The Effect of Project Monitoring and Controlling Practice on Project Success: A Case Study of Projects in Information Network Security Agency (INSA)

By: Seblewongel Nega

A Research Project Report Submitted in Partial Fulfilment of the Requirements for the Award of the Degree of Masters of Arts in Project Management

Advisor: Dr. Worku Mekonnen

Addis Ababa, Ethiopia

Addis Ababa University

College of Business and Economics

School of Commerce

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Declaration

I, Seblewongel Nega, hereby declare that the thesis entitled on: “The Effect of Project Monitoring and Controlling Practice on Project Success: A Case Study of Projects in Information Network Security Agency (INSA) has been carried out by me under the guidance and supervision of Worku Mekonnen (PhD).

I also declare that this research work is my own original work, all materials, and Sources used for this thesis have been duly acknowledged and this work had not been submitted to any educational institutions for the requirement of any award.

Signature: _____ Date: _____

Approval page

This is to Certify that the thesis prepared by Seblewongel Nega, entitled: The Effect of Project Monitoring and Controlling Practice on Project Success: A Case Study of Projects in Information Network Security Agency (INSA) submitted in partial fulfilment of the requirements for the 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.

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Abstract

The objective of this study was to investigate the effect of project monitoring and controlling practice on project success in information network security agency (INSA). To achieve the objectives of the study the researcher adopted both Primary and Secondary data sources; Quantitative and Qualitative research approaches and Descriptive and Explanatory research design. The target population of the study were 115 employees of the agency who took a role in undertaking commercial software development projects. Purposive sampling technique was used to select only commercial software development projects undertaken in the past five years and a stratified sampling technique was employed to select respondents from different functional teams thus the commercial software development project always comprises. While The quantitative data was analysed using descriptive, correlation and regression analysis using SPSS version 23.0, The qualitative data was analysed, described, and interpreted in the form of statement. The major findings of the study revealed that there is good project monitoring and controlling practice in the organization, yet relatively there is weak project change control practice. Results also revealed that Pearson correlation between project progress tracking, project progress reporting, project change control and project documentation practice were strongly positive with project success. Regression results show that Among all the project monitoring and controlling practices, project change control has relatively the highest influence on the project success and 60.6% of changes in the project success attributed to the combined effect of project Progress tracking, project progress reporting, project change control, and project documentation. From this, the study concludes that the overall project monitoring and controlling practice have a strong impact on project success. This means the practice of project monitoring and controlling with a high level of effectiveness yields a higher level of project success. To be more successful in projects, the study recommends that the organization must focus on enhancing project monitoring and controlling practice, especially on project change control areas as they have the highest impact on project success, yet they are practiced poorly in the organization.

Keywords: Project Monitoring and Controlling Practice, Project Success

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First and foremost, praise and thanks to God, the almighty for all his love, forgiveness, and blessings throughout my life.

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Acronyms

INSA: Information Network Security Agency

SPSS: Statistical Package for the Social Sciences

PMBOK: Project Management Body of Knowledge

PMO: Project Management Office

PMI: Project Management Institute

PMLC: Project Management Life Cycle

CSF: Critical Success Factor

CHAPTER ONE: INTRODUCTION

This chapter comprises the background of the study, the background of the company, general objective, Specific objective, Research questions, the significance of the study, the scope of the study, limitation of the study, definition of terms, and organization of the study.

1.1 Background of the study

As Project Management Institute (PMI, 2013) defines: A project is a temporary venture undertaken to create a unique product, service, or result and Project management is the use of knowledge, skills, tools, and techniques to project activities to meet the project requirements. Project management is accomplished through the proper use and integration of the 47 logically grouped project management processes, which are categorized into five Process Groups. Those Groups are Initiating, Planning, Executing, Monitoring, and controlling, and Closing (PMBOK, 2013).

The monitoring and controlling process group are the collections of a process that track, review, and record the project progress and performance; identify areas which need change; initiate the corresponding changes. The major benefits of this Process Group are that project performance is quantified and analysed at customary intervals and any variances from the project management plan are identified so that corrective action can be made (PMBOK,2013).

Successful project management defined as finalizing and achieving the project objective within time and cost, at the desired performance level (quality), and most importantly by meeting the customer expectation. To ensure a project is successful one should ensure all the stages of a project life cycle have been followed. Project planning, execution, monitoring, and controlling are vital components in the science of project management and they must be well managed for the successful delivery of goods and services in an organization. Any deviation from the standardized norms of managing these stages can lead to the poor performance of the project. A poorly performing project leads to poor deliverables in terms of customer satisfaction, budget, time, and value utilities (Chin, 2004). As such, project managers should understand how certain aspects of the project life cycle affect project performance.

According to Iman and Siew (2008), poor project monitoring and controlling practice is the major causes of project failure. Monitoring and controlling are essential components of any project and are crucial to is success. Several studies have been carried out to determine the critical success factors which contribute to project success and applying

An effective project management process is the major essential tool to achieve the project goal and objective (Charles and Humam, 2015).

An organization like INSA try to meet its aim by drafting and implementing different software development projects needs to have a well-managed and successful Project management practice so the project manager or project management office (PMO) needs to develop and implement standard project monitoring and controlling process, method and activities for the effective and successful project outcome.

This research attempted to assess the project Monitoring and Controlling practice and its effect on project success of information network security agency (INSA).

1.2 Background of the organization

Information Network Security Agency (INSA) is one of the largest securities and cyber technology organizations in Ethiopia established for the first time in the year 2006 by Council of Ministers Regulation No.130/2006 intending to defend the country's information and information infrastructure from attack and protecting the national interest. However, as it was necessary to amend the agency's power and functions to prevent cybercrimes that becomes gradually complex and to protect the national interest, its establishment regulation was amended by Council of Ministers Regulation No.250/2011 and recently re-amended by Proclamation No.808/2013(https://www.insa.gov.et/).

Information Network security agency (INSA) is a governmental organization with a vision to realize a globally competent National Cybersecurity institution that plays a key role in the renaissance of the country and mission to protect the national interest through building a capability that enables safeguard the country's information and information infrastructures.

Besides its mission and vision, the organization actively engages in Grand National technology projects. Those projects include software development, hardware programming, and network security projects. Some of the commercial and grand projects undertaken by INSA includes Commercial bank of Ethiopia core banking system,

Condominium lottery system, Grand renaissance dam Electrical and computer system, Federal police biometrics system, installation of secured network and develop websites for different governmental organizations, etc.

1.3 Problem statement

As Ethiopian Country Program Evaluation [ECPE] (2010), stated; in Ethiopia, most of the government organizations do not use effective project monitoring and controlling system in appropriate manner for their projects that is why most governmental projects in the country failed to complete as planned.

The monitoring and controlling process group controls the entire project effort .it does not monitor and control only the work being done within a process group. It enables to measure and analyse project performance at regular interval and can identify variance from the project management plan so can control change or recommended corrective or preventive actions by anticipating possible problems which can prevent the project from failure and effective project monitoring and controlling leads to project success (Karangwa, Mbabazi and Mbera, 2016). In the other side, poor project monitoring and controlling practice is the major causes of project failure (Iman and Siew, 2008).

From the year of establishment to now, the agency (INSA) is actively engaged in different technology projects by investing a large amount of resource and budget. however, as per the review of some unpublished documents and preliminary interview with the project management office head, some projects in the past five years are not finished timely and as planned and some projects are resumed because of the large deviation they showed from the planned one.

Even the reason to establish separate project management office to manage commercial projects is that the number of projects with cost overrun and time delay is increased. as (Mohammed,2019) asses the practice of software development projects in the agency, the findings of his research show that most of the project management knowledge areas were not practiced effectively and the researcher recommended to use best tool and method for monitoring and controlling of projects.

The researcher tries to review different papers and articles. (Mohammed,2019) assessed the practice of software development projects in INSA in terms of the ten-project

management body of knowledge and (Abel,2019) revealed that executive management support, emotional maturity level of team members ,user involvement ,skilled human resource and clear business objective are the critical success factors of software development projects of INSA. There is no research conducted to assess the effect of monitoring and controlling practice on project success of INSA. Due to all those reasons, the researcher believes that doing the research: the effect of monitoring and controlling practice on project success of INSA is worth full to test all the above findings of other researches in the context of INSA.

1.4 Research Questions

From the above problem statements, the following research questions are developed:

1. What is the current monitoring and controlling practiced?
2. How does the project progress tracking practice affect project success?
3. How does the project progress reporting practice affect project success?
4. How does the project change control practice affect project success?
5. How does the project documentation or lesson learned practice affect the project success?
6. What effect does the Project Monitoring and Controlling Practice has on the project success of information network security agency?

1.5 Research objective

1.5.1 General objective

The general objective of the study is to investigate the effect of monitoring and controlling process on project success of information network security agency.

1.5.2 Specific objectives

1. To evaluate the current monitoring and controlling practice of information network security agency
2. To determine the effect of project progress tracking practice on project success
3. To investigate the effect of project progress reporting practice on project success
4. To examine the effect of project change control practice on project success

5. To inspect the effect of project documentation or lesson learned practice on project success

1.6 Significance of the study

The research finding will help the organization by providing tangible and concrete evidence about what their current project monitoring and controlling practice looks like, what effect the monitoring, and evaluation practice has on the project's success. This will help the agency to identify the area of weakness and strength related to monitoring and controlling process, to design strategy to deliver successful projects, which can complete within the planned time, budget and meet customer expectation, and finally works towards improving the overall monitoring and controlling process practice. Besides this research fill the gap in this area on the organization, it can be a foundation for further study in the organization or as a reference for other studies and other organizations in the same context with INSA may use the finding of this research to improve their monitoring and controlling process practice.

1.7 Scope of the study

The scope of this study limited only on commercial software development projects that are undertaken in the past five years because projects concern to national security and organization secrecy not allowed using for this kind of research work, and project information before the past five years is not available.

1.8 Limitation of the study

- Difficult to accesses all project documentation (secondary data) due to confidentiality of records
- Limited to generalize the findings of this study to the whole organization because the sample is taken only from the commercial software development projects undertaken in the past five years
- Limitation of time to deeper analysis and to cover larger scope

1.9 Definition of basic terms

- **Project:** A project is a sequence of unique, complex, and connected activities that have one goal or purpose and that must be completed by a specific time, within budget, and according to specification (Wysocki, 2014).

- **Project management:** The application of knowledge, skills, tools, and techniques to project activities to meet the project requirements (Wysocki, 2014).
- **Project management process:** These processes ensure the effective flow of the project throughout its life cycle using tools and techniques to apply skills and capabilities described in the Knowledge Areas (PMBOK, 2013).
- **Project management process group:** These are the logical sequence of stages from initiating, planning, execution, monitoring and controlling to closing that project management follows (PMBOK, 2013).
- **Motoring and controlling process group:** This group is a collection of process that track, review and record the project progress and performance; identify areas which needs change and initiate the corresponding changes (PMBOK, 2013).
- **Project success criteria:** Project success criteria are the set of standards and measures by which the projects will be judged at the conclusion to decide whether or not it has been effective or successful. Usually Project success criteria adopted the so-called Iron Triangle of 'Time, Cost and Quality' as the set of principles for evaluating the success of a project (Wysocki, 2014).
- **Process:** A process is a collection of interrelated actions and activities performed to create a pre-specified product or service (Wysocki, 2014).
- **Practice:** Practice is the genuine application or utilize of monitoring and controlling systems within the organization (Wysocki, 2014).

1.10 Organization of the study

This research organized into five chapters: the first chapter contains background of the study, background of the company, problem statement, general and specific objectives of the study, research questions, Significance of the Study, Scope(delimitation) of the Study, Limitation of the Study, definition of terms and organization of the study. Chapter Two explained relevant literature about project monitoring and controlling process and show the conceptual framework of the study.

In the third chapter Research Approach, Research Design, study area and target population, Sample Design, Sample Size, Data Collection, Data Analysis, Scale Reliability and Validity and Ethical Considerations were explained and discussed. While Chapter four includes Response Rate and Demographic Data, Results and Discussion. the

last chapter of the report includes Summary, Conclusions, Recommendations, Limitation, and suggestion for further study.

CHAPTER TWO: REVIEW OF RELATED LITERATURE

2.1 Project management process group

While a project is a sequence, of non-repetitive activities that has specific and unique goal, which is achieved according to the specification and by committing specific time and budget, Project management is the use of knowledge, skills, tools, and techniques to project activities to meet the project requirements. This application of knowledge, skill, tool, and technique requires the effective management of the project management processes. A process is a collection of interrelated actions and activities performed to create a pre-specified product or service. Each process is characterized by its inputs, the tools and techniques that can be applied, and the resulting outputs (PMBOK, 2013). The project processes are mainly performed by the project team members and may involve stakeholders. Generally, project process falls into one of two major categories:

- **Project management processes**. the project management process ensures the effective flow of the project throughout its life cycle using tools and techniques to apply skills and capabilities described in the Knowledge Areas.
- **Product-oriented processes**. Product oriented process specify and create the project's product.

Nowadays Project management processes apply globally and across all business groups. Good practice does not mean that the knowledge, skills, and processes described should always be applied uniformly on all projects instead Good practice means there is general agreement that the application of project management processes can enhance the chances of project success. For any project, the project manager, in collaboration with the project team, is always responsible for determining which processes are appropriate, and the appropriate degree of rigor for each process (Wysocki, 2014). Project management process groups are the building blocks of every project management life cycle (Wysocki, 2014). The Process Groups are not a PMLC. They are simply groupings of processes by project phases so all of the project management life cycles (PMLC) are constructed from the five Process Groups known as Project Management Process Groups defined by the Project Management Institute (PMI) as follows:

1. **Initiating Process Group.** This group holds the process of defining a new project or a new phase of an existing project by obtaining authorization from the

concerning party to start the project or phase.

2. **Planning Process Group.** This group holds the process of establishing the scope of the project, refine the objectives, and define the course of action required to attain the objectives of the project.
3. **Executing Process Group.** This group holds the process of executing and completing the work defined in the project management plan to satisfy the project specifications and meet its goal.
4. **Monitoring and controlling Process Group.** This group is a collection of process that track, review and record the project progress and performance; identify areas which needs change and initiate the corresponding changes.
5. **Closing Process Group.** Processes in this group are performed to finalize all activities across all Process Groups to formally close the project or phase.

Even if the project management processes are presented as discrete elements with well-defined interfaces they overlap and interact in practice. The use of the project management processes is iterative, and many processes are repeated during the project.
The integrative and consolidative nature of project management requires the Monitoring and Controlling Process Group to interact with the other Process Groups, as shown in Figure 1 Monitoring and Controlling processes occur at the same time as processes contained within other Process Groups. Thus, the Monitoring and Controlling Process is pictured as a “background” Process Group for the other four Process Groups shown in Figure 1.

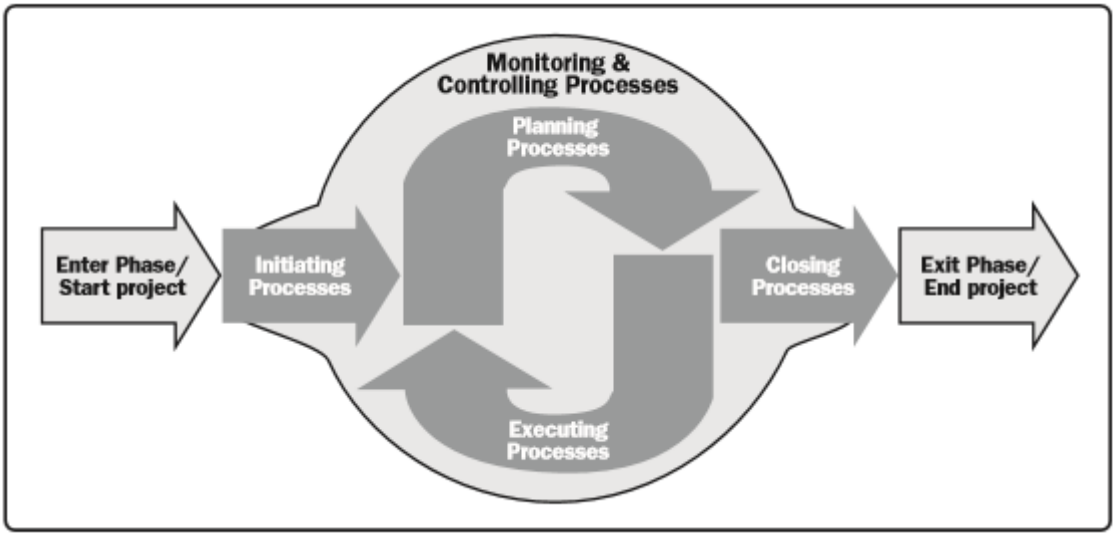

Figure 1: Project management process groups (PMBOK, 2013)

These five Process Groups have clear dependencies, typically performed in each project, and highly interact with one another. The nature of these interactions varies from project to project and may or may not be performed in a particular order. The project management processes are linked by specific inputs and outputs where the result or outcome of one process becomes the input to another process (PMBOK, 2013).

The monitoring and controlling process groups have the longest duration in terms of process interaction in a project. The main reason of this is monitoring and controlling processes check all other process groups whether the project is healthy and will meet its objectives (TeamFME, 2013).

2.2 Project monitoring and controlling processes

The monitoring and controlling process group are the collection of process that track, review and record the project progress and performance; identify areas which needs change; initiate the corresponding changes. The major benefits of this Process Group are that project performance is quantified and analysed at customary intervals and any variances from the project management plan are identified so that correction action can made (PMBOK,2013).Beside this, the Monitoring and Controlling Process Group Control changes and recommend corrective or preventive action in anticipation of possible problems, Monitor the ongoing project activities against the project management

plan and the project performance measurement baseline, and Influence the factors that could circumvent integrated change control or configuration management so only approved changes are implemented. Continuous project monitoring and controlling help the project team to have insight on the health of the project and identifies any areas requiring additional attention.

The Monitoring and Controlling Process Group monitors and controls the entire project effort rather than monitoring and controlling only the work being done within a Process Group. Project Monitoring and Control activities take place in parallel with Project Execution Process Group activities so that, while the project work is being executed, the project is being monitored and controlled by implementing the appropriate level of oversight and corrective action.

The project is observed and measured regularly against the project plan to ensure that the project is within acceptable variances of cost, schedule and scope, and that risks and issues are continually monitored and corrected as needed.

No amount of time and effort expended on planning, scheduling and resource assessment will compensate for a lack of effective monitoring and a sound control system. The purpose of this system is to ensure that the team always have the information to make an accurate assessment of what has happened and compare this with what should have happened according to the plan.

Controlling the project means managing the many problems that arise to maintain the project schedule, cost and quality through: monitoring the work (observing and checking what is happening); identifying and resolving the problems that arise; tracking the project; comparing progress with the plan and updating the records.

Monitoring is a checking activity, talking to the team members and finding out directly how things are going. While the project team are physically constructing each deliverable, the project manager undertakes a series of management processes to monitor and control the activities being undertaken. Due to the inherently risky nature of software projects, constant monitoring and control is required to rectify any event that may jeopardize the project. To monitor and control effectively, the project manager needs measurement data. The measurement data come from measuring processes and product. So, first project processes should be planned such that their measurement can be taken,

and secondly, it should be ensured that proper measurements are taken. Only then effective project monitoring and control is possible.

As stated on (PMBOK,2013), the processes in the Monitoring and Controlling Process Group are monitor and control project work, perform integrated work control, control scope, control schedule, control schedule, control cost, control communication, control quality, control stakeholder engagement, control risk, Control procurement. From those processes, the main Processes of Monitoring and Controlling Process Group are **project performance tracking, project status reporting, change control and documentation**.

- **Project performance tracking**

  The best monitoring and controlling system have the simplest and effective data collection procedure to collect project performance data. the first thing considered in monitoring and controlling is knowing what to monitor, how the executing activities will be monitored and how progress will be reported.

  Usually project team members expected to maintain up to date timesheets and records of the activities they are involved with and the team leaders collect the data from the team members and pass it to the project managers. while in this process project teams approach to give information about the project must be honest, objective, accurate, up to date and timely .since the quality of the performance data is absolutely critical to the success of the project, care must be taken while choosing the appropriate mechanism and while deciding when and the frequency to conduct progress tracking .

  Progress monitoring should be conducted regularly and continuously through different methods: participatory review, progress review meeting and millstone review.

  Project progress tracking usually focus on:

  - ✓ Compare actual completion time against expected completion time (Schedule tracking)
  - ✓ Measure wither the project is within assigned budget or not (Cost tracking)
  - ✓ Consistently check quality or customer expectation (Quality tracking)

- ✓ Measure and track number of change request (Change tracking)
- ✓ Track the status of work being performed
- ✓ Measure volume of work completed

- **Project status reporting**

Project status reporting is the key method to keeping project stakeholders informed about project progress and performance. Status reports contain data collected from the project team used as input to evaluate and compare actual result against planned result in order to make corrective action that will keep the project on schedule and budget where there is variance between actual and planned measurements. this document also used as lesson learned for future works. reporting mechanism are time sensitive and should enable the project manager to take appropriate action as and when deviation occur. if the reporting mechanism are slow, it will not help to control the project, instead it will be historical account of how out of control it was.

There are different types of status report:

- ✓ **Current period reports** cover only the most recently completed period. They report Advance on activities that were open or planned for work amid the period (Wysocki, 2014).
- ✓ **Cumulative reports** contain the history of the project from the starting to the conclusion of the current report period. They are more instructive than the current period since they appear patterns in project progress (Wysocki, 2014).
- ✓ **Exception reports** indicate variances from the plan. These reports are ordinarily outlined for senior administration to perused and translate quickly (Wysocki, 2014).
- ✓ **Stoplight reports** are a variation that can be utilized on any of the past report sorts (Wysocki, 2014).
- ✓ **Variance Reports** as their name suggests, they report differences between what was planned and what actually happened in a tabular form (Wysocki, 2014).

- **Change control**

  As well as monitoring activities against the plan, monitoring and controlling process group also includes controlling changes by influencing factor that will cause change and recommending preventive action in anticipation of potential problems.

  Even if there is effective planning in the project change may happened due to both external influences as well as internal influence (problems that arise within the project environment).

  The four main sources of change are:

  - ✓ **Environmental**: resulting from changes in legislation, government policy, or business strategy.
  - ✓ **Organizational**: High-level business decisions may change the basic terms of reference of the project.
  - ✓ **End-User**: resulting from changes in customer requirements.
  - ✓ **Technical**: New technology may offer a better solution to that originally planned.

  The process of controlling those changes and their potential effect on the project is called change control. The change control process should ensure that the proposed changes are interpreted after checking their potential effect on project timescales, costs, benefits and quality. in addition, it should always analyze the change, assess its impact, prioritize it, plan the necessary work, and finally control its implementation.

- **Documentation**

  While Project documentation is the process of documenting information and data related to project work throughout the project life, Project document includes project status report, change request, updated plan and all project progress and performance information as lesson learned placed in the repository.

  The lessons learned will address any issues or problems encountered in the quality of the project and the associated resolutions, which enables to prevent future project work from becoming too detached from plan (Team FME, 2013).

The project manager is responsible to produce and distribute all the project documentation necessary to reflect any changes to the project plans and/or schedule. The Communication Matrix developed in the Planning Phase will detail the recipients, communication methods, and number of copies required (Wysocki, 2014).

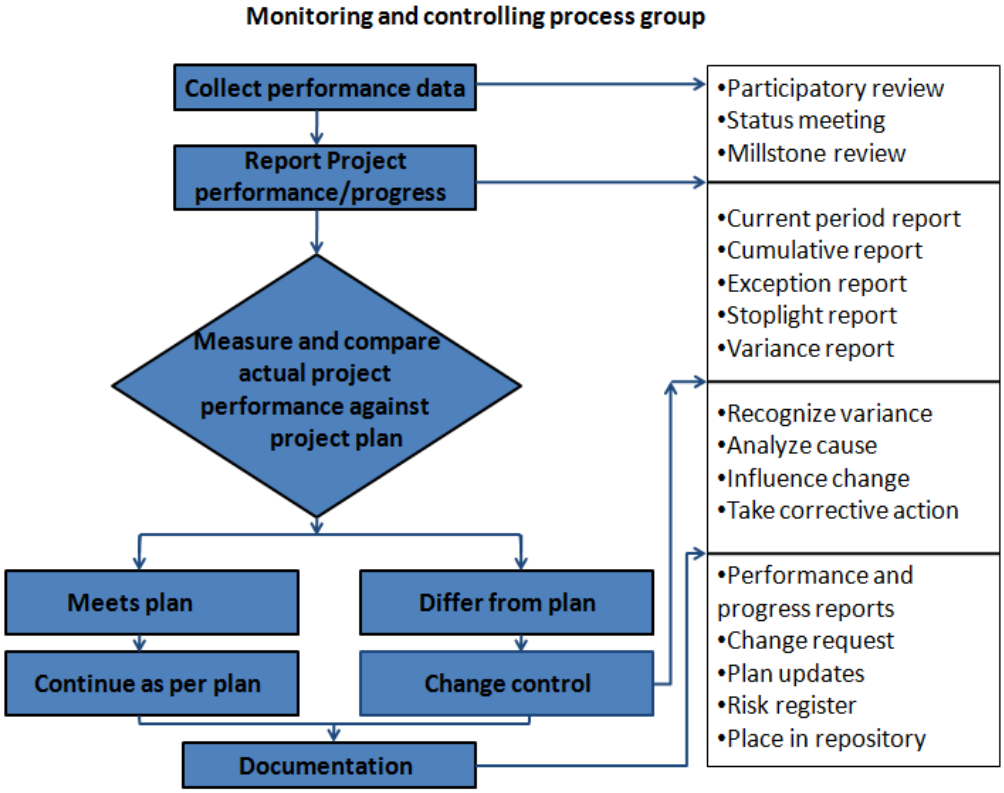

Figure 2: Monitoring and Controlling process (source: own,2020)

2.3 Effects of monitoring and controlling process on project success

Project monitoring is the systematic and regular collection and analysis of data over a period of time to identify and measure changes. Monitoring involves the collection of data prior to and during project implementation (United Nations Environment Programme,2008). The primary purpose of monitoring is to document the implementation process, facilitate decision making, and provide feedback for plan review and lessons learnt. According to (PRINCE2, 2017), project control is project management function that comprises of monitoring, evaluating and comparing actual versus planned results (ILX Group, 2015). It tracks the project progress towards achieving the stated objectives within project constraints; identifies deviations; evaluates alternative courses

of action and takes remedial actions (Larson and Gray, 2011).

Project monitoring and control have gradually become key functions of project management as projects grow bigger and more complex. it tracks, analyzes and reports progress with respect to objectives. With this task stakeholders can understand the current state of the project, activities undertaken, and the budget, schedule and scope forecasts. According to (Shrenash, and Sawant, 2013), Monitoring and control cycle comprises: plan making; plan implementing; actual output monitoring and recording; actual output reporting, and finally; take corrective action on the variations. This phase of the project enables to understand the project's progress so that appropriate corrective action can be taken when the project's performance deviates significantly from the plan. While project monitoring and controlling identify deviation and put things back on track in traditional project management, it identifies changes in the business environment and adjusts the plans accordingly in the adaptive project management approach.

Project monitoring and controlling activities are carried out throughout the life of the project by taking measurements that help the project team understand progress. This stage has an impact on the business objectives and acceptance of the eventual project outcome in terms of quality.

Since Monitoring and controlling process is continuously performed through the life of the project; it oversees all the task and metrics necessary to ensure that the approved and authorized project is within scope, on time and on budget, the project proceeds with minimum risk to fail (wysocki, 2014).

A continues monitor of key factor of a project helps the project team to have insight in to a project's potential success or failure as well It helps project manager to make important decision with verified data and with evidence which can make the corrective action efficient to prevent the project from failure, which means the project, become successful.

Project monitoring and controlling play a vital part in project management as well as the project manager's decision-making process, furthermore it helps the project managers and their team to foreseen potential risks and obstacles that could spoil the project if it left unaddressed.

Monitoring and controlling keep the management aware of the problems, which crop up during the implementation of the project, by providing continuous and regular reports

about the project progress. Besides it supports and motivates the management to complete the project within the budget, time and quality.

As (Karangwa, Mbabazi and Mbera, 2016) stated that effective monitoring and controlling enable the project manager and project teams to identify the potential problems encountered during the course of the project so that they can make Suitable corrective action to ensure the project is back on track and eventually lead to project success.

2.4 Project success and project successes criteria

Since Projects vary in their size, uniqueness and complexity, thus the criteria for measuring project success differ from project to project. The success of a project as well as the factors that affect this success are considered in a various way by different project management scholars. There is no unified treatment and definitions of these concepts. according to (Mir and Pinnington, 2014) a criterion for measuring the success of a project varies and a general definition of project success and ways to assess it, is therefore unlikely (Westerveld,2003).

In an extensive review of literature on project success (Müller and Jugdev,2012) concludes that no clear definition exists and stresses the need for measurable constructs of project success. There is no unique definition of project success so every project manager must develop their own critical success factor. (Calleam.com, 2020). Defining and agreeing upon project success criteria to make project success measurable is a way to overcome the subjective interpretation of project success (Müller & Turner, 2007) also Project success can be determined with achieving the success criteria defined by the project team, end users, customers and stakeholders

According to (Rodolfo, 2018), project success is gained when the project meets its objectives under the pre-planned budget and schedule. Even if this evaluation criterion is common in many industries to measure project success, it is different for the development projects because, in the development projects success is more than achieving schedule and budget goals, it includes meeting stakeholder expectation and benefit. Measuring these criteria of project success is more difficult and some can only be

evaluated years after project completion. so, for many organizations, these types of evaluations are unachievable due to lack of funding.

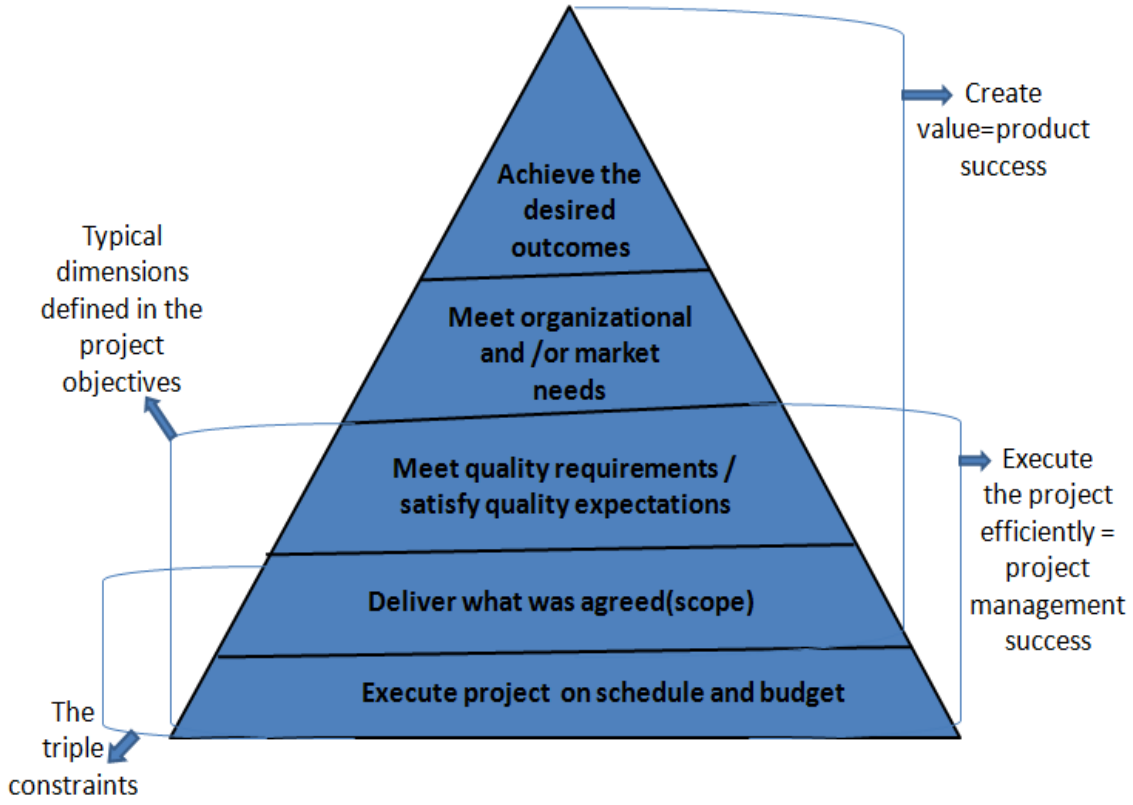

Figure 3: Layer in project success (Calleam.com, 2020)

A difference must be made between project success and project management success before assessing success.Project success is defined as achieving effectiveness(project deliverables achieved its objective and meet stakeholder satisfaction),while project management success is defined as achieving efficiency (how the project manages its resource to achieve its goal).

According to (PMI, 2012), Over 90% of studies, including studies like chaos report and scientific publication, project success and failure considered the triple constraints (iron triangle) base. according to this criterion to be successful, project must be on time, within budget and in specification. Every project is always constrained with resources that determine project management process and success (Karangwa and Mbabazi, 2016). In

addition, according to (Kerzner, 2003) and (Pinto, 2012) project is successful if it its completion is within the constraints of time, cost, and performance.

In project management, all project builds upon a foundation called critical success factor (CSF) which is a criterion a project needs to satisfy. They used as the definition of project success defined as cost, schedule, scope, quality, and satisfaction.

As stated by (Scott, 2013) the main pointer of success of the project is encompassed of on time finishing of work, finish the work under predicted budget, and most significantly meet the exact desire of customers. they are considered highly relevant and frequently used in practice for assessing project success.

As (Pinto, 2013) define, there are three factors that determine the success of a project: **Quality, costs and time**, also called the iron triangle. Since they can be easily measured statistically, they are specific standards for measuring project success. This means Project has to be completed within the predefined time schedule and budget, respectively measured by quality, delivery time and costs. If one or more of these criteria are not met, project success is expected to be lower (EL-Sheikh & Pryke, 2010).

Quality

Projects are formed to meet some predefined technical specification. Thus, measuring success consider determining to what extent the project fulfills the predefined specification (pinto, 2013).

Time

Projects are obliged to a time outline amid which they are to be completed. No projects are planning to proceed until the end of time. Hence, one of the fundamental necessities that control project management and determine its success is whether it is completed on the pre-planned schedule or not (Pinto,2013).

Cost

Projects are obliged to a restricted budget; no company has boundless assets to spend on projects. projects moreover compete for assets between each other. In arrange to utilize resources effectively projects must follow to confirmed budget. Hence, the second

requirement that control project management and determine its success is whether it is completed within pre-planned budget or not (Pinto, 2013).

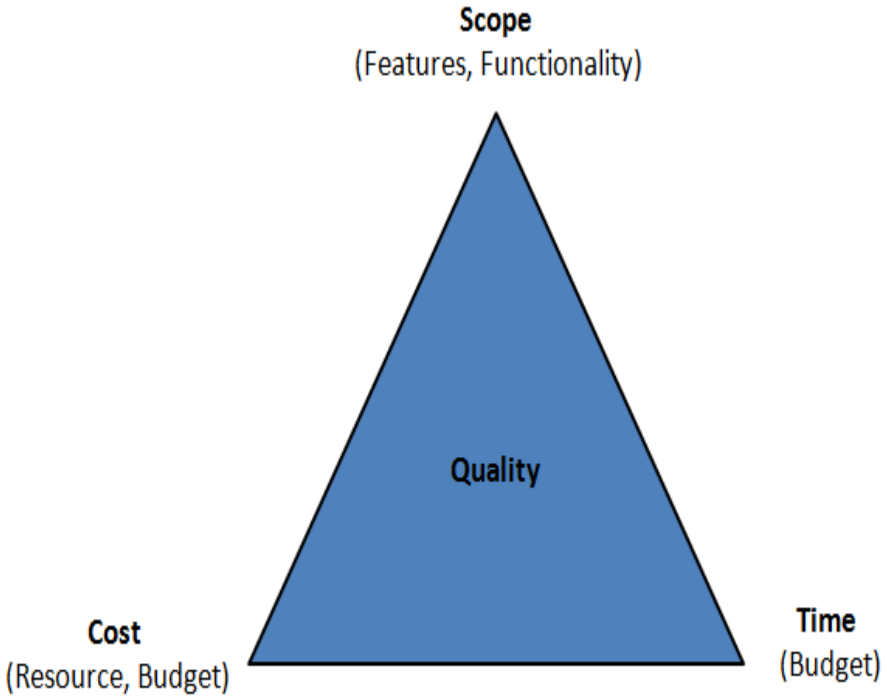

Figure 4: The iron triangle / triple constraints (wysocki, 2014)

2.5 Conceptual framework

After reviewing relevant literature which can be used as the theoretical foundation to develop the conceptual framework of the study, the researcher developed the following conceptual framework. The dependent variable is project success while the independent variables are the four-main process in monitoring and controlling process group (project progress tracking, project progress reporting, project change control and project documentation).

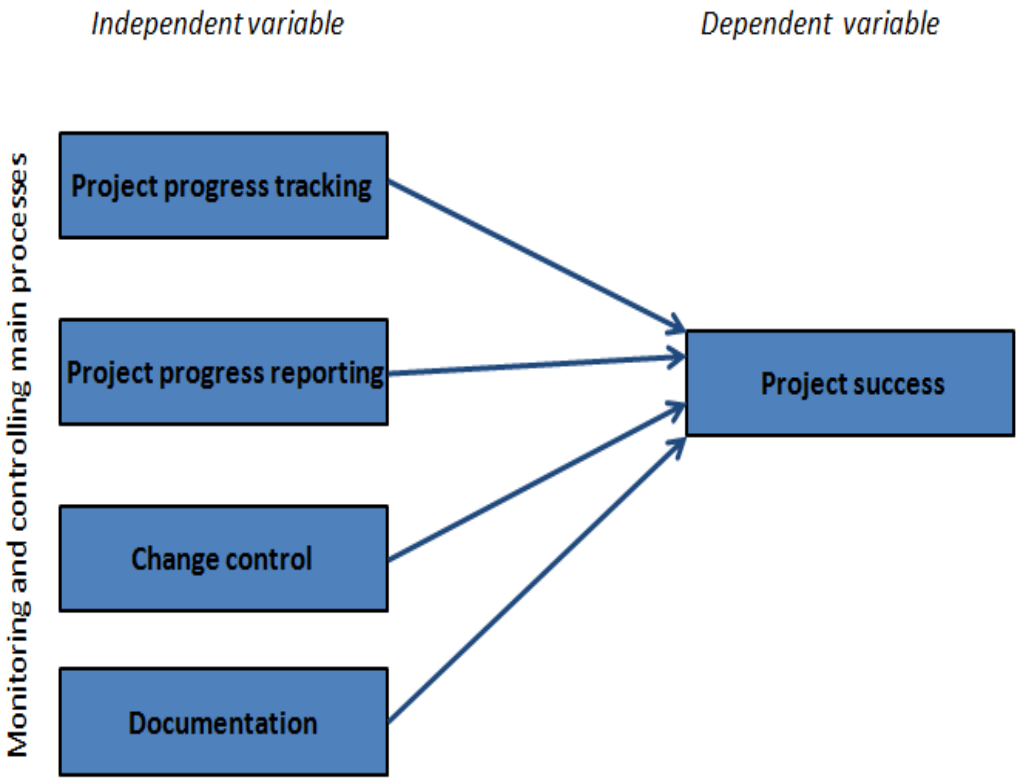

Figure 5: Conceptual framework (modified from (Karangwa, Mbabazi and Mbera, 2016))

From the above conceptual framework and from the research question presented in chapter one, the study proposes the following five hypotheses to be tested in relation to the effect of project progress tracking, project progress reporting, project change control and project documentation on project success.

Alternative hypothesis (H_1): Project progress tracking practice has positive significant effect on the project success.

Alternative hypothesis (H_2): Project progress reporting practice has positive significant effect on the project success.

Alternative hypothesis (H_3): Project change control practice has positive significant effect on the project success.

Alternative hypothesis (H_4): Project documentation practice has positive significant effect on the project success.

Alternative hypothesis (H_5): Project monitoring and controlling process has positive significant effect on the project success.

CHAPTER THREE: RESEARCH METHODOLOGY

Research methodology is a particular strategy, procedure and technique utilized to recognize, select, handle and analyze information about topic of interest. Therefore, in this paper this section answers the following main questions: in what approach the study conduct, where the study conducts, who is the target population, which sampling technique used, how data collected or generated and how data analyzed. The researcher believes that answering all those questions allow the reader to critically evaluate a studies overall validity and reliability.

3.1 Research approach

As discussed on (Kothari, 2004) there are two basic approaches to research: - the quantitative and qualitative approach. Quantitative research is based on the estimation of amount or quantity It is applicable to phenomena that can be communicated in terms of amount or quantity. Qualitative research, on the other hand, is concerned with qualitative or subjective phenomenon, i.e., phenomena relating to or involving quality or kind. It concerned with subjective evaluation of opinions, states of mind, conclusions, and behavior. Research in such a situation is a function of researcher's insights and impressions and not subjected to quantitative examination.

A combination of qualitative and quantitative approaches can construct on the strengths and minimize the shortcomings of both (Dahlan,2009).also (Saunders, Lewis, & Thornhill ,2009), contend that blended strategies are valuable since they give superior opportunities to reply research questions and permit to assessing the degree to which the research findings can be trusted.

This research therefore used mixed approaches in a complimentary manner, Quantitative designs are for carrying out research oriented towards quantification and are applied in order to describe current conditions or to investigate relationships. On the other hand, it is also qualitative research since it describes the actual condition of project monitoring and controlling process practice in the software development projects in a non-numerical way aided by the quantitative approaches.

3.2 Research design

A research design is a systematic approach that a researcher applies to conduct a scientific study. To get reliable and accurate findings, the research design should follow a strategic methodology, which can fit the chosen type of research. Basically, research can be structured by three types of research design. According to (Shiu ,2009) and (Saunders, 2003) there are three different types of research designs, namely, Exploratory, Descriptive and Explanatory.

An exploratory research design helps to explore a topic or an issue in order to learn more about it. On the other hand, Descriptive research presents a picture of the specific details of a situation, social setting, or relationship. The major purpose of descriptive research is to describe characteristics of a population or phenomenon while Explanatory research builds on exploratory and descriptive research and goes on to identify the reasons for something that occurs. It looks for causes and reasons (Kothari, 2004).

In this study, the researcher discovered the current project monitoring and controlling practice of the agency and its effect on project success. Thus, it stresses on finding out the current practice of the monitoring and controlling process and what effect it has on the project success. Therefore, in that prospective the research used Descriptive and Explanatory research design.

3.3 Study area and target population

The study was conducted in Information Network Security Agency (INSA), one of the largest securities and cyber technology organizations in Ethiopia, besides this, the organization actively engages in Grand National technology projects.

According to (Kothari, 2004) A complete enumeration of all items in the 'population' is known as a census inquiry. Considerations of time and cost almost invariably lead to a selection of respondents or selection of only a few items. The selected respondents called a 'sample' and the selection process is called 'sampling technique.' The survey so conducted is known as 'sample survey'.

As stated in the scope of the study, this study limited with commercial software projects undertaken by information network security agency in the past five years.

According to the information collected from the project management office of the agency, 34 commercial software development projects are undertaken in the past five

years and currently 7 software development projects are being undertaken by the organization. In the organization there are five teams involves in all software development projects namely: -

Business analysis: Identify business need of the product and create business and system requirements document.

Development team: Develop product based on the system requirement document.

Project management team: registered, scheduled, managed and control projects.

Knowledge management and collaboration team: Collaborate the other four teams and document, and manage all project related knowledge.

Quality assurance team: Check whether developed products are as business requirement and check whether project documents are as predefined organizational, national and product specific standards.

The target population of this study is all project managers, business analysts, developers' quality assurance and knowledge mangers from the five functional teams of the organization.

Notice:

- ✓ Individuals in each team may get involved in more than one project at a time or in different times.
- ✓ There are some individuals left the agency

3.3.1 Sample design

According to (Kothari, 2004), A sample design refers to the technique or the procedure the researcher adopts in selecting or obtaining a sample or items from a given population. Besides it lay down the number of items to be included in the sample i.e., the size of the sample. Sampling design are classified as either probability or non-probability sampling.

Probability sampling (Random sampling) also known as 'Chance sampling'. In this sampling design, every item of the population has an equal chance of inclusion in the sample. It is so a lottery method in which individual items are selected from the whole group not deliberately but by some mechanical process like Systematic sampling, Stratified sampling, and Cluster sampling. Whereas non-probability sampling (non-random sampling) known by different names such as deliberate sampling, purposive

sampling, and judgement sampling. under this type of sampling, the researcher selects items for the sample deliberately.

For the present study, the researcher used both purposive and stratified sampling techniques. purposive sampling technique is used for the selection of commercial software development projects undertake in the past five years in information network security agency and stratified sampling techniques is used to select employees from the above-mentioned functional teams engaged in commercial software development projects.

3.3.2 Sample size

Sample size refers to the number of items to be selected from the universe to constitute a sample (Kothari, 2004). Approaches to determine the sample size includes using a census for small populations, imitating a sample size of similar studies, using published tables, and applying formulas to calculate a sample size. For the present study the researcher employed the later strategy.

Yamane (1967) provided a simplified formula to calculate sample sizes as follows:

$$n = \frac{N}{1 + Ne^2}$$

Where, n is total sample size, N is population size and e is level of precision

On the basis of the formula shown above, the researcher decided on the sample size required to represent project managers, business analysts, developers, quality assurance and knowledge mangers, who are selected for the study. Hence, the researcher calculated the sample size as 90**.** The researcher distributed the sample size to the five teams based on the total number of employees of the five teams. The proportional allocation method, originally proposed by (Bowley, 1926) was used to do so. In proportional allocation method, the sampling fraction, n/N is same in all strata and the allocation of a given sample of size n to different stratum was done in proportion to their sizes.

$$n_i = \frac{n}{N} \times N_i \; ; i = 1, 2, 3, 4, 5$$

Where N_i and n_i are the population and sample sizes of each of the i^{th} team.

NB:

- When calculating sample size, the researcher assumed that margin of error (e)=0.05.

Table 1: Description of sample sizes determination (source: own survey, 2020)

No.	Team	Number of employees in each team	Samples of employees in each team
1	**Business analysis team**	18	14
2	**Development team**	46	36
3	**Project management team**	24	19
4	**Knowledge management and collaboration team**	12	9
5	**Quality assurance team**	15	12
6	**Total**	**115**	**90**

3.4 Data collection

As (Kothari, 2004) stated, Data collection is the method of gathering data on targeted variables. The researcher should keep in mind the two types of data: primary and secondary before deciding on the method of data collection to be utilized for the study. While the primary data are those which are collected for the first time so that those are original and fresh in character, the secondary data are those which have been collected and passed through statistical process by someone else. From several methods of collecting primary data: observation, interview, questionnaire, and focus group discussion are particularly important in survey and descriptive researches. In the other side Secondary data can be published or unpublished which may be: technical and trade journals, books, magazines, newspapers, reports and publications of various associations connected with business and industry, reports prepared by research scholars, universities, economists, etc. in different fields; public records and statistics and historical documents.

To get a sound finding on this research, the researcher uses both primary and secondary data, secondary data is collected by document review from the project management office of the agency and to gather the primary data mailed-questionnaire and key informant interview are used. The questionnaire mailed to respondents assuming that chosen respondents may not be easily approachable and maybe spread geographically (they are staying in their home) due to the coronavirus and interview was held using phone calls.

A questionnaire consists 40 questions categorized into 2 sections, the first part is socio-demographic characteristics of respondents (give personal information about respondents)(7 questions) and the second part focus on project monitoring and controlling processes (project progress tracking, project progress reporting, change control and documentation) and on project success(33 questions). From all the questions few are adopted with modification from earlier studies(Henoke,2018) and five-point Likert scale (1=strongly agree, 2=disagree, 3= neutral, 4=agree and 5=strongly agree) used to show the level of agreement on the practice of monitoring and controlling process.

3.5 Data analysis

The data, after collection, must be processed and analysed in order to get findings. In survey or experimental data, analysis involves predicting the values of unknown parameters of the population and testing of hypothesis for drawing inferences.

There are two major types of analysis: descriptive analysis and inferential analysis. Descriptive analysis concerns the development of certain indices from the raw data, whereas inferential statistics concern with the process of generalisation.

Depending upon the nature of the problem under study both, quantitative and qualitative analysis were used. For the quantitative (numerical) response descriptive statistics such as percentage, frequency, measures of central tendency and measure of dispersion were used to summarize the responses using tables and charts. Besides inferential analysis such as correlation and regression, analysis was used to assess the relationship between each independent variable with the dependent variable and the aggregate effect, using SPSS (Statistical Package for Social Science) version 23.0.

The qualitative response such as perception, opinion, attitude obtained using interview, data obtained by researcher's observation and data obtained from secondary source were analysed, described, and interpreted in the form of statement.

3.6 Scale reliability and validity

Validity is the ability of an instrument used to measure what it is designed to measure. It further explained two basic questions: does the study have sufficient control to ensure that the conclusions the researcher drew are truly warranted by the data? And can the researcher use what he has observed in the research to generalize to the population beyond that specific scene? The answers to these questions address the issues of content validity, internal validity, and external validity (Leedy and Ormond, 2001). Efforts were made to make the respondents of this study to understand the questionnaire and they gave back the valuable information. However, inconsistencies may occur in understanding contexts when respondents had their perceptions, which might affect the true value measured in the survey.

Although the measurement instruments that the researcher employed have been used for many different research purposes and deemed effective by many researchers and research results, still some factors that threaten the validity of this study might arise. Pilot testing on the questionnaire is conducted on some individuals. The main purpose of the pilot test was to ensure that it takes limited time to complete the questionnaire and the questions are not ambiguous and double-barrelled. Corrections on the pilot testing are incorporated in the questionnaire that would finally be distributed to respondents.

Reliability is consistency across time (test-retest reliability), across items (internal consistency), and across researchers (interpreter reliability). Reliability is also a measure of the extent to which the result of the research can be repeated with the same result if the research is replicated. Furthermore, to increase reliability, the researcher should use the same template as far as possible and use static methods. Furthermore, ambiguous terms are not used in questionnaires to avoid confusion. So, ensuring validity and reliability is one of the basic things that help get valuable results from research work.

For this work 16 questionnaires were distributed to the respondents organized from the Five functional teams, based on their easy accessibility. Then the returned 16 pilot

instrument questioners are coded, analysed, and a Cronbach's Alpha test is identified by SPSS IBM version 23.0.

Table 2 revealed that the reliability of constructs /variables incorporated in this study is in their acceptable level since Cronbach's alpha score of more than 0.70 indicates that the instrument is reliable. Interpretation of Cronbach's alpha is made based on a document by the U.S Department of Labour and Training Administration (1999).

Table 2: Reliability test result (source: own, 2020)

Variable	Cronbach's alpha	Cronbach's Alpha Based on Standardized Items	No of items	Interpretation
Project Progress Tracking	0.831	0.833	7	Good
Project Progress Report	0.754	0.763	7	Adequate
Change Control	0.812	0.808	10	Good
Documentation	0.823	0.828	5	Good
Project Success	0.858	0.861	4	Good
Combined result	0.926	0.925	33	Excellent

3.7 Ethical consideration

Upholding high ethical standards remain essential and a priority during the research. Respect for privacy and confidentiality is paramount to build trust with the participants. All participants' information would be kept private and confidential. Participants are provided with a survey questionnaire and in its cover was a brief explanation of the purpose of the survey and its benefits and details regarding participant's confidentiality. To ensure anonymity, respondents were not be allowed to indicate their names in the questionnaire. Since anonymity is guaranteed, respondents were free to give honest responses (valuable information). Consent was also be prepared during data collection. The necessary and maximum care for plagiarism was considered.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1 Introduction

This chapter deals with the presentation and interpretation of the descriptive, correlation and regression analysis of the quantitative and qualitative data collected from respondents of the study.

4.2 Response rate and demographic data

4.2.1 Response rate

The study has been conducted in information network security agency. To collect data questionnaires were distributed for a total of 90 respondents composed from the five functional teams (business analysis team, software development team, project management team, knowledge management and collaboration team and quality assurance team) always engaged in the development of commercial software development projects. However, only 72 questionnaires were appropriately filled and returned in electronic form within 12 days, which gives 80% response rate. As stated on (Mugenda,2003) a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent; therefore, this response rate is excellent for further analysis and reporting. Also, interview was held with the higher manager of the agency which helps the researcher to gain detailed and well explained answer for the research questions.

4.2.2 Demographic data

This section summarizes the first part of the questionnaire which consist the socio-demographic characteristics of the respondents (gender, age, educational level, field of specialization, role in project work, total work experience and project work experience). The main purpose of the Socio-demographic analysis in this research is to describe the characteristics of the respondents in terms of personal and professional characteristics so that the analysis could be more meaningful for readers.

Table 3: Socio-demographic characteristics of respondents (source: own survey, 2020)

Item		Frequency	Percent	Total Frequency	Total Percent
Sex of	Female	22	30.6%	72	100.0%

respondents	Male	50	69.4%		
Age of respondents' (in years)	18-25	7	9.7%	72	100.0%
	26-35	52	72.2%		
	36-45	13	18.1%		
	46-55	3	4.2%		
	Above 56	0	0.0%		
Respondents' educational level	College diploma	3	4.2%	72	100.0%
	Bachelor's degree	50	69.4%		
	Master's degree	19	26.4%		
	Doctoral degree	0	0.0%		
	others	0	0.0%		
Respondents' field of study	Engineering	27	37.5%	72	100.0%
	Technology	36	50.0%		
	Management	9	12.5%		
Respondents' role in the project work	Business analysis	11	15.3%	72	100.0%
	Software development	26	36.1%		
	Project management	16	22.2%		
	Knowledge management	7	9.7%		
	Quality assurance	12	16.7%		
Respondents' total work experience (in years)	Less than 3 years	10	13.9%	72	100.0%
	3-5 years	24	33.3%		
	5-10 years	21	29.2%		
	More than 10 years	17	23.6%		
Respondents' experience in project work (in years)	Less than 3 years	38	52.8%	72	100.0%
	3-5 years	8	11.1%		
	5-10 years	20	27.8%		
	More than 10	6	8.3%		

	years				

From the above table**,** Respondents' characteristics in relation to **gender** showed that 69.4 % (50) of them were males and 30.6% (22) represented females. the number of male participants is greater than female participants. This reflects software development missions are chiefly undertaken by males. Regarding the **age,** from 72 respondents, 7 belong to the first age group (18-25), 52 respondents are from the second age group (26-35), 13 from the third age group (36-45), 3 from the fourth age group (46-55) and no respondents account for the last group which represented people aging above 56. Looking at the composition of age groups, one can easily understand that the second age groups (26-35) which consisted of 72.2 % are registered to be highest in comparison to the rest of the group. This shows the fact that most of the employees for software development mission are young. **As to respondents' educational level** the numbers of respondents with college diploma are found to be 3 (4.2%) while 50(69.4%) respondents have achieved bachelor degree. The survey furthers informed us that 19(26.4%) respondents belong to the category of master's degree, and no respondents in the category of doctoral degree. Understandably, respondents who have achieved Bachelor Degree represented the highest percentage (69.4%). This implies that Software development missions are handled with advanced knowledge and skills. **In terms of respondents' field of study** respondents who studied engineering are 27(37.5%) and 36(50.0%) and 9(12.5%) respondents studied technology and management respectively. Thus, it is discernible from the data that greatest percentage of respondents studied technology that implies that respondent's field of study and work position is so related**. Regarding to respondents' role in the project work** 11(15.3%) respondents are business analysis, 26(36.1%) respondents are software development while project management, knowledge management and quality assurance represented 16(22.2%) ,7(9.7%) and12(16.7%) respectively. In comparison, the second group covered the highest number of respondents group that implies that employees who cover the higher role or responsibility in software development project are software developers.

In terms of respondents' total work experience (in years) ,10(13.9%) respondents are the ones who resided in the agency for less than 3 years and 24(33.3%), 21(29.2%) and

17(23.6%) of them belongs to 3-5 years, 5-10 years and more than ten years respectively. The second group (to 3-5 years) signals the higher number of respondents. **As respondents' experience in project work (in years)** Out of the total respondent, 38(52.8%) of them have an experience of less than three years on the project work. While 8(11.1%) of them have an experience from 3-5 years, 20 (27.8%) of them have an experience from 5-10 years and the remaining 6 (8.3%) have an experience more than ten year. This implies that most of the respondents are the participants in the commercial software development projects that are undertaken in the past five years.

4.3 Results and discussion

4.3.1 Descriptive analysis

4.3.1.1 **Project monitoring and controlling process practice and project success**

A blend of 33 questions had been included in the questionnaire with a view to assess the effect of project monitoring and controlling process practice on project success in the case of software development projects in information network security agency. Respondents were asked to indicate their level of agreement on statements that characterize project monitoring and control process and its effect on project success. The descriptive statistical results (Mean and Standard Deviation) of the responses from strongly disagree to strongly agree were tabulated in the following tables. According to (Scott, 1999) interpretation for mean values of Likert type scale ranging from 1 (Strongly Disagree/ highly dissatisfied) to 5 (Strongly Agree/Highly Satisfied), should be like; mean up to 2.9 is considered as Disagree, from 2.9 to 3.1 means neutral or neither disagree nor agree and mean above 3.1 is considered as an agree.

Table 4: Respondents views on the Practice of Project Progress tracking (source: own survey, 2020)

Item	SD	D	N	A	SA	Total	$\bar{x}$	Sd.
	F	F	F	F	F	F		
1. Assessment on project performance	4 (5.6%)	4 (5.6%)	8 (11.1%)	44 (61.1%)	12 (16.7%)	72 (100%)	3.78	0.982

are regularly and continuously conducted from the beginning of the project to the end								
2.Tool and techniques for project progress tracking is well assessed, selected, and implemented (BSC, millstone review)	5 (6.9%)	6 (8.3%)	7 (9.7%)	36 (50.0%)	18 (25.0%)	72 (100%)	3.78	1.129
3.Participatory review and progress review meeting (status meeting) approach are used to determine performance	1 (1.4%)	3 (4.2%)	9 (12.5%)	47 (65.3%)	12 (16.7%)	72 (100%)	3.92	0.765
4.The actual Projects	4 (5.6%)	18 (25.0%)	8 (11.1%)	31 4(3.1%)	11 (15.3%)	72 (100%)	3.38	1.180

progress on schedule, cost, and quality regularly compared against the planned schedule, cost, and quality to check variance								
5.Number of change requests measured and tracked	5 (6.9%)	17 (23.6%)	25 (34.7%)	21 (29.2%)	4 (5.6%)	72 (100%)	3.03	1.021
6.There is an expert for internal and external monitoring and controlling,	6 (8.3%)	9 (12.5%)	29 (40.3%)	23 (31.9%)	5 (6.9%)	72 (100%)	3.17	1.021
7.There is effective project status/progress tracking practice or system	4 (5.6%)	19 (26.4%)	27 (37.5%)	20 (27.8%)	2 (2.8%)	72 (100%)	2.96	0.941
Combined							3.428	0.726

F= Frequency /percent, $\bar{x}$= Mean, Sd. = Standard deviation, SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree

The above table shows that the items under project progress tracking has a mean value range from 2.96 to 3.92 and a standard deviation range from 0.765 to 1.18.

While respondents were not uniformly in agreement as deduced from the standard deviation ranging from 0.765 to 1.18, the larger number of respondents has positive response for the item 1, 2, 3 and 4 with frequency or percentile value of 44(61.1%), 36(50.0%), 47(65.3%) and 31(43.1%) respectively. Moreover, they have neutral response for item 5, 6 and 7 with frequency or percentile value of 25(34.7%), 29(40.3%), and 27(37.5%) respectively.

The combined mean value of project progress tracking is 3.428, which implies that respondents agreed on the existence of project progress tracking practice with the combined standard deviation of 0.726, which implies that there was no higher level of agreement among respondents about the existence of project progress tracking practice.

Beside this analysis, the interviewees stated that the organization adapt practice of project progress tracking through regular and continuous follow up of project milestones.

Table 5: Respondents views on the Practice of Project Progress reporting (source: own survey, 2020)

Item	SD	D	N	A	SA	Total	$\bar{x}$	Sd.
	F	F	F	F	F	F		
1. Project status reports are regularly conducted	3 (4.2%)	7 (9.7%)	15 (20.8%)	39 (54.2%)	8 (11.1%)	72 (100%)	3.58	0.960
2.Project status reports are timely, complete, accurate, clear,	3 (4.2%)	11 (15.3%)	16 (22.2%)	32 (44.4%)	10 (13.9%)	72 (100%)	3.49	1.048

up-to-date, and simple to understand								
3.Tool and techniques for project progress reporting is well assessed, selected, and implemented	6 (8.3%)	12 (16.7%)	16 (22.2%)	30 (41.7%)	8 (11.1%)	72 (100%)	3.31	1.134
4.Internal Project status meetings conducted within reasonable intervals	0 (0.0%)	2 (2.8%)	12 (16.7%)	47 (65.3%)	11 (15.3%)	72 (100%)	3.93	0.657
5.Project status reports shared among all stakeholders and team members.	5 (6.9%)	3 (4.2%)	14 (19.4%)	39 (54.2%)	11 (15.3%)	72 (100%)	3.67	1.021
6.Project status updated data are available to track projects and its performance,	6 (8.3%)	15 (20.8%)	11 (15.3%)	33 (45.8%)	7 (9.7%)	72 (100%)	3.28	1.153

in Order to identify problems early (to give early warning system)								
7.There is effective project status reporting practice or system	4 (5.6%)	11 (15.3%)	16 (22.2%)	38 (52.8%)	3 (4.2%)	72 (100%)	3.35	0.981
Combined							3.513	0.738

F= Frequency /percent $\bar{x}$= Mean Sd. = Standard deviation, SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree

In response to the questions blend to know the existence of project progress reporting practice, table 5 shows that each item has a mean value range from 3.28 to 3.93 and a standard deviation range from 0.657 to 1.153.

While respondents were not uniformly in agreement as deduced from the standard deviation ranging from 0.657 to 1.153, the larger number of respondents has positive response for all seven items listed from 1-7 with frequency or percentile value of 39(54.2%), 32(44.4%), 30(41.7%), 47(65.3%), 39(54.2%), 33(45.8%) and 38(52.8%) respectively.

The combined mean value of project progress reporting is 3.513, which implies that respondents agreed on the existence of project progress reporting practice with the combined standard deviation of 0.738, which implies that there was no higher level of agreement among respondents about the existence of project progress reporting practice.

Beside this analysis, the interviewees stated that the organization adapt practice of project progress reporting using scrum meeting and BSC reporting mechanism.

Table 6: Respondents views on the Practice of change control (source: own survey, 2020)

Item	SD	D	N	A	SA	Total	$\bar{x}$	Sd.
	F	F	F	F	F	F		
1. Source of variation on schedule, cost, and quality are identified.	3 (4.2%)	22 (30.6%)	23 (31.9%)	24 (33.3%)	0 (0.0%)	72 (100%)	2.94	0.902
2. Project change control procedure is well defined at the beginning of the project.	3 (4.2%)	25 (34.7%)	22 (30.6%)	22 (30.6%)	0 (0.0%	72 (100%)	2.88	0.903
3. Authority and responsibility for change requests is defined in advance.	3 (4.2%)	21 (29.2%)	24 (33.3%)	22 (30.6%)	2 (2.8%)	72 (100%)	2.99	0.942
4. Change request always formalized and acknowledges by both parties.	3 (4.2%)	24 (33.3%)	15 (20.8%)	28 (38.9%)	2 (2.8%)	72 (100%)	3.03	1.007
5. The effects of project change assessed in terms of project time	0 (0.0%)	26 (36.1%)	11 (15.3%)	30 (41.7%)	5 (6.9%)	72 (100%)	3.19	1.016

scales, costs and quality before the change is approved.								
6. Influence the factor that cause change on project time, cost, and scope.	6 (8.3%)	21 (9.2%)	15 2(0.8%)	30 (41.7%)	0 (0.0%)	72 (100%)	2.96	1.027
7. Scope/requirement change made, if and only if the change does not have impact on the planned project budget and time.	0 (0.0%)	22 (30.6%)	32 (44.4%)	18 (25.0%)	0 (0.0%)	72 (100%)	2.94	0.748
8.Project changes follow formulated procedures for review and approval	3 (4.2%)	16 (22.2%)	25 (34.7%)	23 (31.9%)	5 (6.9%)	72 (100%)	3.15	0.988
9.Integrated change control on (scope, time, budget, quality, communication, risk, procurement, and stakeholder)	3 (4.2%)	25 (34.7%)	27 (37.5%)	17 (23.6%)	0 (0.0%)	72 (100%)	2.81	0.850

exist								
10.There is problem escalation strategy	3 (4.2%)	19 (26.4%)	19 (26.4%)	29 (40.3%)	2 (2.8%)	72 (100%)	3.11	0.972
Combined							3.0	0.637

F= Frequency /percent $\bar{x}$= Mean Sd. = Standard deviation, SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree

Different questions were asked to check the existence and practice of change control. The above table shows that the response of each item with mean value range from 2.96 to 3.92 and a standard deviation range from 0.765 to 1.18.

While respondents were not uniformly in agreement as deduced from the standard deviation ranging from 0.765 to 1.18, the larger number of respondents has positive response for the item 1, 4, 5, 6 and 10 with frequency or percentile value of 24(33.3%), 28(38.9%), 30(41.7%), 30(41.7%), and 29(40.3%) respectively. Additionally, they have neutral response for item 3, 7, 8 and 9 with frequency or percentile value of 24(33.3%), 32(44.4%), 25(34.7%) and 27(37.5%) respectively. moreover, they have negative response for item 1 with frequency or percentile value of 25(34.7%).

The combined mean value of change control is 3.0, which implies that respondent's moderately (partially) agreed on the existence of change control practice with the combined standard deviation of 0.637, which implies that there was no higher level of agreement among respondents about the existence of change control practice.

Beside this analysis, the interviewees stated that the organization adapt practice of project change control through regular and continuous follow up of project milestones, even though there is unsatisfactory practice of cost and time control.

Table 7: Respondents views on the Practice of documentation (source: own, 2020)

Item	SD	D	N	A	S A	Total	$\bar{x}$	Sd.
	F	F	F	F	F	F		
1.Documentation	3	10	7	43	9	72	3.63	1.013

will be made at the beginning of the project and continue updating in regular meetings	(4.2%)	(13.9%)	(9.7%	(59.7%)	(12.5%)	(100%)		
2.The time scale, budget and customer requirements of each project are clearly defined and documented.	0 (0.0%)	7 (9.7%)	9 (12.5%)	36 (50.0%	20 (27.8%)	72 (100%)	3.96	0.895
3.Project progress reports and meetings are well documented	3 (4.2%)	9 (12.5%)	24 (33.3%)	31 (43.1%)	5 (6.9%)	72 (100%)	3.36	0.939
4.Requirement for any project changes are well documented	3 (4.2%)	14 (19.4%)	13 (18.1%)	39 (54.2%)	3 (4.2%)	72 (100%)	3.35	0.981
5.Decisions to approve or reject changes are well documented	5 (6.9%)	20 (27.8%)	4 (5.6%)	40 (55.6%)	3 (4.2%)	72 (100%)	3.22	1.116
Combined							3.5	0.754

F= Frequency /percent $\bar{x}$= Mean Sd. = Standard deviation SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree

In response to the questions blend to know the existence of project related documents and documentation practice the above table shows that each item has a mean value range from 3.22 to 3.96 and a standard deviation range from 0.895 to 1.116. While respondents were not uniformly in agreement as deduced from the standard deviation ranging from 0.657 to 1.153, the larger number of respondents has positive response for all five items listed from 1-5 with frequency or percentile value of 43(59.7%), 36(50.0%),31(43.1%), 39(54.2%) and 40(55.6%) respectively.

The combined mean value of documentation is 3.50, which implies that respondents agreed on the existence of project related documents and documentation practice with the combined standard deviation of 0.754, which implies that there was no higher level of agreement among respondents about the existence of project progress reporting practice.

Beside this analysis, the interviewees stated that the organization adapt practice of project documentation using knowledge management repository.

Table 8: Respondents views on the project success (source: own survey, 2020)

Item	SD	D	N	A	SA	Total	x	Sd.
	F	F	F	F	F	F		
1.Projects meet their intended goal and objectives	3 (4.2%)	7 (9.7%)	23 (31.9%)	31 (43.1%)	8 (11.1%)	72 (100%)	3.7	0.964
2.Projects completed within expected time frame	7 (9.7%)	30 (41.7%)	22 (30.6%)	10 (13.9%)	3 (4.2%)	72 (100%)	2.61	0.987
3.Projects completed within the	3 (4.2%)	18 (25.0%)	24 (33.3%)	27 (37.5%)	0 (0.0%)	72 (100%)	3.04	0.895

expected budget								
4.Project completed meeting required scope and quality specification of customer	3 (4.2%)	15 (20.8%)	27 (37.5%)	25 (34.7%)	2 (2.8%)	72 (100%)	3.11	0.912
Combined							3.05	0.781

F= Frequency /percent $\bar{x}$= Mean Sd. = Standard deviation, SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree

In order to check project success, statements of questions that can express project success were asked. The above table shows that the response of each item with mean value range from 2.61 to 3.47 and a standard deviation range from 0.895 to 0.987.

While respondents were not uniformly in agreement as deduced from the standard deviation ranging from 0.765 to 1.18, the larger number of respondents has positive response for the item 1 and 3 with frequency or percentile value of 31(43.1%) and 27(37.5%) respectively. Additionally, they have neutral response for item 4 with frequency or percentile value of 27(37.5%). moreover, they have negative response for item 2 with frequency or percentile value of 30(41.7%).

The combined mean value of project success is 3.05, which implies that respondent's moderately (partially) agreed on the success of the projects with the combined standard deviation of 0.781, which implies that there was no higher level of agreement among respondents about success of projects undertaken in the agency.

Beside this analysis, the interviewees stated that from those projects undertaken in the past five years some were completed without meeting the pre-planned time schedule.

Table 9: Summary of Mean and Standard Deviation of project monitoring and controlling process practice and project success (source: own survey, 2020)

Item	F	$\bar{x}$	Sd.
The Practice of Project Progress tracking	72	3.428	0.726
The Practice of Project Progress reporting	72	3.513	0.738
The Practice of change control	72	3.0	0.637
The Practice of documentation	72	3.5	0.754
The combined practice of monitoring and controlling	72	3.361	0.624
Project success	72	3.05	0.781

F= Frequency $\bar{x}$= Mean Sd. = Standard deviation

From the above table one can get the descriptive statistics result (mean and standard deviation) of every construct total (total of every individual construct). Thus, Project Progress tracking has a mean of 3.428 and a standard deviation of 0.726. Project progress reporting has a mean of 3.513 and a standard deviation of 0.738. Change Control has a mean of 3.0, a standard deviation of 0. 637.Documentation has a mean of 3.5, and a standard deviation of .754 and Project success has a mean of 3.05 and a standard deviation of 0.781.

The analysis of mean of constructs illustrate that the mean values of Project Progress tracking, Project Progress Report and Documentation is above 3.1 which is considered as "agreed" according to (Scott, 1999), which shows that Project Progress tracking, Project Progress Report and Documentation practices are exist and practiced well in the organization. While the mean value of change control is greater than 2.9 but less than 3.1, which mean neutral, or neither disagrees nor agrees, this implies that the change control practice is weak and employees are moderately satisfied with the indicators of change control practice.

Project success has a mean of 3.05 and a standard deviation of 0.781. according to (Scott, 1999) mean value greater than 2.9 but less than 3.1, considered as neutral, or neither disagrees nor agrees. This implies that the success rate of projects undertaken in the agency is weak and employees are moderately satisfied with project success indicators. In addition, the combined practice of monitoring and controlling has a mean value of 3.361 and a standard deviation of 0.624. since the mean value is greater than 3.1

it implies that the respondents agreed on the existence of project monitoring and controlling practice.

Beside this analysis the interviewees stated that the organization adapt the practice of project monitoring and controlling, implies that they have a practice of project progress tracking, project progress reporting, project change control and project documentation.

For the overall practice of monitoring and controlling, they use "open project" and "Jira" software tool. Additionally, they state that project managers, quality assurance team and audit and evaluation team (which is not member of the project team) is responsible for the role of project monitoring and controlling. Lastly, they state that project monitoring and controlling process has the largest impact on the software development projects next to project planning process.

4.3.2 Correlation analysis

Correlation analysis determines the existence of association or correlation between the two or more variables. In this study correlation analysis determines the relationship between project monitoring and controlling process and project success using Bivariate Karl Pearson's coefficient of correlation (product moment correlation coefficient) (r). The value of 'r' lies between ± 1. while A zero value of 'r' indicates that there is no association between the two variables, Positive values of r indicate positive correlation between the two variables (i.e., changes in both variables take place in the statement direction) and negative values of 'r' indicate negative correlation (i.e., changes in the two variables taking place in the opposite directions).

According to (Pallant, 2010) where 'r' value is 0 to 0.29 the correlation is weak positive; 0.3 to 0.49 the correlation is moderately positive; and 0.5 to 1 corresponds to strong positive correlation. Conversely, 0 to -0.29 is considered as weak negative correlation; -0.3 to -0.49 is moderately negative correlation; and -0.5 to -1 corresponds to strong negative correlation.

Table 10: Pearson product-moment correlation matrix among all independent and dependent variables (source: own, 2020)

Correlations						
		Project Progress Tracking	Project Progress Report	Change Control	Documentation	Project success
Project Progress	Pearson	1	.715**	.667**	.643**	.676**

Tracking	Correlation					
	Sig. (2-tailed)		.000	.000	.000	.000
	N	72	72	72	72	72
Project Progress Report	Pearson Correlation	.715**	1	.715**	.635**	.707**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	72	72	72	72	72
Change Control	Pearson Correlation	.667**	.715**	1	.742**	.727**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	72	72	72	72	72
Documentation	Pearson Correlation	.643**	.635**	.742**	1	.646**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	72	72	72	72	72
Project success	Pearson Correlation	.676**	.707**	.727**	.646**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	72	72	72	72	72
**. Correlation is significant at the 0.01 level (2-tailed).						

The above table shows the overall Pearson product-moment correlation matrix for the project monitoring and controlling process indicators and project success. Which implies:

There is strong positive correlation between project progress tracking and project success that was statistically significant (r=0.676, N=72, P=0.000). that means both variables move in tandem (in the same direction). When project progress tracking practice increase so do the project success rate, or on the other hand When project progress tracking practice decreases as the project success rate decreases. This implies that project progress tracking practice would result to project success.

There is significant strong positive relation between project progress reporting and project success (r=0.707, N=72, P=0.000). that means both variables move in tandem (in the same direction). When project progress reporting practice increase so do the project success rate, or on the other hand When project progress reporting practice decreases as

the project success rate decreases. This implies that project progress reporting practice would result to project success.

There is strong positive correlation between change control and project success that was statistically significant (r= 0.727, n= 72, p=0.000). that means both variables move in tandem (in the same direction). When project change control practice increases so do the project success rate, or on the other hand When project change control practice decreases as the project success rate decreases. This implies that project change control practice would result to project success.

There is significant strong positive relation between documentation and projects success (r= 0.646, n= 72, p=0.000). that means both variables move in tandem (in the same direction). When project documentation practice increases so do the project success rate, or on the other hand When project documentation practice decreases as the project success rate decreases. This implies that project documentation practice would result to project success.

Generally, from the correlation analysis one can understand that project monitoring and controlling process would lead to project success. And this finding can be supported by the previous literatures written by (Karangwa, Mbabazi and Mbera, 2016).

4.3.3 Regression analysis

At the side of, correlation analysis regression analysis was done to find out the effect of project monitoring and controlling practice on project success.

Regression is the determination of a statistical relationship between the two variables in case of the bivariate population or between one variable on one side and two or more variables on the other side in case of multivariate population.

Before ruining, the multiple regression the researcher run simple linear regression analysis to examine the individual effect of the four independent variables (project progress tracking, project progress reporting, change control and documentation) on the dependent variable (project success). the result showed on **Appendix D**.in addition the researcher checked whether the data met or violated the basic assumptions that are required to run regression. The basic assumptions are:

- Sample size (some rules of thumb)

According to (Harris,1985) the number of participants should exceed the number of predictors/independent variables at least by 50. This study uses 72 cases for regression analysis, which satisfy the assumption.

- Normality

The variables in the Regression model must follow normal distribution. To check the normality of variable the researcher uses histograms with a normal curve. As shown below the variables are multivariate normal.

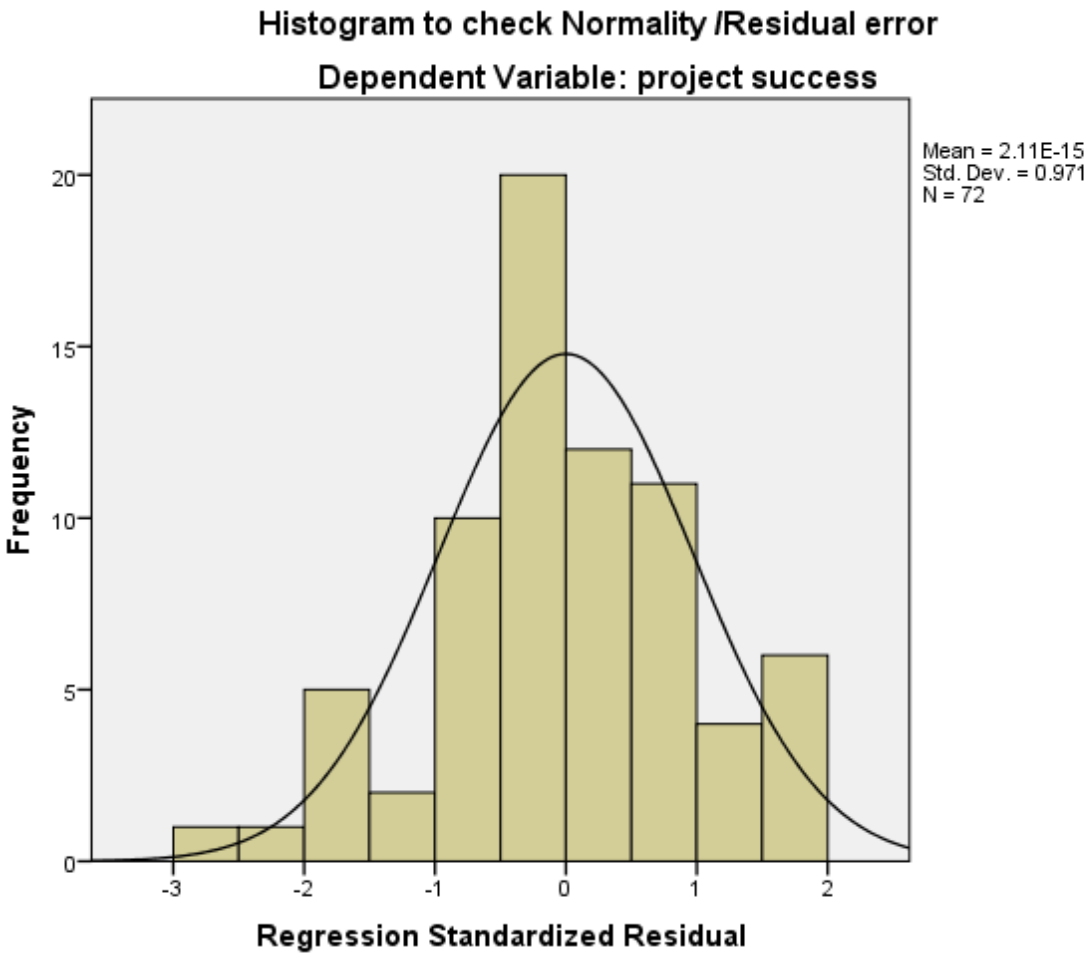

Figure 6: Histogram to check normality assumption of regression analysis (source: own, 2020)

- Linearity

In order to check whether the bivariate relationships between the dependent variable and each of the independent variables are linear, the researcher employs scatter plots and correlations. As shown below linearity is present between the four independent variables (project progress tracking, project progress reporting, change control and documentation) and the dependent variable (project success).

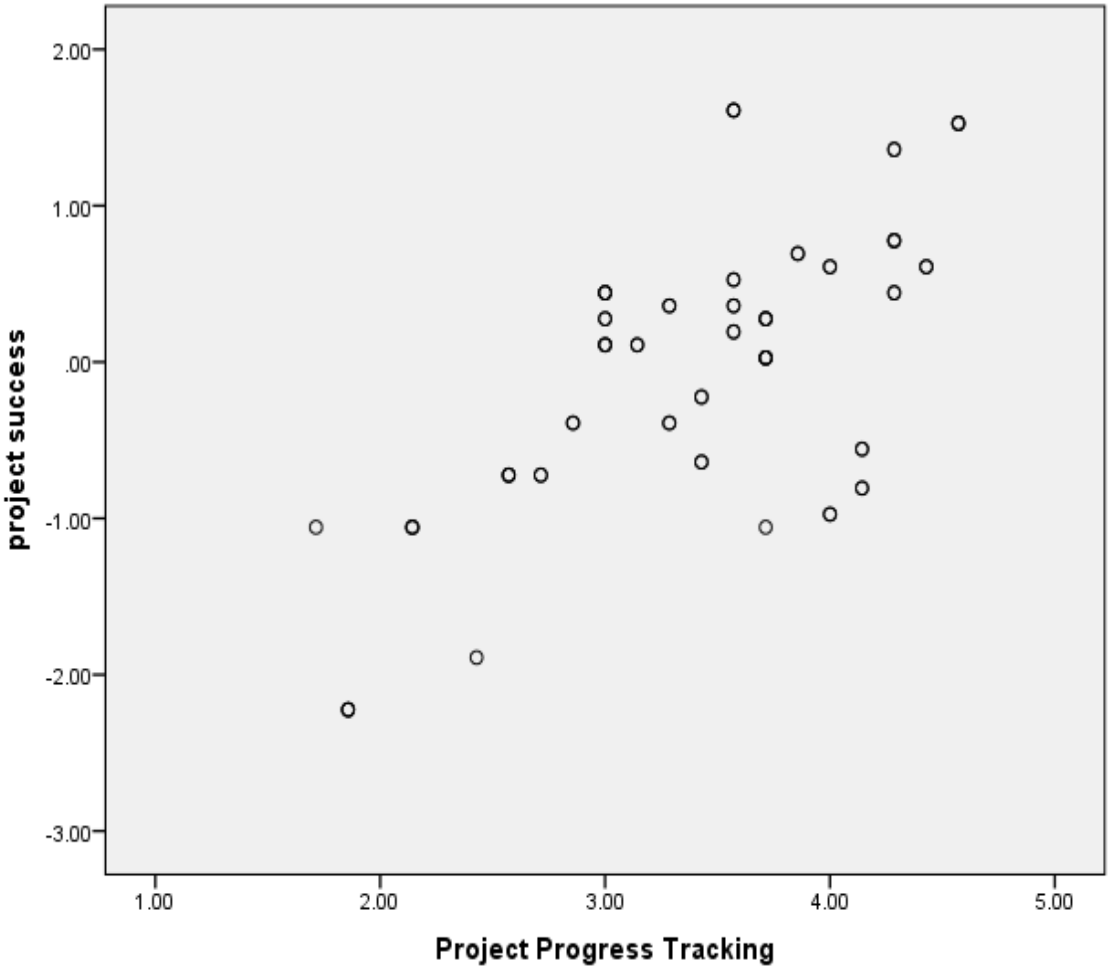

Figure 7: Scatter plot between project success and project progress tracking (source: own, 2020)

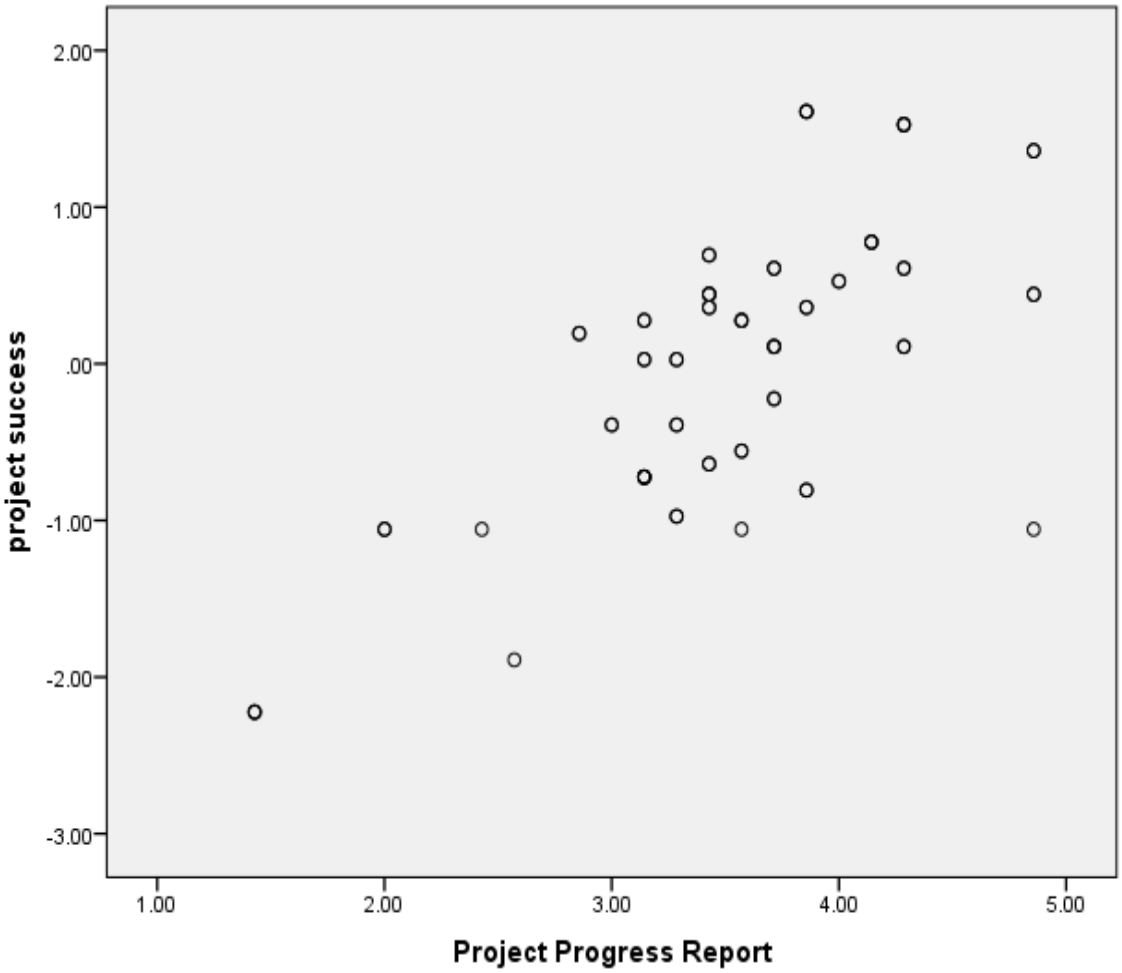

Figure 8: Scatter plot between project success and project progress reporting (source: own, 2020)

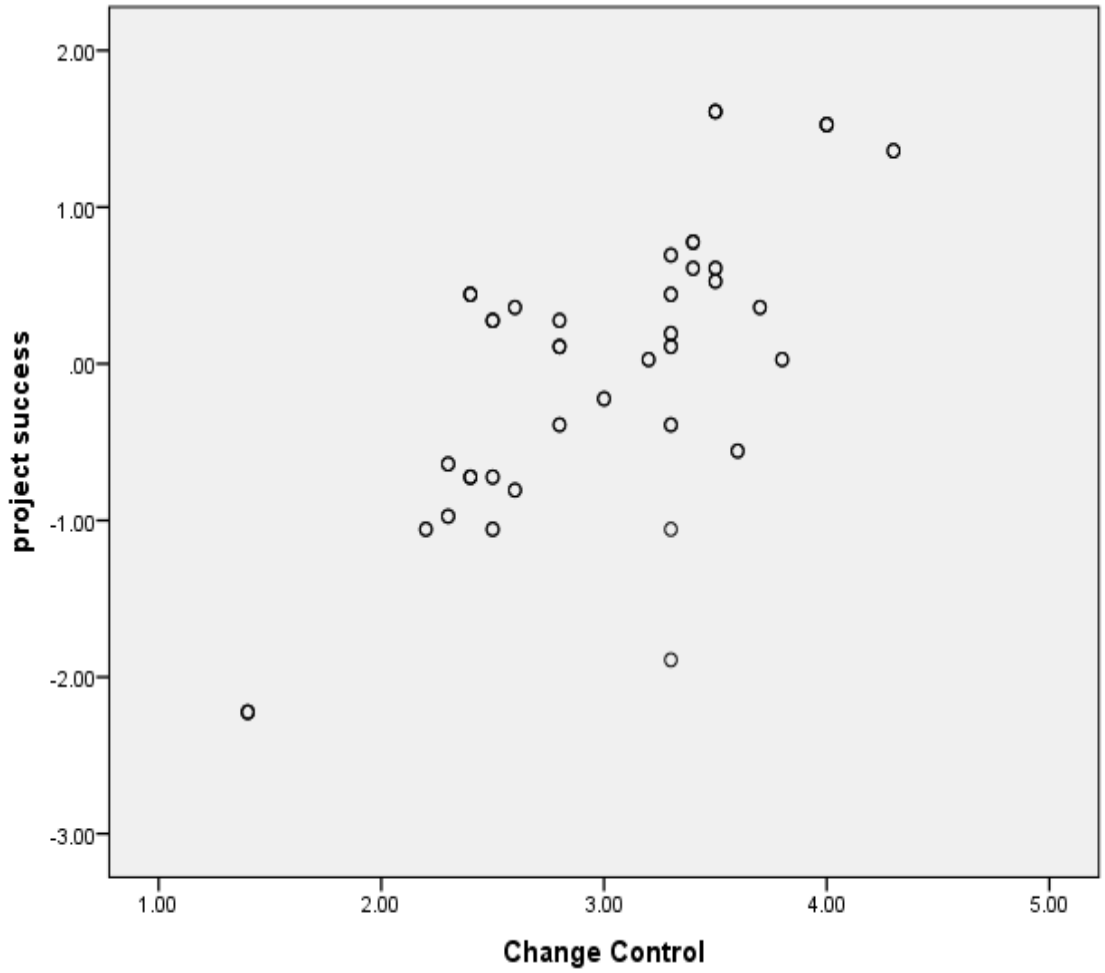

Figure 9: Scatter plot between project success and project change control (source: own, 2020)

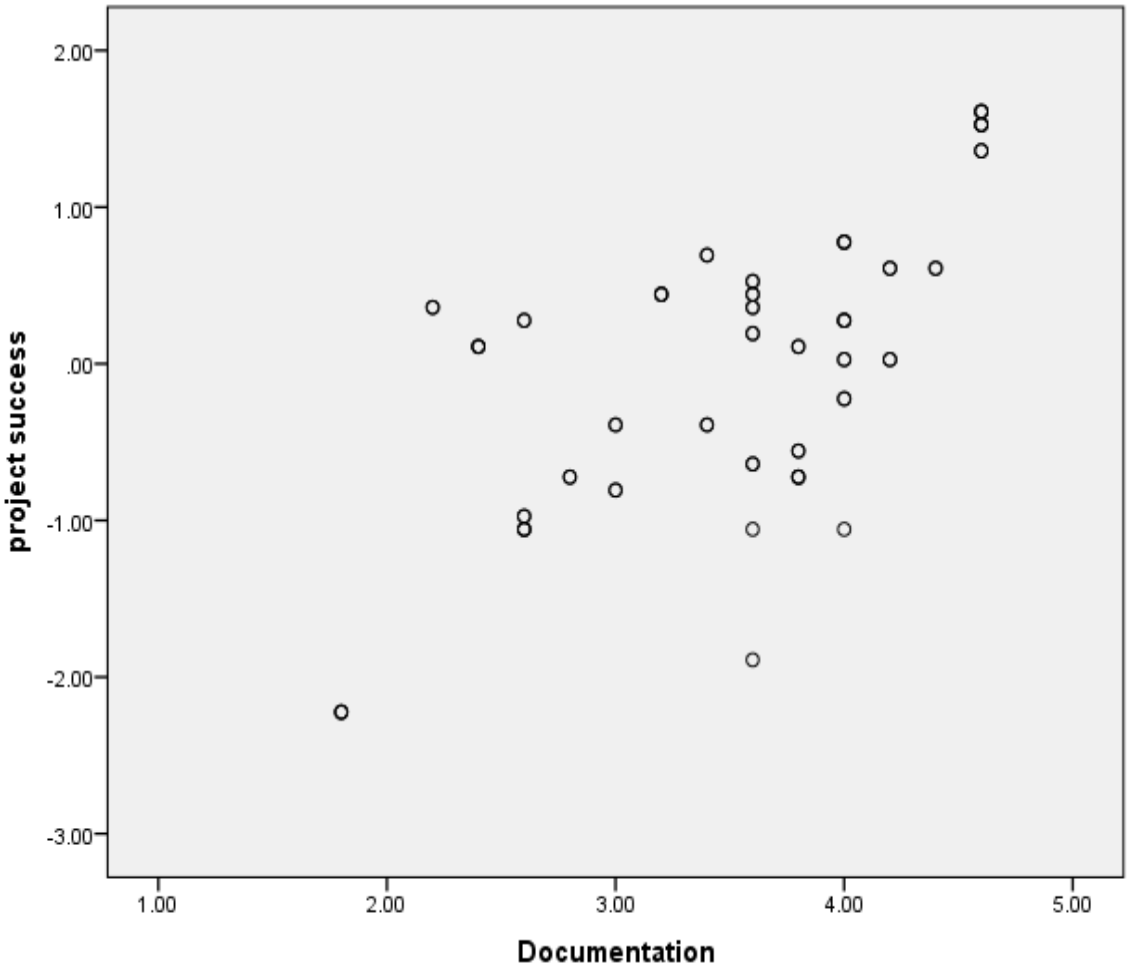

Figure 10: Scatter plot between project success and project documentation (source: own, 2020)

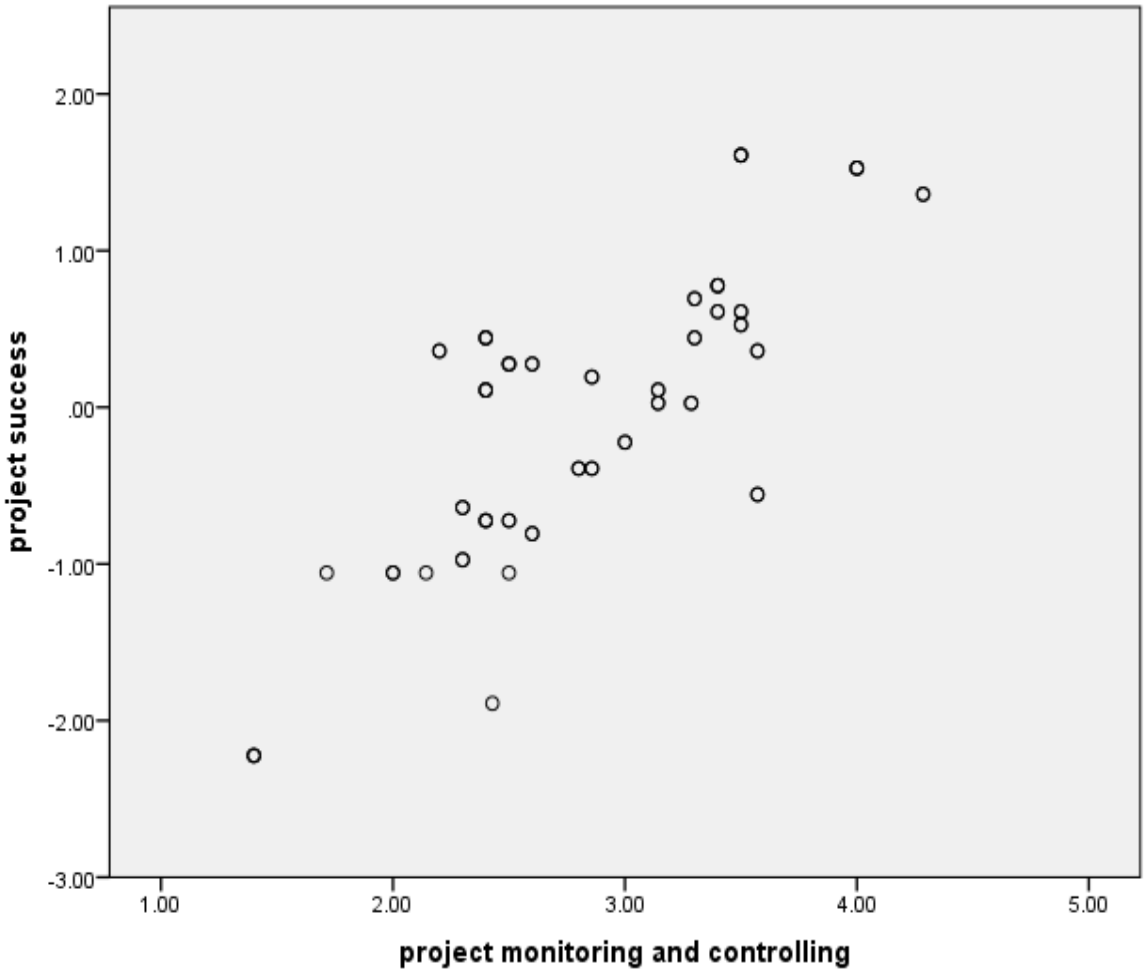

Figure 11: Scatter plot between project success and project monitoring and controlling (source: own, 2020)

- Homoscedasticity

In order to check whether points are reasonably spread about the line of best fit the researchers check scatter plots of the residuals (ZRESID) and predicted values (ZPRED). As shown below the data are not Hetroscedastic.

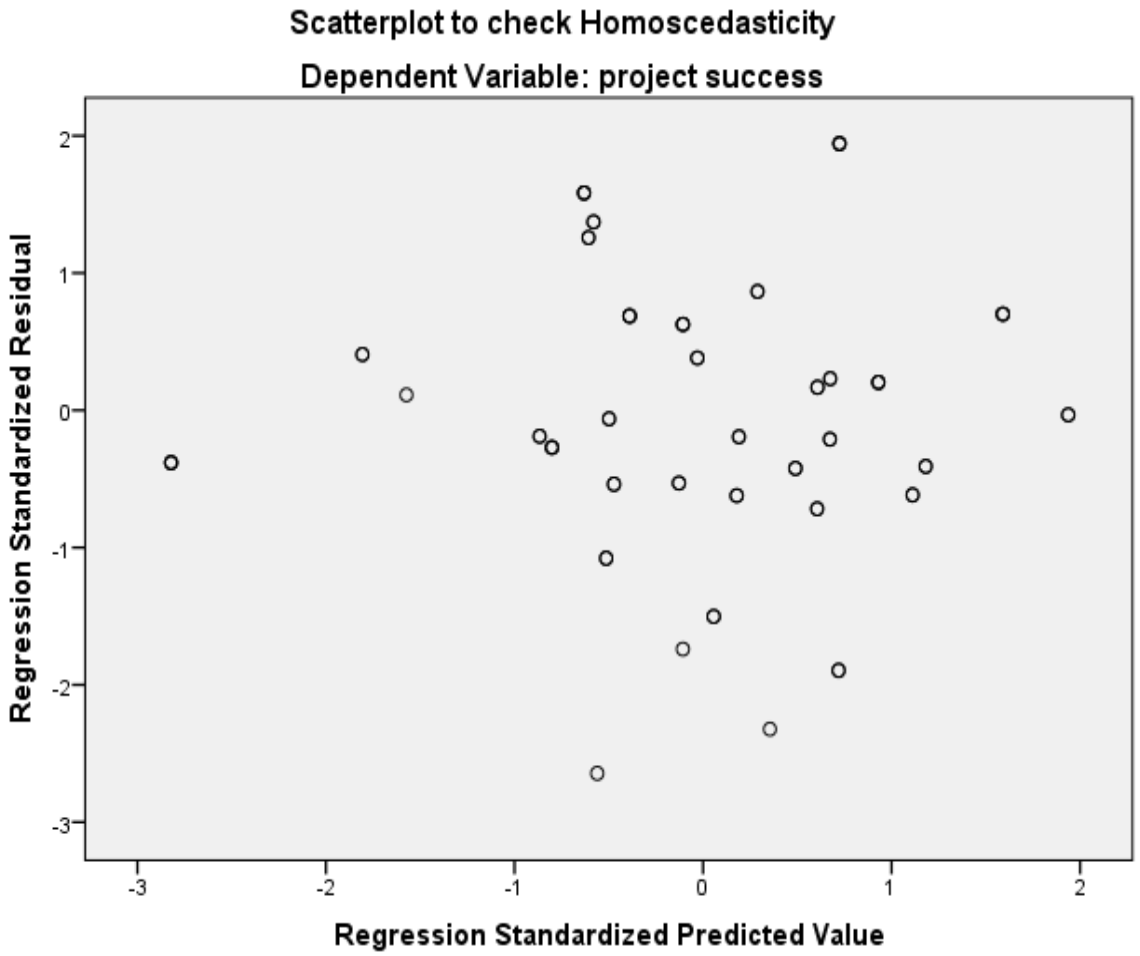

Figure 12: Scatter plot to check Homoscedasticity (source: own, 2020)

- Multicollinearity

The Multicollinearity assumption assumes that the independent variables are not overly correlated with one another. In order to check this the researcher examining bivariate correlations which should not be above 0.80 and use Variance Inflation Factor (VIF) which should be below 10 or Tolerance (TOL) should be above 0.2. For this study all, the correlation coefficients are below 0.80 (as shown on table 10) and the VIF value is less than 5 which shows that certainly there is no multicollinearity.

Table 11: Multicollinearity test result (source: own, 2020)

Variables	Collinearity Statistics	
	Tolerance	VIF

Project Progress Tracking	.417	2.399
Project Progress Report	.383	2.614
Change Control	.340	2.937
Documentation	.405	2.466

By considering that the data satisfies (met) all the above assumptions, the researcher deploy multiple linear Regression to reach on finding.

4.3.3.1 Multiple linear regression analysis

In multiple linear regressions, there are two or more than two independent variables and one dependent variable. In this study, multiple Regression analysis was done to determine the effect of project monitoring and controlling practice on Project Success. So, the multiple linear regression equation for this study is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Where:

Y = Project Success

$\beta_{0=}$ estimated Y-intercept (the value of Y when all the independent variables (X_1 through X_4) are equal to zero)

β_1, β_2, β_3 and β_4 =estimated slope (estimated regression coefficients for X_1, X_2, X_3 and X_4 respectively), Each regression coefficient represents the change in Y relative to a one-unit change in the respective independent variable

X_1 = Project Progress tracking

X_2= project progress reporting

X_3 = Change control

X_4= Documentation

ϵ = Standard Error

Table 12: Model summary showing the combined effect of project monitoring and controlling practice on Project Success (source: own, 2020)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.793[a]	.628	.606	.56365	1.740

a. Predictors: (Constant), Documentation, Project Progress Report, Project Progress Tracking, Change Control

b. Dependent Variable: project success

Multiple linear regressions were run to predict project success from project Progress Tracking, project progress reporting, change control and documentation.

The **model summary** table revealed that 60.6% of the variation in the dependent variable (project success) can be explained by the independent variables (project Progress Tracking, project progress reporting, change control and documentation).

Table 13: ANOVA results showing the combined effect of project monitoring and controlling practice on Project Success (source: own, 2020)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	35.962	4	8.990	28.299	.000[b]
	Residual	21.286	67	.318		
	Total	57.248	71			

a. Dependent Variable: project success

b. Predictors: (Constant), Documentation, Project Progress Report, Project Progress Tracking, Change Control

From the **ANOVA** table p-value =0.000 <5%, indicating that the regression relationship is highly significant in predicting how project monitoring and controlling practice influenced project success. Additionally, the critical F-value is 3.61 at 99% level of confidence. Thus, with F obtained (=28.299) ≥ F critical (=3.61); the model is statistically significant that means the overall regression model is a good fit for the data.

Table 14: Coefficient results showing the relationship between the combined project monitoring and controlling practice and project success (source: own, 2020)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.801	.366		-10.372	.000
	Project Progress Tracking	.251	.143	.203	1.763	.009
	Project Progress Report	.317	.147	.260	2.161	.034
	Change Control	.460	.180	.326	2.554	.013
	Documentation	.128	.139	.107	.919	.042
a. Dependent Variable: project success						

The **coefficients** table revealed that project progress tracking(X_1), project progress reporting(X_2), change control(X_3) and documentation(X_4) are positively significant with (p-value = 0.009, 0.034, 0.013 and 0.042 respectively which is <0.05) in influencing project success (Y). The findings also indicate holding all variables at zero will result project success equal to 3.801. In a similar way, keeping all other independent variables constant, A unit change on project progress tracking would lead to a change in project success by a factor of 0.251. A unit change in project progress reporting would lead to change in project success by a factor of 0.317. A unit change in change control would lead to change in project success by a factor of 0.460 and a unit change in project documentation would lead to change in project success by a factor of 0.128.

This means project Progress Tracking, project progress reporting, change control and documentation would increase project success with 25.1%, 31.75%, 46.0% and 12.8% respectively. Accordingly all the independent variables project progress tracking, project progress reporting, project change control and project documentation practice has positive significant effect on the dependent variable project success.

In addition, Based on their contribution on the project success, among all the project monitoring and controlling process relatively Project change control is the 1st with standardized coefficients(=0.326), Project progress reporting is the 2nd with standardized coefficients(=0.260), Project progress tracking is the 3rd with standardized coefficients(=0.203) and Project documentation is the 4th with standardized coefficients(=0.107).

Generally, all the independent variables (project Progress Tracking, project progress reporting, change control and documentation) influence the response variable (project success) since the coefficients for each variable are non-zero (p-value for each variable is <0.05).

The fitted model from this analysis is $Y = -3.801 + 0.251X_1 + 0.317X_2 + 0.460X_3 + 0.128X_4 + \epsilon$ Where:

Y = Project Success

X_1 = Project Progress tracking

X_2= project progress reporting

X_3 = Change control

X_4= Documentation

ϵ = Standard Error

4.3.3.2 Summary of hypothesis testing

The above multiple linear regression analysis indicates that:

H_1= $\beta_1(0.251) \neq 0$ with p-value (0.009) < 0.05. Therefore, the null hypothesis is rejected and the alternative hypothesis accepted that project progress tracking practice has positive significant effect on the project success.

H_2= $\beta_2(0.317) \neq 0$ with p-value (0.034) < 0.05. Therefore, the null hypothesis is rejected and the alternative hypothesis accepted that project progress reporting practice has positive significant effect on the project success.

H_3= $\beta_3(0.460) \neq 0$ with p-value (0.013) < 0.05. Therefore, the null hypothesis is rejected and the alternative hypothesis accepted that project change control practice has positive significant effect on the project success.

H_4= $\beta_4(0.128) \neq 0$ with p-value (0.042) < 0.05 Therefore, the null hypothesis is rejected and the alternative hypothesis accepted that project documentation practice has positive significant effect on the project success.

H_5= adjusted R^2 (0.606) > 0 and F obtained (=28.299) ≥ F critical (=3.61) with p-value =0.000 <0.05. Therefore, the null hypothesis is rejected and the alternative hypothesis accepted that project monitoring and controlling process has positive significant effect on the project success.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter discusses summary of major findings from the previous chapter. Moreover, based on the findings of the study conclusions and recommendations are made.

5.2 Summary

This part will summarize the major findings of the study on the project monitoring and controlling process practice of the information network security agency.

Regarding the **project progress tracking practice,** the respondents were agreed with the entire listed project progress tracking indicators except measuring change request statement. This implies that there is good practice of project progress tracking in the agency. Additionally, the multiple linear regression analysis reviled that project progress tracking has positive significant effect on project successes and it can be considered as good predictor to project success. This is supported by the positive significant correlation realized between project progress tracking practice and project success (r=0.676, N=72, P=0.000), with the unstandardized coefficient(= 0.251) and with p-value of 0.009 ($p<0.05$) .

About the **project progress reporting practice**, the level of agreement of the respondents for all the statements indicating project progress reporting practice were all agreed which indicates that there is effective project progress reporting practice in the agency. Additionally, the multiple linear regression analysis reviled that project progress reporting has positive significant effect on project successes and it can be considered as good predictor to project success. This is supported by the positive significant correlation realized between project progress reporting practice and project success (r= 0.707, n= 72, p=0.000), with the unstandardized coefficient(= 0.317) and with p-value of 0.034 ($p<0.05$).

Regarding the **project change control practice** as per the collected data from the respondent the mean value show that respondent's moderately (partially) agreed on the existence of change control practice which indicate that there is no satisfactory (there is weak) practice of project change control in the agency. Additionally, the multiple linear regression analysis reviled that project change control has positive significant effect on project successes and it can be considered as good predictor to project success. This is

supported by the positive significant correlation realized between project change control practice and project success (r= 0.727, n= 72, p=0.000), with the unstandardized coefficient(= 0.460) and with p-value of 0.013 (p<0.05).

About the **project documentation practice**, the level of agreement of the respondents for all the statements indicating project documentation practice were all agreed which indicates that there is effective project documentation practice in the agency. Additionally, the multiple linear regression analysis reviled that project documentation has positive significant effect on project successes and it can be considered as good predictor to project success. This is supported by the positive significant correlation realized between project documentation practice and project success (r= 0.646, n= 72, p=0.000), with the unstandardized coefficient(= 0.128) and with p-value of 0.042 (p<0.05

Regarding the **project success**, as per the collected data from the respondent the mean value show that those projects are partially successful. While projects are completed meeting their intended goal and objectives and meeting required scope and quality specification of customers, most of the projects faced time delay and some projects completed with a poor cost performance. That means there is good practice to complete projects meeting their goal, customer specification and as per the planned quality, however there is weak practice to complete projects with the pre-planned time and cost.

In general, the analysis results of the collected data for studying the practice of project monitoring and controlling practice and its effect on project success shows that there is good project monitoring and controlling practice in the organization. However relatively there is poor project change control practice which result to complete projects beyond the pre-planned timeline and with poor cost performance. additionally, the multiple linear regression analysis showed that, 60.6% of changes in the project success attributed to the combined effect of project Progress Tracking, project progress reporting, change control and documentation while 39.4% of the changes in project success can be attributed to other factors. This is supported with p-value of 0.000 (p<0.05) indicates that the regression relationship was highly significant in predicting how project monitoring and controlling influenced the success of the projects. Furthermore, the analysis reviled that holding all variables at zero will result project success equal to 3.801.

5.3 Conclusion

In this section, conclusions are made based on the major findings of the study listed above on the summary section.

The study concluded that, the organization under study has effective project progress reporting and project documentation practice, while it has good project tracking practice and less satisfactory (weak) project change control practice. The study also conclude that the organization under study has good project monitoring and controlling practice which lead to the partial success of projects undertaken by the organization. Because projects undertaken by the organization are failed to complete within the pre-planned time and cost. While they are completed meeting their goal, customer specification and as per the planned quality.

Additionally, Based on their contribution on the project success, among all the project monitoring and controlling process relatively Project change control is the 1st,Project progress reporting is the 2nd, Project progress tracking is the 3rd and Project documentation is the 4th.

Finally, the study concludes that the overall project monitoring and controlling process have strong impact on the project success.

5.4 Recommendation

Based on the major findings and conclusions of the study, the researcher draws the following recommendations that can enhance project success rate through the effective practice of project monitoring and controlling process.

- Since the organization has weak change control practice, the organization needs to focus failing the gaps on project change control area as they have significant impact on the project success.
- In order to make corrective action the Number of change requests should be measured and tracked
- The agency should recruit internal and external monitoring and controlling experts. Beside it should train project managers and team leaders about how to monitor and control projects
- When variation exists, Source of variation on schedule, cost, and quality should be identified.

- Procedure, Authority and responsibility for Project change control should be well defined at the beginning of the project.
- Project changes should follow formulated procedures for review and approval
- Change request should always formalize and acknowledged by both parties.
- The effects of project change should be assessed in terms of project time scales, costs and quality before the change is approved.
- The agency should have problem escalation strategy that can Influence the factor that cause change on project time, cost and scope.
- Any Scope/requirement change should made, if and only if the change does not have impact on the planned project budget and time.
- The agency should have Integrated change control (scope, time, budget, quality, communication, risk, procurement and stakeholder) control.
- The organization under this study should consolidate the partially practiced project monitoring and controlling process
- The organization under the study should allocate resource for only the purpose of project monitoring and controlling process.

Finally, as Iman & Siew (2008) stated, poor project monitoring and controlling Practice is the major causes of project failure. Moreover, according to the findings from this study project monitoring and controlling practice has significant influence on project success. Considering all this, the study suggests that the organization should have effective project monitoring and controlling practice or system, which lead to have the maximum project success rate. This can be happen through:- strengthen the current project monitoring and controlling Practice; working hard to fail the observed gaps under monitoring and controlling practice; the introduction of latest and effective project monitoring and controlling tools; deploying of latest and effective reporting and documentation system and training of staff on how to use the new monitoring and controlling tools and systems.

5.5 Limitation and suggestion for further study

This study was conducted to assess the effect of project monitoring and controlling practice on project success in information network security agency, since the study conducted only on the commercial software development projects undertaken by the agency. Thus, this study may be limited in its generalization of the findings to the overall

organization. Therefore, future research should have to draw sample of respondents from all types of projects undertaken by the agency to generalize the results of the study to the overall organization. Additionally it would be appreciable to conduct further study on the other project management process groups in order to know which one has the highest influence on the software development project success. Moreover Technology is among the factors that are significantly changing the landscape of project implementation it does not mean the critical findings in yesterday is necessarily be the same today and in future so It would be remarkable to conduct a future study to see if these findings remain constant or will be changed with times.

References

- Andy Murray; Nigel Bennett; Colin Bentley; Great Britain, 2017. Managing successful projects with PRINCE2. London : TSO.
- Attarzadeh, I. and Ow, S.H., 2008. Project management practices: the criteria for success or failure. Communications of the IBIMA, 1(28), pp.234-241.
- Birhanu, M., 2019. An Assessment of the Practices of Software Development Projects: The Case of, Addis Ababa, Ethiopia: s.n.
- Chan, A.P., Scott, D. and Chan, A.P., 2004. Factors affecting the success of a construction project. Journal of construction engineering and management, 130(1), pp.153-155.
- Dominguez, J., 2009. The curious case of the chaos report 2009. Project Smart, pp.1-16. Standish Group, 2013. CHAOS manifesto 2013. The Standish Group International.
- El-Sheikh, A. and Pryke, S.D., 2010. Network gaps and project success. Construction management and economics, 28(12), pp.1205-1217.
- Ethiopia Country Program Evaluation ,2010. Synthesis Report. Retrieved from http://oecd.org/countries/ethiopia/45875541.pdf.
- Green, s., 1991. How Many Subjects Does It Take To Do A Regression Analysis. Multivariate Behavioral Research, 26(3), pp. 499-510.
- Harris, 1985. A primer of multivariate statistics. sample size and multiple regression analysis, p. 434–458.
- Henok, A., 2018. Assessing the Effect of Project Monitoring and Controlling Practice on Project Success: In the Case of Ethiopian Airlines Digital Project Management Office (Doctoral dissertation, Addis Ababa University).
- Iman, A., and Siew, H.O.,2008. Project Management Practices: The Criteria for Success or Failure. Faculty of Computer Science & Information Technology. University of Malaya
- Kamau, C.G. and Mohamed, H.B., 2015. Efficacy of monitoring and evaluation function in achieving project success in Kenya: a conceptual framework. Science Journal of business and Management, 3(3), p.82.

- Karangwa, J., Dr. Mbabazi, M. & Dr. Mbera, Z. 2016). Influence of Project Management Processes on Project Success in Rwandan Health Sector. European Journal of Business and Social Sciences.
- Kelley, Ken,Maxwell, Scott E, 2003. Sample Size for Multiple Regression: Obtaining Regression Coefficients That Are Accurate, Not Simply Significant.. Psychological Methods, Volume 8(3), pp. 305-321.
- Kerzner, H., 2017. Project management metrics, KPIs, and dashboards: a guide to measuring and monitoring project performance. John Wiley & Sons.
- Kerzner, H.,2009. Project management: A systems approach to planning, scheduling and controlling. John Wiley & Sons.
- Kothari, C.R., 2004. Research methodology: Methods and techniques. New Age International.
- Larson, E.W. and Gray, C.F., 2011. Project management: The managerial process.
- Müller, R. and Jugdev, K., 2012. Critical success factors in projects: Pinto, Slevin, and Prescott-the elucidation of project success. International Journal of Managing Projects in Business, 5(4), pp.757-775.
- Pinto, Jeffrey K.,2013. Project management: Achieving competitive advantage. 3rd ed.Boston: Pearson.
- PMI, A., 2013. guide to the project management body of knowledge (PMBOK guide). In Project Management Institute (Vol. 5).
- Raut, S., Pimplikar, S.S. and Sawant, K., 2013. Effect of Project Cost and time Monitoring on Progress of Construction Projct. International Journal of Research in Engineering and Technology, 2(12), pp.796-800.
- Team, F.M.E., 2013. Project Management Process Groups. Project management skill: www. free-management-ebooks. com ISBN, pp.978-1.
- Westerveld, E., 2003. The Project Excellence Model®: linking success criteria and critical success factors. International Journal of project management, 21(6), pp.411-418.
- Wysocki, R.K., 2014. Effective project management: traditional, agile, extreme. John Wiley & Sons

Appendix

Appendix A: questionnaire

Addis Ababa University

College of Business and Economics

School of commerce

Masters of Arts in Project Management

Dear respondents

Thank you for agreeing to take part in conducting the research: "The effect of monitoring and controlling on projects success, a case study of projects in Information Network Security Agency"

I am seblewongel, currently pursuing my master's in project management at Addis Ababa university school of commerce. By assuring you that your information will be used only for academic research purposes and confidentiality of your response is 100% granted, I kindly request you to answer the entire questions provided below believing that the quality of this research findings highly depends on your honest and accurate information.

Thank you again for your generous time!

Seblewongel Nega

Email:sebethioa@gmail.com

General direction

- ✓ Please check that the paper has two sections and six pages
- ✓ Please do not write your name
- ✓ Please Put "X" mark on your choice
- ✓ If you cannot get a satisfying choice among the given alternatives, please write your answer in the space provided at the end of the questioner.

Section I

1. Socio-demographic characteristics of respondents

1.1 Gender Male ☐ Female ☐

1.2 Age 18-25 ☐ 26-35 ☐

36-45 ☐ 46-55 ☐ above 56 ☐

1.3 Educational background

Diploma ☐ BA/BSc ☐ MA/MSc ☐ PhD ☐

If other please specify ----------

1.4 Field of specialization (The field you have studied) ----------

1.5 Role in the project work

Business analyst ☐ Developer ☐

Project manager ☐ Quality assurance ☐

Knowledge management and collaboration ☐

If other please specify ----------

1.6 Year of experience

Less than 3 years ☐ 3 to 5 years ☐

6 to 10 years ☐ More than 10 years ☐

1.7 Service period in the project work

Less than 3 years ☐ 3 to 5 years ☐

6 to 10 years ☐ More than 10 ☐

Section II

1. Project monitoring and controlling process.

The following are statements on project monitoring and controlling practice related to project success, to your project monitoring and controlling practice please indicate your level of agreement using the scale “strongly agree(5)", "agree(4)", "neutral(3)”, "disagree(2)" and" strongly disagree(1)".

No.	Statements	Level of agreement				
		Strongly agree (5)	**Agree (4)**	**Neutral (3)**	**Disagree (2)**	**Strongly disagree (1)**
Statements of Project Progress tracking						
1	Assessment on project performance are regularly and continuously conducted from the beginning of the					

	project to the end					
2	Tool and techniques for project progress tracking is well assessed, selected, and implemented (BSC, millstone review)					
3	Participatory review and progress review meeting (status meeting) approach are used to determine performance					
4	The actual Projects progress on schedule, cost, and quality regularly compared against the planned schedule, cost, and quality to check variance					
5	Number of change requests measured and tracked					
6	There is an expert for internal and external monitoring and controlling,					
7	There is effective project status/progress tracking practice or system					
Statements of Project Progress Report						
8	Project status reports are regularly conducted					
9	Project status reports are timely, complete, accurate, clear, up-to-date, and simple to understand					
10	Tool and techniques for project progress reporting is well assessed, selected, and implemented					

11	Internal Project status meetings conducted within reasonable intervals					
12	Project status reports shared among all stakeholders and team members.					
13	Project status updated data are available to track projects and its performance, in Order to identify problems early (to give early warning system)					
14	There is effective project status reporting practice or system					
Statements of Change control						
15	Source of variation on schedule, cost, and quality are identified.					
16	Project change control procedure is well defined at the beginning of the project.					
17	Authority and responsibility for change requests is defined in advance.					
18	Change request always formalized and acknowledges by both parties.					
19	The effects of project change assessed in terms of project time scales, costs and quality before the change is approved.					
20	Influence the factor that cause change on project time, cost and scope.					

21	Scope/requirement change made, if and only if the change does not have impact on the planned project budget and time.					
22	Project changes follow formulated procedures for review and approval					
23	Integrated change control on (scope, time, budget, quality, communication, risk, procurement and stakeholder) exist					
24	There is problem escalation strategy					
Statements of Documentation						
25	Documentation will be made at the beginning of the project and continue updating in regular meetings					
26	The time scale, budget and customer requirements of each projects are clearly defined and documented.					
27	Project progress reports and meetings are well documented					
28	Requirement for any project changes are well documented					
29	Decisions to approve or reject changes are well documented					
Statements of Project success						
30	Projects meet their intended goal and objectives					
31	Projects completed within expected time frame					

32	Projects completed within the expected budget					
33	Project completed meeting required scope and quality specification of customer					

Thank you for your valuable time and assistance!

Appendix B: interview question

1. Tell me about your age, educational background, specialization, role, and experience in the project work.
2. How do you observe the practice of project monitoring and controlling in software development projects?
3. What is the major project monitoring and controlling process activities?
4. Who is responsible for monitoring and controlling practice?
5. Is there monitoring and controlling experts?
6. Is the monitoring and controlling practice participatory?
7. Are there any specified tool, technique and system used for project monitoring and controlling?
8. How do you see the effect of monitoring and controlling on project success?
9. Did projects complete on time, budget and as customer expectation?
10. Is there any mechanism for lesson learned?
11. What are the major challenges of monitoring and controlling practice?

Please forward any additional comments (ideas) you have on the practice of project monitoring and controlling in the software development projects undertaken by INSA.

Appendix C: correlation between combined project monitoring and controlling practice and project success

Correlations		
	Combined project monitoring and controlling	Project success

Combined project monitoring and controlling	Pearson Correlation	1	.790**
	Sig. (2-tailed)		.000
	N	72	72
Project success	Pearson Correlation	.790**	1
	Sig. (2-tailed)	.000	
	N	72	72
**. Correlation is significant at the 0.01 level (2-tailed).			

Appendix D: Simple linear regression

- **Simple regression to determine the effect of project progress tracking on project success**

Model summary showing effect of project progress tracking on Project Success (source: own, 2020)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.560[a]	.314	.304	.65170
a. Predictors: (Constant), Project Progress Tracking				

ANOVA results showing the effect of project progress tracking on project success (source: own, 2020)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.582	1	13.582	31.980	.000[b]
	Residual	29.729	70	.425		
	Total	43.312	71			
a. Dependent Variable: project success						
b. Predictors: (Constant), Project Progress Tracking						

Coefficient results showing the relationship between project progress tracking and project success (source: own, 2020)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.063	.373		-5.534	.000
	Project Progress Tracking	.602	.106	.560	5.655	.000
a. Dependent Variable: project success						

- **Simple regression to determine the effect of project progress reporting on project success**

Model summary showing effect of project progress reporting on Project Success (source: own, 2020)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.569[a]	.324	.314	.64697
a. Predictors: (Constant), Project Progress Report				

ANOVA results showing the effect of project progress reporting on project success (source: own, 2020)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.012	1	14.012	33.475	.000[b]
	Residual	29.300	70	.419		
	Total	43.312	71			
a. Dependent Variable: project success						
b. Predictors: (Constant), Project Progress Report						

Coefficient results showing the relationship between project progress reporting and project success (source: own, 2020)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		

1	(Constant)	-2.115	.373		-5.664	.000
	Project Progress Report	.602	.104	.569	5.786	.000
a. Dependent Variable: project success						

- **Simple regression to determine the effect of change control on project success**

Model summary showing effect of change control on Project Success (source: own, 2020)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.641[a]	.411	.403	.60369
a. Predictors: (Constant), Change Control				

ANOVA results showing the effect of change control on project success (source: own, 2020)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.801	1	17.801	48.845	.000[b]
	Residual	25.511	70	.364		
	Total	43.312	71			
a. Dependent Variable: project success						
b. Predictors: (Constant), Change Control						

Coefficient results showing the relationship between change control and project success (source: own, 2020)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.358	.345		-6.838	.000
	Project Progress	.786	.112	.641	6.989	.000

	Report					
a. Dependent Variable: project success						

- **Simple regression to determine the effect of documentation on project success**

Model summary showing effect of documentation on Project Success (source: own, 2020)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.661[a]	.437	.429	.59003
a. Predictors: (Constant), Documentation				

ANOVA results showing the effect of documentation on project success (source: own, 2020)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.942	1	18.942	54.410	.000[b]
	Residual	24.369	70	.348		
	Total	43.312	71			
a. Dependent Variable: project success						
b. Predictors: (Constant), Documentation						

Coefficient results showing the relationship between documentation and project success (source: own, 2020)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.398	.333		-7.213	.000
	Documentation	.685	.093	.661	7.376	.000
a. Dependent Variable: project success						