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ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE

DEPARTMENT OF BIAS

POST GRADUATE PROGRAM IN PROJECT MANAGEMENT

**Generic Risk Factors and Their Implication for Information System
(IS) Projects of Ethiotelecom**

A project work submitted to Addis Ababa University School of commerce in partial fulfillment of the requirements for the awarded of MA degree in Project management.

BY: Melkamu Asmare

May, 2017

Addis Ababa, Ethiopia

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**GENERIC RISK FACTORS AND THEIR IMPLICATION FOR INFORMATION
SYSTEM (IS) PROJECTS OF ETHIOTELECOM**

BY

Melkamu Asmare (GSD\0335\06)

Approved Board of Committee:

Examiner

Signature

Examiner

Signature

Examiner

Signature

Statement of declaration

I, Melkamu Asmare, declare that this research entitled “Information Systems Analysis: Generic Risk Factors and Their Implication for Information System (Is) Projects of Ethio telecom” is the outcome of my own effort and study. All source of material used for the study have been correctly acknowledged. This study has not been be reused before in any universities and first time research in IS projects of this kind.

Melkamu Asmare

Signature -----

Date -----

Advisor: Wubshet B. (PhD)

Signature -----

Date -----

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Abbreviations

C	Critical
CD	Compact disk
CCTV	Closed Circuit Television
CERT	Computer Emergency Response Team
CRM	Customer Relation Management
IT	Information Technology
IS	Information System
IPCC	Internet Protocol Call Center
ITSM	Information Technology Service management
ITNMS	Information Technology Network management system
IPNGN	Internet Protocol new Generation Network
L	Low
M	Major
mVAS	Multi Value Added Service
NA	Not Applicable
NGBS	New Generation Billing System
NFD	Need Further discussion
OSS	Operational Support System
RFC	Request For Change
RFxxx	Risk factor
TEP	Telecom Expansion Program
UNMS	Unified Network Management System
UAC	Universal Account Control

Abstract

This study identified the risk factors in each project phases or process groups of IS projects in ethiotelecom. The researcher used descriptive research method. Risk factors were identified by interviewing project managers and project team members, project document analysis, and by reviewing other research works. Structured questionnaires with Likert type was used for severity level analysis on different project phases of IS projects.

This study is significant to a larger extent to project implementers, users, and venders to identify and prioritize risk factors while the projects are initiated, Planned, launched, monitored, and closed. Moreover, it can be used as an input for further study on risk management of the company.

The findings of the study indicated that the average severity of identified risk factors is found to be different on different project phases. On average, there is lower severity on scoping phase and M&C phase, where as there is higher impact on Closing, Planning, and launching project phases. Moreover, except for few risk factors which affect all the project phases similarly, every project phase is affected differently by different risk factors.

Risk factors which have considerable impact on each project phase and hence the project as a whole were identified and prioritized through experts, experienced project team members, and project managers.

It is therefore, worthwhile and effective to conduct continual risk identification, prioritization and treatment with in each project phase so as to avoid the underline gap in project progress or achieving the objectives of project deliverables.

Key words: risk identification, project process group.

CHAPTER ONE INTRODUCTION

1.1 Background of the study

All projects are one time endeavor and unique. One project may vary from another project in terms of objectives, technologies, resources etc. One thing that all projects share is that projects are exposed to threats and opportunities (Robert and Wallace, 2004). Every project encounters different types of risks, and the factors that causes risk are different from project to project. Risk factors are the threats and influences that will affect the cost, duration and quality of the project negatively (Bannerman, 2008), and if ignored or not mitigated well they will present serious threats to IS projects.

Every project has five different phases or stages, those are: Scoping, planning, Launching, Monitoring and controlling, and closing phases (Wysocki, 2014). This category or stage of a project is the same for IT or information System projects. IS projects are complex in nature and vulnerable to risks from the start of the project till the final acceptance of the Service or product (Hijazi, 2014). Each phase of the Project is susceptible to different sets of threats that might hinder the project being completed successfully. In order to manage these risks properly, an adequate understanding and identification of the risk factors in every project stage is required.

Risk Identification is a critical step (Kwak & Stoddard, 2004), since the success of the risk management depends mostly on identifying all possible risks the project may face during its progress (Shahzad, Ullah & Khan, 2009). Hence, the first step in managing these risks is to identify them. Project Risk Identification is the process of identifying the items that present a threat to the success completion of each phase of the project. Kerner (2009), also states that risk management is the act or practice of dealing with risk.

Proper risk management as a part of project management, starts from identifying the risk factors, analysis and prioritize them. By doing so, one can not only reduce the chance of an event occurring but also it might reduce the magnitude of the severity.

Understanding and managing project risk factors in each project phase enables projects teams, project managers, and other stack holders to effectively carry out the project to meet the required expectations and to deliver the objective of the project. In an effort to know risk factor identification in projects is applied, this study is made by focusing on IS projects to identify, analyze and prioritized risk factors in IS projects of ethiotelecom.

1.2 Project profile

This research is intended to identify possible risk factors and their severity on different stages of these IS projects.

In telecom organizations, Information systems (IS) projects are projects that incorporate hardware, software, database, applications, network elements, power and environment elements, people, and telecom services. As a result the projects involves a great number of mutually interconnected and multi-protocol interfaces.

The main (production) site for the projects is Addis Abba, and disaster recovery site is in Mekle.

The implementation of these projects is expected to increase the number of subscribers from 17million to 68 Millionsubscribers (both Moblie and fixed line subscribers). In others words the target capacity of the projects after completed is 51million subscribers. The projects are targeted not only to increase the number of subscribers but also to provide new features and functionalities than the legacy systems. The projects after completion are estimated to increase the revenue of the company by 40% and play a great role for national economic growth.

The projects are categorized in to two, Business part and operational support part. The Business projects includes, NGBSS, CRM, mVAS, and IPCC. Whereas the operational support category includes, OSS, UNMS, and security (UAC, CCTV, and CERT).

The business projects was owned by Huawei, and operational support projects was owned by ZTE, both or Chinese telecom operators. January, 2013 was the start date of Business projects and was expected to be completed in January 2015. One year later, January, 2014, operational support projects was started and supposed to be completed in 2016, January.

1.3 Statement of the problem

IS project success ,in my experience, doesn't come easily, for example in 2016 January, the company lost significant amount of revenue while cutover of NGBSS and UAC projects due to in appropriate planning and lack of risk mitigation plans. Some projects are not fully deployed delayed, even there are also projects which are canceled.

This research is supposed to identify the practical risk factors and hence risk management practice on IS projects of ethiotelecom, a sole telecom operator in the country. This study will focus on these projects to gain a better understanding of what are the risk factors existed with in each phase of the projects.

There is no doubt for the importance of a well-developed risk management system and reliable project plan for the success of any projects. Prior reports and/or articles conducted in different countries suggest risk factor in IS projects has to be identified and managed (Hijazi, 2014). IS projects are over delay and out of agreed quality requirements. As a result, both internal and external customer are not satisfied by the project deliverables. Even projects like ITNMS, ITSM, and others are failed or partially failed before giving the required project deliverable. Sometimes even the projects are successfully completed, there are considerable revenue loss due to unplanned integration or cutover.

The projects are large and complex, hence, a sound risk management system with well-defined risk factors with in each project phase is required. However, as mentioned under the project profile and in as attached here in appendix part, projects are over delay, with cost overrun, and unable to achieve agreed quality standards. This shows indirectly or directly that is no prior risk factor identification as part of project management. Lack of identified risk factors in each process group of IS projects affects the objectives of the project deliverables. Hereunder are specific questions to be answered by the paper.

- ❖ What are the typical risk factor in each project phases of IS projects in ethiotelecom?
- ❖ Which risk factor require more attention in each project phase?
- ❖ How risk planning activities change within each project phases?

Answering the questions mentioned above would enhance our understanding about the risk management processes and practice in ethiotelecom and helps better risk management system in the company.

1.4 The objectives of the study

The main objective of the study is to identify the risk factors and their severity levels in each process groups of IS projects in Ethio telecom. Particularly, the study has the following sub-objectives:

- a. To provide a comprehensive review of sources and characteristics of risk factors in IS projects.
- b. To provide list of prioritized risks in each phase of IS projects
- c. To identify level of severity of the risk factors in each project phase

1.5 Significance of the Study

This study is significant to a larger extent to project implementers (information division), users (network division, customer service division, and business divisions), and vendors to identify and prioritize risk factors while the projects are initiated, Planned, launched, monitored, and closed. It provides in particular, list of identified and prioritized risk factors to developed risk management process for IS projects and helps to make an informed decision.

The result of this study will be valuable to all information system projects of the company as well as the vendors in developing better practice and tools for risk management and look-ahead the success of IS projects.

The research findings, therefore, help the project implementers to improve their risk management strategies and resolve some of the problems like project delays, resource shortages, deliverable qualities, and unexpected revenue losses as mentioned in statement of the problem. Moreover, the research can be used as a baseline study for further researches on project phase level risk management of projects.

1.6 Scope and Limitation of the study

The study covers one of project management knowledge area which is project risk management, particularly focusing on identification and prioritization of risk factors in IS projects. The scope of the research is delimited to only TEP1 projects. Other non -TEP projects like automation projects are excluded from this study which may be viewed as a restriction that limits the generalization of the result. Moreover, the study is only limited to the internal risk factors associated with IS projects. External risk factors, like governmental influence, globalization factors and, risk factors related with cross boundary resource are not part of this study. This study, moreover, is limited only to identification of risk factors on each project phases and their severity level, the probability of these risk factors are not included in this research. Hence the qualitative analysis of risk factors includes only severity level analysis based on responses. The total risk score which is the product of probability and severity level is not part of this study.

1.7 Organization of the Research

This research as a descriptive research includes five separate chapters. The first chapter is an introductory part covering discussions on background of the study, background of IS projects, research problem, objective, of the study, significance of the research, delimitation and limitation of the research, and organization of the research. The second chapter briefly viewed literature relevant to the study which includes theory and empirical evidence related to the research topic. The third chapter discussed about the research design and methodology which was applied in the study. In the fourth chapter findings are presented and interpreted. The last chapter includes summary of the findings, conclusions, and recommendations.

CHAPTER TWO REVIEW OF LITRETURE

2.1 Introduction

This chapter presents the overview of current literature related to my research problem. The bodies of literature are discussed based on the specific nature of the relevant literatures that relates to this study.

2.2 Projects and project management

Project is a sequence of unique, complex, and interconnected activities that have one goal or purpose and that must be completed by a specific time, with in the budget, and according to specification (Wysocki, 2014).

A project is defined as a single, definable purpose, product or result, it usually has defined constraints, with expected threats and opportunities, it uses skills from multi professions and organizations, it is unique, it is somewhat unfamiliar, it is a temporarily activity, it is part of the process involved in working to achieve a goal (Robert and Wallace, 2004).

A project has different life cycles each with distinct activities .Kerzner (2009), explains the different life cycles of a project as: the conceptual phase, which includes the preliminary evaluation of business idea. The most important activity in this stage is identification and analysis of risk factors which may have severity on completion time, cost, and performance requirements, together with the potential severity of on company resources. The Second phase is planning phase. The major activities in this phase are: develop project proposal, develop project schedule, define tasks and there dependencies, build work break down structure, and others. The third phase is concerned about testing and final standardization effort so that operation can began.

Project management, on the other hand, involves five process groups as identified in the PMBOK ® Guide, namely: project initiation, project planning, project execution, project monitoring and control, and project closure. Wysocki (2014), also categorize project process groups in to five, such are: scoping phase, planning phase, launching phase, Monitoring and controlling phase, and closing phase, which is similar to PMBOK. For this research I prefer this standardization for simplicity and consistency.

As seen above, different authors share similar ideas on projects. Projects are not free from risk. For the success of the projects therefore, risk management is mandatory activity. One of the input for the development of risk management system is risk identification, analysis and prioritization, which is the main objective of this study.

2.3. Project risk management process

Risk management is a key part of overall project management and it is one of the knowledge area of PMBOK (2005). It forces the project managers and project teams to focus on the situations where uncertainty exists or will exist and develop suitable plans of action to prevent the possible threats from potential severity on the project or part of it (Kernzer, 2009). Managing risks on projects is a process that includes risk assessment and a mitigation strategy for those risks. All approaches to project risk management strive to maximize project efficiency and effectiveness. Although the details of risk processes may differ depending on the project, risk management has three important parts: identification, analysis and action. Before risk can be properly managed, it must first be identified, described, understood, and assessed. The objectives of project risk management are to increase the probability and severity of positive events and decrease the probability and severity of negative events.

2.3.1 Risk management plan

Planning risk management is the process of defining how to conduct risk management activities for a project. The plan risk management process should start when the project starts. Members of the project team meet to develop a risk management plan that categorizes risks, defines probability and severity includes a probability and severity matrix, and sets forth stakeholder tolerances. Other portions of the plan will define the tools, approaches, and data sources needed to manage risks; roles and responsibilities of the risk management team; the costs necessary to perform risk management; how often the team will review risks and perform risk management; and the methods of reporting and tracking. By planning how you will manage risks, you increase the probability that your risk management methods, as well as the project itself, are successful (Wysocki, 2014).

2.3.2 Risk identification

Risks must be identified and described in an understandable way before they can be analyzed and managed. Risks are documented in a concise statement that includes the context, conditions, and consequences of risk occurrence (Callahan and Brooks, 2004). This identification helps to know potential problems that otherwise will affect the progress of the project and its deliverables. According to Kerzner (2009), risk identification must continue through all project phases and should be an iterative one, as the project team or responsibly assigned person will need to perform it several times throughout a project's life cycle. Upon identifying risks, the team will need to input them into a risk register. The risk register is a list of all identified risks and their potential responses. To be effective, risk identification should not be an attempt to address every possible event regardless of how highly improbable it may be. Use of the categories and parameters developed in the risk management strategy, along with the identified sources of risk, can provide the discipline and streamlining appropriate to risk identification.

2.3.3 Risk Analysis

Perform Qualitative Risk Analysis

PMBOK® Guide (2005) defines Performing qualitative risk analysis as the process of prioritizing risks for further analysis or action by assessing and combining their severity. Through qualitative analysis, it is possible to rank and categorize risks and distinguish which ones are high priorities. You can then identify which risks require responses in the near future, which ones need additional analysis, and which ones are low-priority risks to keep on a watch list.

The evaluation of risks is needed to assign relative importance to each identified risk, and is used in determining when appropriate management attention is required. Often it is useful to aggregate risks based on their interrelationships, and develop options at an aggregate level. When an aggregate risk is formed by a roll up of lower level risks, care must be taken to ensure that important lower level risks are not ignored.

2.3.4. Monitor and Control Risks

According to Callahan and Brooks (2004), Monitoring and controlling risks is the process of implementing risk response plans, tracking identified risks, monitoring residual risks, identifying new risks, retiring risks and/or issues, contingency modification, and evaluating risk process effectiveness throughout a project. Continuous risk monitoring ensures risks are detected and managed and that risk response actions that are implemented and effective. Risk monitoring continues for the life of the project.

While monitoring and controlling risk in projects, it is extremely important that the project team practices them throughout the life cycle of a project. Communication and consultation with a project's sponsor and stakeholders is critical to executing successful risk management and achieving project outcomes that are broadly accepted.

2.4 sources of risk

The major risk sources for IT or IS projects are: User involvement, Executive support, Requirements inflation (or scope creep), Schedule flaws, Unrealistic expectations, Staff turnover, Project management, Specification breakdown, team members, Technology and uncertainty, Not knowing what is at stake, deployment complexity, deployment environment, company mission and goals, organizational management, project characters, deployment process, and others (Vicky, 2009).

2.5 Risk factors in different process groups of IS projects

The identification of risks factors in information system projects has been the subject of many researches through the years. The history tells the reader that the risk arises the technology type, the complexity, and the continuous requirement changes from the customer or client.

The critical risk factors in IS projects includes inexperienced Project Manager, Poor project planning, Poor requirements management, Dependency on project management tools, No clear project schedule, Weak leadership, and Inadequate testing. The cooperation for these factors effects on projects and take them to cost so much and overrun time (Hajee, 2012).

The frameworks of risk factors provide clues within each process group of projects and provides an understanding of the dynamics and cause-effect relationships of complex and large IS projects (Ziemba & Kolasa (2015).

According to Haneen (2014) IS projects are susceptible to different types of risk factors indifferent stages of the project lifetime. Identifying and understanding these risks is a preliminary stage for managing risks successfully.

As defined in a hand book of Texas project delivery framework (2013), identifying the sources of risk by category is another method for exploring potential risk on IT project. Some examples of categories for potential risks include organizational management, customer and users, project characteristics, product content, deployment complexity, deployment process, deployment environment, project management, team member characteristics, and technology type, maintenance support.

2.6 Conceptual framework of the study: Project management process groups and the associated risk

2.6.1 Scoping phase

Most of the Information System (IS) projects start without clear understanding of exactly what was to be done. Well identified risk factors at Scoping phase helps to identify relevant assumptions, risks, and obstacles on client expectations, conditions of satisfaction, project success criteria, and requirement identification.

A definition of completeness or doneness including all possible risk factors has to be documented and agreed before proceeding to the next phase of the projects. So risk factor identification at this stage is also a critical activity for the success of the project.

2.6.2 Planning phase

A complete plan is not only a roadmap to show how the work is scheduled, but it is also a tool to aid in decision making. The plan suggests alternative approaches, schedules, and resource requirements from which you can select the best alternative. Among the activities in IS project management practice of ethiotelecom, the least priority given is for project planning. Planning is simply considered as rough and initial scheduling and not any other else. With good planning, the quality is better, the cost is less,

and project delay is less. Here, planning includes identification of risk factors for better risk management. Well identified risk factors in planning phase helps to identify relevant assumptions, risks, and obstacles on completeness criteria of the plan, resource loading, task duration, cost estimation, and task dependencies and sequences.

By identifying the possible risk factors during planning phase provide prior information for proper management of major products, milestones, activities and resources required on the project.

2.6.3 Launching phase

All the project stakeholders in IS project management environment of ethiotelecom, are very eager for this word and quick to kick it off. Since this is done without well-developed project plan and formal approval procedure, later confusion and conflicts with in the project teams are common events; and considerable delay in each project tasks is a common escalated event. Well identified risk factors during launching phase helps to identify relevant assumptions, risks and obstacles on roles and responsibilities, scope change requests, team development and resources assignments, and team operating rules and conflicts

Once the risk factors are identified on this stage, a responsive action will be taken so that the objective of the project deliverables will be achieved.

2.6.4 Monitoring and control phase

There is somewhat healthier management practice at this stage in our project practice than the other process groups. But management wastes time to close a lot of escalated issues. This is because of poor requirement identification and poor planning. Even this stage is relatively better managed than others, it is not free from risk factors. Well identified risk factors in Monitoring and control phase helps to identify relevant assumptions, risks, and obstacles on project progress, trends and variations, reporting systems, resource consumptions, corrective actions, and escalation strategies.

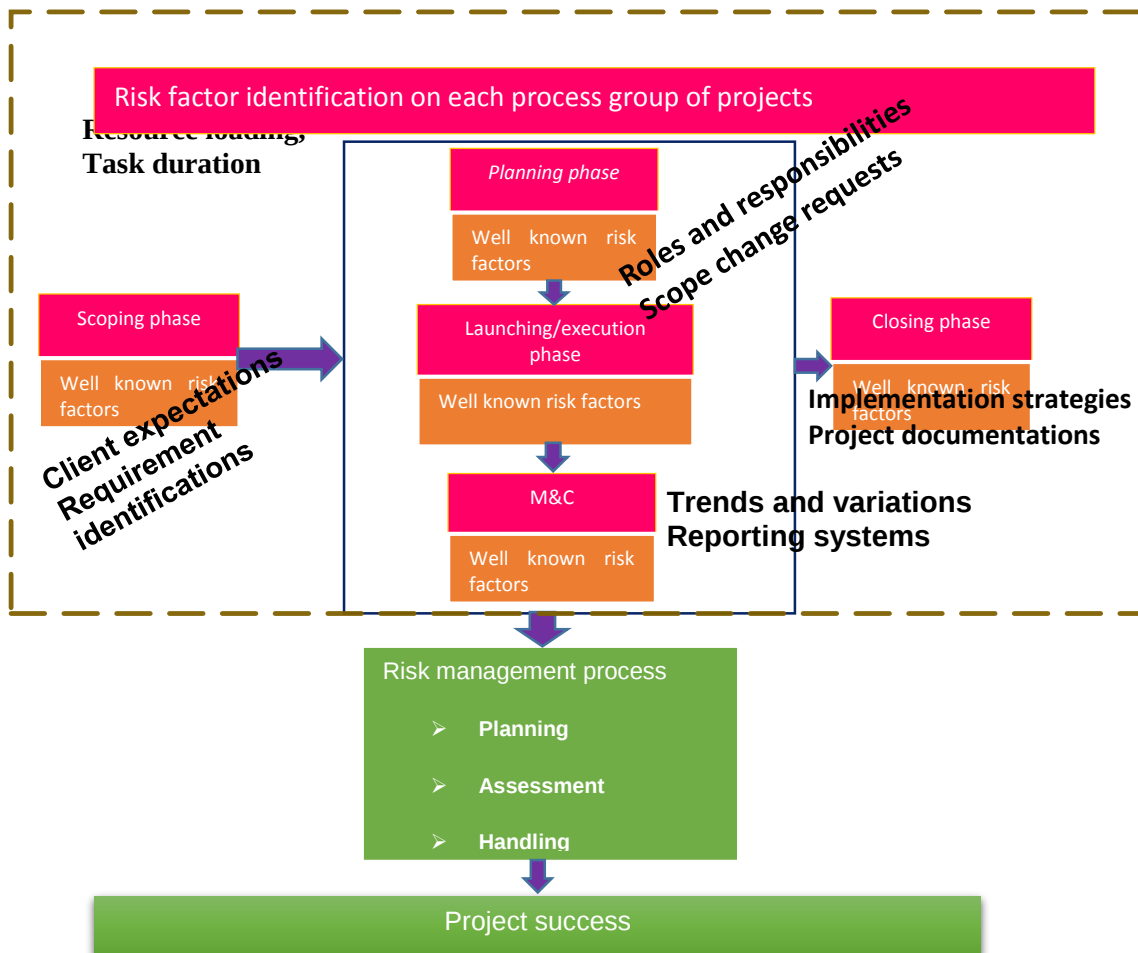
Identifying the possible risk factors at this stage helps to make sure that the time spent and budget allocated are in the best way possible to improve the business value of the final project deliverables. Moreover, such identification provides organized oversight process to be followed by the company, senior management, the project manager, and all the project team members.

2.6.5 Project closure phase

As per my observation in our IS projects, celebration and rewarding top level management comes before the project is fully implemented. By the first cutover or migration, the management make official project success announcement. Soon, a lot of complaints from customers and user comes. Well identified risk factors at closing phase helps to identify relevant assumptions, risks, and obstacles on acceptance test procedures and pilot tests, implementation strategies, project documentations, and final project audit reports

By identifying the risk factors here, the Company will formally establish project completion criteria. Moreover, it enforces the company to develop a process for writing and maintaining client acceptance test procedures starting during requirements gathering, document during project planning, and maintained during project execution. This helps for moving to the project closing phase successful.

Figure 2.6.5: Summarized conceptual frame work for managing risk factors at each stage of process groups.



CHAPTER THREE METHODOLOGY

3.1 Research design, approach, and methods

The methodology part of the study contains research design, data collection methods, the design of the questionnaire and sampling design. The methods of data analysis like severity analysis, descriptive statistics, and measure of central tendency all will be discussed in this chapter.

3.1.1 Research Design

Quantitative research method is selected to conduct this study through objective data collection procedures. This stemmed from the mere fact that quantitative study tools are best fit to answer the “what are” questions. Therefore, quantitative data is used to find the possible risk factors at every project phase or process group of IS projects of ethiotelecom.

3.1.2 Research approach

This study is descriptive and problem oriented in nature. Descriptive studies can answer questions such as “What is” or “What was.” So, this study is designed to describe the nature of risk factors in IS projects of ethiotelecom. Here, description is in the form of identification, analysis, and prioritizing the risk factors across different project phases.

3.2 target population, Sampling Technique and Sample Size

3.2.1 Target population

The target population of the study includes all the project teams of IS projects of the company. The projects has 85 team member assigned dedicatedly to the project , this number is taken as the population of the study .However, it was not feasible to include all these stakeholders in this study because of time and other workloads they are assigned. In order to save time and obtain accurate information for this study experienced project team members and project managers are selected as a focus group.

3.2.2. Sample size

Sample size refers to the number of items to be selected from the universe to constitute a sample. The important issues that helps the data analysis and saves time and other wastages is selecting the

appropriate sample size (Kothari, 2004).due to different reasons, like annual leave, all the project teams are not participated in this research. Only 70% of the project team which are on their duty are taken as sampling size. Therefore, the sampling size is 60.

3.2.3Sampling technique

A non-probabilistic proportional sampling technique was implemented to represented the population based on assignment duration and experience on the IS projects. The below table shows the samples size distribution. This proportional sampling based on judgmental form of sampling is often used when working with very small samples or focus groups Saunders et.al (2009). This form of sampling enables to use judgment to select the best fit project team member to answer or assess the risk severity of give risk factor in every project process group. The judgment is based on their project experience and participation duration or frequency.

Table 3.2.3 sample distribution

	Design team	Implementation team	Core team	Support team
Sample size distribution	23.33%	60%	6.67%	10%
Sample size	14	36	4	6

3.3 Data Collection

3.3.1 Data sources

The first task here is to identify or develop risk factor list that affect the project. The approach used to gather data related with risk factors is as follows:

A. focus group discussion

Sanders et al (2009), suggests that focused group discussion provides information by interactive discussions. One focus group discussion was conducted with the project team. By discussing with some of project managers, project teams, and end users helps me to identify and collect project risk factors which they assume to reduce the performance of project progress, and I interpret them including my personal observation through my experience in IS projects.

B. Document analysis

In addition to the primary data, IS risk factors was collected by analyzing secondary data sources like: review risk management efforts from similar projects like NGPO and Ip NGN projects, examine lessons-learned documents in finalized projects, other research works on risk identification, from documents of rollback or reasons of back out strategy of change implementation of the RFC, examine design specifications and agreement requirements, issue logs and experience database of the company, company memos and minutes, final project reports (challenges, and limitations), and project progress follow up meetings and documentations.

Then, finally by triangulating and organize those risk factors, only 64 risk factors are taken as a risk list or risk register by external and non-project related risk factors are excluded.

3.3.2 Research instrument

The instrument applied to collect data for identifying and leveling the risk factor was questionnaire.

A list of identified risk factors or risk register was ready and organized as a questioner. The questioner containing 64 risk factors were distributed to the sample. Each risk factor was assigned a Likert scale ranging from not applicable (NA), to Low, Major, and critical severity for all project phases.

Data was supposed to be collected to answer the questions like which risk factors are critical, major, low or not applicable to one or more project phases?

3.4 Data Analysis

Analysis of the data collected from primary source using questionnaire was analyzed, interpret, and present by using both SPSS and Excel. The data was collected with structured questionnaire that contain Likert type scale modified with adopted the companies risk category (NA or notification, Low, major, and Critical).

3.5 Reliability and validity

According to Kothari (2004), validity refers to the extent to which a test measure what we actually wish to measure. Reliability has to do with the accuracy and perception of a measurement procedure. Therefore, to ensure the content validity validly of the data the study used reliable resources as mentioned under data sources. To obtain acceptable response on each risk factor, a pre-defined information as a clue was given so that the responder will have enough information to determine whether a given risk factor is NA, Low, major, or critical severity level. Moreover, a face to face, and/or by phone discussion was given on each risk factor for further clarification.

Giving clues to the risk severity for each identified risk factors increases accuracy to the responses and make the data more valid and dependable. In addition, the questioners are reviewed, commented, and rechecked by more experienced project team members for their reliability and consistency. For this research, the Cronbach's alpha was expected to be 0.8 in average for each project phase.

3.6 Ethical issues

The study was conducted by adhering to the research ethics. To ensure the ethics of the study, prior clarification about the purpose of the study was given to the project teams and all were convinced, the respondents were cooperative and confidential for accepting the questioner.

CHAPTER FOUR DATA ANALYSIS AND PRESENTATION

4.1 Introduction

This chapter deals with the presentation, analysis and interpretation of the data which was collected from respondents (project teams). To analysis the collected data in line with the overall objective of the study, statistical procedures were applied using both SPSS and excel. To determine the actual risk factors on every process group of IS projects of ethiotelecom, data was collected through questioner. Average alpha was found to be 0.7634.

4.2 Response Rate

The primary data that was collected through questioner consisted of 64 with Likert scale ranging from NA to critical. The questioner was distributed by email to 60 project team members. Among the sample size of 60 member of the project teams, 48 questioners were properly completed and returned by email. Therefore the response rate was 80%.

The measurement was reliable with the average alpha of 0.763. The Cronbach's alpha obtained for each project phase is given in the table 4.2

Table 4.2 Cronbach's alpha for each phase of the projects

	Scoping phase	Planning phase	Execution phase	M&C phase	Closing phase
Cronbach's alpha	0.859	0.871	.723	0.705	0.716

4.3 General information about respondents

The project team mix contains different professionals, deferent experience and titles ranging from specialists, experts and consultants. The summary response of the respondents for each project process group is given below.

4.4 Risk Severity Level Response

Based on the responses collected, the severity level of every risk factor for each project process groups are identified and prioritized.

Table 4.4 Risk severity level response.

Scoping phase				Planning Phase				Launching Phase				M & C phase				Closing Phase			
NA	Low	Major	Critical	NA	Low	Major	Critical	NA	Low	Major	Critical	NA	Low	Major	Critical	NA	Low	Major	Critical
737	1244	696	395	229	1035	1338	470	41	796	1364	871	86	1364	1187	435	74	534	1257	1207

Fig 4.4 Risk severity level



Source: own questioner response, 2017

- For 64 risk factors, the possible response for the five process groups is:

$$64 * 5 * 48 = 15362$$

- The mean value from this response is $15362 / (4 * 5) = 768.1$.

For separate process group data analysis the below conditions have to meet:

- A. If all response are equal, less than the mean value, the risk factor need further analysis.
- B. The risk factor will be NA, L, M, or C if and only if the number of respondent is great than or equal to 52% of the sample size.
- C. Where mean value is 24.5 responses from 48 responses.
- D. The percentage of each severity level is calculated by:

$$\frac{\text{Number of risk factors with assigned risk severity level}}{64}$$

- For all the project phases; from the total number of responses, the percentage can be computed as:

$$\frac{\text{the mean value of the given severity level}}{\text{total number of responses}} \times 100\%$$

From the total number of risk factors, the percentage can be computed as:

$$\frac{\text{The number of identified risk factors for the given severity level}}{\text{total number of risk factors}} \times 100\%$$

Where, the number of identified risk factors with a given severity level is obtained from counting the actual response whose response is greater than the mean value.

4.4.1 Scoping process group

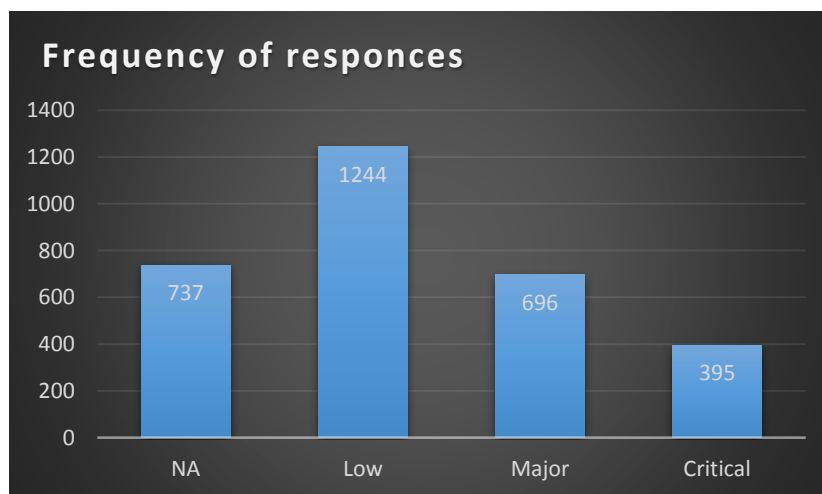
From Fig 4.4, we can compute the severity rates in percentage in two ways; the first from the total number of responses, and the second is from the total number of risk factors.

Table 4.4.1 Response frequency for scoping process group

Severity level	NA	Low	Major	Critical	total
Frequency	737	1244	696	395	3,072
Number of risk factors (>mean value)	14	23	19	8	64
In % from total number of responses	23.99	40.49	22.65	12.86	100
In % from total number of risk items	21.88	35.94	29.69	12.50	100

In scoping phase above 60% of the responses are not applicable and low severity. Around 35% need careful risk management practice on this phase.

Fig 4.4.1 Response frequency for scoping process group



Source: own questioner response, 2017

As scoping phase involves many activities like feasibility study, requirements elicitation, requirements analysis, requirements validation, requirements documentation, the sever risk factors are identified. those risk factors which dominate in severity or critical severity levels are: use of defined process and procedures in project activities, requirements completeness and clarity, project size, alternatives approach analysis, subject matter expertise in each domain, leadership, which are eight in number. Table 4.4.1 shows the percentage of other severity levels and their numbers.

4.4.2 Planning process group

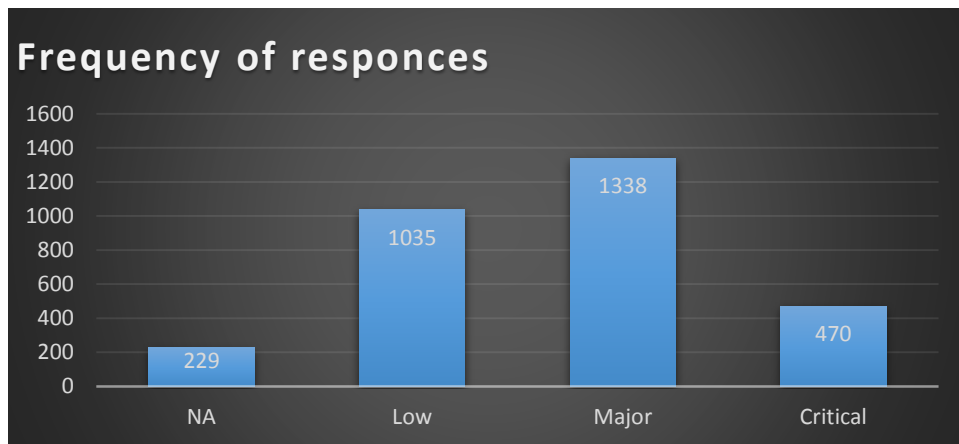
The actual execution of the projects starts after planning phase is completed. Unless planning is successful the next project phase will not be successful.as interpreted hereunder, the risk factors which seek higher attention in planning are: together with others, Conflict resolution testing team, qualification and completeness of testing resources, localizing and repairing errors, team, communication channels.

With similar computation as in scoping phase, the statistical presentation for planning phase is given below.

Table 4.4.2. A response frequency for planning process group

Severity level	NA	Low	Major	Critical	Total
Frequency	229	1035	1338	470	3,072
Number of risk factors (>mean value)	4	21	31	8	64
In % from total number of responses	7.45	33.69	43.55	15.30	100
In % from total number of risk items	6.25	32.81	48.43	12.5	100

Fig 4.4.2 Response frequency for planning process group



Source: own questioner response, 2017

In this process group, the risk factors which need different treatment are identified, and therefore the risk plan has to consider these treatment so that impacts on later project phases will be minimized.

4.4.3 Launching process group

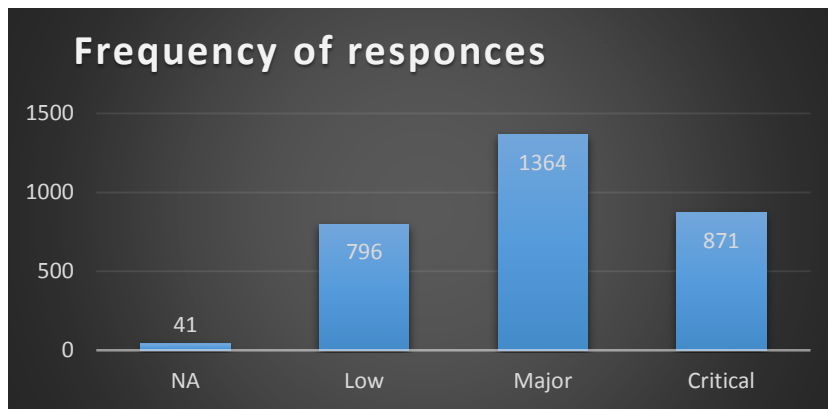
With similar computation with scoping and planning above, the table shows the statistical presentation and analysis of responses on launching phase.

Table 4.4.3. A response frequency for launching process group

Severity level	NA	Low	Major	Critical	Total
Frequency	41	796	1364	871	3,072
Number of risk factors (>mean value)	1	15	29	19	64
In % from total number of responses	1.33	25.911	44.40	28.35	100
In % from total number of risk items	1.56	23.43	45.31	29.69	100

In launching phase above 72.75 % of the response is major and critical, that is 48 risk factors need attention while planning risk.

Fig 4.4.3 Response frequency for launching process group



Source: own questioner response, 2017

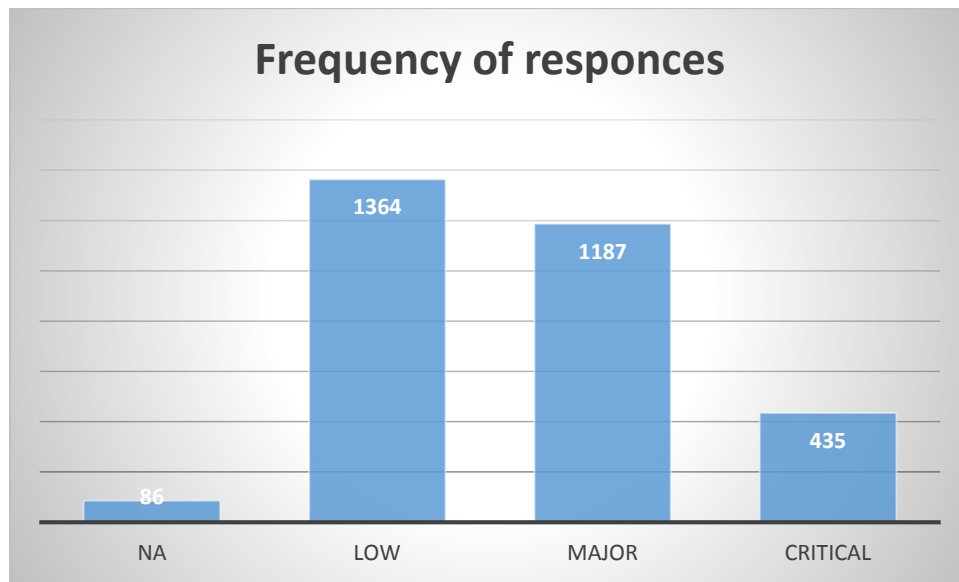
The critical risk factors like delay in hardware delivery, hardware and software installation threats, and debugging errors during deployment have to be planned to share the risk with another party or vendors for effective risk management or as a prevention action so that the particular risk with critical and major severity level will not happen during execution of the projects.

4.4.4 Monitoring and controlling process group

Table 4.4.4. A response frequency for M&C process group

Severity level	NA	Low	Major	Critical	total
Frequency	86	1364	1187	435	3,072
Number of risk factors (>mean value)	2	27	26	8	63
In % from total number of responses	2.80	44.40	38.64	14.16	100
In % from total number of risk items	3.17	42.86	41.27	12.70	100

Fig 4.4.4 Response frequency for M&C process group



Source: own questioner response, 2017

In monitoring and closing phase one risk factor need further discussion. The risk factor whose Risk ID is RF063 or Resource conflict needs further analysis to check its severity level in M&C phase of IS projects. Because the number of response are: for low severity level 20, for major 20, and for critical 8. This response result can't satisfy our severity level assignment. This risk factor was also removed in alpha analysis to make the measurement reliable.

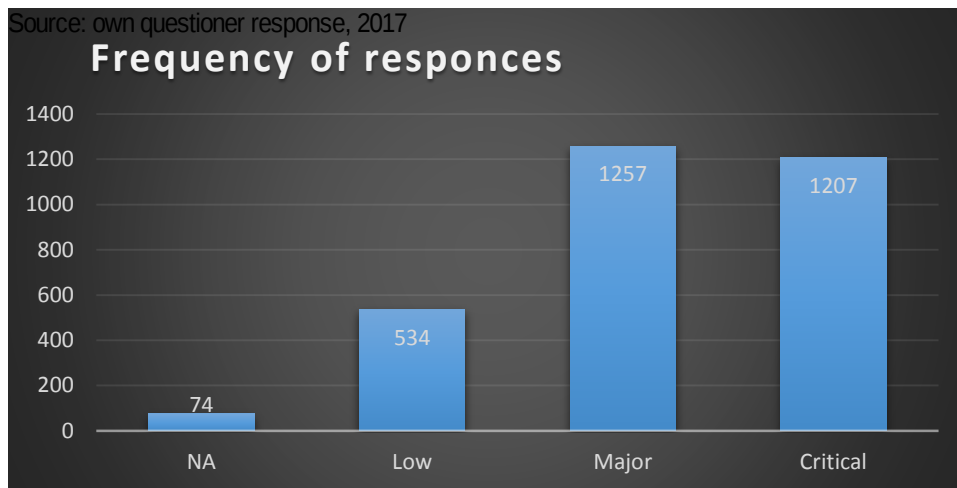
4.4.5 Closing process group

Closing phase is the last phase in IS project lifecycle. In this project phase, above 80% of the response were critical and major in risk severity. The risk factors with such severity includes unavailability of Policies and standards, data clearing, data migration, user acceptance issues ,tools (applications, recovery CDs connectivity cables),and personnel support. Particularly, 20 risk factors are the sever factors that need to be managed properly for successful closing of the projects. On the other hand, 11risk factors can be retained without any potential problem on this phase.

Table 4.4.5. A response frequency for closing process group

Severity level	NA	Low	Major	Critical	total
Frequency	74	534	1257	1207	3,072
Number of risk factors (>mean value)	2	11	28	23	64
In % from total number of responses	2.41	17.38	40.92	39.29	100
In % from total number of risk items	3.13	17.19	43.75	35.94	100

Fig 4.4.5 Response frequency for closing process group



Source: own questioner response, 2017

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter represents the summaries of the findings, conclusions derived from the analysis and the recommendations that are suggested to be implemented in our IS project management approaches specifically in risk management practice for achieving the objectives of project deliverables.

5.2 Summary of the findings

In this research, an ultimate effort is done in identifying a comprehensive list of IS projects risk factors that covers wider range of threats through the project life cycle.

Based on the analysis of chapter four, the following findings were established and are outlined here under.

- ❖ From the above risk severity level figure (figure 4.4), when we consider the project as a whole, the severity level is found to be low in scoping phase, major in planning and launching phase, low in monitoring and controlling phase, and major in closing phase. This shows that Scoping phase and Monitoring phase are less impacted by those risk factors relatively than planning, Launching, and closing phases of IS projects.
- ❖ The average severity of identified risk factors is found to be different for different project phases. There is lower severity on scoping phase and M&C phase, where as there is higher severity on Closing, Planning, and launching project phases in average. When the severity level is prioritized from higher to lower severity we obtain the list as below.
 1. Closing phase
 2. Planning phase
 3. Launching phase
 4. Monitoring and controlling
 5. Scoping

That is highly impacted is closing phase and lower impacted is scoping phase.

- ❖ As depicted in table 5.1, among 64 identified risk factors, 85.94% have different severity on each project phases, and 14.06% have similar severity on all project phases, from which 1.56% critical in severity, 6.25% major severity, 4.69% have lower severity and 1.56 have not applicable. This shows that except few risk factors, which have similar severity in all project phases, the majority risk factors have different severity on different project phases.

Table 5.2. Risk factors which has similar severity on all project phases

severity level	The same severity on all process groups	Risk ID	Risk factor
Critical	Yes	RF060	Unclear project Objective
Major	yes	RF062	Leadership approach
major	yes	RF035	Project Schedule
major	yes	RF049	Design Complexity
major	yes	RF056	Implementation Difficulty
Low	yes	RF011	Team Turnover and availability
Low	yes	RF014	Project manager Experience and approach
Low	yes	RF058	User Justification (internal user)
NA	yes	RF01	Goal conflict

- ❖ A given project phase is affected differently with different risk factors. Here, closing is a challenge activity. Among 64 identified risk factors 34.38% are critical. On the other hand scoping phase is found to be a happy and hope time, with minimal risk, but adds complexity to the coming project phases by making the project scope too narrow and complex.
- ❖ Projects like, OSS, UNMS, and security projects lack management support and follow up. Among the 48 respondents, 16 respondents (33%) have commented that the management only requested progress report, no physical visit to site work, war room, or/and meeting places. Few others also comments that the management and the core team is now dedicatedly assigned to other huge activities forgetting the existing project activities to close.

- ❖ The severity of the identified risk factors with in each project phase is summarized on the table below.

5.3 List of identified risk factors in each project phase

Fig 5.3.1. Critical risk factors in Scoping phase

Risk ID	Project Risk Factor
RF002	Unrealistic Schedule
RF018	Use of Defined Process and procedures in project activities
RF021	Requirements Completeness and Clarity
RF023	Project Size
RF039	Alternatives approach analysis
RF045	Mix of team Skills
RF046	Subject matter expertise in each domain
RF060	Project Objectives

Fig 5.3.2. Major risk factors in Scoping phase

Risk ID	Project Risk Factor
RF001	Incomplete, inconsistent, and unclear design documents
RF003	Vendor cooperation and Support
RF005	conflict resolution
RF017	Physical Facilities
RF020	System dependencies
RF024	User involvement and experience
RF026	project team roles and responsibilities
RF027	Definition of the Program
RF035	Project schedule
RF036	Requirements Stability
RF040	well organized project documentation
RF047	Team efficiency and effectiveness
RF049	Design Complexity
RF050	Support Personnel
RF051	technology Experience of project team
RF052	Experience with Project Process
RF055	commitment process
RF056	Implementation Difficulty
RF062	Leadership

Fig 5.3.3. Low risk factors in Scoping phase

Risk ID	Project Risk Factor
RF004	Technology Match to Project
RF007	testing process completeness and clarity
RF008	New requirements emerge
RF011	Team Turnover and availability
RF012	Team Spirit and attitude
RF013	team communication channels
RF014	Project manager Experience and approach
RF015	Project manager authority and management support
RF022	Budget Size and cost controls
RF030	Projects fit to ethiotelecom
RF032	decision time or situation
RF033	Policies and Standards
RF034	Delivery Commitment with venders
RF042	Tools Availability (applications, recovery cds connectivity cables)
RF043	clear project management approach
RF044	Contract and negotiation fit
RF048	Maturity of Technology applied
RF053	team work experience
RF054	Quality KPI (key performance indicator) availability
RF057	Testability
RF058	User Justification (internal user)
RF061	Management Support
RF063	Resource Conflict
RF064	Executive (officers, chief officers)involvement

Fig 5.3.4. Not applicable risk factors in Scoping phase

Risk ID	Project Risk Factor
RF006	Lack of complete and automated test tools
RF009	localizing and repairing errors
RF010	testing team qualification and completeness of testing resources
RF016	Disaster recovery
RF019	Pilot testing
RF025	training needs for both project team and user
RF028	internal customer conflict
RF029	Work Flow for each system
RF031	Goals conflict
RF037	Customer Service Impact
RF038	Data Migration Required
RF041	Change Control for Work Products
RF059	User Acceptance

Fig 5.3.5. Critical risk factors in planning phase

Risk ID	Project Risk Factor
RF005	conflict resolution
RF009	localizing and repairing errors
RF010	testing team qualification and completeness of testing resources
RF013	team communication channels
RF020	System dependencies
RF023	Project Size
RF034	Delivery Commitment with vendors
RF060	Project Objectives

Fig 5.3.6. Major risk factors in planning phase

Risk ID	Project Risk Factor
RF001	Incomplete, inconsistent, and unclear design documents
RF002	Unrealistic Schedule
RF004	Technology Match to Project
RF007	testing process completeness and clarity
RF008	New requirements emerge
RF012	Team Spirit and attitude
RF016	Disaster recovery
RF017	Physical Facilities
RF018	Use of Defined Process and procedures in project activities
RF021	Requirements Completeness and Clarity
RF024	User involvement and experience
RF025	training needs for both project team and user
RF026	project team roles and responsibilities
RF027	Definition of the Program
RF032	decision time or situation
RF033	Policies and Standards
RF035	Project schedule
RF038	Data Migration Required
RF040	well organized project documentation
RF043	clear project management approach
RF046	Subject matter expertise in each domain
RF047	Team efficiency and effectiveness
RF049	Design Complexity
RF050	Support Personnel
RF053	team work experience
RF054	Quality KPI (key performance indicator) availability
RF056	Implementation Difficulty
RF059	User Acceptance
RF061	Management Support
RF062	Leadership
RF063	Resource Conflict
RF064	Executive (officers, chief officers)involvement

Fig 5.3.7. Low risk factors in planning phase

Risk ID	Project Risk Factor
RF003	Vendor cooperation and Support
RF011	Team Turnover and availability
RF014	Project manager Experience and approach
RF015	Project manager authority and management support
RF019	Pilot testing
RF022	Budget Size and cost controls
RF028	internal customer conflict
RF029	Work Flow for each system
RF030	Projects fit to ethiotelecom
RF037	Customer Service Impact
RF039	Alternatives approach analysis
RF041	Change Control for Work Products
RF042	Tools Availability (applications, recovery cds connectivity cables)
RF044	Contract and negotiation fit
RF045	Mix of team Skills
RF048	Maturity of Technology applied
RF051	technology Experience of project team
RF052	Experience with Project Process
RF055	commitment process
RF058	User Justification (internal user)

Fig 5.3.8. Not Applicable risk factors in planning phase

Risk ID	Project Risk Factor
RF006	Lack of complete and automated test tools
RF031	Goals conflict
RF036	Requirements Stability
RF057	Testability

Fig 5.3.9. Critical risk factors in launching phase

Risk ID	Project Risk Factor
RF001	Incomplete, inconsistent, and unclear design documents
RF005	conflict resolution
RF007	testing process completeness and clarity
RF008	New requirements emerge
RF010	testing team qualification and completeness of testing resources
RF012	Team Spirit and attitude
RF013	team communication channels
RF015	Project manager authority and management support
RF020	System dependencies
RF021	Requirements Completeness and Clarity
RF023	Project Size
RF026	project team roles and responsibilities
RF032	decision time or situation
RF033	Policies and Standards
RF040	well organized project documentation
RF042	Tools Availability (applications, recovery cds connectivity cables)
RF043	clear project management approach
RF050	Support Personnel
RF060	Project Objectives

Fig 5.3.10. Major risk factors in launching phase

Risk ID	Project Risk Factor
RF002	Unrealistic Schedule
RF003	Vendor cooperation and Support
RF006	Lack of complete and automated test tools
RF009	localizing and repairing errors
RF016	Disaster recovery
RF017	Physical Facilities
RF018	Use of Defined Process and procedures in project activities
RF019	Pilot testing
RF022	Budget Size and cost controls
RF024	User involvement and experience
RF025	training needs for both project team and user
RF029	Work Flow for each system
RF030	Projects fit to ethio telecom
RF034	Delivery Commitment with vendors
RF035	Project schedule
RF038	Data Migration Required
RF046	Subject matter expertise in each domain
RF047	Team efficiency and effectiveness
RF049	Design Complexity
RF051	technology Experience of project team
RF052	Experience with Project Process
RF053	team work experience
RF054	Quality KPI (key performance indicator) availability
RF056	Implementation Difficulty
RF059	User Acceptance
RF061	Management Support
RF062	Leadership
RF063	Resource Conflict
RF064	Executive (officers, chief officers) involvement

Fig 5.3.11. Low risk factors in launching phase

Risk ID	Project Risk Factor
RF004	Technology Match to Project
RF011	Team Turnover and availability
RF014	Project manager Experience and approach
RF027	Definition of the Program
RF028	internal customer conflict
RF036	Requirements Stability
RF037	Customer Service Impact
RF039	Alternatives approach analysis
RF041	Change Control for Work Products
RF044	Contract and negotiation fit
RF045	Mix of team Skills
RF048	Maturity of Technology applied
RF055	commitment process
RF057	Testability
RF058	User Justification (internal user)

Fig 5.3.12. Not Applicable risk factors in launching phase

Risk ID	Project Risk Factor
RF031	Goals conflict

Fig 5.3.13. Critical risk factors in M&C phase

Risk ID	Project Risk Factor
RF005	conflict resolution
RF013	team communication channels
RF018	Use of Defined Process and procedures in project activities
RF021	Requirements Completeness and Clarity
RF023	Project Size
RF040	well organized project documentation
RF043	clear project management approach
RF060	Project Objectives

Fig 5.3.14. Major risk factors in M&C phase

Risk ID	Project Risk Factor
RF001	Incomplete, inconsistent, and unclear design documents
RF002	Unrealistic Schedule
RF003	Vendor cooperation and Support
RF007	testing process completeness and clarity
RF008	New requirements emerge
RF009	localizing and repairing errors
RF015	Project manager authority and management support
RF017	Physical Facilities
RF020	System dependencies
RF024	User involvement and experience
RF025	training needs for both project team and user
RF026	project team roles and responsibilities
RF029	Work Flow for each system
RF032	decision time or situation
RF033	Policies and Standards
RF034	Delivery Commitment with vendors
RF035	Project schedule
RF038	Data Migration Required
RF047	Team efficiency and effectiveness
RF049	Design Complexity
RF050	Support Personnel
RF052	Experience with Project Process
RF054	Quality KPI (key performance indicator) availability
RF056	Implementation Difficulty
RF061	Management Support
RF062	Leadership

Fig 5.3.15. Low risk factors in M&C phase

Risk ID	Project Risk Factor
RF004	Technology Match to Project
RF006	Lack of complete and automated test tools
RF010	testing team qualification and completeness of testing resources
RF011	Team Turnover and availability
RF012	Team Spirit and attitude
RF014	Project manager Experience and approach
RF016	Disaster recovery
RF019	Pilot testing
RF022	Budget Size and cost controls
RF027	Definition of the Program
RF028	internal customer conflict
RF030	Projects fit to ethiotelecom
RF036	Requirements Stability
RF037	Customer Service Impact
RF039	Alternatives approach analysis
RF041	Change Control for Work Products
RF042	Tools Availability (applications, recovery cds connectivity cables)
RF044	Contract and negotiation fit
RF045	Mix of team Skills
RF046	Subject matter expertise in each domain
RF048	Maturity of Technology applied
RF051	technology Experience of project team
RF053	team work experience
RF055	commitment process
RF057	Testability
RF058	User Justification (internal user)
RF059	User Acceptance
RF064	Executive (officers, chief officers)involvement

Fig 5.3.16. Not Applicable risk factors in M&C phase

Risk ID	Project Risk Factor
RF031	Goals conflict

Fig 5.3.17. Critical risk factors in Closing phase

Risk ID	Project Risk Factor
RF010	testing team qualification and completeness of testing resources
RF012	Team Spirit and attitude
RF013	team communication channels
RF016	Disaster recovery
RF018	Use of Defined Process and procedures in project activities
RF025	training needs for both project team and user
RF026	project team roles and responsibilities
RF033	Policies and Standards
RF034	Delivery Commitment with vendors
RF035	Project schedule
RF040	well organized project documentation
RF042	Tools Availability (applications, recovery cds connectivity cables)
RF043	clear project management approach
RF047	Team efficiency and effectiveness
RF050	Support Personnel
RF052	Experience with Project Process
RF053	team work experience
RF054	Quality KPI (key performance indicator) availability
RF059	User Acceptance
RF060	Project Objectives
RF061	Management Support
RF064	Executive (officers, chief officers)involvement

Fig 5.3.18. Major risk factors in Closing phase

Risk ID	Project Risk Factor
RF001	Incomplete, inconsistent, and unclear design documents
RF002	Unrealistic Schedule
RF003	Vendor cooperation and Support
RF005	conflict resolution
RF007	testing process completeness and clarity
RF009	localizing and repairing errors
RF015	Project manager authority and management support
RF017	Physical Facilities
RF019	Pilot testing
RF020	System dependencies
RF021	Requirements Completeness and Clarity
RF022	Budget Size and cost controls
RF023	Project Size
RF024	User involvement and experience
RF028	internal customer conflict
RF029	Work Flow for each system
RF030	Projects fit to ethiotelecom
RF032	decision time or situation
RF037	Customer Service Impact
RF044	Contract and negotiation fit
RF046	Subject matter expertise in each domain
RF048	Maturity of Technology applied
RF049	Design Complexity
RF051	technology Experience of project team
RF056	Implementation Difficulty
RF057	Testability
RF062	Leadership
RF063	Resource Conflict

Fig 5.3.19. Low risk factors in Closing phase

Risk ID	Project Risk Factor
Risk ID	Project Risk Factor
RF004	Technology Match to Project
RF006	Lack of complete and automated test tools
RF008	New requirements emerge
RF011	Team Turnover and availability
RF014	Project manager Experience and approach
RF027	Definition of the Program
RF038	Data Migration Required
RF039	Alternatives approach analysis
RF041	Change Control for Work Products
RF045	Mix of team Skills
RF055	commitment process
RF058	User Justification (internal user)

Fig 5.3.20. Not Applicable risk factors in Closing phase

Risk ID	Project Risk Factor
RF031	Goals conflict
RF036	Requirements Stability

5.4 Conclusions

In this research, the risk factors and their severity level are identified well. This list can serve as a checklist or risk register that can guide project team in identifying probable risk factors for ongoing or future projects.

As the major objective of the study is to identify risk factors in each process groups and their implication on overall success of ethiotelecom IS projects, the following conclusions are drawn based on the findings above.

- ❖ The most common risk management challenge in IS project management practice of ethiotelecom is that risks are not properly identified. Project Managers and team members frequently identify situations, assumptions, events, and / or opinions that are indications that a risk exists but, they do not quantify the risk to the point that the actual risk is identified.
- ❖ In this study, the most effective key risk factors which have significant impact on each project phase and hence the project as a whole are identified and prioritized through experts, experienced project team members, and project managers' response in IS projects. In proposed classification, effort is to cover the most effective risk factors and their trend of severity across the project phases, and this is clearly established.
- ❖ Referring to Closing process group, the project activities in this phase lacks, together with others, management support, user acceptance, training requirements, time for adaption the new technology, and team motivation, this phase therefore needs special management attention.
- ❖ In planning process group, conflict resolution is ignored, which in turn damages within team and across team communications. Pilot testing and all integration activities are also major activities which are unplanned that cause project delays and team conflicts.
- ❖ Some of the critical risk factors that limit the qualities of project deliverables while the project is in launching phase are continuous emergence of new requirements, complex system dependencies, and the limited power of project managers which all need mitigation plans during planning phase of the projects.
- ❖ In Monitoring and controlling phase, as the projects are large and complex, there should be well organized reporting systems and procedures, but they lack this Process and procedures which creates delay in responses and conflicts within even top level managements and project teams.

- ❖ On the other hand scoping phase is found to be comfort zone with less risky activity, but however leave complexity for the next project process groups.
- ❖ Finally, the difficult task in risk management is risk identification, the key to effective risk management is to follow a defined, disciplined approach and focus on objective measures for identifying, quantifying, and prioritizing risks, which is well established by this research. Therefore, as a whole it can be concluded that the practice of risk factor identification, which contribute a major part of risk management is implemented to major extent in IS projects of ethiotelecom. The task, which is left is therefore, developing complete risk management process, as shown in the picture 5.3, for IS projects of ethiotelecom.

5.5 Recommendations

In order to develop a sound risk management system and to adapt reliable overall project plan to minimize the gap between the actual theory of project risk management and implementation of IS projects of ethiotelecom, the following possible recommendations are forwarded by the investigator.

- It is recommended to consider that, the way how to manage risk factors for one project phase differs from the successive project phase within the same project. For example, the way how risk factors are treated in Monitoring and closing phase have to be different so that the overall risk management process will be effective.
- Due to shortage of experts or man power, it is advisable to close all the projects/programs before starting new projects/programs of the same kind or different. This will minimize the complexity of closing of the existing projects.
- Since risks are not static, Threats, vulnerabilities, likelihood or consequences may change abruptly without any indication. Therefore while implementing risk management, constant monitoring and feedback is necessary in each project phase to detect and treat these changes.
- Based on the identified risk factors, it will be simple to prepare risk mitigation plan so as to minimize the implied consequences on quality targets, agreed performance, customer satisfaction, and on project completion time.
- It is advised that, the risk management plan should be action oriented, comprehensive, up to date, accessible, and realistic. It must also enable to consider phase dependent risk management practice and continual alignment of the management of risks with the project objectives.

- It is recommended that, the risk management system must be flexible and able to incorporate all the identified, classified, and prioritized risk factors. That is while treating or handling the risk:
 - ✓ For the level of Risk identified as high to the majority of the project phases– Risk treatment has to be a priority at any cost.
 - ✓ For the level of Risk identified as major to the majority of the project phases – Risk treatment must be taken into account.
 - ✓ For the level of Risk identified as low to the majority of the project phases – The cost and the advantages are taken into account.
 - ✓ For the level of Risk identified as not applicable to the majority of the project phases – No treatment is foreseen.
- It is advisable to incorporate identified risk factors in project schedules and develop separate mitigation plan for each project phase depending on the severity of the risk items.
- It is worthwhile and effective to conduct continual risk identification, prioritization and treatment with in each project phase as depicted in the figure below.

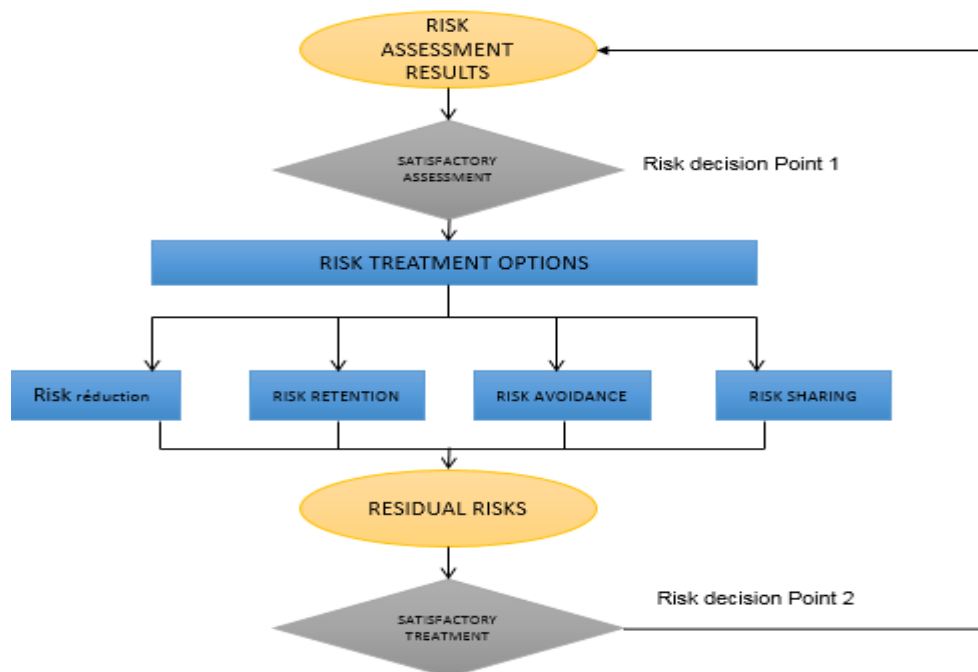


Fig 5.3 Risk assessment and treatment methods

- Finally, the researcher recommends for further research to include external sources of risk factors for IS projects of ethiotelecom, like governmental influence, global impact on technology, and risk sources related to across boundary resources. Moreover, the new study to be conducted has to include the total risk score by considering the probability of each risk factors.

As the scope of the study is limited to only internal risk sources, generalization of the study is limited. Therefore, it is suggested that a wider research need to be made to include all risk sources including their occurrence.

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Appendix

Support (research approval) from ethiotelecom, final Project Closing Reports, questioners, clues on impact level assignment to each risk factor, and major project activities in each project phase.

Support letter from ethio telecom



P.O. Box 1047 Addis Ababa Ethio
tel.: +251 (0) 115 505
fax: +251 (0) 115 515

Request for Support to Conduct Research Paper

ISD; May 08, 2017

to: Whom it may concern_(All ISD Division Members)

Reference: ET/CIO/204/2017

Mr. Melkamu Asmare has requested to conduct a research on "Information System Analysis: Generic Risk Factors and Their Implication for Information System (IS) Projects of Ethio Telecom". Followed the ethics of a research the company has allowed to conduct the research on our IS projects and contribute his part for the success of the projects implemented in the company. Having this in mind, all the project team members has to provide your support & cooperation for all his demand.

With Kind Regards

A handwritten signature in blue ink, appearing to read 'Minas Ermlas'.

Minas Ermlas
IT Service Strategy & Program
Management Officer (ISD)

Cc:

- IT Service Transition
- File



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ADDIS ABABA UNIVERSITY
College of Business and Economics (CoBE)
SCHOOL OF COMMERCE

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ADDIS ABABA, ETHIOPIA

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Our Ref. BAIS/H/029/2017
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Date 06/06/2017

To: - Ethio telecom
Addis Ababa

The Addis Ababa University School of Commerce currently runs four Postgraduate programs: Human Resource Management, Project Management, Marketing Management, Supply Chain and Logistics Management beside its preparation to embark on launching some more expedient programs very soon.

As an immediate and direct stakeholder to this socioeconomically pragmatic move, we would like you to cooperate with us by way of assisting our students to conduct academic researches and case analyses in your organization. As such, we kindly request your esteemed organization to provide student Meramu Asmare ID.No.GSD/0335 with information pertaining to Information system analysis: General Risk factors and their Implication for IS projects of Ethio telecom.. A copy of the paper produced may be provided to you if so demanded.

Thanking for your earnest cooperation, we remain

Sincerely Yours


Abraraw Chanie (PhD)
Business Administration
Department
Distance Program Coordinator
Addis Ababa University College of Commerce

Project closing report of IS projects (partial)

POST LAUNCH

Projects	Total Logged	Solved/ Clarified	Closed Rate	Open Issue
Project A	233	232	99.14 %	1
Project B	152	151	99.30%	1
Project C	122	121	100%	1

- 65 % of issues are new Requirement (Improvement), Requirement change or FRS and Design Gap
- 20 % of issues are Knowledge gap
- 5% of issues are usability
- 3 Open issues are Escalated (Automatic Provisioning , Directory issue and Project C ringing time)

CHALLENGE

- Very tight Plan
- Human and other Resource Limitation
- Working Place limitation
- User resistance for not ignoring simple and unnecessary functions.
- Lack of Tester (especially user) flexibility during PAT executions.
- Most of the test team was not referring FRS during testing and this was making understanding gaps.
- End users (user Divisions) Challenge to accept new integrated and multi purpose system
- User awareness (, IT system , back end system , project objective , why migration)
- Vendor resistance during implementation
- Language and understanding gap as Vendor brings new persons repeatedly

CHALLENGE

- Early migration or cutover
- No design for usability
- Delay on FRS, Design and PAT documents (Design and TEP Team)
- Frequently changed on FRS, Design ,PAT and BOQ
- Delivery Delay Vendor side
- Delay Decision making from ethio side.



ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE

MASTERS OF ART IN PROJECT MANAGEMENT

Dear participant!

This is a project work to be completed in partial fulfilment of my Second degree in project management. As part of my research work I am studying risk factor identification in IS projects of ethiotelecom, which is a major task in risk management practice in any project.

I kindly request you to participate in this research as member of information system project teams in ethiotelecom by completing the attached questioner. In order to insure all information will be confidential you have not write your name or section name in any part of this questioner. I also sincerely request you to cover all the items as honestly as possible before you return.

For any question related with how to each item of the questioner, please refer the clue prepared for each item or address me by my email or phone number.

Email: melkamu.asmare@ethiotelecom.et

: yabsramelkamu@gmail.com

Tell: 0911516419

Questionnaire

General instruction and information

Part I team member general information part II includes assessment guide, , part III, questioner, part IV clue for each risk factor, hot to determine low impact, major impact, and critical impact, and the last part contains major activities on each project phase so that the team will try to relate each risk factor with project phase.

Part I: team member general information

Projects you participate (please select one or more projects if you participate)

☐ CBS	☐ UNMS	☐ IPCC	☐ mVAS
☐ CRM	☐ OSS	☐ Security	☐ ERP

Your Job Title	☐ Associate	☐ Specialist	☐ Expert
----------------	------------------------------------	-------------------------------------	---------------------------------

Project assignment	☐ Consultant	☐ architect	☐ other
--------------------	-------------------------------------	------------------------------------	--------------------------------

Part II: Assessment Guide

☐ Dedicated

☐ Support

Below are 64 risk factors identified, you can put critical (C), Major (M), Low (L), or NA (not applicable) for each process group of you are involved.

Note that:

- A. A given risk factor can be critical, major or other for one or more project process groups. Project process groups are project scoping phase, planning phase, implementation (execution) Phase, Monitoring and control phase, and project close out phase.
- B. If you have additional comments or suggestions please mention it by using the last (comments) table.

Pat III: Risk Factors

NB:	Critical=C	Major= M	Low =L	Not applicable =NA
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Risk ID	Project Risk Factor	Project Process Group				
		Scoping	Planning	Execution	M&C	Closing
RF001	Incomplete, inconsistent, and unclear design documents					
RF002	Unrealistic Schedule					
RF003	Vendor cooperation and Support					
RF004	Technology Match to Project					
RF005	Incomplete, inconsistent, and unclear design documents					
RF006	Lack of complete automated testing tools (simulators)					
RF007	testing process completeness and clarity					
RF008	New requirements emerge					
RF009	localizing and repairing errors					
RF010	testing team qualification and completeness of testing resources					
RF011	Team Turnover and availability					
RF012	Team Spirit and attitude					
RF013	team communication channels					
RF014	Project manager Experience and approach					
RF015	Project manager authority and management support					
RF016	Disaster recovery					
RF017	Physical Facilities					
RF018	Use of Defined Process and procedures in project activities					
RF019	Pilot testing					
RF020	System dependencies					
RF021	Requirements Completeness and Clarity					
RF022	Budget Size and cost controls					
RF023	Project Size					
RF024	User involvement and experience					
RF025	training needs for both project team and user					
RF026	project team roles and responsibilities					
RF027	Definition of the Program					
RF027	Definition of the Program					

RF028	internal customer conflict					
RF029	Work Flow for each system					
RF030	Projects fit to ethiotelecom					
RF031	Goals conflict					
RF032	decision time or situation					
RF033	Policies and Standards					
RF034	Delivery Commitment with venders					
RF035	Project schedule					
RF036	Requirements Stability					
RF037	Customer Service Impact					
RF038	Data Migration Required					
RF039	Alternatives approach analysis					
RF040	well organized project documentation					
RF041	Change Control for Work Products					
RF042	Tools Availability (applications, recovery cds connectivity cables)					
RF043	clear project management approach					
RF044	Contract and negotiation fit					
RF045	Mix of team Skills					
RF046	Subject matter expertise in each domain					
RF047	Team efficiency and effectiveness					
RF048	Maturity of Technology applied					
RF049	Design Complexity					
RF050	Support Personnel					
RF051	technology Experience of project team					
RF052	Experience with Project Process					
RF053	team work experience					
RF054	Quality KPI (key performance indicator) availability					
RF056	Implementation Difficulty					
RF057	Testability					
RF058	User Justification (internal user)					
RF059	User Acceptance					
RF060	Project Objectives					
RF061	Management Support					
RF062	Leadership					
RF063	Resource Conflict					
RF064	Executive (officers, chief officers) Involvement					

Your additional comments if any:

Part IV: Impact level information (clue) for each risk item

Risk ID	Risk impact clue		
	Low	Major	Critical
R001	design document is detail and consistent but contains unimportant specification,	design document lacks major important details	components in the design document are not clearly defined;
R002	The estimated time for the project as a whole may exceed the delivery date agreed upon previously in few days or weeks	the schedule prolonged or reschedule to months	Schedule extends above three or above months
R003	complete support at reasonable price and in needed time frame	adequate support at contracted price, reasonable response time	little or no support, high cost, and/or poor response time
R004	technology planned for project is good match to customers and problem	some of the planned technology is not well suited to the problem or customer	selected technology is a poor match to the problem or customer
R005	conflicts are resolved on time	rarely conflicts are resolved	conflicts are ignored
R006	simulators are complex and not user friendly	testing tools exist but poorly automated	No testing tool available
R007	testing process is well organized and clear	testing process lacks consistent process	testing process is very Informal and ill-understood
R008	few modification requests are emerged	users need new requirements while operation	considerably many requirements are emerged
R009	errors are quick identified and fixed	errors are identified but difficult to fix	errors are difficult to identify and fix

R010	testing team has experience but test cannot be in real environment	testers have minimal experience but lacks testing tools	testers are unqualified and testing resources are not complete
R011	no fluctuation of teams on a given project	team members change through team	experienced team member resign prior project completion
R012	strongly committed to success of project; cooperative	willing to do what it takes to get the job done	little or no commitment to the project; not a cohesive team
R013	clearly communicates goals and status between the team and rest of organization	team communicates some of the information some of the time	rarely communicates clearly within team or to others who need to be
R014	Project manager is very experienced with similar projects and can process planning and monitoring well	PM has moderate experience and need enhancement in planning process	PM has no experience in project management and weak in planning and monitoring process
R015	the project manager has official authority that enables project leadership effectiveness and also has complete support from the management and project team	support by most of team, with some reservations and his/her authority is based on personal relations with top level management	no visible support; manager in name only, and with little authority, and little personal power to influence decision-making and resources
R016	all areas following security guidelines; data backed up; disaster recovery system in place; procedures followed	some security measures in place; backups done; disaster recovery considered, but procedures lacking or not followed	no security measures in place; backup lacking; disaster recovery not
R017	facilities are completed	facilities are not always available	required facilities are not existed
R018	process and procedures are well developed and followed by the project team	process and procedures are developed but not fully followed by the project team	no formal process and procedure used
R019	pilot site (or team) available and interested in participating	pilot needs to be done with several sites (who are willing) or with one who needs	pilot environment is not available
R020	clearly defined dependencies of the project and other parts of system	some elements of the system are well understood and planned; others are not yet comprehended	no clear plan or schedule for how the whole system will come together
R021	all completely specified and clearly written	some requirements incomplete or unclear	some requirements only in the head of the customer
R022	sufficient budget allocated with stable commitment dates	questionable budget allocated with some uncertain commitments	doubtful budget is sufficient with unstable, fluctuating commitments
R023	small, noncomplex, or easily decomposed	medium, moderate complexity, decomposable	large, highly complex, or not decomposable

R024	users are highly involved with project team, and have high experience on similar projects	users play minor roles , and with good experience but have needs in mind	minimal or no user involvement, and not sure how needs can be met
R025	user training needs considered; training in progress or plan in place	user training needs considered; no training yet or training plan is in development	requirements not identified or not addressed
R026	individuals in each project understand their own roles and responsibilities and those of others	individuals understand their own roles and responsibilities, but are unsure who is responsible for work outside their immediate group	many in the organization are unsure or unaware of who is responsible for many of the activities of the organization
R027	program is well-defined, with a scope that is manageable by ethiotelecom	program is well-defined, but unlikely to be handled by ethiotelecom management	program is not well-defined or carries conflicting objectives in the scope of the program
R028	multiple divisions of the program have common needs	multiple divisions of the program have different needs, but do not conflict	multiple divisions of the program are trying to drive it in very different directions
R029	little or no change to work flow	will change some aspect or have small effect on work flow	significantly changes the work flow or method of organization
R030	directly supports ethiotelecom mission and/or goals	indirectly impacts one or more goals of ethiotelecom	does not support or relate to ethiotelecom mission or goals
R031	goals of projects within the program are supportive of or complimentary to each other	goals of projects do not conflict, but provide little direct support	goals of projects are in conflict, either directly or indirectly
R032	time for decision has been set by reasonable project commitment process	time of decision is being partially driven by need to meet marketing demo, or other governmental mandate not related to technical estimate	time or situation of decision is totally driven by need to meet marketing demo, or other governmental mandate; little consideration of project team and task complexity
R033	development policies and standards are defined and carefully followed	development policies and standards are in place, but are weak or not carefully followed	no policies or standards, or they are ill-defined and unused
R034	stable commitment dates	some uncertain commitments	unstable, fluctuating commitments and delays
R035	team agrees that schedule is acceptable and can be met	team finds one phase of the plan to have a schedule that is too aggressive	team agrees that two or more phases of schedule are unlikely to be met
R036	little or no change expected to approved set (baseline)	some change expected against approved set	rapidly changing or no agreed-upon baseline

R037	requires little change to customer service	requires minor changes to customer service	requires major changes to customer service approach or offerings
R038	little or no data to migrate	much data to migrate, but good descriptions available of structure and use	much data to migrate; several types of data or no good descriptions of what is where
R039	analysis of alternatives complete, all considered, assumptions verifiable	analysis of alternatives complete, some assumptions questionable or alternatives not fully considered	analysis not completed, not all alternatives considered, or assumptions faulty
R040	correct and available	some deficiencies, but available	not exist
R041	formal change control process in place, followed, effective	change control process in place, not followed or is ineffective	no change control process used
R042	available, documented, validated	available, validated, some development needed (or minimal documentation)	invalidated, proprietary or major development needed; no documentation
R043	product and process planning and monitoring in place	planning and monitoring need enhancement	weak or nonexistent planning and monitoring
R044	contract and negotiations with vendors has good terms, communication with team is good	contract has some open issues which could interrupt team work efforts and followed by complex negotiations	contract has burdensome document requirements or causes extra work to comply
R045	good mix of disciplines (end users) and	some disciplines (from different stack holders) inadequately represented	some disciplines not represented at all
R046	good background with application domain within development team	some experience with domain in team or able to call on experts as needed	no expertise in domain in team, no availability of experts
R047	all milestones met, deliverables on time, productivity high	milestones met, some delays in deliverables, productivity acceptable	productivity low, milestones not met, delays in deliverables
R048	technology has been in use in the industry for quite some time	technology is well understood in the industry	technology is leading edge
R049	easily maintained	certain aspects difficult to maintain	extremely difficult to maintain
R050	In place, experienced, sufficient in number	missing some areas of expertise	significant discipline or expertise missing
R051	good level of experience with technology	some experience with the technology	no experience with the technology
R052	high experience	average experience	low experience
R053	extensive experience in working with team	some experience with similar projects	little or no experience with similar projects

R054	QA system are established and followed effectively	procedures established, but not well followed or effective	no QA process or established procedures
R055	changes to commitments in scope, content, schedule are reviewed and approved by all involved	changes to commitments are communicated to all involved	changes to commitments are made without review or involvement of the team
R056	content is reasonable for this team to implement	content has elements somewhat difficult for this team to implement	content has components this team will find very difficult to implement
R057	product requirements easy to test, plans underway	parts of product hard to test, or minimal planning being done	most of product hard to test, or no test plans being made
R058	user justification complete, accurate, sound	user justification provided, complete with some questions about applicability	no satisfactory justification for system
R059	users accept concepts and details of system; process is in place for user approvals	users accept most of concepts and details of system; process in place for user approvals	users do not accept any concepts or design details of system
R060	verifiable project objectives, reasonable requirements	some project objectives, measures may be questionable	no established project objectives or objectives are not measurable
R061	strongly committed to success of project	some commitment, not total	little or no support
R062	program has active program manager who coordinates projects	program has person or team responsible for program, but unable to spend enough time to lead effectively	program has no leader, or program manager concept is not in use
R063	projects within the program share resources without any conflict	projects within the program schedule resources carefully to avoid conflict	projects within the program often need the same resources at the same time (or compete for the same budget)
R064	visible and strong support	occasional support, provides help on issues when asked	no visible support; no help on unresolved issues

Part V: major activities in a project

Project Process group	Major activities
Scoping /initiation phase	
	define a business case
	requirement identification
	Requirement assessment and evaluation
	undertake a feasibility study
	establish a project charter
	set up a project office
	conduct a phase review
	vender contract and negotiation
	tender announcement
Project planning phase	develop project proposal
	develop project schedule
	define tasks and there dependencies
	Estimate and assign resource to tasks/activities
	build work break down structure
	define communication channels
	define completion and success criteria
	Draw network diagram
Launching / Implementation phase	conflict resolution
	team meetings
	managing scope
	define roles and responsibilities
	finalize project schedule
	developing team operating rules
	execute activities
Monitoring and controlling phase (M&C)	track the progress of the project/activity
	determine appropriate reporting plan
	analysis the report
	Build and maintain an Issues Log
	Determine the appropriate corrective actions to restore a project to its
	Review the schedule
Closing phase	project documentation
	post-implementation audit
	Handover, terminate contract

Summary of responses

Project Process group	NA	Low	Major	critical	NFD
Project scope group	14	23	19	8	0
Planning	4	21	31	8	0
Lunching	1	15	29	19	0
M&C	2	27	26	8	1
Closing	2	11	28	23	0