



ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

**An Assessment of Critical Success Factors of Software Development
Projects: A Case on Information Network Security Agency (INSA)**

A Research Project Submitted to Addis Ababa University, School of
Commerce in Partial Fulfillment of the Requirements for Master's
Degree in
Project Management.

By
Abel Solomon Bekele

Advisor
Mengistu Bogale (PhD)

June, 2019
Addis Ababa, Ethiopia

Statement of Declaration

I, **Abel Solomon Bekele**, have carried out a research project on the **Assessment of critical success factors of software development projects: a case on Information Network Security Agency (INSA)** independently in partial fulfillment of the requirement of the Masters of Art (MA.) degree in Project Management with the guidance and support of the research advisor, Mengistu Bogale (PhD). I, also declare that this research project is my original work and that all sources of materials used for the research project have been duly acknowledged.

:

Declared by

advisor Name **Abel Solomon Bekele**

Signature _____

Date _____

Confirmed by

advisor Name **Mengistu Bogale (PhD)**

Signature _____

Date _____



Addis Ababa University

School of Commerce

Department of Project Management (Graduate Program)

This is to Certify that Research Project prepared by **Abel Solomon Bekele**, entitled: **An Assessment of critical success factors of software development projects: a case on Information Network Security Agency (INSA)**, submitted in partial fulfillment of the requirements for the degree of Degree of Master of Arts in **Project Management**, complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Signed by the Examining Committee:

Examiner: _____ **Signature:** _____ **Date:** _____

Examiner: _____ **Signature:** _____ **Date:** _____

Advisor: _____ **Signature:** _____ **Date:** _____

Advisor _____ **Signature:** _____ **Date:** _____

Abstract

This study is about assessing factors which are critical to project success in Information Network Security Agency (INSA). It is a descriptive research. The target population of the study was the team leaders and team members who took role in undertaking of projects in the agency. The total software development commercial projects in the agency in the past five years are 34. the researcher uses all projects. In order to gather the primary data, self-administered questionnaire and focus group discussion are employed, and after collecting adequate and enough data tabulation methods are used for analysis propose and in order to generate these categorized data statistical package for social science (SPSS) IBM version 23.4 was used. Major findings of the study revealed that Executive management support, Emotional maturity of team members, User involvement in the software development projects, Skilled human resource, Project management expertise of the project management and executives, and Clear business objective are very important critical success factors of the agency. Modest execution of project activities, Standard architecture of management environment and Optimizing a collection of many small projects or major requirements are not important factors for successful software development projects in the agency. It is also found out that there is poor communication and coordination with customers and other stakeholders, limitations on quality planning, control and assurance and well defined project acceptance criterion. Because of these factors majority there are projects that are not successfully delivered as per project success criteria. Based on those major findings and the conclusions some recommendations are given which can enable the Agency to undertake projects successfully creating customer satisfaction.

Key words: Project management, Executive Support, Emotional maturity, User Involvement Optimization, Skilled staff, SAME, Agile proficiency, Modest execution, Business Objectives, INSA.

Acknowledgment

Before anything I want to thank God for giving me all I need to reach hear passing all the ups and downs. Thank you Tete, Mimiye, and Aman, for giving me a reason to keep marching. I would like to also express my sincere gratitude and respect to my advisor Dr. Mengistu Bogale whose professional guidance, advice and patience has been remarkable.

Abaye, if there is any praise from this achievement, I want to dedicate the honor to you. Let God rest your soul in peace.

I want to say, no one is self-made, I want to thank all of you around me physically and spiritually for making me the way I am.

Table of content

1	INTRODUCTION	1 -
1.1	Background of the Study	- 1 -
1.2	Statement of the Problem	- 3 -
1.3	Research Questions	- 5 -
1.4	Objectives of the Study	- 5 -
1.5	Significance of the Study	- 5 -
1.6	Scope of the Study.....	- 6 -
1.7	Limitation of the study	- 6 -
1.8	Organization of the Study	- 7 -
2	REVIEW OF RELATED LITERATURE	- 8 -
2.1	Introduction	- 8 -
	Project, Project Management and Project Management Process.....	- 8 -
	Project Management Best Practice, Historical Perspective	- 10 -
	Project Success, Success Criteria and Success Factors	- 15 -
	Project Failure.....	20
	Project Management Methodology.....	21
2.2	Empirical data on Project Success and Failure	22
2.3	Conceptual framework	24
3	RESEARCH DESIGN AND METHODOLOGY	29
3.1	Introduction	29
3.2	Research Design.....	29
3.3	Research Approach	30
3.4	Population and Sampling Techniques	30
3.5	Types of Data and Tools/Instruments of Data Collection.....	32
3.6	Procedures of Data Collection.....	32
3.7	Methods of Data Analysis	33
3.8	Ethical Consideration	33
4	RESULTS AND DISCUSSION	35
4.1	Introduction	35
4.2	Reliability and Validity	35
4.3	Response rate and demographic data	36
4.4	Assessing the general questions raised about the projects	39

4.5	Critical success factors	42
4.6	Focus Group Discussion.....	43
5	SUMMARY, CONCLUSION, AND RECOMMENDATIONS.....	46
5.1	Introduction	46
5.2	Summary of Major Findings	46
5.3	Conclusion.....	47
5.4	Recommendations	48
5.5	Future Studies.....	49
6	Appendix 1: QUESTIONNAIRE	50

LIST OF TABLES

Table 1-Historical Project Management achievements and Progresses Pinto and Slevin (1988) - 14 -	
Table 2- Standish CHAOS Report for Project Success Factors Clancy (2012)	- 18 -
Table 3-Lists of critical success factors developed by Belassi & Tukel (1996).....	19
Table 4-Project Failure Factors	21
Table 5-2017 CHAOS Report.....	25
Table 6-Reliability test (Source: own survey, 2019)	35
Table 7-Reliability test for each factor (Source: own survey, 2019).....	36
Table 8- Gender and Role matrix(Source: own survey, 2019)	37
Table 9-Level of Education of respondents (Source: own survey, 2019).....	37
Table 10-Level of Education of respondents (Source: own survey, 2019).....	37
Table 11- experience and position on the project matrix (Source: own survey, 2019)	38
Table 12- Status of the projects	39
Table 13-status of projects and parameters (Source: own survey, 2019)	40
Table 14- Project Management tool and Product development Lifecycle.....	41
Table 15- descriptive statistics for critical success factors (Source: own survey, 2019).....	42

LIST OF FIGURES

Figure 1- Project Management Triangle	- 9 -
Figure 2- Conceptual Framework	26
Figure 3-experience in the organization and role(Source: own survey, 2019).....	38

ACRONYMS AND ABBREVIATIONS

ARPANET:	Advanced Research Projects Agency Network
CPM:	Critical Path Method
ICT:	Information Communication Technology
INSA:	Information Network Security Agency
ISO:	International Organization for Standardization
MRP:	Material requirement planning
PMI:	Project Management Institute
PM:	Project Management
PMBOK:	Project Management Book of Knowledge
PMBOK®:	Project Management Body of Knowledge
PMI:	Project Management Institution
PRINCE:	Project Management in a Controlled Environment

CHAPTER ONE

1 INTRODUCTION

This chapter deals with background of the study, statement of the problem, research questions, research objectives, significance of the study, scope of the study, limitation of the study and organization of the study.

1.1 Background of the Study

According to Kerzner (2009), a project is any series of activities and tasks that have a specific objective with defined specifications, start and end dates, funding limits, use resources (like human, financial) and they are multifunctional which many they cut across several functional lines.

PMBOK (2013) defined Project management as the application of knowledge, skills, tools, and techniques to project activities to meet the project requirement. And also it is a tool that helps organizations to execute designated projects effectively and efficiently (Sandro Azzopardi, 2015, pp. 72). This implies that one of the most important functions of Project management is to ensure project success.

Therefore, since all projects include the above characteristic they need close supervision in order to deliver successfully. Successful project management can be defined as finalizing and achieving the project objectives within time and cost, at the desired performance/technology level, while utilizing the assigned resources effectively and efficiently, and most importantly the project should be accepted by the customer (Kerzner, 2009, pp 121). Therefore, any project which is finalized with time overrun or cost-overrun or which didn't meet the desired performance level or most importantly which didn't get accepted by the customer cannot be called successful. Hence, close supervision is necessary for project success.

Rockart (1979) developed a three step procedure for determining which factors contribute to meeting organizational goals. His study reveals that many executives tend to link in terms of

“what does it take to be successful” in their business rather than in terms of purposes, objectives, and goals. Consequently, the key question in this method is, “what does it take to be successful in the business?” The three main steps in the process are: the first step is **Generate critical success factors (CSFs)**: The key question in this step is, “what does it take to be successful in the business?”. The second step in the process is **Refine CSFs into objectives**: The key question in this step is, “What should the organization’s objectives and goals be with respect to the critical success factors?”. The third and final step in this process is to **Identify measures of performance**: The key question in this step is, “How will we know whether the organization has been successful on this factor?”

Rowe, Mason and Dickel (1982) say that “Key result areas (KRAs) and critical success factors (CSFs) provide clues that help to answer the question of whether the organization is able to effectively mobilize its resources where there are conflicting sub goals, environmental uncertainty, and internal politics and constraints”.

Information Network Security Agency (INSA) is a governmental agency in Ethiopia, established in 2005 G.C and re-established under the re-establishment regulation number 250/2011 by the council of ministers. According to the regulation *‘ensuring the security of information and information infrastructures to facilitate their use for the implementation of the country’s peace, democracy, good governance and development programs’* is one of the mandate of the agency (INSA re-establishment regulation number 250/2011). Information Network Security Agency (INSA) currently has more than four thousand three hundred (4,300) employees with various educational and expertise level mainly in the field of computer science, technology and engineering.

In order to achieve its objectives, the agency does different projects for different governmental organizations. The projects undertaken by the agency can be categorized majorly into software development, hardware programming, networking, network security and research and development broad categories. This thesis will be concerned with mainly on the identification of critical success factors for the software development projects undertaken by the agency.

1.2 Statement of the Problem

PMBOK (2013) defined Project management as set of principles, methods, and techniques that people use to effectively plan and control project work. It establishes a sound basis for effective planning, scheduling, resourcing, decision making, controlling, and re-planning. Project management principles and techniques help complete projects on schedule, within budget, and in full accordance with project specification. At the same time, they help achieve the other goals of the organization, such as productivity, quality, and cost effectiveness. The objective of project management is to optimize project cost, time, and quality (Larry, 2002 p.81).

A project is a complex, non-routine, one-time effort limited by time, budget, resources, and performance specifications design to meet customer needs (Gray and Larson, 2008, p. 21). According to Rowe, Mason and Dickel (1982), Every project is conducted to solve some kind of problem for an organization or exploit an opportunity. Projects are the cutting edge of development; indicating the significant importance of projects as instruments for development.

Project management is a set of tools, techniques, and knowledge that, when applied, helps to achieve the three main constraints of scope, cost and time (Charvat, 2003). According PMBOK, (2013) project management involves five process grouped as project initiation process group, project planning process group, project execution process group, project monitoring and control process group, and finally project closure process group. These five major processes include different pieces of tasks within them.

Project performance can be measured and evaluated using a large number of performance indicators that could be related to various dimensions such as time, cost, quality, client satisfaction, client changes, business performance, health and safety (Cheung, 2004). Time, cost and quality are, however, the three principal performance evaluation dimensions of any type of projects.

Project performance dimensions may have one or more indicators, and could be influenced by various project characteristics. Dissanayaka and Kumaraswamy (1999) found that project time and cost performances get influenced by project characteristics, procurement system, project team performance, client representation's characteristics, contractor characteristics, design team characteristics, and external conditions. Similarly, Iyer and Jha (2005) identified many factors as

having influence on project cost performance, these include: project manager's competence, top management support, project manager's coordinating and leadership skills, monitoring and feedback by the participants, decision making, coordination among project participants, owners' competence, social condition, economic condition, and climatic condition. Coordination among project participants, however, was identified as the most significant of all the factors, having maximum influence on cost performance. Interestingly, Love et al. (2005) examined project time cost performance relationship, and their results indicate that cost is a poor predictor of time performance.

The Standish Group research report (<http://www.projectsmart.co.uk/white-papers/chaos-report.pdf>) shows a staggering 31.1% of projects will be cancelled before they ever get completed. Further results indicate 52.7% of projects will cost 189% of their original estimates. The cost of these failures and overruns are just the tip of the proverbial iceberg. The lost opportunity costs are not measurable, but could easily be in the trillions of dollars. On the success side, the average is only 16.2% for software projects that are completed on time and on-budget. In the larger companies, the news is even worse: only 9% of their projects come in on-time and on-budget. And, even when these projects are completed, many are no more than a mere shadow of their original specification requirements.

Since there are relatively large number of software development projects being undertaken in Information network security agency, the projects need close supervision and have to be managed in a way that they could be successful and achieve their goals with the required quality, at the required time and costs. However, from informal observation, discussions and communications with clients and system developers in the agency, the researcher has observed that there are some difficulties in delivering software development projects as proposed. Therefore, this research is intended to identify the critical success factors (CSFs) in software development projects that positively impact the development and implementation of software projects. Additionally, the research is intended to find out the ranking of the critical success factors, whose presence contribute to the success of the project and whose absence has adverse effect on the successful development of the product and delivery of the project.

1.3 Research Questions

The research paper in general tries to address the question “what are the critical success factors in the software development projects undertaken by the agency?” and specifically the research will answer the following research questions:

- ⇒ What are the critical success factors for software development projects in the agency?
- ⇒ What is the degree of contribution of each success factors to the project success?
- ⇒ What other success factors absent in the agency?
- ⇒ What should be done to create the critical success factors?

1.4 Objectives of the Study

The objectives of the study are to:

- ⇒ Assesse the availability of the critical success factors, whose presence is essential for successful completion of projects.
- ⇒ Rank the major success factors of software development projects undertaken in the agency.
- ⇒ Assess which of the success factors are lacking in the agency, so that successful completion of projects is adversely affected.
- ⇒ Assess the management tools, practice and challenges faced by the management in implementation of software development projects.

1.5 Significance of the Study

The finding of the study will help the organization by providing tangible and concrete evidence regarding the developed objectives and the results of the research. These will help the agency to design its strategy for the successful completion of its projects and deliver the projects to its customer as per the agreed time, quality, scope and other parameters. Moreover, the outputs of the study will help project management practitioners by showing in which points they should give due emphasis when they undertake software development projects and also policy makers and professionals will also be the beneficiaries of the result (output). The output of the research will

have a significant academic role in providing a knowledge basis of project management for identification of critical success factors in Information technology software development projects on organizational, industry and national basis. Lastly this research can contribute as an inspiration and source of data for further researches and studies in the area.

1.6 Scope of the Study

The scope of the study is delineated to commercial software development projects that are undertaken and being undertaken in the past five years by the information network security agency, because information about projects that are concern to national security and organizational secrecy is not allowed to be used for such kind of researches. Projects are centrally managed by the project management office after the structural change of the agency before five years in June 2014. Project information before June 2014 are not readily available at the project management office.

Therefore, from the commercial projects the researcher focus on those software development projects completed and which are in progress in the since June, 2014. Regarding the budget, complexity and time span of projects, all commercial software development projects of any budget and complexity are in scope of this study.

1.7 Limitation of the study

Limitation of a study help to identify possibly expected challenges that can affect the due process and output of the research. Here below listed limitations that potentially alter the findings of the research faced and expected to be faced by the researcher.

- ✦ Access of information from all project management and project individuals from the project management office and those individuals that participated in projects under consideration because of unavailability of records or employees.
- ✦ Access to some project documents manuals and records from the finance and record management departments of the agency due to confidentiality of records.

- ▲ Limitation of time and resource make deeper analysis and cover larger scope.
- ▲ Due to lack of experience of the student researcher and time constraint, difficulty to summarize the collected data.

1.8 Organization of the Study

This paper will be organized in four sections or chapters. The first chapter is the introduction part of the study and it includes background of the study, statement of the problem, research questions, objective, significance, scope, limitation and finally organization of the study. The second chapter is all about review of literature, these literatures are important and bases for the research as a whole in developing theoretical framework and deeper understanding regarding the subject. The third chapter is going to be about research design and methodology. Which includes research design, population and sampling techniques, types of data and tools which is going to be used for data collection, procedures of data collection and finally methods of data collection. The fourth chapter includes data presentation, analysis and interpretation section and the last chapter, chapter five, deals with summary, conclusion and recommendation of the study.

CHAPTER TWO

2 REVIEW OF RELATED LITERATURE

2.1 Introduction

Related literature review will support and inform the subject the study is covering. This chapter presents the theoretical and empirical literatures, and concepts related with the topic of the study. It provides a summary of previous related studies and various literatures on the research problem areas. This chapter reviews both theoretical and empirical literature by various scholars on the relationship between critical success factors and project success in organizational context.

Project, Project Management and Project Management Process.

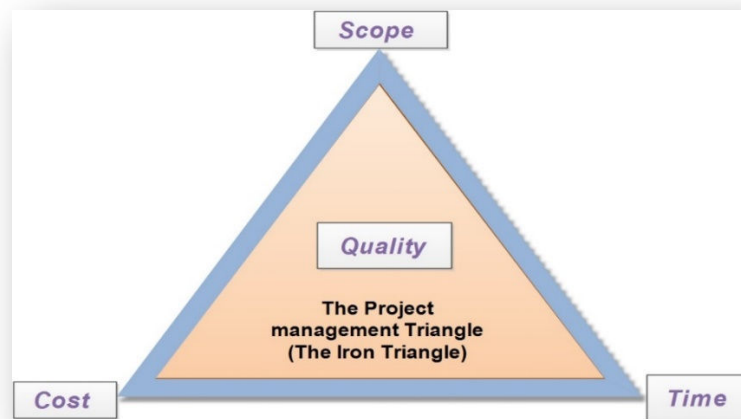
Duncan (1996) defines a project as “a temporary endeavor undertaken to create a unique product or service”. Meaning that, every project has a definite beginning and end by doing something which is not done before. PMBOK (2017) defines project as a temporary endeavor undertaken to create a unique product or service. we can generalize the definitions of various scholars as a project is a temporary organization or endeavor that is created for the purpose of delivering one or more unique business product, service or result according to an agreed business case. And it is an undertaking designed to examine present practice, to propose change and to test the implementation of change.

According to Charvat (2003) Project management is a set of tools, techniques, and knowledge that, when applied, helps to achieve the three main constraints of a project, which are, scope, cost and time. According to Gray and Larson (2006), project management is a task derived from an organization that enables professional project managers to use their skills, tools and knowledge to plan, execute and control a unique project within a limited lifespan by meeting the specification requirements of the organization. Generally, Project Management is the application of a collection

of tools and techniques to direct the use of diverse resources toward the accomplishment of a unique, complex, one-time task within time, cost and quality constraints.

In these definitions of project management some of the success criteria are included, the iron triangle, time, cost and quality. From the figure below (figure-1) we can understand that there are three main interdependent constraints for every project; time, cost and scope. This is also known as Project Management Triangle.

Figure 1- Project Management Triangle



Wideman (2012) states that Project management effectiveness is a measure of the quality of attainment in meeting objectives. It is the extent to which the goals of a project are attained, or the degree to which a system can be expected to achieve a set of specific requirements

According to PMBOK (2017) project management involves five process grouped as project *initiation*, *project planning*, *project execution*, *project monitoring and control*, and finally *project closure*. Kerzner classifies the five major processes in to different pieces, like:

- ♣ **Project initiation:** in these stage activities like selection of the best project given resource limits, recognizing the benefits of the project, preparation of the documents to sanction the project and assigning of the project manager are expected to be done.
- ♣ **Project planning:** in these stage activities like definition of work requirements, the quality and quantity of work and the resources needed. Also scheduling the activities and evaluation of the various risks are expected to be done.

- ♣ **Project execution:** negotiating for the project team members, directing and managing the work and working with the team members to help them improve and progress towards the project goals and objectives.
- ♣ **Project monitoring and control:** tracking progress, comparing actual outcome to predicted outcome, analyzing variances and impacts, and making adjustments.
- ♣ **Project closure:** verifying that all of the work has been accomplished, contractual closure of the contract, financial closure of the charge numbers and administrative closure of the paper work. Documenting lessons learned for future use.

Project Management Best Practice, Historical Perspective

Based on Snyder and Kline (1987) four distinctive periods exist in the historical development of project management, which are, prior to 1958, between 1958 and 1979, between 1980 and 1994, and 1995 to present have been identified to better capture the history of modern project management, and in these periods there is distinctive project management tools, techniques and science that contribute to the success of distinct projects.

1.1.1.1. Prior to 1958

The origin of the modern project management concept started between 1900s and 1950s. During this time, technology advancement reduced the project schedule. Telecommunication system increased the speed of communication. Automobiles allowed effective resource allocation and mobility. The job specification was widely used and Henry Gantt invented Gantt chart. The job specification later became the basis of developing the Work Breakdown Structure (WBS).

Actual Representative Projects

- ♣ ***Hoover Dam (1931–1936):*** In 1928, the U.S congress passed the Boulder Canyon Act assigning \$175 million to the Hoover Dam. The “Big Six” that consists of Utah Construction, Pacific Bridge, H.J. Kaiser, W.A MacDonald and Kahn, Morrison-Knudsen, and J.H. Shea formed a consortium to work as a general contractor. It was crucial for the companies to have a detail project planning, controlling, and coordinating plan because the project involved six independent companies.

The project employed approximately 5,200 workers, and large amount of construction resources including concrete, structural steel components, steel pipe, and so on were required. The project was successfully completed under budget and ahead of schedule (David Moore, 1999). The Hoover dam project is still one of the highest gravity dams in the U.S., which generates more than four billion kilowatt-hours a year.

- ♣ ***Manhattan Project (1942–1945):*** The Manhattan project was the pioneer research and development project that designed and built the atomic bomb. The initial project was proposed in 1939 to defend possible threats from Germany. In 1941, the Office of Scientific Research and Development (OSRD) was established to coordinate government-sponsored projects, and the Manhattan project was initiated in 1942. The OSRD coordinated universities and resources for the research and development of the atomic bomb. The project was successfully tested in July of 1945, a month before the bomb was dropped on Hiroshima, Japan. The project involved 125,000 labors, and cost nearly \$2 billion.

1.1.1.2. Between 1958-1979

There was significant technology advancement between 1958 and 1979. In 1959, Xerox introduced the first automatic plain-paper copier. In the 1960s, many industries were influenced by the development of silicon chips and minicomputers. In 1969, Bell Laboratories developed programming language UNIX and computer industry started to develop rapidly. NASA's successful Apollo project earmarked a historic event of the mankind. In 1971, Intel introduced 4004, a 4-bit microprocessor, which is a foundation of the evolution of Intel's 80386, 80486, and Pentium processors in the 1990s. While many dedicated scientists developed ARPANET, Ray Tomlinson in 1972 introduced the first e-mail software. In 1975, Bill Gates and Paul Allen founded Microsoft. Several project management software companies were founded during the 1970s including Artemis (1977), Scitor Corporation (1979), and Oracle (1977).

Between 1950 and 1979, several core project management tools including CPM/PERT, Material Requirement Planning (MRP) and others were introduced. CPM/PERT was calculated in large computer systems, and specialized programmers operated the CPM/PERT mainly for the government sector projects.

Actual Representative Projects

- ♣ ***Polaris project (1956–1961):*** The Polaris project refined the project management concepts as known today (Sapolsky 1972). The \$11 billion Polaris project was undertaken by the U.S. government to deliver nuclear missiles carried by submarines, known as Fleet Ballistic Missile. The project was initiated by U.S. Navy in late 1956, and successfully launched its first Polaris missile in 1961. The Navy created a new unit called Special Project Office (SPO) to avoid giving the Polaris project to Bureau of Ordinance and Bureau of Aeronautics (OBA) (Sapolsky 1972).
- ♣ ***Apollo project:*** In 1958, National Aeronautics and Space Administration (NASA) were created. Between 1969 and 1972, NASA successfully led six missions to explore the moon. In 1960, NASA set up the Apollo program office to provide following functions:
 - ❖ Maintain and schedule Apollo missions using PERT
 - ❖ Procurement and contracting with suppliers such as GE (General Electric).
 - ❖ Develop management system to measure the performance.
 - ❖ Set up a focal point of the Apollo program.
- ♣ ***RPANET:*** The U.S. Department of Defense initially funded the project, and Advanced Research Projects Agency (ARPA) coordinated it. The ARPA's objective was to schedule and coordinate the activities of the heterogeneous set of contractors. (Hughes 1998). The ARPA started to develop its ARPANET, the origin of the Internet. The ARPA project was a research and development project that was initially developed by the ARPA then managed by several organizations.

1.1.1.3. Between 1980-1994

During the 1980's and early 1990's, the revolution of information technology and information system (IT/IS) sector shifted people from using mainframe computer to multitasking personal computer that had high efficiency in managing and controlling complex project schedules. In the mid-80s, the Internet served researchers and developers, and local area networks and Ethernet technology started to dominate network technology (Barry et al 2000).

During the 1950s through 1970s, most computer engineers were responsible for operating the project management systems because the mainframe systems were not easy to use. During the

late 1970s and early 1980s, project management software for personal computers became widely available by a number of companies in the mid-1980s which made project management techniques more easily accessible.

Actual Project Cases

- ♣ ***The English-France Channel project (1989- 1991):*** The project was an international project that involved two (British and French) government agencies, several financial institutions, engineering construction companies, and other various organizations from the two countries. The project goal, cost, schedule, and other factors needed to be adjusted to conduct the project. The language, use of standard metrics, and other communication differences needed to be coordinated.
- ♣ ***The XV Calgary Olympic Winter Games (1988):*** The Calgary Winter Olympic games in 1988 applied project management to event management. Its successful adoption of the project management practices expanded to various event management practices.

1.1.1.4. 1995 – Present

The Internet started to change virtually every business practices in the mid-1990s. It provided fast, interactive, and customized new medium that allowed people to browse, purchase, and track products and services online instantly. As a result, the Internet permits organizations to be more productive, efficient, and customer-oriented. Between 1995 and 2000, the project management community adopted internet technology to become more efficient in controlling and managing various aspects of projects. While the information technology revolutionized the traditional business practices, various industries started to adopt and to apply project management practices.

Actual Project Cases

- ♣ ***Year 2000 (Y2K) Project:*** The Year 2000 (Y2K) Problem known as the millennium bug referred to the problem that computers may not function correctly on January 1st, 2000 at 12 AM. The Y2K project integrated several aspects of project management. First, the Y2K project had a specific objective (to fix Y2K problems) and sharp deadline (on January 1st, 2000 at 12:00 AM). Second, the project was globally and independently conducted that virtually every organization using

computers were at stake. Third, there were various methodologies and tools to remedy the problem. Fourth, from the initiation to completion, detailed progressive reports were widely available. The Y2K project became the most documented projects in the project management history because virtually similar projects were conducted by millions of organization in the world. Furthermore, use of the Internet was common practice for Y2K projects which led to set up a virtual project office. In addition, it increased the awareness and importance of risk management practices to numerous organizations.

Table 1-Historical Project Management achievements and Progresses Pinto and Slevin (1988)

	Technology	Management Science	Project Management & Technology	Major Projects	Project Office
Prior to 1958	⌘ Telegraph ⌘ Telephone ⌘ First computer ⌘ Automobile ⌘ Airplane ⌘ First database	⌘ Adam Smith ⌘ Frederick W. Taylor ⌘ Henry Fayor ⌘ Henry Gantt ⌘ McGregor's XY theory	⌘ Parametric Cost Estimating ⌘ PERT/CPM ⌘ Gantt Chart ⌘ Monte Carlo Simulation	⌘ Inter-Continental railroads ⌘ Hoover Dam ⌘ Polaris ⌘ Manhattan project ⌘ Panama Cana	⌘ Focal point ⌘ "proximity" ⌘ Traditional project office functions ⌘ Navy Special Project Office (SPO)
1959 to 1979	⌘ IBM 7090 ⌘ Xerox copier ⌘ UNIX ⌘ Microsoft Founded	⌘ ISO ⌘ TQM ⌘ Globalization ⌘ Quality Management	⌘ PMI ⌘ Inventory Control ⌘ MRP	⌘ Apollo 11 ⌘ ARPANET	⌘ Project Supporting Office
1980 to 1994	⌘ Personal Computer ⌘ Wireless in building network ⌘ First Internet browser (MOSAIC)	⌘ Manufacturing resource planning ⌘ Risk Management	⌘ Matrix organization ⌘ PM Software for PC	⌘ Boeing 777 ⌘ Space Shuttle Challenger ⌘ The English-France Channel project	⌘ Project Headquarter ⌘ War Room
1995 to Current	⌘ Internet	⌘ Critical chain ⌘ ERP ⌘ Cloud computing	⌘ PMBOK (PMI)	⌘ Iridium ⌘ Y2K project	⌘ Virtual Project Office ⌘ Web-based Project Office

Project Success, Success Criteria and Success Factors

The project management literature agrees that there are two components of project success, (Jugdev and Muller, 2005; Morris and Hough, 1987; Wateridge, 1998; Turner, 1999)

- ★ **Project success factors**, elements of a project that can be influenced to increase the likelihood of success; these are independent variables that make success more likely.
- ★ **Project success criteria**, the measures by which we judge the successful outcome of a project; these are dependent variables which measure project success.

Project success criteria vary from project to project. What is acceptable in one project without impact on perceived success is abject failure in another project. People, organizations, or stakeholders also judge the success of projects differently depending on their personal objectives, and it can be the case that one person judges a given project a success, while another judges it a failure.

Based on Kerzner,(2009) successful project satisfies three factors: first, it complies with the functionality or quality agreed to in advance, second, it is delivered on time and finally, it is delivered within the agreed budget. When these three factors balance each other, we can speak of a successful project. Kerzner,(2009) generalized successful project management as having achieved the project objectives of finalizing the project within time, within cost, at the desired performance/technology level, while utilizing the assigned resources effectively and efficiently and the project should be accepted by the customer.

1.1.1.5. Project Success Criteria

According to Crawford (2005) project success is an important project management issue, it is one of the most frequently discussed topics and there is a lack of agreement concerning the criteria by which success is judged (Pinto and Slevin 1988; Freeman and Beale 1992; Shenhar, Levy, and Dvir 1997; Baccarini 1999).

A review of the literature further reveals that there is, in fact, a high level of agreement with the definition provided by Baker, Murphy, and Fisher (1988), that project success is a matter of

perception and that a project will be most likely to be perceived to be an “overall success” if the project meets the technical performance specifications and/or mission to be performed, and if there is a high level of satisfaction concerning the project outcome among key people on the project team, and key users or clients of the project effort.

Besides the “iron triangle”, and taking into account considerations of project management success, it is possible to find many different approaches for instance, Baccarini (1999) states that project manager is not responsible only for time, cost and quality management, but also integration, scope, human resource, communication, risk and procurement management.

There is also a general agreement that although schedule and budget performance alone are considered inadequate as measures of project success, they are still important components of the overall construct. According to Baccarini (1999), quality is intertwined with issues of technical performance, specifications, and achievement of functional objectives and it is achievement against these criteria that will be most subject to variation in perception by multiple project stakeholders.

The Standish Group defines success as follows and differentiates failure in to the following categories as presented in CHAOS (2015):

- ❖ **Successful project:** These projects are completed on time and on budget, with all features and functions as initially specified. Only 16.2% of information technology projects fell in this category.
- ❖ **Challenged project:** These projects are completed and operational but are over-budget, over the time estimate, and offer fewer features and functions than originally specified. 52.7% of all studied information technology projects fell into the challenged category.
- ❖ **Impaired/ Failed project:** These projects are cancelled at some point during the development cycle. They are abandoned at some point and thus became total losses. A disturbing 31.1% of all studied information technology projects fell into this category.

1.1.1.6. Project Success Factors

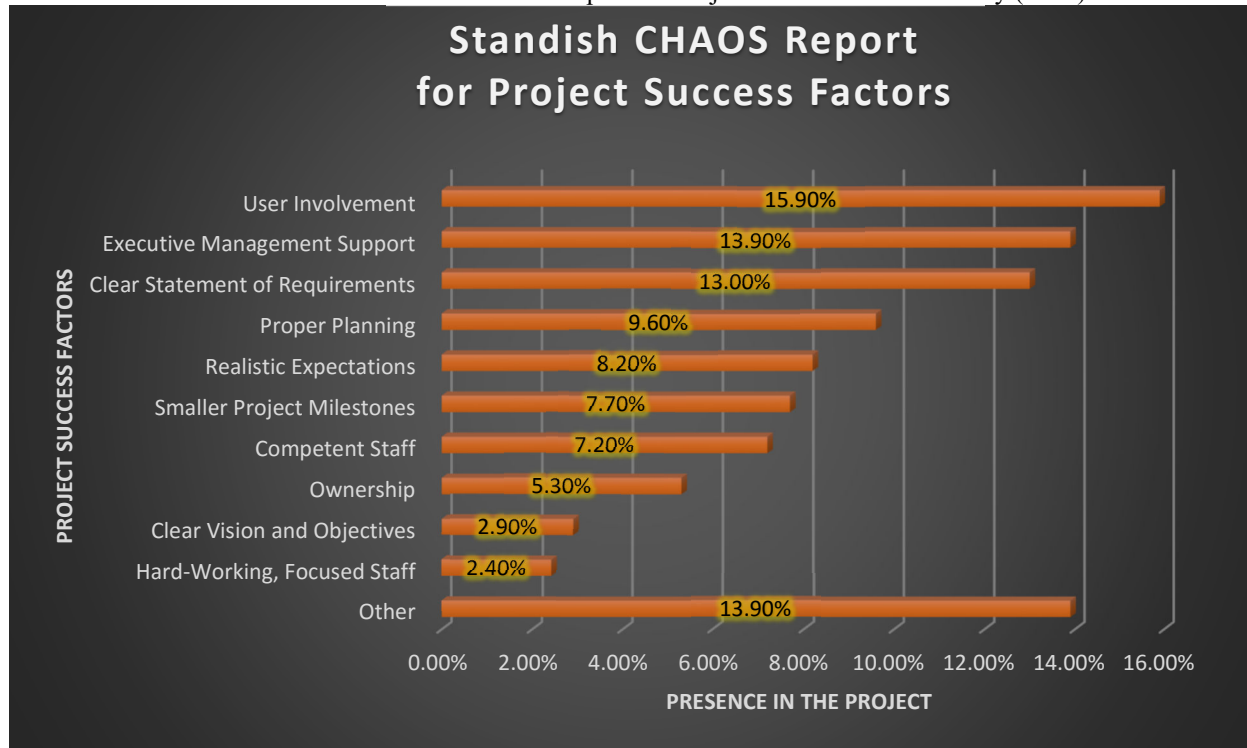
According to Shenhar, Dvir, Levy and Maltz (Shenhar, Dvir, Levy, & Maltz, 2001), the first dimension of the project management success logical framework, includes only two measures:

meeting schedule, and budget goals. The second dimension includes meeting functional requirements, meeting technical specifications, fulfilling customer needs, solving a customer's problem, customer using of product, and customer satisfaction. The third dimension includes the measures of commercial success and creation of a large market share. And finally, the fourth dimension includes the measures of new market creation, new product line creation, and new technology development. Further research showed the importance of soft factors such as teamwork (Hoegl & Gemuenden, 2001) or leadership styles of project managers (Turner & Müller, 2005) and the shared leadership by the team (J.F.Cox, Pearce, & Perry, 2003).

According to on Hogel and Gemuenden, teamwork relates to different measures of project success. Both team performance (efficiency and effectiveness) and the personal success of team members (satisfaction and learning) are significantly connected to teamwork quality. According to Turner and Müller (Turner et al., 2005), although the project success literature has, by and large, ignored the project manager as a project success factor. So, according the authors, the project manager's competence is related to his or her success as a project manager; different project leadership styles are appropriate at each stage of the project life cycle; specific leadership styles are appropriate for multi-cultural projects; project managers have a leadership role in creating an effective working environment for the project team and the project manager's leadership style influences his or her perception of success in different situations.

According to the 2011 Standish CHAOS Report, there are top 10 factors found in successful projects. The Standish group identify and rank the success factors, failure factors and other factors that affect the performance and achievement of projects. These success factors are listed in Table below (Clancy, T. 2012).

Table 2- Standish CHAOS Report for Project Success Factors Clancy (2012).



Murphy, Baker and Fisher (1974) used a sample of 650 completed aerospace, constructions, and other projects with data provided primarily by project managers on the factors contributing to project success. Their finding has been the most cited, used, extensive and authoritative research in the area of project success factors. They found ten factors that were found to be strongly linearly related both to perceived success and perceived failure of projects, while twenty-three project management characteristics were identified as being necessary but not sufficient conditions for perceived success.

Pinto and Slevin (1987, 1988) and Morris and Hough (1986, 1987) also did an important work on project success factors in the 1980s. While Morris and Hough (1986, 1987) drew primarily on literature and case study analysis of major projects, Pinto and Slevin (1987, 1988) based their findings on the opinions of a usable sample of 418 project managers, responding to questions asking them to rate the relevance to project implementation success of ten critical success factors and four additional external factors (Slevin & Pinto 1986).

Table 3-Lists of critical success factors developed by Belassi & Tukul (1996)

Sayles and Chandler (1971)	Martin (1976)	Baker, Murphy and Fisher (1983)	Cleland and King (1983)	Lock (1984)	Morris and Hough (1987)	Pinto and Slevin (1989)
▲ Project manager's competence ▲ Scheduling ▲ Control systems and responsibilities ▲ Monitoring and feedback ▲ Continuing involvement in the project	▲ Define goals ▲ Select project organizational philosophy ▲ General management support ▲ Organize and delegate authority ▲ Select project team ▲ Allocate sufficient resources ▲ Provide for control and information mechanisms ▲ Require planning and review	▲ Clear goals ▲ Goal commitment of project team ▲ On-site project manager ▲ Adequate funding to completion ▲ Adequate project team capability ▲ Accurate initial cost estimates ▲ Minimum start-up difficulties ▲ Planning and control techniques ▲ Task (vs. social orientation) ▲ Absence of bureaucracy	▲ Project summary ▲ Operational concept ▲ Top management support ▲ Financial Support ▲ Logistic Requirements ▲ Facility support ▲ Market intelligence (who is the client) ▲ Project schedule ▲ Executive development and training ▲ Manpower and organization ▲ Acquisition ▲ Information and communication channels ▲ Project review	▲ Make project commitments known ▲ Project authority from the top ▲ Appoint competent project manager ▲ Set up communications and procedures ▲ Set up control mechanisms (schedules, etc.) ▲ Progress meetings	▲ Project objectives ▲ Technical uncertainty innovation ▲ Politics ▲ Community involvement ▲ Schedule duration urgency ▲ Financial contract legal problems ▲ Implement problems	▲ Top management Support ▲ Client Consultation ▲ Personnel recruitment ▲ Technical tasks ▲ Client acceptance ▲ Monitoring and feedback ▲ Communication ▲ Trouble shooting ▲ Characteristics of the project team leader ▲ Power and politics ▲ Environment events ▲ Urgency

Therefore, one can conclude that there are countless numbers of factors that may have a bearing on project success. They may differ with respect to the industry, level of complexity, contextual factors, dynamicity of technology and other factors.

Project Failure

The term project failure is defined by different writers in different ways without shifting the basic meaning. Flowers (1996) have the opinion that a project fails when it does not achieve successful implementation and others take it further and include the user satisfaction and the benefits for the business in their assessment.

According to Jones (1996) the term "failure" refers to projects that are cancelled without completion due to cost or schedule overruns or that run later than planned by more than 25 percent. A failure is also defined as any software project with severe cost or schedule overruns, quality problems or that suffers outright cancellation.

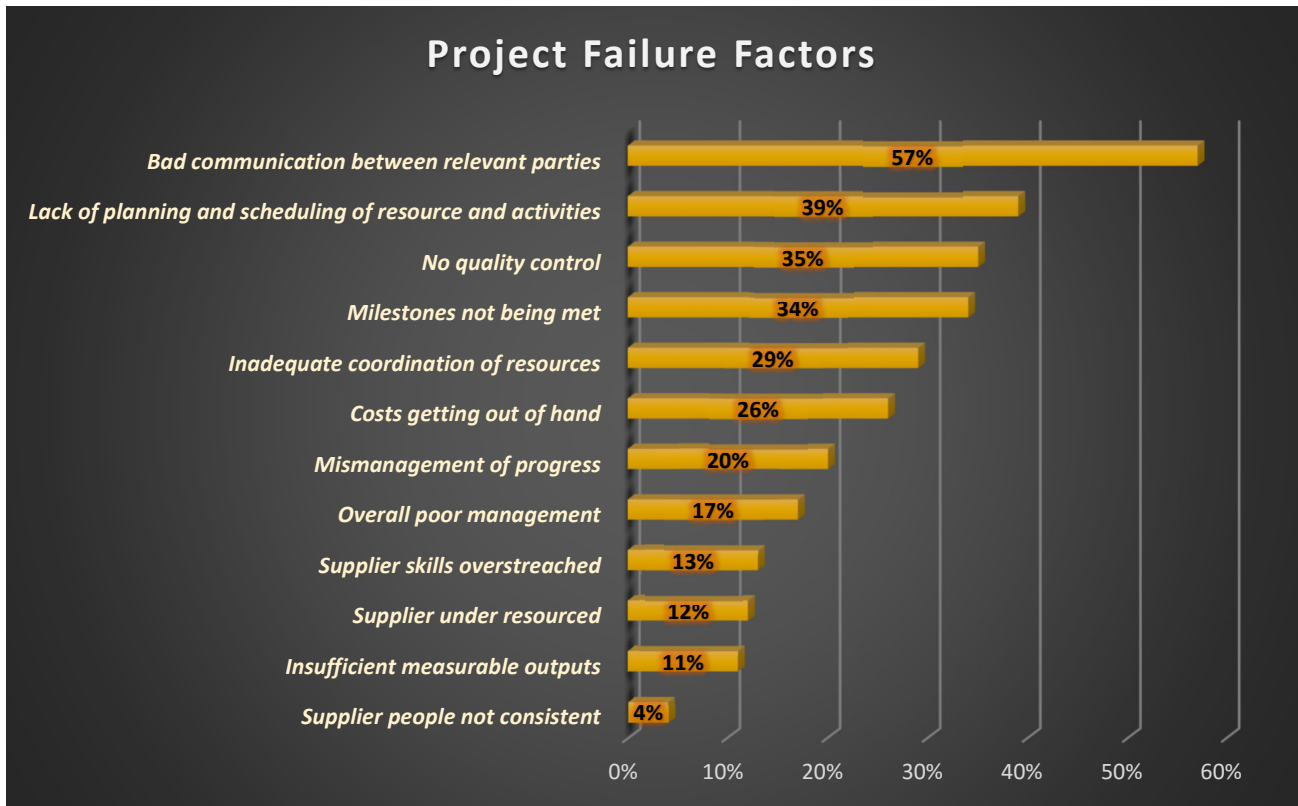
Flowers (1996) define an information technology system as a failure if any of these following situations occurs: the first one is when the system as a whole does not operate as expected and its overall performance is suboptimal. Secondly if, on implementation, it does not perform as originally intended or if it is so user-hostile that it is rejected by users underutilized. Thirdly, if the cost of the development exceeds any benefits the system may bring throughout its useful life. And lastly due to problems with the complexity of the system, or the management of the project, the information system development is abandoned before it is completed. As per, Smith (2001) a failed project is a project which does not make the journey from conception through to successful implementation.

1.1.1.7. Project Failure Factors

The French computer manufacturer and systems integrator, BULL, requested an independent research company, Spikes Cavell to conduct a survey in the UK to identify the major causes of IT project failure in the finance sector. The survey reveals that the major causes of project failure during the lifecycle of the project are a breakdown in communications (57%), which is resulted by Bad communication between relevant parties, a lack of planning of schedule, resource and activities

(39%) and poor quality control (35%). In the contrary, even if they have some contributions issues related with suppliers are the list factors for project failure. (http://www.it-cortex.com/Stat_Failure_Cause.htm, accessed Feb 20, 2019)

Table 4-Project Failure Factors (http://www.it-cortex.com/Stat_Failure_Cause.htm, accessed Feb 20, 2019)



Project Management Methodology

Wateridge (1995) suggests that in choosing a project management methodology, the project sponsor or project manager should identify the relevant success criteria, from them determine appropriate success factors to increase the chance of achieving those success criteria, and then select a project management methodology that delivers those success factors.

Crawford et al. (2005) have developed a categorization system for projects which they offer as helping to identify appropriate methodologies for projects, but they offer no guidance on whether different success criteria will be relevant for different types of projects, and hence different success factors, and whether different projects will perform differently against those different success

criteria. In addition, project sponsors, when selecting project managers to manage their projects, want to know that the manager will focus on the relevant success criteria of the project, and will be skilled in implementing the appropriate success factors. Thus the sponsor wants a project manager not just with appropriate competencies, (Turner and Muller, 2006; Müller and Turner, 2007), but also with appropriate focus for their work.

2.2 Empirical data on Project Success and Failure

The Standish Group Report (2015) indicates that in the United States, more than \$450 billion is spent each year on IT application development of approximately 230,000 projects. The average cost of a development project for a large company is \$2,822,000; for a medium company, it is \$1,931,000; and for a small company, it is \$734,000. The report indicates that a great many of these projects will fail. Software development projects are in turmoil. The Standish Group research shows a staggering 31.1% of projects will be cancelled before they ever get completed. Further results indicate 52.7% of projects will cost 189% of their original estimates. The lost opportunity costs are not measurable, but could easily be in the trillions of dollars.

Based on the research made by Project Management Institute (PMI) 2016, American companies and government agencies will spend \$81 billion for canceled software projects. These same organizations will pay an additional \$59 billion for software projects that will be completed, but will exceed their original time estimates.

Referring to the Standish Group Report (2015) which has studied 50,000 projects around the world, ranging from tiny enhancements to massive systems re-engineering implementations. Only 9% of projects in large companies were successful. At 16.2% and 28% respectively, medium and small companies were somewhat more successful. A whopping 61.5% of all large company projects were challenged compared to 46.7% for medium companies and 50.4% for small companies. The most projects, 37.1%, were impaired and subsequently cancelled in medium companies, compared to 29.5% in large companies and 21.6% in small companies. The average cost overrun across all companies is 189% of the original cost estimate. The average cost overrun is 178% for large companies, 182% for medium companies, and 214% for small companies. The average time

overrun is 222% of the original time estimate. For large companies, the average is 230%; for medium companies, the average is 202%; and for small companies, the average is 239%.

Khan et al. (2013), who analyzed the literature on success criteria of the past 40 years. Their model for measuring success was selected for this study as it is based on most recent literature, which is a superset of the success criteria from the leading researchers on project success. Their model offers a balance between hard and soft factors and measures 25 success criteria variables organized in the five dimensions. The model contains the three criteria, which are typically termed the iron triangle (project efficiency criteria), plus four additional project success criteria dimensions

The Standish Group surveyed IT executive managers for their opinions about why projects succeed. The three major reasons that a project will succeed are user involvement, executive management support, and a clear statement of requirements. There are other success criteria, but with these three elements in place, the chances of success are much greater. Without them, chance of failure increases dramatically.

For purposes of comparison, the project success criteria from the survey of IT executive managers were used to create a "success potential" chart. The success criteria were then weighted, based on the input from the surveyed IT managers. The most important criterion, "user involvement," was given 19 "success points". The least important "hard-working, focused staff" was given three points. Two very important success criteria "realistic expectations" and "smaller project milestones" were weighted at ten and nine points respectively.

Research at The Standish Group also indicates that smaller time frames, with delivery of software components early and often, will increase the success rate. Shorter time frames result in an iterative process of design, prototype, develop, test, and deploy small elements. This process is known as "growing" software, as opposed to the old concept of "developing" software.

Growing software engages the user earlier, each component has an owner or a small set of owners, and expectations are realistically set. In addition, each software component has a clear and precise statement and set of objectives. Software components and small projects tend to be less complex.

As a result of the numerous studies that approached the topic of project success, several lists of success factors exist. Pinto and Levin's paper (1987) represents a reference point by establishing a list of ten success factors, recognized by other authors as accurate (Turner, Müller, 2005): project

mission, top management support, schedule and plans, client consultation, personnel, technical tasks, client acceptance, monitoring and feedback, communication, trouble-shooting (Pinto, Slevin, 1987). Davis (2014) adopted in her paper a set of nine themes in order to describe success factors of projects: cooperation and communication, timing, identifying/ agreeing objectives, stakeholder satisfaction, acceptance and use of final products, cost/ budget aspects, competencies of the project manager, strategic benefit of the project and top management support.

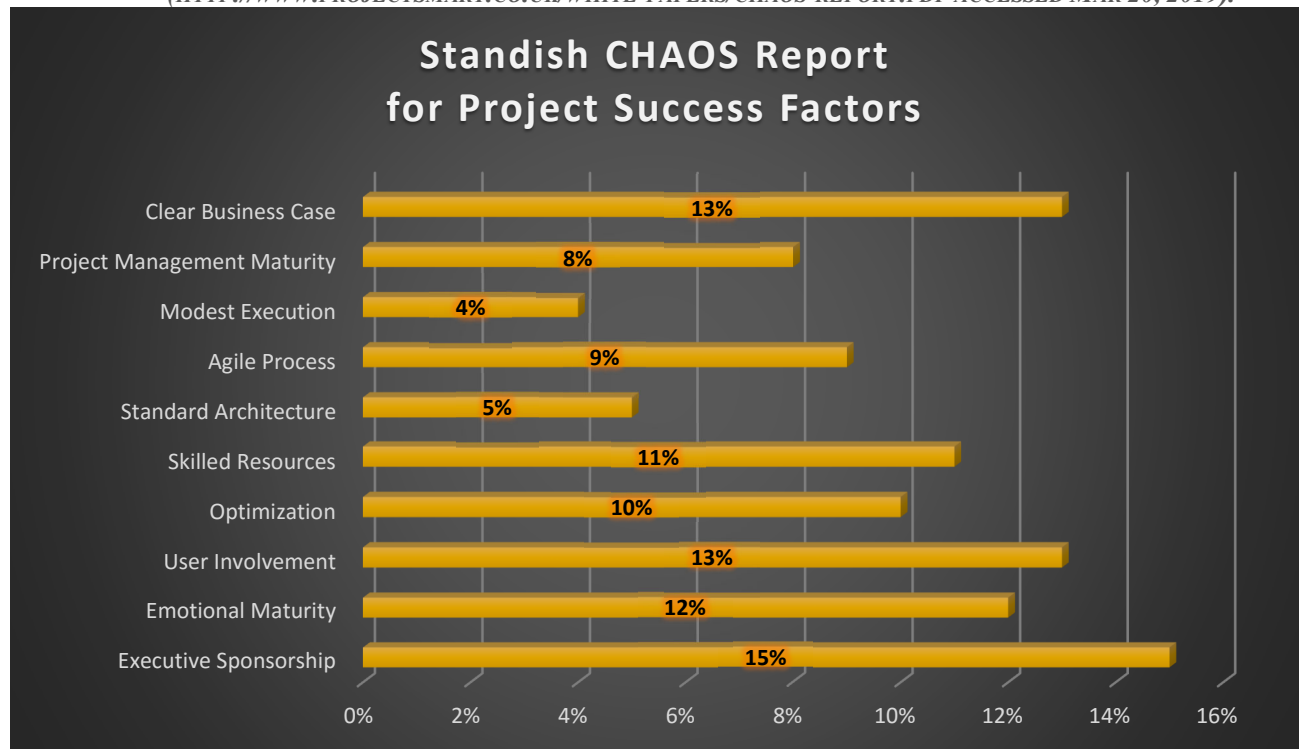
2.3 Conceptual framework

The conceptual framework used by the researcher (shown on Figure-) is based on the “2017 CHAOS Report” released by the Standish Group. (<http://www.projectsmart.co.uk/white-papers/chaos-report.pdf> accessed Mar 20, 2019). The CHAOS Reports have been published since 1994 and are a snapshot of the state of the software development industry. The 2017's report studied 50,000 projects around the world, ranging from tiny enhancements to massive systems re-engineering implementations.

A key part of the Standish Group analysis over the last 21 years has been the identification and ranking of the factors which work together to make projects more successful. Each year results are published to the public.

The survey made by The Standish Group was as thorough as possible, short of the unreachable goal of surveying every company with MIS in the country. The results are based on what The Standish Group define as "key findings" from the research surveys and several personal interviews. The respondents were IT executive managers. The sample included large, medium, and small companies across major industry segments, e.g., banking, securities, manufacturing, retail, wholesale, health care, insurance, services, and local, state, and federal organizations.

Table 5-finding of 2017 CHAOS Report” released by the Standish Group.
([HTTP://WWW.PROJECTSMART.CO.UK/WHITE-PAPERS/CHAOS-REPORT.PDF](http://www.projectsmart.co.uk/white-papers/chaos-report.pdf) ACCESSED MAR 20, 2019).



The researcher has used the research finding of 2017 CHAOS Report” released by the Standish Group.(<http://www.projectsmart.co.uk/white-papers/chaos-report.pdf> accessed Mar 20, 2019). Based on the report there are identified critical success factors whose presence lead the Information Technology project to success. An Information Technology project is successful when meets its success criteria: effectiveness/success will be accorded in project if it is completed within the budgeted cost, implemented on time and to quality/deliverable parameters that are preset during project planning phase (Atkinson, 1999). Therefore, based on this finding the researcher has developed the following conceptual framework.

The researcher chose this report because first, it is one of the most thorough research efforts into the reasons for project failure is the work of the Standish Group. Beginning in 1994 and repeating every two years, they have conducted interviews of more than 300 C-level Information technology project executives assessing over 500 projects of all size globally. The objective of these surveys is to discover and prioritize the reasons why Information technology projects fail. Second, Standish

Group is one of the reliable source of information globally. Third the findings of 2017 CHAOS Report” released by the Standish Group.(<http://www.projectsmart.co.uk/white-papers/chaos-report.pdf> accessed Mar 20, 2019), is their most recent report of its kind.

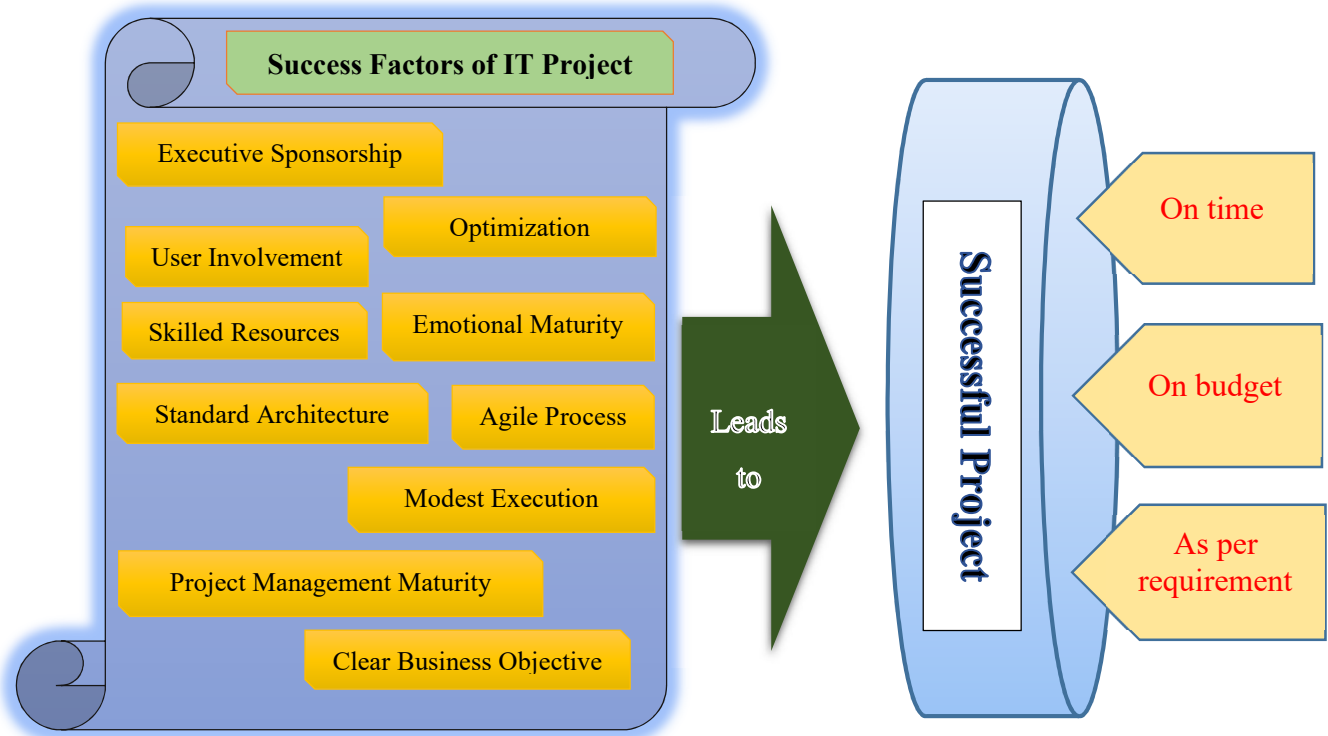


Figure 2- Conceptual Framework

According to the Standish Group.(<http://www.projectsmart.co.uk/white-papers/chaos-report.pdf> accessed Mar 20, 2019), the definitions for these critical success factors are:

- » **Executive Support:** when an executive or group of executives agrees to provide both financial and emotional backing. The executive or executives will encourage and assist in the successful completion of the project.
- » **Emotional maturity** is the collection of basic behaviors of how people work together. In any group, organization, or company it is both the sum of their skills and the weakest link that determine the level of emotional maturity.

- » **User Involvement:** takes place when users are involved in the project decision-making and information-gathering process. This also includes user feedback, requirements review, basic research, prototyping, and other consensus-building tools.
- » **Optimization** is a structured means of improving business effectiveness and optimizing a collection of many small projects or major requirements. Optimization starts with managing scope based on relative business value.
- » **Skilled staff** are people who understand both the business and the technology. A skilled staff is highly proficient in the execution of the project's requirements and deliver of the project or product.
- » **SAME** is Standard Architectural Management Environment. a consistent group of integrated practices, services, and products for developing, implementing, and operating software applications.
- » **Agile proficiency** means that the agile team and the product owner are skilled in the agile process. Agile proficiency is the difference between good agile outcomes and bad agile outcomes.
- » **Modest execution** is having a process with few moving parts, and those parts are automated and streamlined. Modest execution also means using project management tools sparingly and only a very few features.
- » **Project management expertise** is the application of knowledge, skills, and techniques to project activities in order to meet or exceed stakeholder expectations and produce value for the organization.
- » **Clear Business Objectives** is the understanding of all stakeholders and participants in the business purpose for executing the project. Clear Business Objectives could also mean the project is aligning to the organization's goals and strategy. (both for the client and developer organizations)

In developing the conceptual framework, the researcher uses the traditional view of how the success of a project is measured which is by the use of three criteria: time, budget and requirements, Bakker (2009 pp 493-503). This structure though criticized is routinely used to determine the success factors in almost all semi-complex projects such as information technology projects Bakker (2009).

Based on this conceptual framework, the relationship between variables for project performance which are the critical success factors, and the project outcome is used. The researcher, therefore, assesses the presence of those critical factors in the research area, which is Information Network Security Agency software development projects in the past five years. In the conceptual framework,

CHAPTER THREE

3 RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter basically describes how the study was carried out, the data collection methods that were used, its analysis and presentation. Research methodology is an approach and a set of supporting methods and guidelines to be used as a framework for doing research (Rusell, 2000). It is a very important chapter as it provides reasons to why a particular method of research, sampling, data collection and data analysis were chosen; it also gives the design of the study, population and the area on which the research was based on and procedures for collecting and analyzing collected data.

3.2 Research Design

The research design defines the researcher's overall plan for obtaining answers to the research questions; it's a road map for achieving the research objectives of the study. Research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure (Kothari, 2004). In fact, the research design is the conceptual structure within which research is conducted.

According to Saunders (2009) the most commonly used research designs are explanatory, exploratory, and descriptive which are selected based on the purpose of the study. From this research designs the researcher used cross-sectional descriptive design. Marczyk, DeMatteo, & Festinger (2005) states that, descriptive design is used to describe an intervention or phenomena in the real life context in which it occurs.

A case study is an intensive study of a single unit for the purpose of understanding a larger class of similar units (Gerring, 2004). Adams, Khan, Raeside, & White (2007), argue that case studies are used to study particular phenomena in particular settings. The case study method is very common in business research and is particularly useful for the analysis of organizations. According to Marczyk, DeMatteo, & Festinger (2005), case studies involve an in-depth examination of a single

person or a few people. The goal of the case study is to provide an accurate and complete description of the case. The principal benefit of case studies is that they can be immediately applicable to the participant's diagnosis or treatment.

Because of the topical scope and the above stated arguments, the research design adopted for this study is descriptive cross-sectional case study research design. This design is believed to be appropriate because of the nature of the study and the research questions were designed in such a way that they address the key factors of success for software development projects in the case of Information Network Security Agency.

3.3 Research Approach

The study employed mixed research approach. In a mixed methods design format, the research brings together approaches that included in both the quantitative and qualitative formats (Creswell, 2009). Qualitative method used to describe the state affairs, while quantitative method is used to give numeric presentation and analysis of the study; because according to Creswell (2009), qualitative research design can be best for gathering detailed information from participants about the subject of the study. Therefore, it is reasonable to use qualitative research approach for describing the current situation in detail. Since the research titled, an assessment of success factors of software development projects: a case on information network security agency, involves on the concepts related with project, project management, project success, project failure and other quality issues, qualitative method is used to describe the current situation in detail, while quantitative method is used to give numeric presentation and analysis of the study.

3.4 Population and Sampling Techniques

As mention in the scope of the study the researcher limelight the study in all commercial software development projects undertaken by information network security agency in the past five years. Therefore, the population of the study is all commercial software development projects that are undertaken and completed and being undertaken by the agency.

In doing so, first the researcher has identified all the commercial software development projects undertaken and being undertaken by the Information Network Security Agency. According to the

information collected from the project management office of the agency, it is found out that 31 software development projects are undertaken in the past five years and currently 3 software development projects are being undertaken by the organization.

In the organization there are four teams involved in any of software development projects, namely Development team, Project Management team, Business Analysis team and Quality Team. The major responsibilities of the four teams are:

- ♣ Business Analysis team- identify the business need of the product create a business and system requirement document to be used by the development team and make sure the product is developed as per the requirement of the customer.
- ♣ Development team- Based on the system requirement document and functional and nonfunctional requirements develop the product and take review comments from business analysis and quality assurance teams and update the product until it reach acceptable level by the two teams.
- ♣ Project Management Team- is what is called Project Management office of the agency. All projects are registered and scheduled on Primavera, control the progress, cost, documentations, customer relation activities of each projects.
- ♣ Quality Assurance team- develop test cases based on the business requirement and system requirement specifications. Additionally, develop organizational, national and product specific standards then make sure that all the developed products and documentations are as per the standard.

The target population of this study is all the team leaders from the four functional teams engaged in all 34 software development projects. A team leader may get involved in more than one projects at a time or in different times.

According to Kothari (2004) Census inquiry needs to be emphasized that when the universe is a small one, it is no use resorting to a sample survey. Census is a complete enumeration of all items in the 'population'. It can be presumed that in such an inquiry, when all items are covered, no element of chance is left and highest accuracy is obtained. In addition, it will enable the highest accuracy on the finding of the study. Additional to the team leaders the operational managers of the

five teams are part of the target population. Therefore, all of the target population will be addressed for information inquiry on the subject under study.

3.5 Types of Data and Tools/Instruments of Data Collection

To reach on a sound finding, the researcher uses primary and secondary data. Secondary data is collected by document review from the project management office of the agency and from finance and contract administration department regarding information which are related with the subject of the study. In order to gather the primary data, self-administered questionnaire and focus group discussion are used.

The effective measurement instrument should cover all content domains of constructs (Parasuraman, 1991). The measurement instruments is based upon the findings of 2017 CHAOS Report” released by the Standish Group.(<http://www.projectsmart.co.uk/white-papers/chaos-report.pdf> accessed Mar 20, 2019), as mentioned in the proposed conceptual framework model then questions are adopted with modifications from earlier studies and for External factors In addition, to address the critical success factors of software development projects, five point likert scale were used ranging from very unimportant (1) to very important (5) with Neither Important nor Unimportant in the middle (3)

The questionnaire has three parts and is prepared in English version. The first part of the questionnaire is about the respondents’ personal information. Its second part focuses on the status of the project, and other information related to the management and product development methods employed on the project. The third part of the questioner focuses on the critical success factors of project.

3.6 Procedures of Data Collection

After dividing the whole projects into two strata, the primary data from those samples is collected using self-administered questionnaire. The other source of primary data is focus group discussion. On the focus group discussion, the main ideas involve on major discussion topics like communication and coordination, planning and management, quality, time, scope, cost and budget, procurement and supplier, and user (customer) experiences while undertaking each project are

discussed. Additionally, the management measures taken to problems in each area of discussion are discussed and minutes are recorded. In order to get secondary data, the researcher investigates finance related reports, project agreements, acceptance documents, and other project related document.

3.7 Methods of Data Analysis

Descriptive analysis refers to statistically describing, aggregating, and presenting the constructs of interest. Descriptive statistics are used to describe the data collected and to accurately characterize the variables under observation within a specific sample (Marczyk et al., 2005). Both quantitative and qualitative methods are employed to present, analyze and interpret the data collected from the above sources. Data from questionnaire are coded and entered into the computer using statistical package for social science (SPSS) IBM version 24.3. Descriptive statistics involves the use of absolute and relative (percentages) frequencies, measures of central tendency and dispersion (mean and standard deviation respectively). Thus this research used descriptive analyses. Quantitative method involved descriptive analysis such as frequencies and percentages, mean and standard deviation to present quantitative data in form of tables and graphs. The analysis is aimed at showing the relationship in the existence of success factors with the successful completion of projects and ranking those factors. Additionally, the analysis shows the relationship of the absence of those success factors in the unsuccessfully closed projects.

3.8 Ethical Consideration

When doing research, treating people unfairly and using the information inquired during the research work or allowing others to use to harm people is unethical (Colin F., 2007). With this view, any information gathered from any individuals and the agency during the research work is treated confidentially without disclosing the respondent's identity or the agencies' or its customer's confidential information. For this reason, the respondents are allowed to respond anonymously in the questioners, and the focus group discussion minutes do not disclose the identities of the participants. The data is collected with the full consent of the participants. Involuntary participants were replaced by the same number of voluntary professionals from their teams and with adequate knowledge about the project.

The purpose of the study is clarified for increased participants on voluntary basis. According to Creswell (2003) the researcher has an obligation to respect the rights, needs, values, and desires of the informant(s), therefore the rights, needs, values and interests of respondents are respected. The researcher followed ethically and morally acceptable processes throughout the research process. The data was collected with the full consent of the participants.

CHAPTER FOUR

4 RESULTS AND DISCUSSION

4.1 Introduction

This chapter deals with the presentation, analysis and interpretation of the data which was collected from respondents. To analyze the collected data from the questionnaires distributed in line with the overall objective of the research, statistical procedures were carried out using statistical package for social science (SPSS) IBM version 24.3. The questionnaires used a five point Likert scale were used ranging from very unimportant (1) to very important (5) with Neither Important nor Unimportant in the middle (3). While Qualitative analysis is done for the semi-structured focus group discussions conducted.

4.2 Reliability and Validity

Cronbach's alpha was used to measure the reliability of the instrument used in this research which is based on the findings of 2017 CHAOS Report" released by the Standish Group (<http://www.projectsmart.co.uk/white-papers/chaos-report.pdf> accessed Mar 20, 2019). Content validity is assumed because the conceptual framework is proven. Reliable measures give greater confidence that the individual indicators are all consistent in their measurements, and therefore, the model is repeatable. The reliability test result is reported in the following table.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.835	.843	10

Table 6-Reliability test (Source: own survey, 2019)

For the reality Cronbach's alpha was used to measure the reliability of the ten success factors, as shown in the following table all the ten factors are found to be reliable.

	Cronbach's Alpha if Item Deleted
Executive Support	.750
Emotional maturity	.707
User Involvement:	.677
Optimization:	.615
Skilled staff:	.711
SAME:	.761
Agile proficiency:	.754
Modest execution:	.652
Project management expertise:	.771
Clear Business Objectives:	.685

Table 7-Reliability test for each factor (Source: own survey, 2019)

4.3 Response rate and demographic data

The questioners were distributed to team leaders who participate in the management of the 31 commercial projects undertaken and the 3 projects being undertaken by the agency. The four teams' leaders are from project management, business analysis, development and quality assurance. Team leaders from the four teams were contacted and were asked to answer the questions regarding the projects they participated. 136 questioners were prepared to be distributed, however some team leaders have left the agency and among those who left the agency and who are still working in the agency some of them did not respond. However, 124 questionnaires were appropriately filled and returned in hard copy and electronic form, within 10 days, which gives 91.2% return rate which is assumed to be suitable for further analysis. Focus group discussion was also held with the project team members who are involved in the on-progress three projects.

			Gender		Total
			Male	Female	
Role on the project	Project Manager	Count	20	10	30
		% of Total	16.1%	8.1%	24.2%
	Business Analyst	Count	30	3	33
		% of Total	24.2%	2.4%	26.6%
	Development	Count	23	8	31
		% of Total	18.5%	6.5%	25.0%
	Quality	Count	22	8	30
		% of Total	17.7%	6.4%	24.1%

		Gender		Total
		Male	Female	
% of Total		17.7%	6.5%	24.2%
Total	Count	95	29	124
% of Total		76.6%	23.4%	100.0%

Table 8- Gender and Role matrix(Source: own survey, 2019)

As shown on the above table only 23.4% of the respondents were female. The respondents count show that almost similar number of respondents are included from the four team leaders. The number of female respondents is higher on the project manager role compared to the other three roles, which is out of the 30 project management team leaders the number of females is 10.

As can be seen in the following table the educational level of the respondents is of first and second degree. Almost half of the respondents (54.8%) have a second degree and the rest of the respondents have first degree. Among those who have a second degree only 9 respondents (16.1%) are found to be female.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	First Degree	68	54.8	54.8	54.8
	Second Degree	56	45.2	45.2	100.0
	Total	124	100.0	100.0	

Table 9-Level of Education of respondents (Source: own survey, 2019)

As can be seen in the following table, the role of the respondents in the project is from four areas: project management team, business analysis team, quality assurance team and development team. And the numbers show that proportion of the respondents from the four teams is almost similar.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Project Manager	30	24.2	24.2	24.2
	Business Analyst	33	26.6	26.6	50.8
	Development	31	25.0	25.0	75.8
	Quality	30	24.2	24.2	100.0
	Total	124	100.0	100.0	

Table 10-Level of Education of respondents (Source: own survey, 2019)

The respondents fall in two categories of work experience on the position. The following table summarizes the role of the respondents on the project and the number of years on the position.

			Role on the project				Total
			P.M	B.A	Dev.	Qul.	
Years On the Position	4 to 6 years	% within Years On the Position	20.3%	44.6%	2.7%	32.4%	100.0%
		% within Role on the project	50.0%	100.0%	6.5%	80.0%	59.7%
		% of Total	12.1%	26.6%	1.6%	19.4%	59.7%
	6 to 8 years	% within Years On the Position	30.0%		58.0%	12.0%	100.0%
		% within Role on the project	50.0%		93.5%	20.0%	40.3%
		% of Total	12.1%		23.4%	4.8%	40.3%
Total		% within Years On the Position	24.2%	26.6%	25.0%	24.2%	100.0%
		% within Role on the project	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	24.2%	26.6%	25.0%	24.2%	100.0%

Table 11- experience and position on the project matrix (Source: own survey, 2019)

As shown in the above table, almost 60% of the respondents have an experience on the position they are currently working from 4 to 6 years. And the rest of the respondents have a corresponding experience from 6 to 8 years. The only exception is that, there are no respondents from business analysis with more than 6 years.

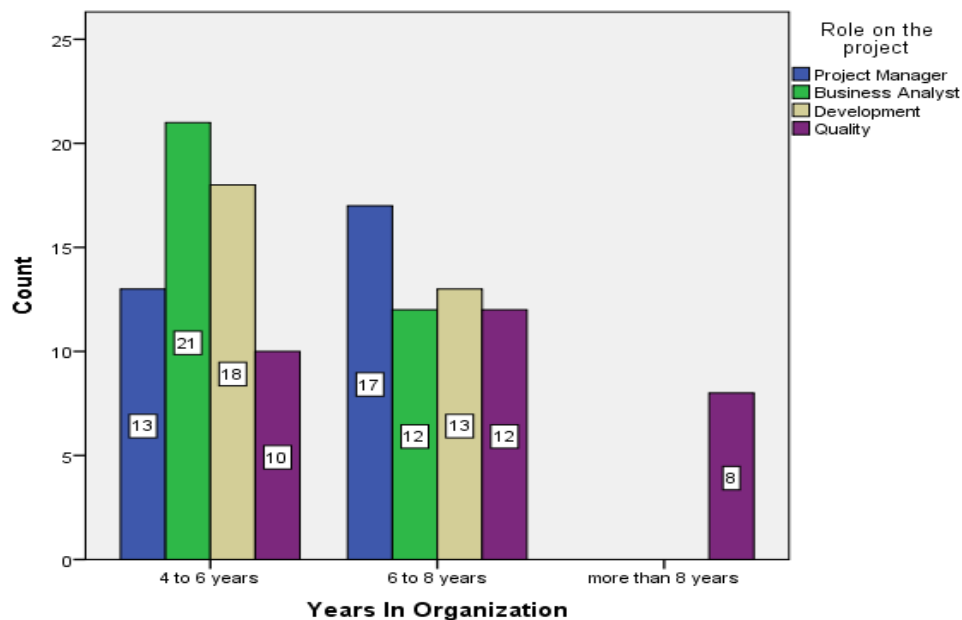


Figure 3-experience in the organization and role(Source: own survey, 2019)

As can be seen on the above bar graph only 8 (6.5% of respondents) of the respondents have more than 8 years of experience in the organization. 50% of the respondents have 4 to 6 years of experience in the organization.

4.4 Assessing the general questions raised about the projects

The status of the 34 projects is summarized in the following table. 13 of the projects are on progress and 34 of the respondents (27.4%) of the respondents are from the on progress projects. 7 of the commercial software development projects are stopped by management decision and 10.5% of respondents are from those projects. Respondents from the 13 successfully completed projects constitute 37.9%. Finally, 30 respondents are from failed and closed projects which constitute 24.2% of the respondents.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Completed and Closed	47	37.9	37.9	37.9
On Progress	34	27.4	27.4	65.3
Failed and Closed	30	24.2	24.2	89.5
Stopped	13	10.5	10.5	100.0
Total	124	100.0	100.0	

Table 12- Status of the projects

From the respondents it is confirmed that all the projects are software development projects, and all the respondents were part of the project throughout the project lifecycle.

			Cost parameter		Total
			On Schedule	Behind Schedule	
Status of the project currently?	Completed and Closed	% within Status of the project currently?	100.0%		100.0%
		% within Cost parameter	72.3%		37.9%
		% of Total	37.9%		37.9%
	On Progress	% within Status of the project currently?	52.9%	47.1%	100.0%
		% within Cost parameter	27.7%	27.1%	27.4%

			Cost parameter		Total
			On Schedule	Behind Schedule	
	% of Total		14.5%	12.9%	27.4%
Failed and Closed	% within Status of the project currently?			100.0%	100.0%
	% within Cost parameter			50.8%	24.2%
	% of Total			24.2%	24.2%
Stopped	% within Status of the project currently?			100.0%	100.0%
	% within Cost parameter			22.0%	10.5%
	% of Total			10.5%	10.5%
Total	% within Status of the project currently?		52.4%	47.6%	100.0%
	% within Cost parameter		100.0%	100.0%	100.0%
	% of Total		52.4%	47.6%	100.0%

Table 13-status of projects and parameters (Source: own survey, 2019)

All successfully completed projects are undertaken with in the cost schedule. And almost 50% on progress projects are on schedule regarding cost parameter. And all of the projects that are stopped by the management decision were behind the cost schedule. Regarding meeting the quality requirement of the project all on progress projects are under quality testing process. All the successfully completed projects have met the quality requirement of the project and have got the customers' acceptance upon the closure of the projects.

			Project Management Guide/Tool			Total
			PMBOK	PRINCE1 or 2	combination	
Product Development Life Cycle	Standard Waterfall	% within Product Development Life Cycle	43.3%	56.7%		100.0%
		% within Project Management Guide/Tool	18.6%	48.6%		24.2%
		% of Total	10.5%	13.7%		24.2%
	Rapid Development Waterfall	% within Product Development Life Cycle	100.0%			100.0%
		% within Project Management Guide/Tool	18.6%			10.5%

		Project Management Guide/Tool			Total
		PMBOK	PRINCE1 or 2	combination	
	% of Total	10.5%			10.5%
DSDM	% within Product Development Life Cycle	47.1%	52.9%		100.0%
	% within Project Management Guide/Tool	22.9%	51.4%		27.4%
	% of Total	12.9%	14.5%		27.4%
Scrum	% within Product Development Life Cycle	38.7%		61.3%	100.0%
	% within Project Management Guide/Tool	17.1%		100.0%	25.0%
	% of Total	9.7%		15.3%	25.0%
Adaptive Project Framework (APF)	% within Product Development Life Cycle	100.0%			100.0%
	% within Project Management Guide/Tool	22.9%			12.9%
	% of Total	12.9%			12.9%
Total	% within Product Development Life Cycle	56.5%	28.2%	15.3%	100.0%
	% within Project Management Guide/Tool	100.0%	100.0%	100.0%	100.0%
	% of Total	56.5%	28.2%	15.3%	100.0%

Table 14- Project Management tool and Product development Lifecycle (Source: own survey, 2019)

From those projects which use standard waterfall product development life cycle, 43.3% use PMBOK and 56.7% use PRINCE 1or 2 Project Management Guide/Tool which is 10.5% and 13.7% of the total projects under study. All projects which use Rapid Development Waterfall product development life cycle, use PMBOK project management guide/tool. PMBOK project management guide/tool is used more widely than any other project management guide/tools.

4.5 Critical success factors

Critical success factors are conditions, events and circumstances contributing to project success. They are defined as: ‘factors *which, if addressed, significantly improve project implementation chances*’ (Pinto and Slevin, 1987). Discussion of the finding has made its base on this concept critical success factor.

The data collected was analyzed using Frequencies, Percentages, mean scores and standard deviations. The higher average score means indicate higher levels of agreement of respondents for each critical success factor. A mean score greater than 4 is considered to imply to a very important; a mean score greater than 3.5 but less than 4 is considered to important; those with mean scores greater than 3.0 but less than 3.5 imply Neither Important nor Unimportant; a mean score greater than 2 but less than 3.0 imply Somewhat Unimportant; while a mean score of less than 2 is considered as a Very Unimportant.

	N	Mean	Std. Deviation	Kurtosis
	Statistic	Statistic	Statistic	Statistic
Executive Support	124	4.35	0.276	-.926
Emotional maturity	124	4.15	0.020	-1.041
User Involvement:	124	4.42	0.213	-.757
Optimization:	124	2.01	1.136	-.381
Skilled staff:	124	3.66	0.343	-.902
SAME:	124	2.01	0.189	-.797
Agile proficiency:	124	3.36	0.258	-1.028
Modest execution:	124	2.41	1.016	-.702
Project management expertise:	124	4.08	0.055	.498
Clear Business Objectives:	124	4.16	0.209	-.549

Table 15- descriptive statistics for critical success factors (Source: own survey, 2019)

Regarding the critical success factors the Kurtosis values for almost all of the factors except project management expertise is found to be negative so it means that the distribution is flatter than a normal distribution with a wider peak and the probability for extreme values is less than for a normal distribution, and the values are wider spread around the mean of each of the factors.

Executive support has a mean value of 4.35 which is very important critical factor with standard deviation of 0.276 which is way less than 1 implying that there is consensus among the respondents. Emotional maturity is also considered very important critical success factor with a mean value of 4.15 and the lowest standard deviation of 0.020 implying higher agreement among the respondents about the very importance of emotional maturity of project members as a critical factor. According to the respondents the highest mean 4.42 is seen for the user involvement with standard deviation of 0.213 which imply that there is a higher level of agreement among respondents regarding involvement of users as a critical success factor of software development projects.

Optimization is considered almost very unimportant by the respondents with higher level of disagreement indicated by a standard deviation of 1.136. skilled staff is considered important critical factor with a mean value of 3.66 and standard deviation of 0.343. SAME is considered almost very unimportant critical success factor by the respondents with a mean value of 2.01 and higher level of agreement. Agile proficiency and Project management expertise are considered important and very important critical success factors with mean value of 3.36 and 4.48 respectively.

Modest execution Is Somewhat Unimportant with a mean value of 2.41 and lack of agreement among respondents shown by a standard deviation of 1.016. Clear Business Objectives is the other factor which is considered very Important critical factor by the respondents with a mean value of 4.16 and standard deviation of 0.209 indicating higher level of agreement among the respondents.

4.6 Focus Group Discussion

On the discussion the main ideas are involved on major categories of discussion points like communication and coordination, planning and management, quality, time, scope, budget, procurement, and user (customer). Regarding communication and coordination the participants' claims that there is poor communication with customers and stakeholders. Mainly most of the communication is made informally, and they witnessed some problems emanated from this kind of informal communication. The other major point is related with planning and management. Related with planning there are limitations on planning techniques, and there are no well clear and accepted controlling and enforcing organizational policies and procedures regarding development

approaches, methods, tools and techniques, and generally the planning process is not well organized and there is lack of efficient utilization of the PRIMAVERA software deployed in the agency for planning and controlling activities. These things come to the picture because plans are always done just for the sake of formality and they are not used for controlling purpose. Therefore, there is a very poor quality of plan, poor project initiation and in almost all projects the agency involves directly without any feasibility study. The stopped projects with management decisions are the evidence for this.

Regarding risk management even if there is understanding about risk and risk management it is completely forgotten when it comes to practice. Risk management strategy is not developed and incorporated in the plan. There is dominant attitude of being more reactive to risks rather than being proactive, this is justified by the number of behind schedule (both time and cost) projects. Project managers and top management are majorly deals with those risks that already happened.

The other major issue in project management in the agency is related with project scope, time, quality and cost or budgeting. Related with quality, there are no common enterprise or national level quality standards and there is technical limitation on quality assurance and control techniques. In majority of the projects quality had not been planned and the focus is on the completion of the given project not on its quality. Generally, one can say that formal quality planning, quality assurance and quality control mechanisms are not incorporated. Regarding the project scope, time, and cost or budgeting there is big problem with time estimation and there is blind budget cut. Since there is knowledge and technical limitation on cost estimation and budget planning initial plans are not well detailed, for that reason additional costs emerge every time within the lifetime of the project.

The other main problem is on the part of user/customer. Most of the customers have problem/gap on technical capability, knowledge and skill. lack of willingness and resistance to the project is the major bottleneck for the effective completion of projects. Customers may commission the project just for the sake of commissioning and in some cases only the management is interested on the products but not the final users. So since the final user is not interested in the project or since they didn't believe the project will solve their difficulty there are problems in the requirement gathering which are inputs for requirement analysis document.

The other issues raised by the participants are, poor culture in adopting industry standards, methodology, tools and techniques, and the absence of well-defined acceptance criteria.

CHAPTER FIVE

5 SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summaries of the findings, conclusions and recommendations derived from the analysis the results obtained from the study, summary of major findings and conclusions as well as recommendations to the study in line with the objective of the study are presented. The recommendations that can help to improve the practice project management in the information network security agency are provided.

5.2 Summary of Major Findings

- ★ Success factors such as executive management support, emotional maturity of team members, user involvement in the software development projects, skilled human resource, project management expertise of the project management and executives, and clear business objective are found to be very important critical success factors in software development projects.
- ★ Factors such as modest execution of project activities, standard architecture of management environment and optimizing a collection of many small projects or major requirements are found to be somewhat unimportant factors for successful software development project in the agency.
- ★ User involvement, Executive management support, clear business objective, emotional maturity of team members of the project, and project management expertise are the top critical success factors of successful software development projects in the agency.
- ★ Related with planning there are limitations on planning techniques, and there are no well clear and accepted controlling and enforcing organizational policies and procedures regarding development approaches, methods, tools and techniques.
- ★ communication and coordination are found to be poorly managed and decentralized informal communication with customers and stakeholders dominate the communication line.

- ✱ Even if the Agency is trying to adopt some standard project management methodologies, tools and techniques, (like PRINCE2, PMBOOK, EA) capacity building on the areas are missing which create difference in level of understanding among team members.
- ✱ Pertaining to project scope, time, quality and cost or budgeting it is not professionally estimated, are not given due emphasis and in some projects there is blind budget cut. Since there is limitation of knowledge and technical knowhow on cost estimation and budget planning initial plans are not well detailed. For that reason, additional costs emerge every time within the lifetime of the project.
- ✱ Most of the customers have limitations on technical capability, knowledge and skill. For projects are initiated by the agency there is less users'/customer participation, lack of willingness and resistance to the project. Given that the final user is not interested in the project.
- ✱ There are no common enterprise or national level quality standards and there is technical limitation on quality assurance and control techniques. In majority of the projects quality had not been planned and the focus is on the completion of the given project not on its quality.

5.3 Conclusion

The major objective of the research is to assess the critical success factors of software development projects in the agency based on the 2017 “CHAOS Report” released by the Standish Group, and based on the above major findings, the researcher concludes that;

- ▲ Executive management support, Emotional maturity of team members, User involvement in the software development projects, Skilled human resource, Project management expertise of the project management and executives, and Clear business objective are very important critical success factors of the agency.
- ▲ Modest execution of project activities, Standard architecture of management environment and Optimizing a collection of many small projects or major requirements are not important factors for successful software development projects in the agency.

▲ User involvement, Executive management support, clear business objective, emotional maturity of team members of the project, and project management expertise are the top of the list based on contribution to success of projects in the agency.

▲ The other success factors missing in the agency are;

- ♣ Limitations on planning of schedule, lack of practical application of planning tools and controlling techniques.
- ♣ Poor communication and coordination with customers and stakeholders,
- ♣ lack of user involvement in the projects.
- ♣ Limitations on quality planning, quality control and quality assurance tools and techniques.
- ♣ Limitation on enforcement of the available standards, procedures and tools.
- ♣ Lack of common understanding and use of agency wide standards, tools and procedures.
- ♣ limitations on technical capability, knowledge and information technology knowhow by customers or end users of the product.

5.4 Recommendations

In order to improve the success of projects undertaken by information network security agency and minimize the problem which lead to failure of software development projects, the following possible recommendations are provided by the researcher.

▲ Executive management support, enhancement of emotional maturity of team members, User involvement in the software development projects, creating and keeping Skilled human resource, increasing the Project management expertise of the project management and executives, and creating Clear business objective activities should be given top priority by the agency.

▲ In order to have smooth flow of the project activities, the teams and the stakeholders who are part of the projects should work together to define, requirements and scope, creating a mutual understanding on acceptance criteria.

- ▲ A formal communication line should be created to centrally at the agency to manage all the communications with customers.
- ▲ Capacity building trainings should be provided, and same level of understanding should be reached among those who participate in software development projects regarding:
 - ♣ Project planning
 - ♣ Project costing
 - ♣ Quality assurance
 - ♣ Project risk management and other knowledge areas of a project management.
- ▲ Customers/users of the product should be participant of the project.
- ▲ The agency should set a quality standard to all the software products, and an adequate and capable human resource should be prepared to meet those quality standards. Additionally, the agency should create policies and procedures to enact those quality standards.
- ▲ Agency wide project management and other governance standards, tools and procedures like enterprise architecture, PMBOK or PRINCE2 should be developed in the agency context and same level of understanding should be created among project team members, stakeholders and clients.

5.5 Future Studies

The researcher recommends for further research to identify and assess other critical success factors of project success on other organizations, the information technology industry and other industries which highly implement project management practices. In addition, since the practice of project management in Ethiopia is in its early ages, it is suggested that a wider research can be conducted in detail by including various project based organizations to compare their project management practice, how they manage their challenges, share organizational experiences and contribute to the discipline's growth in Ethiopia.

6 Appendix 1: QUESTIONNAIRE

Dear Respondents: My name is Abel Solomon, conducting a research project entitled “An Assessment of success factors of software development projects: a case on Information Network Security Agency” for partial fulfillment of M.A. in Project Management at AAU School of Commerce.

This questionnaire is developed by the researcher to collect data which helps him to indicate factors which are critical to project success and which will contribute to project failure, project management methodologies & practices were implemented by the organization and challenges faced by the management in implementation of the projects.

I would sincerely like to extend my deep appreciation to the agency and the staff for the willingness and cooperation to allow me undertakes this research. I request your kind cooperation in answering the questions as truthfully as possible and I hereby assure you that the information you provide will be used only for the purpose of this study and will be kept strictly confidential.

Instructions: Please enter the appropriate response to each statement below. If you find this questioner on electronic form, please click on the boxes beside your choice. Please use only one choice among the alternatives for a specific question. Please answer the questions considering only the project the researcher asked you about.

Project Name

Part I- General Information of the respondents

A. Check one

Male	☐		Female	☐
------	--------------------------	--	--------	--------------------------

B. Tick the years of schooling you completed

Elementary	☐		College/University (First Degree)	☐
High school	☐		Post Graduate (Masters Degree)	☐
Preparatory	☐		Doctorial level	☐

C. How long have you been in the organization?

Less than 2years	☐		6 to 8 years)	☐
2 to 4 years	☐		more than 8 years	☐
4 to 6 years	☐			☐

D. How long have you been in your current Job?

Less than 2years	☐	☐	6 to 8 years)	☐
2 to 4 years	☐	☐	more than 8 years	☐
4 to 6 years	☐	☐		☐

E. What is your role in the project?

Project Manager	☐	☐	Development	☐
Business Analyst	☐	☐	Quality Assurance	☐
	☐	☐	Other	☐
	☐	Specify		

F. have you been engaged on the project from the start to end?

Yes	☐	☐	No	☐
-----	--------------------------	--------------------------	----	--------------------------

Part II information about project management methodology and standard.

1. Was the project software development?

Yes	☐	☐	No	☐
-----	--------------------------	--------------------------	----	--------------------------

2. What is the status of the project currently?

Completed and closed	☐	☐	Failed and closed	☐
On progress	☐	☐	Stopped	☐
Other	Specify			

3. How is the status of the project based on schedule parameter?

On Schedule	☐	☐	Ahead of schedule	☐
Behind Schedule	Specify			
Other				

4. How is the status of the project based on project cost parameter?

On Schedule	☐	☐	Ahead of cost schedule	☐
Cost overrun	Specify			
Other				

5. How is the status of the project based on product quality parameter?

Accepted	☐	☐	On test	☐
rejected	Specify			
Other				

6. What is the nature of the product development life cycle used?

Standard Waterfall		Dynamic Systems Development Method (DSDM)	
Adaptive Project Framework		A combination of different	
In house /custom		No methodology	
Rapid Development Waterfall		Other standard methodology	
Specify			
.....			

7. Which project management guide/tool do you use most?

PMBOK		PRINCE1 or 2	
In house /custom		combination of different	
Other standard methodology		No methodology	
Specify			
.....			

Part III project success factors.

1. Please rate the factors that have played an important role in the success of your project you involved in. please select only one rate for a factor. You can leave unmarked for those factors that are not impacting the project you were engaged. If the project is not a success, please rate those factors that were not present in the project undertaking. The definition of each of the terms is provided. please use the following scale to answer each item:

Very Important	Slightly Important	Neither Important nor Unimportant	Somewhat Unimportant	Very Unimportant
5	4	3	2	1

No	Factors of Success	5	4	3	2	1
1	Executive Support: when an executive or group of executives agrees to provide both financial and emotional backing. The executive or executives will encourage and assist in the successful completion of the project.					
2	Emotional maturity: is the collection of basic behaviors of how people work together. In any group, organization, or company it is both the sum of their skills and the weakest link that determine the level of emotional maturity.					
3	User Involvement: takes place when users are involved in the project decision-making and information-gathering process. This also includes user feedback, requirements review, basic research, prototyping, and other consensus-building tools.					

4	Optimization: is a structured means of improving business effectiveness and optimizing a collection of many small projects or major requirements. Optimization starts with managing scope based on relative business value.					
5	Skilled staff: are people who understand both the business and the technology. A skilled staff is highly proficient in the execution of the project's requirements and deliver of the project or product.					
6	SAME: is Standard Architectural Management Environment. a consistent group of integrated practices, services, and products for developing, implementing, and operating software applications.					
7	Agile proficiency: means that the agile team and the product owner are skilled in the agile process. Agile proficiency is the difference between good agile outcomes and bad agile outcomes.					
8	Modest execution: is having a process with few moving parts, and those parts are automated and streamlined. Modest execution also means using project management tools sparingly and only a very few features.					
9	Project management expertise: is the application of knowledge, skills, and techniques to project activities in order to meet or exceed stakeholder expectations and produce value for the organization.					
10	Clear Business Objectives: is the understanding of all stakeholders and participants in the business purpose for executing the project. Clear Business Objectives could also mean the project is aligning to the organization's goals and strategy. (both for the client and developer organizations)					

2. Is there any other success factor that you have identified while successfully completing your project?

No

Yes..... (Please specify)

.....

.....