are increasing. The drivers of those changes may be may be political, economical, sociological, or technological.

Organizations are spending millions of dollars to information system implementations, such as ERP implementation, involves sweeping changes to organizational structure, business processes and core competencies at a firm-wide level. Many researchers and practitioners reach agreement that IT-based change is different from more general change processes, and that the change must be managed to be successful (Benjamin, Robert I and Levinson, Eliot, 1993). Benjamin and Levinson (1993) claimed that it would be a mandatory for managers must know how to integrate the technology, business process, and organization in order to achieve the desired goals with the technology.

Change management generally it is all about managing properly the changes that happen to hardware, software, documentation, or procedures related to newly implemented information systems. The aim of the change management is to align an organization to best adopt new information systems. Scott Morton as cited in (Seung et al. 2004) put emphasis and mentioned that organizations should commit to change management activities for IS success since it is becoming a fundamental for effective IS operations. Bostrom et al.; Heinen; Kettinger et al.; Leavitt as cited in (Seung et al. 2004) many scholars have emphasized the importance of change management when IT is employed for organizational transformation. These scholars stress that effective change management requires a socio-technical system (STS) approach.

Taylor as cited in (Seung et al. 2004) the STS approach defines interrelated and mutually adjusting subsystems (technology, people, management, and structure) and presents a joint optimization of technology and people for radical changes of organizational structures and work design. It proposes that bargaining and conflict resolution should be employed at the earliest possible stage to enhance employees' acceptance of newly designed working environments.

Change management after ERP implementation needs to employ the STS approach, which is people-oriented and diagnostic. This study claims that ERP without effective change management programs cannot produce expected returns; change management plays a critical role for firms' performance improvement after ERP implementation. Thus, the role of change management is emphasized as a mediating variable for ERP success (Seung Chang Lee and Ho Geun Lee , 12-31-2004).

As a complex process, managing information system development and implementation projects deserves a very high degree of attention. Project management in general, and especially IT-related project management, is virtually impossible without taking change into consideration. The process of change is a commonplace of contemporary business, and progress in inconceivable without change, because, as Rita Mae Brown would say, '[an excellent] definition of insanity is continuing to do the same thing over and over again and expecting different results'. Changes, therefore, are inevitable, and should by no means be neglected in information system development and implementation projects. In information system development and implementation projects, it is vital to take change into consideration (Zoran Ćirić and Lazar Raković , 2010).

One of the spinning IS resource are the capability to plan, manage, and use appropriate technology architectures and standards also helps to span these gaps. Ross et al. cited in (Michael et al. 2004) key aspects of this resource include the ability to anticipate future changes and growth, to choose platforms (including hardware, network, and software standards) that can accommodate this change, and to effectively manage the resulting technology change and growth (Michael Wade and John Hulland, 2004).

2.3.1 Types of Information System Changes

2.3.1.1 Information System Introduction

Cooper, B.F. and Garcia-Molina, H. as cited in (Katharina et al. 2008) this type of IS change is occur when a new information system implemented by a firm to add new major functionality not provided by any previous IS in the firm (Katharina Krell , Sabine Matook and Fiona Rohde, 2008).Since the firm has no existing IS-facilitated processes the degree of redesigning process become high (Wanda J. Orlikowski, JoAnne Yates, Kazuo Okamura and Masayo Fujimoto, 1994). Davidson as cited in (Katharina et al. 2008) the redesign process has two consequences on the firms. The First one is it needs high degree of user training. Second, if the existing process are temporarily interrupted then the change will cause a high productivity loss (Jing Tan, Katherine Tyler and Andrea Manica, 2007). Due to the above consequences of changing the existing process (Jr., 2003), and the need to acquire hardware and software to develop new IT infrastructure, an IS introduction is associated with very high overall costs (Lorin M. Hitt, D.J. WU and Xiaoge Zhou, 2002).

2.3.1.2 Complete Information System Replacement

In here the existing IS will be completely replaced by new IS that provide new major functionalities to the firm (E. Burton Swanson and Enrique Dans, 2000). Haines et al. as cited in (Katharina et al. 2008) since in the existing environment there is IS-facilitated processes the need for process redesign will be medium to IS replacement. Therefore, relatively productivity losses are limited (Nivedita Mukherji, Balaji Rajagopalan and Mohan Tanniru, 2006). Complete IS replacement requires high cost because IT investments involve a large number of IT infrastructure components need to be replaced (Daniel Robey, Jeanne W. Ross, Marie-Claude Boudreau, 2000).

2.3.1.3 Partial Information System Replacement

As the name indicates this type of IS change only focused on replacing some part of existed IS (Don Chrusciel and Dennis W. Field, 2006). The replaced components rather provide new functionality to the firm it facilitates the same overall functionality as the previous ones and also offer improved performance. In addition, the process redesign is also limited to those departments, divisions, and hierarchy levels of the firm that use the new functionality (Kumar). Consequently, the degree of process redesign is low when evaluated on a firm level (Don Chrusciel and Dennis W. Field, 2006). Therefore, the extent of user training and the

productivity losses are limited. The overall cost of a partial IS replacement are medium to low (Nivedita Mukherji, Balaji Rajagopalan and Mohan Tanniru, 2006).

2.3.1.4 Information System Extension

Haines et al. as cited in (Katharina et al. 2008) IS extension change is a change to offer new functionality details when the existing information system is extended by new hardware and software components that provide. In this type of change rather as partial IS replacement all the prior components of the IS stay in place. Huang et al. as cited in (Katharina et al. 2008) process redesign is restricted to those departments, divisions, and hierarchy levels that make use of the additional functionality. Besides the costs for the additional hardware and software components are medium to low. Boddy & Paton as cited in (Katharina et al. 2008) hence, productivity losses and training costs are limited. In conclusion the overall costs of an IS extension are medium to low.

2.3.1.5 Information System Merger

Wijnhoven et al. as cited in (Katharina et al. 2008) in this type of change two or more existing ISs are merged into one. An example is the merger of accounting systems in the aftermath of a firm merger. Robbins & Stylianou as cited in (Katharina et al. 2008) it is not expected for the merged IS to provide new functionality. Depending on depending on which divisions, departments, and hierarchy levels are affected by the IS merger there is a variation on the degree of process redesign and user training. As well productivity losses and costs for user training also vary (Katharina Krell, Sabine Matook and Fiona Rohde , July 2008).

2.4 Information System Change Management

Changes can be initiate due to several reason and usually they happen to have benefits. But the important thing is how to manage those changes properly to achieve the benefits and not to be surprised negatively. Changes can be caused by the information system development and project implementation (Paulo Roberto Martins de Andrade, Adriano B. Albuquerque, WeskleiDourado Teófilo, Fátima Aguiar da Silva, 2016). According to ITIL change management is a set of process that deals with providing mechanisms to control change in the organization, particularly changes to the IT infrastructure (Persse, 2012). Organizations are facing quick changes due to several factors. Since this research focus is on information system change the integrated framework will to manage those changes only.

IT changes that should go through change management process are categorize into four: small, routine, comprehensive and emergency. Small IT changes happen when there is enhancement to the design of an application that might change the look and feel of the application to the end user. Routine changes are mainly covers a change when there is preventive maintenance for example, fixing application by running patch which is vulnerable to help in reducing system downtime or security flaws. Comprehensive changes are addition of new functionality or features to the existing application. Emergency changes are changes that happens immediately to the business. Since these changes are urgent and might have a big impact it should be managed effectively (Gallagher, 2014).

2.4.1 The importance of the Change Management

Due to the global competition and technology advancements organizations need to change the way they operate. IS change management is a process to ensure that the negative impact of changes to a company's Information Technology system is minimized by using a standardized process of governance. The benefit that the organization get from the change is not always financial but it will improve the relationship between peoples, speed up the internal business operation or encourage employees to involvement in a new project.

To gain from organizational changes for example from information system changes there might be many possibilities and investments of time and money. A change may require changes in existing structures, new skills needs, work load shifting, etc. All of these impacts should be managed effectively so that the transformation can occur. The transition between the current state and the future state should be monitored. Support new processes, contingency planning and treatment of risks, plans and support change issues must not be neglected. Training is an extremely important aspect of the process, but often is mishandled during a transformation. For this reason, it is responsible for the failure of much of the organizational changes. Though, in many organizational changes the desired result is far away. And that does not happen by accident. These benefits include but not limited to the following:

1. Change management enables the organization to respond to the changing customer demands as quickly as possible
2. It allows more flexibility whenever pressures for change arise. The ability to adapt change when it occurs help the organization to improve in terms of processes, decision making capabilities, financial return and others.

3. Problems that requires change effort will be easily identified and allow organizations to familiarize those problems that require change plan.
4. Change can be implemented without affecting the daily activities of the organization
5. It provides the management the know-how in assessing the overall impacts of change
6. Understanding the change process by all employees would likely improve their performance thus, improve organizational performance
7. Change management enable organizations to save cost and increase return on investment thereby reduce waste of resources, time and efforts
8. Change management help organizations to identify accurately the problems or anticipate challenges and respond to it efficiently and effectively
9. Establish opportunities for the development of best practices, leadership development and team development
10. The management and the organization will realize the importance of change and the expected benefit it derived when implemented in the right way (Jalagat, 2015)
11. It also improves the project performance by reducing disruption, cost, time and quality (Bon-Gang Hwang and Lee Kian Low, 2012)

As per a case study conducted by the authors they put an expected benefit after the implementation of change control process in the list below:

- Better alignment of the IT service with the business. The change will be filtered and prioritized as needed for business
- More stable service and increase of user productivity
- Increased visibility in to the changes by exercising great control over the execution of change and reduce the negative impact of change
- The risk analysis to prevent the service becomes unavailable due to failures
- Better assessment of the cost-benefit ratio of the
- change before it is implemented
- Reduction of cost, time and rework (Paulo Roberto Martins de Andrade, Adriano B. Albuquerque, WeskleiDourado Teófilo, Fátima Aguiar da Silva, 2016)

2.5 Enterprise Resource Areas and IS Change Management

In this particular discussion of the literature the researcher tries to show the different best practices that are in different enterprise resource area and how they were align in change management process. Since the study focus on the framework of IS change management designed by Ruta Pirta and Janis Grabis, 2015 that combine multiple best practices. The enterprise resource areas are information technology governance (IT governance), enterprise architecture (EA) and information system change management (Ruta Pirta and Janis Grabis, 2015).

2.5.1 Enterprise Architecture

Enterprise Architecture (EA) is all about the entire enterprise and provide the organizations to viewing organization's systems, processes and people. EA is the future and current vision of organization's strategy for both business processes and IT infrastructure (Jeanne W. Ross, Peter Weill and David C. Robertson, 2006). Enterprise architecture is the core of change, providing an instrument with a set of tools and techniques that help organizations to make strategy decision and showing employees what is really expected from them and guiding the necessary changes. To implement changes successfully enterprise architecture should align with other processes (Greefhorst, 2013).

An EA is developed for one very simple reason: to guide effective change. All Enterprises are seeking to improve. Regardless of whether it is a public, private, or social Enterprise, there is a need for deliberate, effective change to improve. Improvement can be shareholder value or agility for a private Enterprise, mandate-based value proposition or efficiency for a public Enterprise, or simply an improvement of mission for a social Enterprise. EA is used by the stakeholders to govern change. The first part of governance is to direct change activity – align the change with the optimal path to realizing the expected value. The second part of governance is to control the change activity – ensuring the change stays on the optimal path (Dave Hornford, Conexiam Nathan Hornford, Conexiam Sriram Sabesan, Conexiam Sadie Scotch, Conexiam Ken Street, Conexiam Samantha Toder, Conexiam, 2017). EA can be classified into business architecture, application architecture, information architecture and technology architecture.

The IS implementation process by itself it triggers a complex set of change processes within the enterprises. Enterprise architectures change as a consequence of implementation of an ES. The business architecture of EA model focused on the organization planning, application architecture concern on how to connect other parts together, information architecture creates the foundation, and technology architecture stabilizes the development. Even though the EA model is a strategic management tool, the fundamental idea can be adapted to the integration work as well (Saukkonen, 2013). There are different types of enterprise architecture frameworks: Zachman framework, E2AF (Extended Enterprise Architectural Framework), TOGAF (The Open Group Architecture Framework), AGATE (France DGA Architecture Framework) and etc... (Rafi, 2014).

2.5.2 IT Governance

IT governance is a set of processes, methodologies and practices related to IT functions that make sure the effective, efficient and acceptable use of IT in enabling an organization to achieve its goals. IT governance is the process by which decisions are made around IT investments. IT governance cannot exist in isolation but must be a subset of enterprise governance. According to the international standard ISO/IEC 38500 (2008) "Corporate Governance of IT is the system by which the current and future use of IT is directed and controlled to inform and guide the directors in their IT governance activities. Corporate governance of IT is a process of evaluating and directing on how to use the IT to support the organization and monitoring this use to achieve plans. It includes the strategy and policies for using IT within an organization (Calder, 2008).

There are a number of IT governance standards or frameworks available such as: COBIT (Control Objectives for Information and related Technologies), ITIL (IT Infrastructure Library) and ISO 17799 (Symons, 2005). IT Governance is not a matter of making a specific decision rather it is about determining who makes what decision (decision right), who has input right to the decision, and make sure that decisions are carried out in the appropriate manner (measure and monitor the result) systematically (Weill, 2004). In many cases, the reason for IS implementation failure is a lack of change management. Change management is a process of planning, controlling, documenting and coordinating the implementation of all changes in the operating environment (Liopoldi, 2002).

2.6 Related Works

Organizations are investing to implement several frameworks, tools and standards to improve the IT service delivery. Though those frame works individually they are not good enough to serve as efficient IT management system. In this research integration of frameworks and standards of different enterprise resource areas which have been discussed in the above part will be performed for IS change management. The frameworks ITIL, TOGAF, COBIT and a standard, ISO/IEC 27002. Those frameworks have overlap on change management process which means they both have a change management process. This overlap can not only greatly reduce the overhead for organizations that desire to, or are required to, comply with both standards, it can also create a stronger overall framework, where the weaknesses in one framework are balanced by the strengths of another.

The similarity and differences according to IS change and where they overlap will be discussed below.

2.6.1 Change Management in ITIL

ITIL (Information Technology Infrastructure Library) is a de-facto standard which introduced and distributed by Office of Government Commerce (OGC) in UK. ITIL is a collection of process oriented best practices related to effective management of IT services that includes all IT parts of organizations.

Even if ITIL has five phases, based on the research focus, the phase that include change management (**Service Transition**) will be discussed in detail.

Service Transition

Before discussing about service transition, the researcher believed to mention about the two preceding phases that are service strategy and service design.

Service strategy is about establishment and management of the broadest policies and standards which govern the way a Service Provider operates. This phase tries to ensure that the services they offer align with business objectives and the services they offer are likely to offer value.

Service design is also about the design of services and all supporting elements for introduction into the live environment.

Although the main focus of this study is change management which include in service transition phase and this phase is guidance for the development and improvement of capabilities for transitioning new and changed services into operations. Service Transition provides guidance on how the requirements of Service Strategy encoded in Service Design are effectively realized in Service Operation while controlling the risks of failure and disruption. In this phase there are seven processes: Change Management, Service asset and Configuration Management, Release and deployment Management, Knowledge Management, Stakeholder Management, Transition Planning and Support and Service Evaluation.

From those processes our main focus is the change management process (Masarat Ayat, Mohammad Sharifi and Shamsul Sahibudi, 2008). According to ITIL change management is a process with a set of standard methods and procedures for implementing changes with minimum disruption on the IT services (Ruta Pirta and Janis Grabis, 2015).

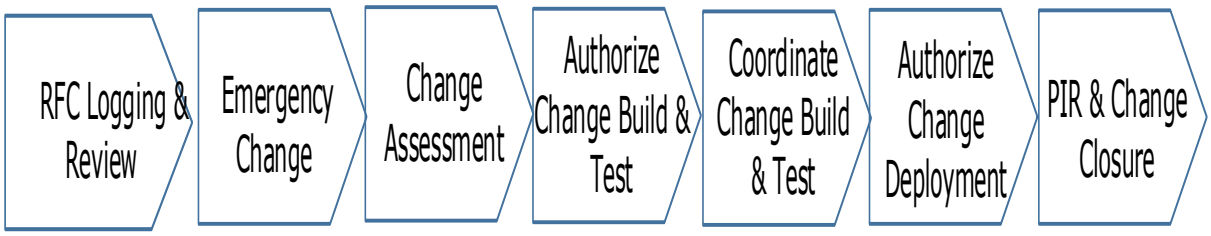

Figure 1 Change Management Flow *(Change Management Process, 2011)*

The first step is to analyze and review the RFC (Request for Change) reports sent by the change initiator to the change management team. From this team, a change coordinator is typically assigned to review and RFC reports and to prioritize RFC based on importance. Additionally, a business case will be provided, containing a time and cost High-Level Estimate (HLE). An RFC report may reference a previous RFC report, if applicable. A subsequent implementation plan can be added to the RFC report if it becomes approved by the change management team. Beginning with the business case for an RFC, it is the case provided which describes the reason for the change, cost, benefits, consequences and source references.

An impact analysis for the business areas (and clients) can be included, along with the IT services affected by the proposed change and if any event will trigger the change. The associated costs and technological aspects, such as IT infrastructure and technical specifications, becomes identified and subsequently analyzed. In conjunction with the business case, the analysis allows for identifying risks and time estimate for implementation. This assessment provides the risks involved and allows for completing scheduling and prioritization. After the initial review and evaluation of an RFC has been completed, the start of change planning procedure begins if the RFC report is approved, along with the creation of the implementation plan for the proposed change(s), as outlined in the RFC report. It contains details relating to operational procedures of performing the changes, in addition to any back-out plan if the execution of the change(s) fails.

2.6.2 Change Management in COBIT

The Control Objectives for Information and related Technology (COBIT) is a set of best practices (framework) for information technology management created by the Information Systems Audit and Control Association (ISACA), and the IT Governance Institute (ITGI) in 1992. COBIT was released and used primarily by the IT community. Later Management Guidelines were added, and COBIT became the internationally accepted framework for IT governance and control (Masarat Ayat, Mohammad Sharifi and Shamsul Sahibudi, 2008).

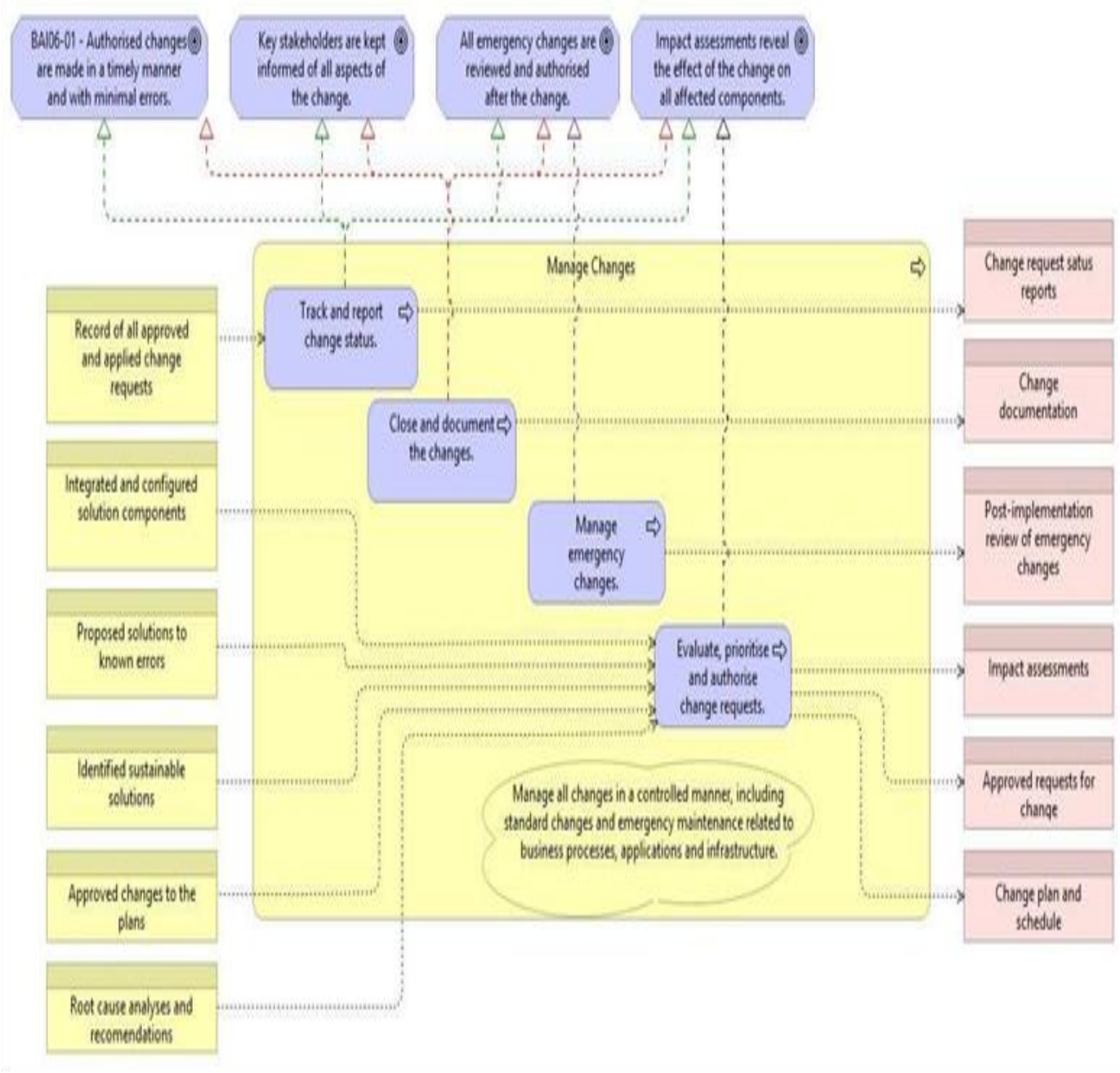

Figure 2 COBIT 5 Process reference *(João Sousa, Hélder Titosse, Nuno Roboredo, and Mário Fernandes, 2015)*

2.6.3 Change Management in TOGAF

TOGAF was developed in 1995 which was based on the Department of Defense's Technical Architecture Framework for information management. TOGAF covers business architecture, application architecture, information architecture and technology architecture. This framework focused on development of architecture and it has architecture development method (ADM) which include the architecture change management phase (Phase H).

Phase H is a set of process that make sure architectural changes are managed properly and in architected way (Ruta Pirta and Janis Grabis, 2015). Phase H provides ongoing review of value realization and monitoring of change. Change and failure to realize value provide entry points to the ADM. Phase H demands the Practitioner to identify the bottom-up drivers for change; change due to improvements in available technologies or conditions controlling the operations or environment of the Enterprise; and initiate the architecture work for the next target transition state (top-down driver) (Dave Hornford, Conexiam Nathan Hornford, Conexiam Sriram Sabesan, Conexiam Sadie Scotch, Conexiam Ken Street, Conexiam Samantha Toder, Conexiam, 2017).

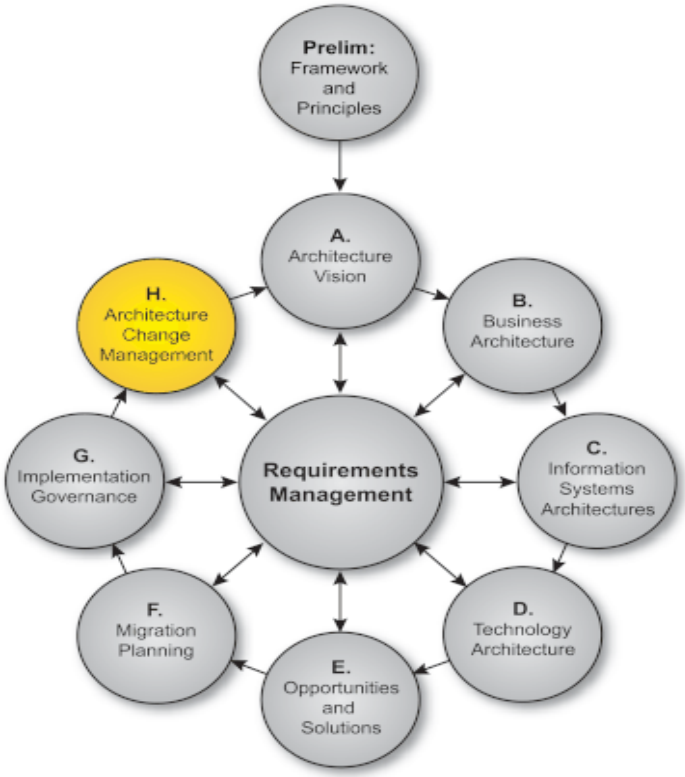

Figure 3 TOGAF Architecture Development Method *(Open Group Standard Togaf Version 9.1, 2011)*

Phase H Architecture Change Management Steps

1. Establish value realization process
2. Deploy monitoring tools
3. Manage risks
4. Provide analysis for architecture change management
5. Develop change requirements to meet performance targets

6. Manage governance process
7. Activate the process to implement change (Dave Hornford, Tara Paider, Chris Forde, Andrew Josey Garry Doherty and Cathy Fox, 2018)

2.6.4 Change Management in ISO/IEC 42010

This standard mainly focuses on application or system architecture. Regarding to IS changes using ISO/IEC 42010 review and analyze changes to the architecture.it also suggest to certify implementations of systems in case of architecture changes.

In conclusion those best practices mentioned in the above overlap in to change management. Both ITIL and COBIT, contain guidelines for IS change management in the IT governance context. The ITIL change management include methods and standards to manage changes with minimum disruption of IT service. The COBIT defines IT change management area controls. ITIL focused on the process, while COBIT defines controls, which means it focuses on what an enterprise needs to do rather than how it needs to do it.

In addition, changes to the enterprise architecture (application, information, business and technology) will be managed by a TOGAF phase H steps. This phase aim is to establish an architecture change management process for the new enterprise architecture baseline that is achieved with completion of Phase G (Implementation governance phase). This framework also helps to manage changes to the architecture appropriately. The final standard which will be chosen for the fusion is ISO 42010. This standard cover system architecture creation, analysis and sustainment through the use of architecture descriptions. With regard to the IS changes, ISO 42010 includes architecture model development guide that should be used as a basis for review, analysis and evaluation of the system across its life cycle as well as in evaluation of alternative implementation of architecture, also in architecture change cases (Ruta Pirta and Janis Grabis, 2015)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This research has attempted to identify information system change management related issues regarding the enterprise architecture in Commercial Bank of Ethiopia (CBE). In the previous chapter, the concept of information system changes and its integration with the other enterprise resource areas were discussed briefly. Although to get a holistic view multiple source of data were used. The chapter explains the methodology that was used in the study. The chapter will focus on the research design, data collection and data analysis.

3.2 Research Method and Case Approach

This research adopts qualitative and design science research method for so many reasons which will be discussed below. Design science was used to evaluate and design the framework following Hevner et al (2004). Qualitative research is concerned with finding the answers the questions that starts with why or what which aim to gather opinions, experiences and feeling of individuals or groups (Hancock, 1998) and to design a framework for IS changes using design science research method. The aim of this research is to investigate what are the important features to be integrated for the IS change management so qualitative research method is more suitable. In addition, it is useful to have a holistic understanding of the experience of people participated in the IS change management implementation process of CBE. This helped the researcher explore the gaps on the existing IS change management methodology and address the research questions, and ultimately achieves the research aim.

There are different types of qualitative research strategies: narrative, phenomenology, grounded theory, ethnography and case study. This study adopts case study research strategy. Case study research is a qualitative approach in which the investigator explores a single case or multiple cases over time, through detailed, in depth data collection involving multiple sources of information (e.g., observations, interviews, audio visual material, and documents and reports), and reports a case description and case-based themes (Creswell, 2008).

Therefore, based on the objectives of the study case study research strategy is more suitable one. This research strategy helps the researcher to examine the complex phenomenon with in its real-life context. The most suitable research strategy in IS research is the in-depth case study. It also involves the study of an issue explored through one or more cases within a bounded system. A case study can be conducted on a single or multiple case. A single case study is suitable when the case is representative, critical, extreme or unique. Therefore, in this research our case company to study the information system change management which basically focus the different best practices or frameworks is commercial bank of Ethiopia.

Commercial bank of Ethiopia is selected company for this research since it implemented the change management process based on ITIL. A single case study is a case study that only aims at acquiring better understanding of the particular case of interest. Because of its uniqueness and to have a deeper understanding of the exploring subject a single case study was chosen. Therefore, the justification to consider CBE as unique case lies in that: -

1. It is the largest banking institute of the country.
2. It is a company with more sophisticated IT infrastructure to be managed.
3. It is investing a lot on IT to cop up with the changing world.
4. It is a company that have a change management process in the banking sector of the country.

In addition to the previous reasons conducting the study on CBE it is also is easy in that: -

1. Access to available data.
2. Preliminary evidence that the case has had the experience or situation that the writer is seeking to study.
3. Willingness of knowledgeable individuals to participate on the study.

3.3 Research Design

Research design is a setting up of situations for data collections and analysis that aims to combine relevance to the research purpose. Research design is necessary when conducting research's because it enables to reach the answer for the various research questions (Kothari, 2004).

3.3.1 Data Sources

For the purpose of this study both primary and secondary data were collected. Primary data gathered through semi structured interview. Available information includes CBE official documents which constituted organizational profiles, published and unpublished documents produced through the initiation and implementation of the change such documents such as RFC, wrap up reports, strategic plan of change procedures, frameworks and processes designed and other documents issued in relation to the change implementation and policies were reviewed as a secondary data. Identifying these sources as a beginning point and retrieving the information is a good starting point in any data collection effort. The main sources for primary data were 10 individuals who have been active participants in the change management process of the case company (change management team members, ITIL team members, and CAB members). Since those are the only experts in the area it was believed they are good enough since they are participating in major part of the IS change management process which helped the researcher to find more data regarding the gaps in the existing practice.

Besides, data collected through direct observation of the researcher was also considered to strengthen the argument. Since the research type is qualitative interviewees was performed to collect relevant data that could help achieve the objective of the study, involving knowledgeable individuals on the subject of the study was crucial.

3.3.2 Data Collection Techniques

In qualitative research method interviews are conducted in order get an in-depth opinion. Collecting different kinds of data by different methods from different sources were performed in order to get a wider range of coverage that may result in a fuller picture of the change management process in CBE context. Semi structured interviews were used as measuring instruments for the collection of the primary data.

It will result in rich and in-depth understanding of IS change management practices in Commercial Bank of Ethiopia. During the interview short notes were taken carefully so as not to miss important points. Analysis of documentation and observation techniques were utilized for data collection with combined manner. Triangulation was used to compare the data collected from the interviews and observations. It allows to gather more evidence.

3.3.2.1 Semi-structured Interview

Qualitative research through interviews was used, in order to provide different perspectives, views and opinions on the topics investigated in the research. Interviews were used, since this is the most appropriate method to get an understanding on the relevance of soft issues during an information system change implementation. Semi-structured interviews allow the researcher to probe intensely to explore answers in more depth, to discover new evidences. Therefore, semi structured face-to-face interviews were chosen to carry out this qualitative research. The interview questions are adopted from literature regarding change management and it is mentioned in the annex. The purposive sampling technique is followed, which is highly recommended for qualitative case study research hence in total, 10 interviews were conducted. The reason for the number of the interviewees is because those are the experts in the IS change management process. The selection for the interviewees is based on their experience and involvement on the change management process across the organization. Therefore, the purposive sample in this study consists of ITIL team leader, change management team leader, change management team member, IT service desk manager, infrastructure manager, project manager, and application manager were interviewed. The interviews were conducted at participants' workstations, at Commercial bank of Ethiopia. Given the time constraints of the participants, each interview lasted 30 minutes to 50 minutes.

Respondents Category	**Number of Respondents**
Executives/IS managers	**5**
Team leaders	**2**
IS staffs	**3**
total	**10**

Table 1 Distribution of interviewees across their hierarchy

In preparation for the interviews, each of the interviewees were communicated to schedule the dates and times of the interviews were conducted through telephone and directly. On the scheduled dates the participants were called and requested to make themselves available at their workstations. At the beginning of the interview, the purpose and procedure of the interview were explained. The anonymity of their identities and responses was assured. The interviewees were further informed that they were not bound to answer all the questions and could reserve their comments to any question they may have felt uncomfortable in answering. All the interviews were conducted in English.

3.3.2.2 Observation

In this study, a participant observation technique is adopted as the researcher is an insider, observed the ITIL process definition including change management process and demarcation between different IS departments. There was a discussion on process definition for change management and the researcher participated to triangulate the data gathered by the interview. The researcher observed how the IS changes are being managed starting from filling the RFCs. In participant observation, the researcher is entirely involved and detailed notes are taken in which the way process define. The collected data through observation is used as additional to foil data obtained through semi-structured interviews.

3.3.2.3 Document Analysis

Collecting documents have been viewed as an important means of data collection in qualitative studies. In addition, case study, researchers often complement interviewing and observation with the collection and analyzing of related documents produced in the course of the day to day activities (William J. Gibson and Andrew Brown, 2009). In this study, different kinds of recorded data are collected to provide information about how changes are requested and documented.

Available, documents of IS change management process and request for change are collected. Besides, selected materials from training and workshop sessions are collected. The documents are generally used to verify the participants' factual statements obtained in semi-structured interviews. The document analysis enabled the researcher to double-check regarding particular issues and dates that participants had difficulty remembering during the interviews.

3.4 Data Analysis Method

Qualitative data analysis is an interactive process which involves three activities: data reduction, data display and conclusions verification (Matthew B. Miles and A. Michael Huberman, 1994). In this study, the qualitative content analysis technique using open coding in a descriptive form is adopted in order to understand the characteristics of the phenomenon and realize the meanings and significance of the views the participants. Moreover, it enabled the explanation of all interviews, documents and notes of observation and relating each one to the whole in order to gain a holistic picture of the phenomenon. The analysis revealed the gaps on the existing IS change management process under the study; the identified themes and the component of the proposed frameworks. A qualitative content analysis technique is more appropriate for this study as it preserves the meaning of the qualitative data as much as possible. Based on the output of the analysis and the existing literatures IS change management framework is designed and evaluated consequently.

3.5 Trustworthiness and Credibility

In order to increase the trustworthiness and credibility of the study the following strategies were adopted:

- Multiple methods (semi-structured interviews, observation and document analysis) for collecting the data of this research are used, which permit the researcher to achieve triangulation. In the semi-structured interviews, data from three hierarchical levels within the IS Divisions of CBE is also picked up in order to advance a different course of inquiry and provide multiple measures of the phenomenon under study, and therefore the findings and determinations of this survey are likely to be more precise and convincing
- The initial drafts of each of the case study reports are emailed to some participants of CBE and discussed in order to verify them for accuracy and to review them for comments, amendment, and further feedback and clarification where necessary.

The respondents were asked what time best suited them before scheduling appointments to reduce the stress factor. The interviewees were without disclosing their name, it may be assumed that the answers given were reliable.

It must be noted that when conducting an interview, employees may understand the questions differently, and that this obviously has an effect on the answers. In addition to the set of questions, the additional questions were used in some interviews to gain additional information to a specific question. During the interviews, the respondents were asked additional questions to make sure that their answer was not clear and understandable.

3.6 Ethical considerations

In ensuring compliance with the ethical considerations, and to ensure the participation by all employees involved in the research study, ethical issues such as guarantees that the names and details of the respondents were not disclosed; the respondents were also assured of confidentiality and anonymity.

3.7 Framework Evaluation Approach

IS research process should be evaluated through well-executed method to prove the utility, quality, and efficacy of a design artifact. Therefore, IT artifact need rigorous evaluation with respect to functionality, completeness, reliability, usability, fit to the organization, and other relevant quality attributes prior to using it to the intended goal. An IT artifact can be evaluated through observational, analytical, experimental, testing, expert validation, and descriptive methods. These evaluation methods can be chosen based on the study that the researcher conducting. In this study, both expert validation and descriptive method are used to evaluate the proposed framework. Accordingly, focus group was used to gain expert validation. Moreover, descriptive method is used to describe the utility of the proposed framework by building a convincing argument for the artifact's utility.

CHAPTER FOUR

ANALYSIS, FINDINGS AND DISCUSSION

In the previous chapter the research methodology that the researcher adopted in order to gather, analyze and evaluate the useful data was discussed in detail. Therefore, the purpose of this chapter is to present the findings from the analysis of the case study. The single subject case study allows for a more narrowly focused investigation rather than a broad overview of multiple subjects. The researcher analyses here the stories of IS change management discovered form commercial bank of Ethiopia. As noted in the previous chapter, the research examination was approached by adopting an interpretive single case study and, consequently, the researcher attempted to understand this phenomenon in terms of the meanings the participants bring to them based on their actual experiences in various IS change management process. Since the primary data was collected through interview the analysis will start by the finding through interviewees. Analysis to the documents related to change management and findings from observation will be present.

4.1 Profiles of Interviewees

The analysis presents the distribution of the respondents by department and their experience in CBE. Thus, semi-structured interview with broad involvement in IS change management process participated separately. These were two experts from the IS change management team, one from ITIL team and the others from CAB team (See Table 2). In order to preserve the anonymity of these employees, their names were replaced by pseudonyms that they had selected for themselves.

Hierarchical Level	Responsibility	Pseudonyms	Gender	Educational Background	No of Participants
IS MANAGERS	IS service desk	Manager 1	M	M.Sc in Information Science	7
	Change management team leader	Manager 2	M	M.Sc in Information Science	
	ITIL team leader	Manager 3	M	B.Sc Computer Science	
	IS infrastructure manager	Manager 4	M	M.Sc in Computer Science	
	Application manager	Manager 5	F	B.Sc Computer Science	
	Project manger	Manager 6	M	M.Sc in Computer Science	
	IT manager	Manager 7	F	M.Sc in project management	
IS STAFFS	Change management team member	IS staff 1	F	B.Sc Computer Science	3
	Application	IS staff 2	M	M.Sc in Computer Science	
	System admin	IS staff 3	F	M.Sc in Computer Science	
Total					10

Table 2 Profile of Interviewees

4.2 Case Study Analysis

The following section provides detailed analysis and descriptions of the case. The descriptions are developed mainly from the examination of the data obtained from semi-structured interviews, observations and document analysis.

The case analysis follows, the research questions and specific objectives of the study, by giving a brief outline on IS change management. This analysis focused on the questions regarding the concept and context wise of IS change management process, gaps on the existing change management process and integration frameworks for IS change management, as outlined in Table 3.

1	IS change management: ▪ Familiarity with the concept ▪ Motivation for IS change management ▪ Participation in the process
2	Gaps on the existing methodology (Research Q1) ▪ Overall change management process ▪ Issues on the existing practice
3	Framework integration (Research Q2) ▪ Understanding listed frameworks relation with change management ▪ Benefit from framework fusion

Table 3 Case analysis format

4.3 Emergence of major themes

The recorded interviews were transcribed by the researcher and stored as text in hard copy and as computer files. And also, the transcripts were read through several times to allow familiarity with the data. During this process it was the researcher's responsibility to organize verbatim quotations gained during the interviews into a framework, in which statements made on the same or similar themes were grouped together. After reading the interview transcripts, the researcher structured the data into major themes and categories, with minor themes also identified.

Five major themes regarding employees' perceptions of IS change management and the status of the existing practice were identified, namely:

 Theme 1: An understanding of change and IS change management processes and practices.

 Theme 2: CBE motivation for IS change management.

 Theme 3: Participation during IS change management process.

 Theme 4: Existing IS change management practice.

 Theme 5: Framework integration effectiveness.

4.3.1 Theme 1: An understanding of change and IS change management processes and practices.

To come up in the same line participants were asked if they are familiar with IS change management concept.

According to interviewees from IS staffs due to the ITIL training provided by the organization they got the picture of change management as one of ITIL process. In relation to this ***manager-1*** explained what IS change management means: "*knowingly or unknowingly there is a change and IS changes are a change that are triggered by when IT projects are implemented. Therefore, IS change management is a process of managing those changes.*"

IS-staff-2 also stated: "*I knew this term after ITIL training so it is one of the process in the service transition*".

Most of the employees interviewed had limited knowledge and understanding of change and IS change management processes and practices. According to the research participant from the management group due to their experience they see a lot IS changes but the way to manage it was not known much.

Manager-4: "*first change is adding or modification of something so when it comes to IS change it a modification to IT services. Therefore, the mechanism to control those changes is so called change management*."

Even though some of the top managers reported that they have a sense of change management before the training when the change management team organized under strategic management office. As one manager commented that change management was there under strategic management office before ITIL best practice is going to be implement.

He commented: "*I knew this concept when strategic management office of CBE tries to manage strategic changes but there was no specific methodology rather procedures although, IS change is start to begin with service design then to transition state"*

From the above report almost, all of the employees of CBE who are on IT department have the know what it is and it was found that the ITIL training provided by the organization(CBE) help IS staffs to get the picture about the concept about the change management since it is one part of ITIL process.

4.3.2 Theme 2: CBE motivation for IS change management.

The interviewees were requested regarding the desire of their organization to adopt IS change management and all the participants replied that CBE is implementing a lot of new systems to improve the services and those new systems will trigger changes therefore changes should be managed to reduce risks. One of the interviewees explained "*Since CBE is investing a lot for new information system projects in order to be highly competitive in the banking sector it was believed to implement the change management process and also there was a trust issues (who did the change, why so…). Therefore, to overcome those issues and to create accountability the process defined."*

According to ***manager-1***: "*The bank is one of the most well-known and larges financial sector in our country. So, the changes that arise should be managed effectively otherwise the risk will be high especially when it is IT related change. The motivation for CBE to adopt this system is because the information systems are becoming complex and frequently changing due to nature of the technology. In addition to that the bank is dependent to information systems to improve the banking operation and increase customer satisfaction."*

The other participant from the management group explained in detail from the beginning how the change management process began in CBE *"At first change management was initiated as sub process under office of strategic management to manage the change changes to processes, job roles, organizational structures and types and uses of technology that addresses the transition comprehensively and to reach the bank vision. So here the aim was to reduce resistance of employees for new projects."*

Manager-4 also stated that the reason for IS change management: "*Information system changes should be managed to minimize the negative impact on the IT services. For instance, departments make their own change without assessing the impact on the infrastructure then the risk will be high if the change is implemented. Therefore, to before affecting the operation CBE believe to manage the changes properly by forming a team under OSM as a sub process then currently it is under application management department."*

The ***IS-staff-2*** also explained why CBE go through change management process: "*I think that CBE is facing the challenge after implementation of IT projects and noticing that it takes a lot of time to make the live project successful without affecting the other existing systems."*

The researcher observed from the documentation and interviews it was discovered that CBE has been continuously passing through change process aiming at reaching its Vision "To become world-class commercial bank by the year 2025" and the bank is undertaking various change initiatives. Therefore, the change management process was to assists the bank to control the installation of new processes to improve the realization of business benefits of the initiatives. Moreover, change management supports the process of changes through coordination of the bank wide efforts and resources to ensure a smooth transition of the business.

4.3.3 Theme 3: Participation during IS change management process

Interviewees were also requested regarding their involvement or participation in the process. According to one of the interviewees as per ITIL process definition most of the participant from IS management group are member of CAB. Furthermore, the interviewee said "*I am the member of CAB and participate at approval when changes are initiated. This team has a meeting weekly Thursday so I make myself there in the meeting and share my opinions in parallel with decision*."

Manager-3 also mentioned that he has a high involvement in the process "*I am the CAB member and I participate in the approval of requested changes*."

IS-staff-1: "*Since i am a member of the change management team my participation is to filing the requests, organizing the RFCs to the change team leader and documenting."*

Since CBE is on the way to adopt the ITIL change management process it involves the participant groups and individuals. ITIL has six roles: change requester, change manager, change coordinator, change implementer, CAB and ECAB.

According to the information gathered during the interview, the role is presented in the following table:

Respondents	Role
IS service desk	CAB member
Change management team leader	Team leader
ITIL team leader	Participate in process definition
IS infrastructure manager	CAB member
Application manager	CAB member
Project manger	CAB member
IT manager	Participate in process definition
Change management team member	Process owner
Application dep't staff	Participate in process definition
System admin	Participate in process definition

Table 4 IS change management participants

4.3.4 Theme 4: Existing IS change management practice

This interview helps to discuss IS change management related issue that commercial bank of Ethiopia encountered. So, the question raised here was regarding how the IS change management process looks like and a large number of participants indicated that even if it is started as a sub process under OSM early it is still not mature**.**

In this section the researcher founds how the IS change management process look like in the case of commercial bank of Ethiopia. The interviewees mentioned repeatedly that all the IS changes are not being manage and defined. ***Manager-1*** discussed issues related to current change management practice:

"*The change management process is not matured as a practice when I say this it is because not all IS changes are being managed. For example, changes that emerge from epyment department are not pass through change management department then after the implementation it might affect the whole enterprise."*

In the same way ***manager-3*** also discussed the setting where change management team is one factor. It is still not yet perfect because the first that affect it is the structure which is under application department and due to this decision become hard and the other thing is not much control included for changes this process. Even when IT projects are going to implement the change management process is not considered as part of it. More ever, the coordination with other IS process and insufficient impact assessment regarding the impact of IS changes on the existing enterprise architecture is what the case company CBE is facing.

In line with this ***IS-staff-2*** added the issues the CBE encountered on the change management process: "I*t is on good progress but still not mature. Not all changes come to IS change management system there is a governance or structure issue that direct all the IS change initiators to submit RFCs as a mandatory before make changes otherwise it will be hard for CBE due to unauthorized changes risks."*

The interviewees were also requested regarding the gaps on the existing change management methodology. ***Manager-6*** mentioned: *"There is no step by step planning. Change in CBE is likely to fall apart or cause problems than benefits. We need to understand exactly what changes will take place and how those changes will occur. For example, if there is new IS solution we should know if the new system is compatible with other existing systems and how transition to the new system. We need plan for downtime and difficulties in completing regular works tasks while the change occurs."*

Many participants reported that any change process will fail to meet the collective goals of an organization or achieve the desired results unless it is implemented in an integrated manner.

Support of senior management provide vision and direction for implementing change in a planned manner. One of the interviewee from ***IS-staff*** recommended "*A well planned change can take time to roll out through an organization, which phase the change is in."*

Manager-2 replied when asked the question about the challenges that face CBE during the IS change management process:

"The organization complexity becoming a challenge to change management process. There is no control mechanism to handle big changes like architectural change aligning with other departments. Since the change influence the way the organization does things. There also unwillingness to attend the meetings during the approval process of requested change."

Manager-1 in his part added*: "lack of consensus is the major challenge. If you fail to get everyone on board with the corporate change you are likely to face barriers during the process. The decision to implement changes should come from top level of the organization. There should be a governance rule or control mechanism."*

IS change management should involve a well-coordinated and a collaborative approach from various stakeholders. This involves selection of problem owners because of their association with the change and also involvement of change agents who take the responsibility of facilitating change through the entire process. Several members from IS management emphasized lack of subject matter expert involvement in the IS change management process is also another big challenge. ***Manager-2*** commented: *"Effective change management process requires the involvement of skilled change agents**:** The change agents greatly have the responsibility of ensuring the success of change initiative by demonstrating the required competencies at work."*

Another interviewee added: *"Many efforts and changes fail because not all groups that should have been involved were actually engaged. Imagine if we put a new application or service in place but didn't work with the storage group around backups or DR from the beginning. Or, what if the network group wasn't consulted about the increase of traffic? When the change is ready to be implemented, it is already on the path to failure. This particular case happens quite often in IT organizations that do not have a good architectural process that links all IT groups together."*

Manager-4 also said: *"Quickly gaining appropriate approval. There is waiting time so we can wrap up your project. There should be rules for overdue tasks and escalation to keep everyone on track."*

In addition to the above challenges mentioned in the above ***Manager-1*** also added: *"there is no dedicated change management resource and structure approach. When change is try to be implement it was believed that it will bring significant impact to the organization so it should be managed to achieve that. The other issue is unknown current state or the existing enterprise architecture. Trying to implement IS change without conducting assessment and understand the current enterprise architecture is common practice in CBE. So, it will be hard to realize the failure on the existing architecture."*

Majority of the interviewees describe how the current IS change management process look like and the challenges that the sector facing.

4.3.5 Theme 5: Framework integration effectiveness

In this section three sub themes will be presented as per the data gathered from the interviewees. The first one is what CBE has adopted regarding the two enterprise resource areas: IT governance and enterprise architecture. The second one will be on their idea about the relation of IS change management, IT governance and enterprise architecture. Lastly their comment on the fusion of those three enterprise resource areas by entailing their best approach specifically on change management.

Interviewees were asked the frameworks that CBE adopt for (IT governance and enterprise architecture). According to the interviewees there is no well-known or official adoption but somehow some features or principles taken from different best practices. Moreover, the interviewee mentioned *"actually ITIL is on progress to be implement but some of the features of COBIT and ISO was taken for procedures".*

The researcher observed the documentation and procedure of the IS change management and documented in hardcopies and the scanned copies are also uploaded to the Gieom. The researcher also participated on a meeting to approve process definition specifically on change management process based on ITIL.

Interviewees were also requested for their opinion regarding the relation between IT governance and enterprise architecture with IS change management. According to the interviewees one of the major components of a mature IT governance framework is the processes and controls used in managing changes to IT infrastructure, enterprise architecture and business applications.

More ever m***anager-1*** stated: "*IT governance is all about who should make what decision so to give directions and controls therefore IT governance gives guidelines to control the IS change management process."*

Manager-5 also mentioned: *"of course they have a direct relationship because every IS change should be governed, controlled and assess if it has impact on the current architecture."*

In interpreting the empirical data, it appeared that almost all the participant believed the interdependencies between the three enterprise resource areas (enterprise architecture, IT governance and IS change management).

As one interviewee stated: *"Those three things are interdependent each other and their purpose is to mitigate IT related risks by controlling IT services including changes. The enterprise architecture framework provides us with a method of translating business goals and objectives into IT goals and objectives. And it helps build an IT strategy, which is important because this is one of the first objects that drives our governance process."*

Manager-6 stressed in his interview: *"There must be a control mechanism that assess the IS change for fit of the IT strategy, financial, and IT standards."*

Since the aim of this research is rather single framework propose a framework which is a fusion of different enterprise resource areas (IT governance framework, enterprise architecture framework and change management framework) the interviewees were requested their opinion regarding fusion of IS change management process and controls from different frameworks.

Lastly the interviewees were asked how the integrated IS change management framework be designed to address the issues. ***Manager-7*** said: *"A frame work that ensure the best chance of long-term positive change management in the organization. To be effective, the IS change management framework must take into account how the IS change will impact the existing the enterprise systems, architecture and employees within the organization."*

According to ***Manager-1*** change management process alone is not efficient until it involves governance or controls. He commented: *"There must be well-defined governance or control to support the change management process and a process for planning and testing change, a process for communicating change, a process for scheduling and implementing change, a process for documenting change and a process for evaluating its effects."*

According to ***Manager-4*** comment in order to track previous implemented change documentation should exist.

Manager-2 explained: *"Documentation is a critical component of change management, not only to maintain an audit trail should a rollback become necessary but also to ensure compliance with internal and external controls, including regulatory compliance."*

Another comment was extracted from the interview with ***Manager-5***.

He explained with his experience in the current IS change management process: *"Currently we are trying to manage operational IS changes following ITIL change management process and it is minimizing the disruption of IT service operations reactively however, I recommend if there is a IS change management approach the include feature for both enterprise architecture and IT governance since their collaboration best for the improvement of IT services. The reason why I said this is we need to use the existing enterprise architecture to create a new IS or change then govern if that change is related to the CBE IT strategy."*

4.4 Discussion

In this section, the researcher tried to present a conclusive discussion based on findings of the case study from the previous section integrating with extant literature. The discussions are related to the data obtained during the interviews with employees, document review and observations followed by discussions relating to the research questions and general objectives detailed in Chapter One. In Chapter One, the two research questions were outlined. To reiterate, primarily this case study was concerned with discovering CBE employees understanding of change management and how IS change management practice look like at CBE. In order to determine this, the researcher conducted formal interviews with top managers who volunteered to participate in this case study.

Interview questions were designed to obtain employees' views in relation to the following issues:

1. Employees' understanding of the definitions of change and IS change management.

2. CBEs motivation to adopt IS change management

3. Employees' experience of IS change management process within the CBE.

4. The existing IS change management practice.

5. The effectiveness of integrating different IS change management frameworks together.

With specific reference to the formal interviews, an analysis of the data collected during the formal interview processes, as presented in above section those five themes discussed in the following section.

Theme 1: An understanding of change and IS change management

It has been noted in the literature review that changes are happening everywhere due to fast technology advancement and swift changes in business strategies. The ability to shift direction and to improve the functioning of an organization is now regarded as one of the key requirements for staying on the competitive market. So, organization become much more sensitive to any occurrence of change that takes place in their environment. Within the context of this discussion, the aim is to find out the degree of understanding that employees of CBE have regarding change and IS change management in their work environment.

Thus, the question that arise were: what is "change? Why do things have to change? Are employees aware of IS change management do? To reiterate, most of the employees interviewed had limited knowledge and understanding of change and IS change management processes and practices. Employees were also uncertain as to providing a clear definition of 'change'. One employee stated that he understood the need and purpose of change and change management in public sector organizations. He went on to explain that 'change' was part of a natural process that all government agencies experienced in order to improve organizational effectiveness. Some employees interviewed, who operated under what they call 'a good manager', were able to paint a visionary picture of the purpose as a whole.

Overall, employees' understandings, as reflected within this theme, demonstrated that the implemented strategies were more concerned with changes in operational practices. Perhaps, employees' confusion was related to a lack of knowledge regarding the activities to manage changes and what was expected of them.

Another important theme to emerge from the data was CBE motivation to adopt IS change management process. These experiences are discussed below under Theme 2.

Theme 2: CBE motivation for IS change management

Katharina Krell et al. (2008) Changes in the organization can be emerged due to the adoption of new information and communication technologies. Therefore, business environment is becoming unpredictable and continuous innovation companies are forces to work on how to manage the changing business environment. In this regard, the participants noted that CBE is implementing a lot of new systems to improve the services and those new systems will trigger changes therefore changes should be managed to reduce risks. Some researchers believe that information system implementations will be successful if and only if the firm put a change management in parallel with implementation; otherwise, the organization would not be positioned to best use the new system. This was evident when interviewees agreed that change has had negative impact if they did not handle it properly and efficiently. The findings emphasize that, in order to reach CBE vision **"To become world-class commercial bank by the year 2025",** the bank is undertaking various change initiatives which requires unreserved involvement of all employees.

The findings are consistent with result of (Peter Doherty and Peter Waterhouse , 2006)who argue that for a business to remain healthy, its IT organization must be capable of effectively and efficiently handling change. It must be able to execute change with minimal cost and minimal risk of business disruption. So, CBE included change management as a sub process under office of strategic management. The reason it was under this department is because the two strategic themes **"business growth"** and **"operational excellence"** are the main drivers for various change initiatives. Nevertheless, at this time the main concern of this sub process was to manage the people side of the change which is responsible to help employees to quickly adopt to the newly implemented systems.

Then, CBE believes that, in addition to managing the human side of change the unit should also look into the impact of new system in the existing processes and other systems. Thus, with this understanding, the team moves to application management department. Furthermore, the interviewees noted that CBE have developed change management procedure in 2016 which already expire to set up an efficient and effective change control process that responds to the business and technical requirements in aligning with the bank strategy. Hence the interviewees suggest to be renewed the procedure and include additional guidelines in more detail.

The findings stress the need to pay greater attention to IS change management is that due to frequent changing environment CBE is also working on how to manage IS related change by forming a team and define the process. The majority of the participants also have put a great deal of emphasis on the importance of IS change management and CBE is also giving attention on it to improve the process.

Theme 3: Participation during IS change management process

It is important to realize that IS change will only succeed to the extent that the expert's involvement in IS change management process. It is for this reason that IS change management also requires understanding the change and its impact at all level of the IS implementation process.

This was evident when some IS managers conceded that IS change has had a negative effect on the team that did not understand how it affect or need a collaboration with other departments. According to the participants rely most of them are member of CAB (Change Advisory Board) team and the others are process owners, and change management team member. To reiterate, presenting a number of different perspectives to offer the group variety, the CAB members are selected from different IS departments such as IS security manager, IS service desk manager, Infrastructure manager, Application manager and project manager in order to review and assess the impact on the business and IT services efficiently.

Drawing from the case study, it has been found that the interviewees are participating in major part of the IS change management process which helped the researcher to find more data regarding the gaps in the existing practice.

Therefore, evidence was sought to identify IS managers' experiences of the IS change process and how they saw themselves as part of the process. Interviewees statements reveal that, top level managers were included and had low level of involvement or participation in the IS change management process. Thus, the researcher felt they had definable role but limited participation in the development and planning of IS change in the organization, suggesting that the role of management was seen as one crucial component for initiating, leading or directing the change.

Another theme identified was 'existing IS change management practice'. This is discussed in the next theme.

Theme 4: Existing IS change management practice

This theme consists of the way how CBE IS changes are being managed and the gaps on the existing process. Drawing from the case study, it has been found that CBE is on process to define IS change management process as per ITIL. However, currently change management team was doing it in a manner that is not procedural and standard. Besides, CBE is acting reactively on IS changes, rather proactively. Jeff Kramer and Jeff Magee (1990) stated changes should be specified in terms of the system structure. The participants pointed out that, the gaps on the existing IS change management are: (1) control mechanisms not defined, (2) ownership of impacted systems unclear, (3) resulting in delays and incomplete assessments, (4) poor impact assessments, (4) incorrect individuals consulted about change, and (5) back-out procedures are missing or are untested.

Other responses from employees indicated that even though the implementation of a new IT system affects the enterprise architecture, and the IT implementation process triggers a complex set of IS changes processes within the enterprises the current IS change management process is not currently addressing such concerns. Another important issue raised by interviewees was the importance of proper planning and control guidelines to the existing change management process which is not included in the existing process. This is also in line with argument of Smith (2006) that effective change management have proper plans that should be done before changes come into effect.

Participants also stated that due to the organization complexity and absence of control mechanism or guidelines how to handle big changes that have impact on the existing enterprise architecture is becoming a major challenge they face during the IS change management process. Furthermore, they all agreed the current IS change management have a lot of issues that should be address and the researcher also observed those issues during process definition with ITIL and change management teams in the organization.

Theme 5: IS Change Management Framework Effectiveness

This set theme address regarding the opinions and understanding on the benefits from fusion of different frameworks that overlap on IS change management process. The study endorses the integration of multiple frameworks are vital for CBE. The finding confirms the argument of Andrew Bream (2013) who explain that no single framework can address every issue, nor should it try to. While ITIL is an excellent operational framework, it is somewhat lacking in instruction on governance and process management. The IT Governance Institute and the Office of Government Commerce have designed and created Aligning CobiT 4.1, ITIL V3 and ISO/IEC 27002 for Business Benefit guide (Institute, 2005).

Since the findings stressed that there are governance issues in the existing IS change management process many of the participants reported that, in most cases, they were very interested, passionate and believed to have a framework that will address all the issues mentioned during the interview and observation. The findings complement the work of other scholars who have stressed on framework integration e.g. Ruta Pirta and Janis Grabis (2015).

In general, the finding of this study about the existing IS change management process gap revealed that it is better to have a control mechanism to assess the entire enterprise architecture if it is impacted by the proposed IS change. Therefore, in this study it could be argued that rather having a single methodology it would be better to design a combine framework.

CHAPTER FIVE

PROPOSED IS CHANGE MANGEMENT FRAMEWORK

In this chapter, the proposed IS change management framework is presented in a high-level representation. The proposed framework is based on the reuse of existing framework found in the literature and on the result of this research arouse an improved IS change management framework. Furthermore, this chapter addressed the evaluation of the proposed framework in order to ensure its applicability, efficiency, effectiveness and usefulness. The framework is designed based on the findings of the study and related literatures in order to provide an answer to the second research question. In the first section, the proposed framework is presented and the evaluation of the proposed framework is discussed in the second part of the chapter.

5.1. Proposed Framework

The proposed framework is based on reuse of existing frameworks found in the literature. As per Hevner et al (2004), in IS design-science research the expected output to be created is a purposeful IT artifact that address an important organizational issue (Alan Hevner, Jinsoo Park Salvatore T. March and Sudha Ram, 2004). Therefore, on this research the framework which is proposed to CBE is a purposeful IT artifact that can address IS change management related issues and improve the bank IT services. This framework is based on the reuse of the existing integrated IS change management framework. Ruta Pirta and Janis Grabis (2015) has developed five phases framework that focuses on high level recommendation for IS change management process organization and applicable controls. The researcher improve the existing Ruta Pirta and Janis Grabis (2015) proposed framework since the findings stress to include test phase and controls which is also the gaps on the CBE IS change management process.

In addition, the other guidelines from Hevner (2004) focused on the problem relevance which is important and addressed in this study so that the framework can be a solution to those relevant problems. According to Zachman (2003), a framework helps to analyze organizational subjects to leverage the required level of integration, reusability and interoperability towards the targeted result. In this study, the designed framework is named ‘IS Change Management – Integrated Framework’. This framework designed based on the findings from the study and the five themes found from the analysis.

Theme 1 link with the first two phases and theme 3 help to include the roles in IS change management process. And also theme 4 shows the weakness of the existing change management process and supports the controls that are included in this proposed framework. In general, the last theme leads to propose this framework since the findings support to use an integrated framework for effective IS change management. In addition, the added phase and the control factors are the contributions made by this study since participants and researchers stressed that to assess the proposed IS change in line with the existing enterprise architecture and to test in the preproduction environment before implementation. As can be seen in figure 4, the high-level representation of the framework indicates the main phases that are proposed to be executed to ensure effective IS change management process. As mentioned in various part of this study, the framework is based on the fusion of ITIL change management process, COBIT (IT governance) BAI06 process for change management, TOGAF phase H change management process and ISO 42010(Enterprise Architecture). This frame work has six phases and controls in line with all phases.

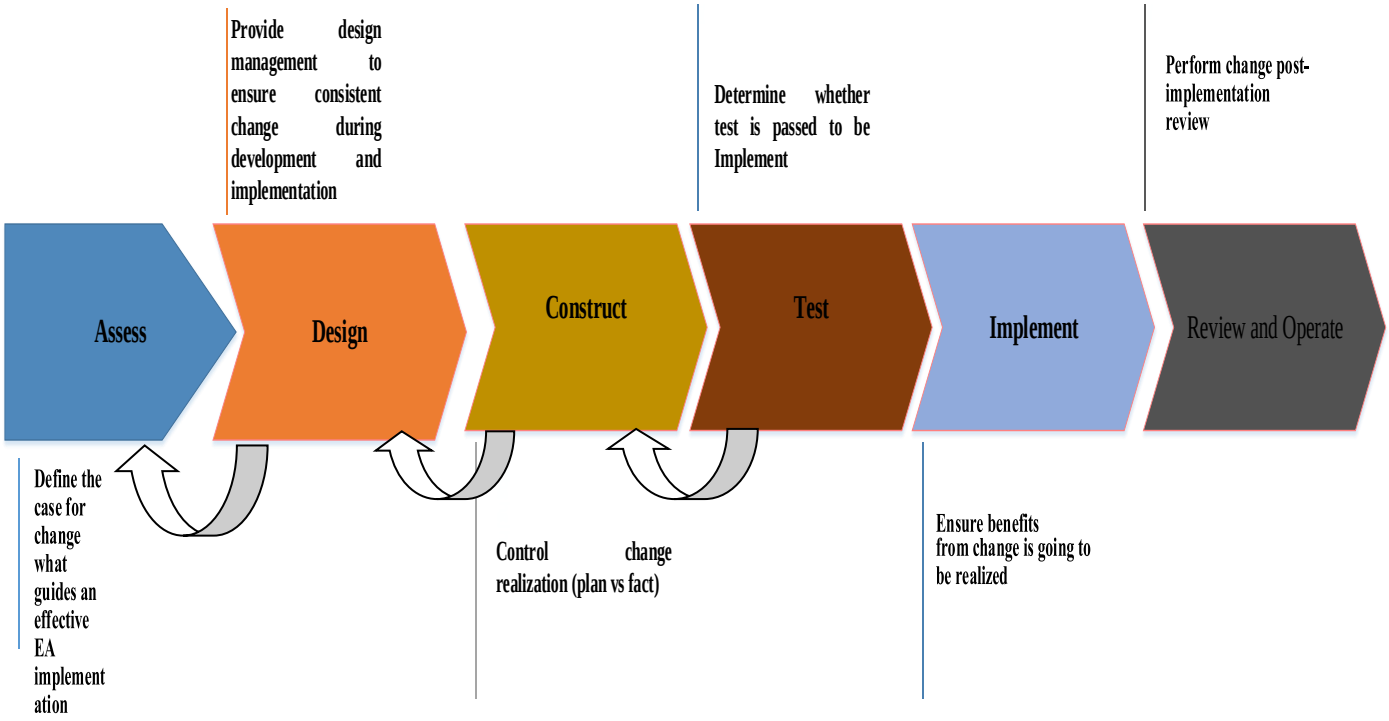

Figure 4 Revised Proposed IS Change Management Framework

According to the findings and literature this framework concentrates on high-level recommendations for the IS change management process organization and applicable controls to address the control problems. The framework consists of two interrelated parts: 1) guidelines for change management processes and principles that are mainly based on existing methodologies; and 2) control lists.

We have used controls from literature based on the finding of the study about CBE change management process to provide a support in controlled change management process. So, this framework will focus on changes that have impact on the enterprise architecture. The following figures shows the proposed change management framework and the subsequent sections present the detailed process and control guidelines of each phase.

Phase 1: Assess

This phase is interacted with theme 1 since it emphasizes to understand the change its reason, how to handle the process. In this phase, changes that are initiated will be authorized and the change scope definitions will be created. Accordingly, the process inputs are RFCs (Request for Change), policies, procedures, change proposal, existing EA (Enterprise Architecture) model and internal IT governance framework.

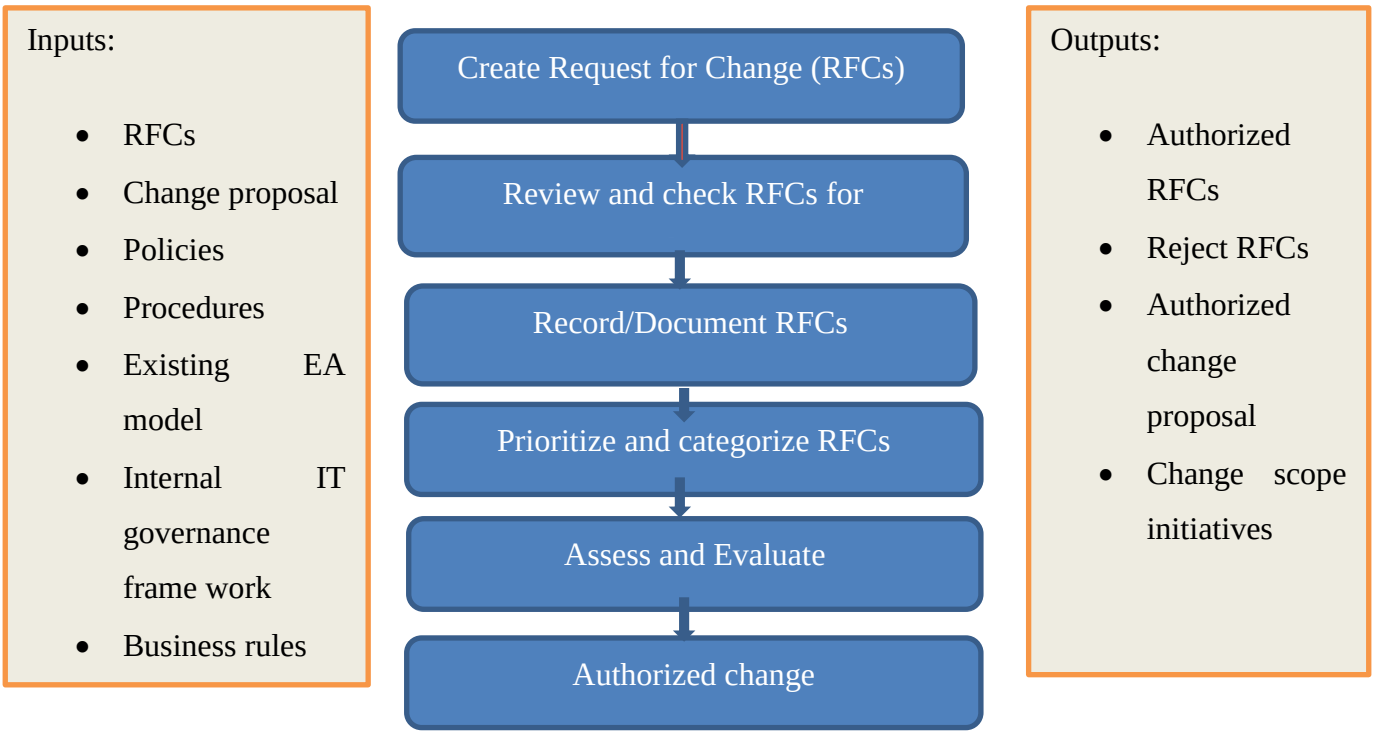

Figure 5 Assess phase process flow

As per theme 3 the participants in the IS change management process are also included in this framework. Since the framework is based on the fusion of ITIL, COBIT, TOGAF and ISO 42010 the activities in the above figure are reuse from ITIL change management process. This phase starts when the change initiator request for change by filling the RFC form and choose the type of the change.

The change coordinator or other authorized person review and check the RFC for completeness and adequacy of data supplied. The RFCs will be documented then the change manager or authorized person prioritize according their urgency and impact then categorize based on the business rules. CAB or higher authority will assess and evaluate RFC. As per ITIL, assessment will be conducted by answering the 7Rs questions.

Finally, change will be authorized or rejected. In here, the researcher emphasize that the authorization is not the final decision and has to be assessed again before implementation based on the test results. Even though; the ITIL change management process attempts to manage IS changes to address the governance related issues, it is recommended to align it with COBIT (ITIL Service Transition, 2011).

Accordingly, the researcher also includes list of applicable controls from COBIT BAI06 process which includes change standard and procedures, impact assessment, prioritization and authorization, emergency change, tracking, reporting, closure and documentation. According to the findings from the study, the researcher included list of controls that will address the issues on the existing IS change management practice. So, the list of control recommended to be included are presented in the following table:

Assess Phase Controls	Description	Goal
Change Request Analysis	• Request for change case(RFC) relevancy assessment • Assess existing EA components • Practicality, correctness, repeats, incompleteness of the information according to the existing EA	*"Prevent from cases when RFC is not relevant, for example, if RFC requestor does not have access or knowledge about existing EA components that can be used to fulfil his needs."*
Change Impact Analysis	• Assess and evaluate impact and risk of the change on the existing EA • Find out what architectural components will be impacted	*"Ensure to minimize the risk and negative impact form implementing change"*
Manage Emergency changes	• All emergency changes are reviewed and authorized • Assess the urgency of the change	*"Quick resolution for IS changes that are affecting the business in high degree"*
EA component analysis and their interoperability influenced by the change	• Assess and analyze existing influences on EA component • Assess component interoperability	*"By change implementation, cover related business needs and concerns (for example, if RFC covers just part of existing business problems)".*
Assessment of change vs development goal	• Identify if the change implementation is aligned with development goal and objectives of affected EA components	*"Ensure that EA changes will lead to envisioned EA development goals and objectives."*

Table 5 Assess phase list of controls

Phase 2: Design

After the RFC is authorized the design phase will follow. In this phase the output of the above phase such as authorized RFC, current EA model, policies and strategies were used as input. Theme 3(participation during IS change management process) support this phase in order to identify the concerned peoples and their role. The aim of design phase is to provide the requirements for the implementation of the requested change and target EA after change implementation. (Fig. 3). The process inputs are authorized RFC, existing or "as-is" EA model (that is, existing architecture documentation (framework description, architecture description, existing baseline description etc.), envisioned or "to-be" EA model, including architecture principles. The process outputs are project plan, change development technical specification and target architecture. In this phase the researcher believes to reuse it as it is on the literature (Ruta Pirta and Janis Grabis, 2015).

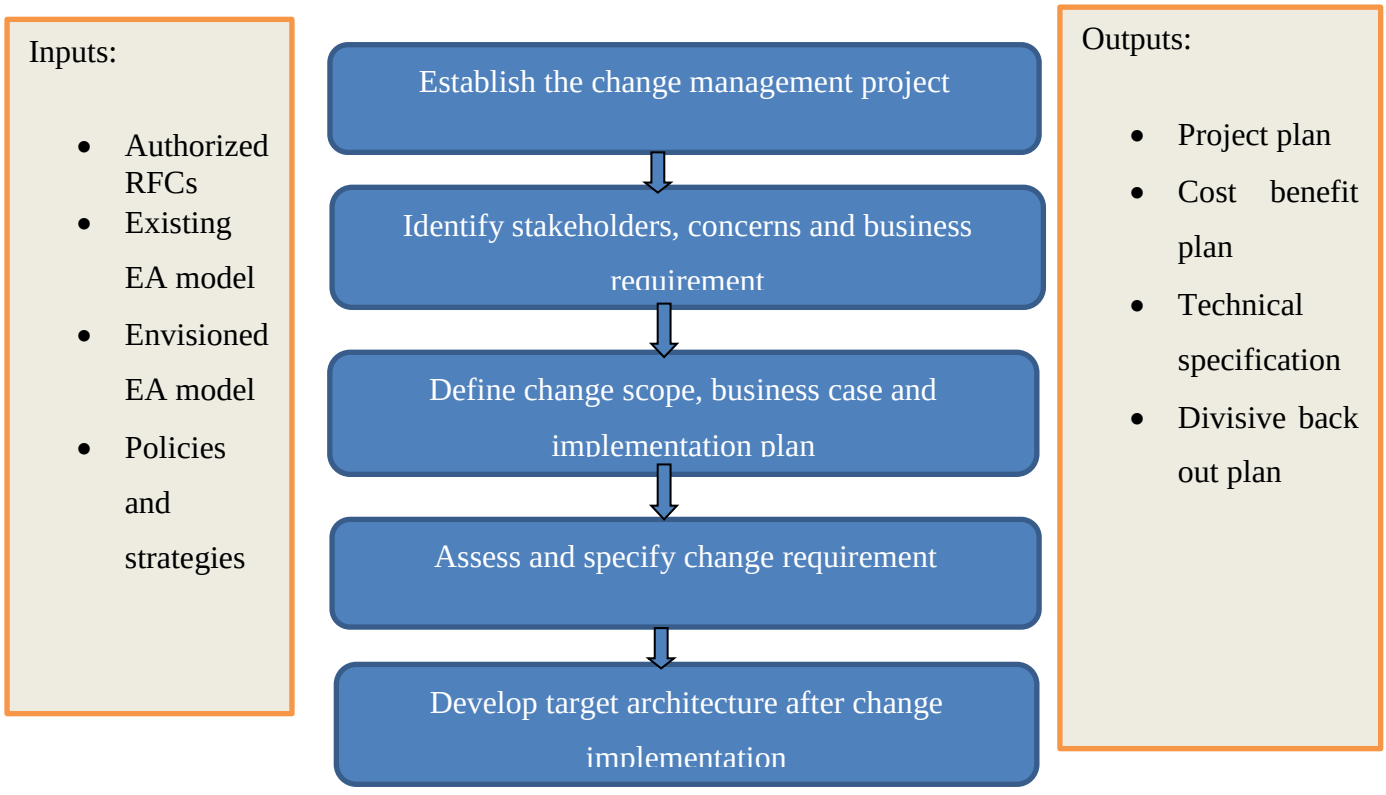

Figure 6 Design phase process flow

Once a change request is made, the next process will be to create the change development project (IT guided function) if it is project change and specify the business requirements and business rules. Then the change coordinator or other authorized person identifies the stakeholders or subject matter experts.

The process owner who initiate the change will then define the scope of the change which consist of the cost benefit analysis, implementation costs, technology enablers, people and process enablers, business issues and risk and implementation dependencies. The process owner or another authorized person defines change implementation principles and specifies detailed change functional and non-functional requirements that will help to turn the change plan into reality. Develop business justification and obtain appropriate emergency changes. Then target architecture is created according to the assessment which is the future state of the architecture. This happen if the change implementation affects the EA. ITIL Service Transition Change management process and COBIT Build, Acquire and Implement domain BAI06 (in versions before v5 - BI06) are also applicable to this phase in the process organization from the IT management view. ISO 42010 is used for the target architecture model development. Recommended controls according to literatures and findings in this phase are stated below in the Table 2. (Ruta Pirta and Janis Grabis, 2015)

Design phase controls	**Description**	**Goal**
Change assessment vs envisioned EA implementation principles	• Assess the change design documentation • Identify if the change implementation aligns with envisioned EA	*Ensure that EA changes will lead to the envisioned EA development goals.*
Change evaluation according to EA-related lessons learned	• Assess the change design documentation with regards to the existing EA change implementation	*Ensure that EA-related mistakes once made are not repeated.*
Optimal use of existing re-usable architectural component evaluation	• Evaluate if there is re-usable architectural component from the existing EA to be included	*Ensure that EA re-usable architectural components are used in the change design for optimal resource allocation*.
Design compliance with existing and envisioned EA evaluation	• Assess the change design documentation integrity with existing and envisioned EA	*Ensure that EA changes will lead to the envisioned EA development goals.*
Change synergy with other planned EA change evaluation	• Evaluate the change design coordination with other ongoing or planned change	*Ensure that EA changes are envisioned EA.*

Table 6 Design phase controls

Phase 3: Construct/Build

After the change design documentation is done then the change will be built or constructed into the system. New ways on how to operate in all EA domains are technically constructed. The change should be developed as per the planned change design. The controls in this phase mainly focus on evaluating the planed change vs actual change implemented. This phase also interacts with theme 4 on how to build the change without affecting the existing systems. Recommended controls were sourced from the findings from the previous research in this phase are stated below and the researcher added new control which to assess the back out plan (Ruta Pirta and Janis Grabis, 2015).

Construct phase controls	**Description**	**Goal**
Assessment of planed and developed solution gaps	• Evaluate developed vs planned solution gaps.	*Ensure that actual EA changes are relevant to current and planned EA*
Assess the back out plan	• Evaluate the back-out plan is appropriate if the change if failed during the test phase	*Ensure that there is back-out plans are developed*

Table 7 Construct phase control

Phase 4: Test

This phase is added by the researcher based on the findings from the qualitative study, on the existing framework by (Ruta Pirta and Janis Grabis, 2015). The findings show changes should be tested to ensure the expected goal is achieved and there is no negative impact before it is fully integrated with the operational system. The change needs to be tested in a pre-production environment to make sure that it is given every chance of success. If a change relates to debugging software or otherwise changing a system, one may need to test the change before it is approved to be implement. Testing the change also gives the organization the opportunity to work out any problems in the procedures that have been developed so far.

Test phase control	Description	Goal
Assess adequacy of change testing	The change implementer will test the build change	*To ensure changes are tested before implementation and minimize risks*

Table 8 Test phase control

Phase 5: Implementation

After the developed change is tested and using the test case to check if the change is free from risk or negative impact to the business and IT service operation, then the change will be implemented. The change coordinator or other authorized person prepares the implementation plan and schedules for the actual implementation. The phase includes new EA model rollout (including new business applications, information systems etc.), as well as assessment that planned benefits are implemented. The implementation phase process is organized according to the implementation plan. Recommended controls according to Ruta Pirta and Janis Grabis (2015) in this phase are stated below in table 5.

Implementation phase control	Description	Goal
"Go-alive" readiness assessment	Assess the readiness of both technical and business aspects of the change	*Ensure that actual EA changes are relevant to current and planned EA*

Table 9 Implementation phase control

Phase 6: Review and Operate

In this phase, post implementation review is conducted for all changes that are implemented through the IS Change Management process for Impact analysis and to identify reasons for success/failure of the Change. In addition, monitor performance of changes after implementation. Recommended controls from Ruta Pirta and Janis Grabis (2015) in this phase are stated below.

Review and Operate control	Description	Goal
Post-implementation review	Conduct the post-implementation review to assess if the planned benefits are gained and	*Ensure that benefits from change are implemented.*

Table 10 Review and Operate phase control

The post-implementation review is an essential part of the change management process to know whether the change procedures are working as expected. This includes reviewing records to determine whether the change was successful or failed and recording details about the time and expense of the change to determine the accuracy of estimates that were made before a request was fulfilled. Reviewing change performance gives CBE the opportunity to fine-tune the IS change management process for better results in the future.

Once the change process is complete, the change manager or coordinator must make sure that the entire process has been documented that all stakeholders can access. Once this documentation has been made, the process will be officially closed.

5.2. Evaluation of the proposed framework

Framework Evaluation Approach

According to Hevner, (2004) framework is an output as model artifact from IS design science research that needs to be evaluated in order to prove its effectiveness, utility and efficiency. Therefore, the evaluation might be iterative to improve the framework and ensure the quality of the proposed solution so that it can solve real world business problems.

In this study, expert validation was used to evaluate the objective of the proposed framework is comprehensible. So, expert validation is chosen to gain different views of the information system experts who work in Commercial Bank of Ethiopia in various IS positions. The information system change management knowledge of the experts along with their expertise in IT is believed to be crucial to gain valuable inputs and proper assessment of the proposed framework. Moreover, majority of the experts have plenty years of experience in organization and management position which adds value to their holistic view of the proposed IS change management integrated framework.

It is also believed that the experts' experience in Commercial Bank of Ethiopia can help to evaluate the framework whether it address the issues on the existing IS change management practice or not. An artifact can be evaluated by observational, analytical, experimental, testing, expert validation, and descriptive methods (Hevner, 2004). As Hevner (2004) stated in the fifth guideline of design science research relies upon rigorous evaluation and re-construction of the design artifact in order to verify the research contributions stated in the fourth guideline. Even though the proposed framework is not rigorously tested, the evaluation consists only focus group discussion with the selected change experts.

The objective of the focus group discussion was to discuss the first draft framework with respect to its completeness, correctness, and clarity; and identify possible improvements opportunities. Subsequently, individual discussions had been conducted with the experts to have detailed discussion and gather additional feedbacks. The content of the evaluation was mainly focused if the proposed framework was clear, correct and complete (include important phases). Based on the experts' feedbacks, the proposed framework was revised to improve its completeness, clarity and correctness. In addition, experts discussed and evaluate the framework applicability. According to the expert feedbacks the researcher added a back out as recommended control and test phase in order to improve the proposed framework. Therefore, the average result acquired from the experts who evaluate the proposed framework is very good. In addition, almost all of them are agreed that it will be helpful to have an integrated framework for IS change management.

This study, not only identifies the process that determines the IS change management but also provided a detailed explanation of required actions that needs to be done in the perspectives the process in detail to be perform in each phase and controls to be conducted. Based on the above analysis, it can be inferred that the proposed framework can improve the IS change management process and minimize failure of changes. Moreover, the comprehensiveness of the framework along with the completeness of its content can be considered as an improvement area to further develop the framework so that it can serve its intended goal.

This research is believed to produce results that can improve the IS change management process in commercial bank of Ethiopia. Finally, it is recommended to execute the proposed framework for the successful management of IS change and achieve information system implementation success.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

This chapter presents conclusions drawn from the study, some recommendations based on the evidences presented during the course of the study and also suggestions for future research.

6.1 Conclusion

In today's world change is happening everywhere; its speed and complexity are increasing; and the future success of any organizations depends on how successful change management process are conducted at managing that change. Dealing with change is one of the most major challenges facing information systems professionals today. There are different change drivers in today's IT environment that most organizations facing such as business process restructuring, shifting alliances and new competitors, deregulation and globalization, legacy system migration and new technology adoption. Commercial Bank of Ethiopia, one of the huge financial sector, launches various institutional transformation initiatives which requires proactive involvements of IS change management process in order to mitigate the risks of NOT operationalizing the initiatives as intended.

The implementation of a new IT system affects the enterprise architecture itself, touching key issues as business and organizational development. The IT implementation process triggers a complex set of change processes within the enterprises. Therefore, the use of change management is becoming increasingly essential for the Information Technology sector, and for businesses, helping and supporting. With the highly competitive market that we live in today, and growth and alignment of information technology with business, adding more value to the enterprise processes such as change management, can be a differentiator so that excel in current market scenario. Hence, investigating and addressing IS change management issues is crucial. IS change management help organizations on how to plan better for implementation of information system change.

In this study, Commercial Bank of Ethiopia is considered as a case organization to examine the management of information system changes. This study was set out to investigate the issues on the existing change management process in commercial bank of Ethiopia and design a framework for addressing the identified issues and ensure IS change implementation success.

The research has also sought to determine multiple frameworks from different enterprise resource areas that are aligned on change management during integration of frameworks. In order to best answer the research questions and achieve the objectives, the study employed a qualitative case study approach using multiple methods of data collection and provided a detailed investigation and understanding of the IS change management process in CBE and point of views the participants bring to them. Information regarding change management process in CBE was obtained from multiple participants with different views, perceptions and experiences.

In due course, extensive literature review and document analysis was conducted to get additional information of the aforementioned constructs and that help to triangulate the findings and get better output. The researcher also maintains that direct participation in change management process definition and RFC documentations to make effective contributions to the organization.

On the basis of the research findings, it is possible to make some sound judgements about CBE change management process using interviews as a means of data collection to ascertain employees' understanding of change and change management. To explain, much of the literature on change management reveals companies are having problems in IS change implementation. The outcome of the study has highlighted the fact that many researchers emphasize the reason for failure of new information system implementations in organizations as due to a poor implementation rather than to the change itself.

In summary, by way of answering the research questions, the study has been able to: (1) identify the core issues and challenges of IS change management in commercial bank of Ethiopia, (2) propose IS change management integrated framework to address those issues and challenges.

Based on the analysis and the findings, the following conclusions are drawn from the study:

- Change was a complex process.
- Change was not properly planned and remains difficult.
- IS changes are not tested before implementation
- Difficulty in tracing changes
- The impact of changes often was not analyzed as expected

- Interaction among all levels of staff should be encouraged to create opportunities for relationship development whereby trust and respect would be earned through action.
- Change Management requires careful planning and ongoing attention

Stemming from the above, and the research questions given in Chapter One, the researcher offers integrated framework for IS change management from the research findings that might lead to the successful implementation and sustainment of IS changes in CBE. Furthermore, the framework is based on the literature pertaining to IS change management, as discussed in the literature review, with specific reference to the organization.

In the framework, the process and controls to be performed in each phase from multiple frameworks regarding change management are revealed clearly. And also, we have added new complementary insights to the integration of different frameworks. It was anticipated that the findings from this case study would provide a better understanding of change and change management and that this knowledge would provide a positive contribution to the understanding of how change is understood in CBE.

In conclusion, this case study provides evidence-based insights about the complexity of change and change management from CBE employee perspective. The researcher is of the opinion that these organizations should consider using integrated IS change management framework that is most applicable and suitable to their organization since single methodology might not be effective.

6.2 Recommendations

6.2.1 Recommendation for practice

The result of this study is believed to provide guidance to managers and IT professionals concerning the main activities which can lead to manage information system changes effectively and realize the intended business benefits. This study provides some useful insight for CBE IS managers who often need to take decisions with regard to IS changes. The proposed framework also provides general guidelines and controls for IS change initiators to structure an effective IS change management process.

Commercial bank of Ethiopia should improve the change management process by focus and achieve change implementation success by focusing more the effect across the enterprise architecture. Accordingly, the execution of the proposed framework is recommended in order to improve the IS change management and achieve continual business results. In order to exercise the proposed framework, it is recommended to follow each phase with regards to the recommended controls as mentioned above. It is believed that improving information system change management can help to improve the business and IT service continuity.

Further, the following recommendations are forwarded on how to execute and practice the proposed framework considering the major issues that this study addressed:

- Top management support is vital to continually ensure the IS change management success. The empirical evidence illustrates that the change management team is under application department and there is an authority issue regarding the decision making
- Additionally, this study found that in order to acquire full benefits of IS change management subject matter experts should be involved in change management process
- This study suggests that CBE should implement a tool to support the change management support. The tool will increase the usability of IS change management support systems by providing users with EA model information for change request filling support.
- Integration with configuration item is mandatory
- It would be good if CBE have enterprise architecture framework in order to standardize the architecture components
- CBE should create awareness across the organization

6.2.3 Recommendation for future research

As part of further future researches, the following are the researcher's suggestions for knowledge

- **Research on other sectors, multiple organizations and other change management frameworks:** This study is a single case and specific to the telecom sector, future research conducted in other different environments would verify the findings of this study and may yield additional insights. Conducting future study in the multiple cases and different environment would enable researchers to obtain an overall picture of the phenomenon or perform a comparison between telecom and other organizations.
- **Impact Assessment Study:** 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 change management. Based on the output of the assessment study, the framework can be enhanced by identifying improvement opportunities through impact assessment study.
- **Further Evaluation Method:** since this study conduct focus group discussion to evaluate the proposed framework the researcher recommended to further evaluation for better output.
- **Further improve the proposed framework**: In this study, IS change management issues are identified using qualitative study. Yet, conducting longitudinal study can improve the proposed framework iteratively by using continuous evaluation and feedback mechanism. This helps to improve the utility and quality and efficacy of the designed framework by rigorously demonstrating a well-executed evaluation method.

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Appendix A: Semi-structured Interview Outline

Source: Adopted with modification and addition from (Nzuki, 2016)

1. How long have you worked with Commercial Bank of Ethiopia?
2. Which position do you hold?
3. How long have you worked in your current position?
4. What is your understanding about change management?
5. What was the practice of change implementation in your organization?
6. What was the process followed for the change implementation?
7. What was the motivation for CBE to implement change management process?
8. Does CBE fulfil the necessary conditions to implement IS change?
9. To what extent has the current change management process improved the organizations performance?
10. What were the key challenges for the change implementation?
11. What result did the organizational change implementation?
12. How often the change objectives are met during the change practices?
13. How does the organization plan for change in the organization?
14. How do you evaluate over all IS changes before and after the implementation of change management process?
15. Who are involved in IS change implementation and decision in your organization?
16. What are the challenges facing change management in Commercial Bank of Ethiopia?
17. Does your organization experience resource constraints during implementation of change?
18. What considerations would you suggest for successful change management in your organization?

Appendix B: Expert Validation focus group Discussion

Monday May 10, 2018, 09:30 – 04:45 P.M.

Organizer: Lewam G/silassie

Participants (Experts at Commercial Bank of Ethiopia)

1. Hailu Tegenaw Manager IT Help Desk
2. Negash Assefa Team leader Change management
3. Marta Sileshi Change Management team member
4. Daniel Kelemwork Team leader ITIL
5. Million Yeshewas Manager IT infrastructure
6. Birehanu Haftu Team leader Project

Focus group discussion setup

The objective of the focus group discussion was to discuss the draft framework with change management experts, with regard to completeness, correctness and clarity. Moreover, the purpose was to gather improvement areas originated from the discussion.

The overall agenda

Presentation on the problem statement, objective, and research design of the study, and discussion on the contents of the framework with the participants comments

Venue

IS conference room

Appendix C: Commercial Bank of Ethiopia IS Process

Change Request Form

Requester's Detail

RFC Number:	**RFC-163-01/06/2017**		
Requesting Organ:	Infrastructure Management		
Email address:	millionyeshiwas@cbe.com.et		
Telephone number:	Date of request:	Proposed Change Implementation Date	Required Down Time
0912649617	1-06-2017	*05-06-2017 to 12-06-2017*	15 minutes per server

Change Details *Please describe the change you are requesting.*	
Short change request title	Upgrade of Production AIX OS version of AIX6.1 to AIX 7.1.TL4 SP4
Change type	☑ Normal ☐ Emergency ☐ Standard
Change Area	☐ Application ☐ Hardware ☑ Operating System ☐ Storage ☐ Service Outage ☐ Database ☐ Network ☐ Security ☐ Process ☐ Document ☐ Environment
Change Category	☑ Upgrade ☐ New Feature ☐ Configuration ☐ Other
Full Description of the Change:	Describe the number of servers and about the os upgrade
Priority	☐ 1 – **Urgent**: ☐ 2 – **High**: ☑ 3 – **Medium**: ☐ **4** – **Minor**:

Test plan description	***Attache test description based on the test case and result template***
Action plan	***Apply Upgrade/Migration one server at a time*** ***1) t24APP servers*** ***2) t24DB servers*** ***3) WEB/MQ/NFS*** ***4) ERP/DATAWAREHOUSE/others..*** ***5) VIOS servers*** ***Steps to upgrade*** • ***Create and Assign new alternate disk*** • ***Clone the current OS to the alternate disk while same time apply the upgrade on the cloned OS on the alternate disk*** • ***Reboot the server and boot from the new alternate disk*** • ***After booting check if the server version is latest*** • ***If upgrade has issues, boot from the previous OS disk.*** ***Steps to Migrate***
Remediation /Fall Back plan	Detailed fall-back plan

Change Justification *Please provide your reasoning for this request. Purpose: Performance improvement, security hardening, etc.*	
*Reason /*Justification *for the change*	AIX OS version should be upgraded to prevent any potential security holes and system crashes due to old Versions
Business purpose / Technical benefit	Avoid any security holes/System crashes that will affect services
Cross-reference to the related incident ID or problem ID, if necessary	