# Influence Of Project Management Information System On Project Success In The Case Of Defense Construction Enterprise In Building Construction And Real Estate Development Projects In Addis Ababa, Ethiopia.

**A Thesis Report Submitted To Business & Economics College Research & Postgraduate Coordination Offices Of Jimma University In Partial Fulfilment Of The Requirements For The Award Of Master Of Art In Project Management And Finance**

**By**

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**July, 2020**

**Addis Ababa, Ethiopia**

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# Declaration

I hereby declare that this thesis entitled "influence of Project Management Information System on project success in the case of Defence Construction Enterprise in Building Construction and Real Estate Development Projects in Addis Ababa Ethiopia.*",* has been carried out by me under the guidance and supervision of Mr. Abel Worku and Mr. Mohammed Getahun.

The thesis is original and has not been submitted for the award of any degree or diploma to any university or institutions.

| Researcher's Name | Date | Signature |
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# Certificate

This is to certify that the thesis entitles “influence of Project Management Information System on project success in the case of Defense Construction Enterprise in Building Construction and Real Estate Development Projects in Addis Ababa, Ethiopia, submitted to Jimma University for the award of the Degree of Master of Art in Project Management and Finance and is a record of confide research work carried out by Ms. Haymanot Getachew, under our guidance and supervision.

*Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree or diploma.*

| *Main Adviser’s Name* | *Date* | *Signature* |
|---|---|---|
| _____ | _____ | _____ |
| *Co-Advisor’s Name* | *Date* | *Signature* |
| _____ | _____ | _____ |

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# ABSTRACT

*The purpose of the study was to examine the influence of Project Management Information System on project success of Defense Construction Enterprise Projects in Addis Ababa, Ethiopia, in regards to the system, quality information, and the system use. To achieve the objective of the research, the study used both quantitative and qualitative research method and descriptive and explanatory research design. Data for the assessment were obtained from 38 selected respondents (project managers, construction managers, supervising managers and case team leaders) from eight different projects through a five point Likert scale-based questionnaire. The collected data were analyzed using descriptive analysis, correlation and regression analysis using SPSS version 23.0. Results revealed that Pearson correlation among project management information system are moderate to high, and correlation between project management information system and project success are also high. Regression analysis results also showed that all the three project management information system variables have strong influence on project success. Quality Information Output has the highest influence followed by System Software and finally System Use having significant impact. Overall, project management information system influence project success. The finding of this research pointed out that using project management information system is imperative to those who manage and supervise construction projects. This study recommends the adoption of project management information system in the management of their projects and also prepare and design continuous programs for managers aiming at providing them with the capabilities and personal skills to work with the system at all organizational levels.*

***Key words: project management, information system, project success, quality of information***

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# Abbreviations and Acronyms

**PMIS**- Project Management Information System

**PMISS**- Project Management Information System

**QIO**- Quality of Information Output

**PMISU**- Project Management Information System

**PS**- Project Success

**BPR-** Business Process Reengineering

**CPI** – Cost Performance Index

**CPM -** Critical Path Method

**ERA** -Ethiopia road Authority

**EASEC**- East Asia-Pacific Conference on Structural Engineering & Construction)

**IS**- Information Systems

**ISSM**- Information System Success Model

**PERT -** Program Evaluation and Review Technique

**PMIS** - Project Management Information System

**SPSS**- Statistical Package for Social Sciences Software

**SAP**- System Application Product

**WBS** - Work Break down Structure

# Chapter One
# Introduction

## 1.1 Background of the Study

In the project management literature, the definition of project has been discussed by numerous literatures, for instance, Project Management Institute define projects as a short-term endeavour undertaken to create a unique product or service (Project Management Institute , 2008). Cleland describe a project as a combination of organizational resources pulled together to create something that did not previously exist and that will provide a performance capability in the design and execution of organizational strategies (Cleland, 2004). A project is used to create a unique service, product or result (Synder, 2014). The project as a whole, has its own objectives, measurable criteria and a defined cost and time.

Information systems are developed using Information technology to assist people in performing their tasks (Ali, et al., 2008). MIS is successfully used for measuring organizational performance and making a necessary change in its plans and procedures (Pfeffer & Sutton, 2000). MIS links all decision centres in the organization, by facilitating the integration of specialized activities by retaining each department conscious of the requirements and issues of other departments (Jorgenson, 1989). Project Management Information System is an example of these Information Systems and is widely regarded as an important building block in project management. A project management information system is a set of interrelated components working together to collect, classify, store and distribute information to support decision making, and monitors the progress of a project. A PIMS is about how effectively the project manages the data, how it transforms data into information and how that information eventually becomes knowledge (Project Management for development Organization , 2011).

Some authors describe Project Management information systems as software for project management (Murray & Fox, 2003) while others view them as orderly procedures or practices that project managers use for producing specific project management deliverables (Milosevic, 2003). But, these systems have continued to evolve from just being planning, scheduling and resource management information systems to complex, distributed, multi-functional systems that can easily generate information necessary to make decisions, improve the efficiency of implementation among other functions within life cycle of the project.

PMIS supplies project managers with essential information on the cost parameter, time parameter and performance parameter of a project and on the interrelationship of these parameters (Raymond, 1987). Although the use of PMIS in the management of projects is not a full guarantee that projects will be successful but PMIS have become a necessity in the management of all projects whether small or large, public or private.

In organizations that are engaged in many projects, management is faced with challenges in resource planning, prioritization and monitoring (Elonen & Artto, 2003). These pressures lead to poor quality of information and a greater time to complete the project. Managers may become overwhelmed by the amount of information that is available for decision making and may not be able to identify the relevant information or realize the inaccuracy of the information. Use of Project Management Information Systems (PMIS) is considered to be beneficial to project managers because of the supposed contribution regarding timelier decision making and project success (Raymond & Bergeron, 2008).

People say that a project is successful as far as project management is concerned if the project is complete within time, within the given budget and meets the customer requirements with the specified quality (Bodicha, 2015). According to Raymond et al., it is paramount for organizations to adequately manage their projects if they are to achieve their performance objectives. They further observe that project management remains highly a problematic endeavor since most projects are either not completed on time or exceed the budget so to support project managers in their planning, organizing, control, reporting and decision making tasks on the one hand and evaluating and reporting on the other (Raymond & Bergeron, 2008).

PMIS enhances the quality of organizations by providing appropriate information for quality decision making. Due to the expansion and complexity of organizations, managers have lost personal contact with the scene of operations. PMIS also changes the bigger amount of data into compiled form and thereby avoids the possible ambiguity that may arise when managers are swamped with detailed facts. PMIS have capabilities that help project managers in planning, budgeting and resource allocation. In addition, many PMISs perform assorted analyses like variance, performance, and forecasting for any level of the WBS and project organization. A good PMIS allows facile control of changes to system configuration and project plans. These PMISs allow for quick review and easy periodic updating; they filter and

reduce data to provide information on summary, exception, or what if bases. With an effective PMIS the project manager need not wait for days or peruse through reams of data to identify problems and determine project status (Slotegraaf & Pauwels, 2008).

The project management systems currently employed in the construction industry can be divided into two types. The first one is off-the-shelf commercial software, where projects are managed using Gantt Charts, the Program Evaluation and Review Technique (PERT) (Kerzner , 2005) and the Critical Path Method (CPM) (Woolf, 2007). These management techniques have quickly spread into many private enterprises. Thus, a lot of the related commercial software packages cater for the aforementioned techniques; examples include Microsoft Project, Primavera Project Planner and SAP. The second type of project management system is custom in-house software, when commercial software does not meet the particular requirements of an engineering project or firm; some firms will develop custom in-house project management software to meet their needs.

Baccarini has summarized project success as: project success = project management success + project product success (Baccarini, 1999). project management success is focused on the dimensions of 'within time', 'within budget' and 'according to the requirements' (Westhuizen & Fitzgerald, 2005). According to DeLone and McLean, the project product success depends on the following seven dimensions. These are system quality, information quality, service quality, information use, user satisfaction, individual impact, and organizational impact (DeLone & McLean, 2003)

According to Standish Group, in 1994 only 16% of the projects met the criteria for success, i.e. completed within budget, within time and all the features originally specified. In 2001, 28% of the projects became successful according to Standish group research (Standish Group , 2001). Year on year project success rate is slowly growing across the world because of the maturity of project management discipline. However, the challenges faced by projects and the project failures are in billions of dollars.

Use of PMIS has become necessary to effectively and efficiently manage projects while supporting the project team to meet the constraints associated with projects. To ensure the success of projects organizations are investing in Project Management Information Systems (PMIS) to assist project managers and the project team in the management and undertaking of the project activities. Thus the purpose of this paper is to study the influence of PMIS on the

success of a project in the case of defense construction enterprise in building construction and real estate development projects in Addis Ababa Ethiopia.

## 1.2 Statement of the Problem

PMIS provides the framework for collecting, organizing, storing, and processing project information. It provides the basis for assessing the status of the project with respect to time, cost, and performance goals and objectives. Without using any PMIS software, engineers and project managers would not be able to communicate project status adequately with functional departments and upper management as well. However, PMIS provides upper management with adequate information about all the projects in the organization's portfolio (Raymond & Bergeron, 2008). According to Rogers (2014 cited in (Kombe, 2015) argued that the fundamental purpose of a PMIS is to manage the flow of information between upper and lower management as well as the other stakeholders working on the project which finally results to minimize the allocation of time, money and man-hours spent to complete a project.

Projects need to be managed, that is, they need to be planned, staffed, organized, monitored, controlled, and evaluated (Liberatore, 2003). Cleland states that project managers necessitate accurate and timely information for the management of a project. Project planning, organizational design, motivation of project stakeholders, and meaningful project reviews simply cannot be carried out without information on the project together with how it relates to the larger organizational context in which the project is found (Cleland, 2004).So in order to succeed, companies must deliver projects on time, within budget and meet specifications while managing project risks. Peters identified that project management has long been considered an important characteristic of successful companies and is more than ever necessary to efficiently and effectively manage these projects and to support project managers in their decision-making (Petter & Randolph, 2009).

There are different studies that show Information systems have an important role on Management success such as (Kahura, 2013; Caniels & Bakens, 2011; Raymond & Bergeron, 2008). In addition IS also has impacts on project management as well so that nowadays project management information system is an inseparable part of any project. According to Raymond and Bergeron, it is predominating for organizations to adequately manage their projects if they're supposed to realize their performance objectives. They observe that project management remains extremely a problematic endeavour since most projects are either not

completed on time or exceed the budget (Raymond & Bergeron, 2008). The use of PMIS can potentially improve documentation, better decision making based on accurate information from the database and helps in time and cost management (Kaiser & Ahlemann, 2010).

However, with project management information system being increasingly used by project managers in all types of industry, not much is known on the characteristics of these systems that contribute to project success. And on the other hand there are no researches done to date regarding PMIS in Ethiopia whereas, there are researches regarding PMIS in Kenya, Nigeria or any other countries for that matter. That being the case the researcher wants to explore more on the influence of PMIS to understand the contribution it has towards the project success. Therefore, the purpose of this study was to examine the influence of project management information system on success of projects in the case of defense construction enterprise in building construction and real estate development projects in Addis Ababa Ethiopia with regard to the system, quality of information, and the system use.

## 1.3 Research Question

To address the issues mentioned under the statement of the problem, this study addressed the following research questions.

1. How the project management information system influences the project's success?
2. What are the important project management information system variables?
3. How the project management information system software influences the project's success?
4. How the quality of information output by PMIS influences the project success?
5. How the project management information system use influences the project success?

## 1.4 Objectives of the study

### 1.4.1 General Objectives

The study sought to investigate the influence of project management information system attributes on project success in the case of Defence Construction Enterprise in building construction and real estate development projects in Addis Ababa, Ethiopia.

### 1.4.2 Specific objectives

1. To assess the influence of project management information system influences the project's success of Defense Construction Enterprise in Building Construction and Real Estate Development Projects;
2. To find out the influence of Project Management Information System software on the success of Defense Construction Enterprise in Building Construction and Real Estate Development Projects;
3. To investigate the influence of quality information generated by PMIS on the success of Defense Construction Enterprise in Building Construction and Real Estate Development Projects;
4. To assess the influence of Project Management Information System use on success of Defense Construction Enterprise in Building Construction and Real Estate Development Projects;
5. To describe the importance of Project Management Information System variables in Defense Construction Enterprise in Building Construction and Real Estate Development Projects.

## 1.5 Significance of the Study

The importance of this research is to enhance the existing body of knowledge on defense construction enterprise in building construction and real estate development management office in providing insights into the influence of PMIS has towards the project's Success since there were no researches found investigating these topics. And further since the ministry office has projects in road, irrigation and dam construction, it can assess the influence of PMIS in those areas too.

It is hoped this study will contribute to the existing body of knowledge to researchers and academicians seeking secondary data on the influence of Project Management Information System on project success. It is also hoped that it will contribute to the wider global debate on the impact of information technology on management of construction projects in public sectors.

This research will finally be of enormous help to its findings and recommendations will inform current practice, to project focused institution/organization, and by identifying PMIS influence in big projects like building construction and real estate development projects in relation to the project success, it can influence the need to be used in small projects also. It is a recommendation for improvement on the use of PMIS in authorities like Ethiopia Road

Authority (ERA), Ministry of Public Works and Addis Ababa City Council on actions that need to be taken to in order to improve the performance rate of public construction projects.

## 1.6 Scope of the study

### 1.6.1 Geographic Scope

Defence construction enterprise operate all over the country in and outside Addis Ababa. This research used respondents from the Addis Ababa where most of project will be done. The input data for analysis is restricted only to Addis Ababa Projects.

As described above, the two core process are road, irrigation and dam construction and building construction and real estate development. But this study focused only on building construction and real estate development projects.

### 1.6.2 Conceptual Scope

As stated in the introduction, a project is considered a success if the project management is a success and the project product are successful (Baccarini, 1999). Project management success is focused on the dimensions of 'within time', 'within budget' and 'according to the requirements' (Westhuizen & Fitzgerald, 2005). According to DeLone and McLean, the project product success depends on the following seven dimensions. These are system quality, information quality, service quality, information use, user satisfaction, individual impact, and organizational impact (DeLone & McLean, 2003).

Even though project management information system has different variables to be studied, this study focused on variables under study, i.e. the system, information quality, and the system use only (Kombe, 2015).

This research has used multiple linear regression and correlation to examine the influence of pmis of project success.

## 1.7 Limitation of the Study

The current study only considers projects in Addis Ababa since the researcher lives and works in Addis Ababa. The research uses a single organization to be studied and also limited variables due to the short time given to complete the research.

## 1.8 Definition of Terms

**Project:** a short-term endeavour undertaken to create a unique product or service. Short term means that the project has a definite ending point, and unique means that the product or service differs in some distinguishing way from all similar products, service, or result.

**Project Management**: is the application and integration of modern management and project management knowledge, skills, tools and techniques to the overall planning, directing, coordinating, monitoring and control of all dimensions of a project from its inception to completion, and the motivation of all those involved to produce the product, service or result of the project on time, within authorized cost, and to the required quality and requirement, and to the satisfaction of participants.

**Project Management Information System:** is a set of interrelated components working together to collect, classify, store and distribute information to support decision making, and monitors the progress of a project.

**Project Management Information System Software:** is a software application and a methodical process for collecting and using project information. It helps to plan, execute and close project management goals.

**Quality of information out put:** is the quality of information generated by project management information system.

**Project Management Information System Use:** is the project's need to determine its information requirement and match it with the appropriate technology.

**Project Success:** effectively and efficiently achieving all project objectives in quality specification, on time and within budget as per the plan.

**Project failure:** not achieving all project objectives in quality of specification, on time and within budget in an effective and efficient manner.

## 1.9 Organization of the Paper

The study was organized into five chapters. Chapter one explains background of the study, statement of the problem, research questions, research objectives, significance of the study, scope and limitations of the study, Definition of terms and organizational of the study. Chapter two was devoted to literature review informing the reader on what is already known in this area of the study, while chapter three presents the methodology that was used in collecting and analysing data. This includes research design, research approach, sample size, data source and collection method, procedure of data collection and method of data analysis. Chapter four presents data analysis, presentation and interpretation of analysed collected data through the proposed instrument. Finally, Chapter five presents, conclusion drawn from the findings highlighted and recommendation made there-to.

# Chapter Two

## Review of Related Literature

### 2.1 Introduction

Reviewed literature is organized according to the themes of the study. This research reviewed the existing literature according to the of research study. It also looks at theoretical framework and the conceptual framework of the study. It further looks at the operational variables that will be used in the study.

### 2.2 Project Management Information System

In the project management literature, the definition of project has been discussed by numerous literatures, for instance, PMI define projects as 'a temporary (definitive beginning and definitive end) endeavour undertaken to create a unique (projects involve doing something that has not been done before) product or service' (Project Management Institute, 2000). Cleland, describe a project as "a combination of organizational resources pulled together to create something that did not previously exist and that will provide a performance capability in the design and execution of organizational strategies" (Cleland, 2004). A project has a defined scope, is constrained by limited resource, involves many people with different skill and, usually progressively elaborated throughout its life cycle (Stanleigh, 2008).

Management information systems on the other hand is a system that converts data into information, communicated in an appropriate form to managers at levels of an organization. The information can contribute to effective decision making or planning to be carried out (Patterson, 2005). MIS basically involves the process of collecting, processing, storing, retrieving and communicating the relevant information for the purpose of efficient management operations and for business planning in any organizations. Thus, the success of effective decision-making, is consider as the heart of administrative process, is highly dependent partly on available information, and partly on the functions that are the components of the process (Nath & Badgujar, 2013).

The PMIS defines the program and the projects: cost, time, scope and quality. It defines the team: people, organizations and their roles. It helps manage agreements: contracts, permits, approvals and commitments. It manages documents. It produces standard and custom reports. It presents vital signs on dashboards. It guides collaboration and communicates best practices

with policies, workflow diagrams and document management**.** Some authors describe project management tool as "software for project management" (Fox & Murray , 2003), while others view them as "systematic procedures or practices that project managers use for producing specific project management deliverables" (Milosevic, 2003). Thus the core of a project management information system is usually project management software which involves wide alteration, configuration or customization before to its applied. It's declared that projects nowadays are most often used in information technology (IT), software development, business process reorganization and research and development (Besner & Hobbs , 2004). According to Ahleman PMIS have become "comprehensive systems that support the entire life-cycle of projects, project programs, and project portfolios" (Ahlemann, 2009). To support project managers in their planning, organizing, control, reporting and decision making tasks on the one hand and evaluating and reporting on the other hand, it seems to be essential to make use of PMIS (Raymond & Bergeron, 2008).

Summarizing those definitions this research defines project management as: The application and integration of modern management and project management knowledge, skills, tools and techniques to the overall planning, directing, coordinating, monitoring and control of all dimensions of a project from its inception to completion, and the motivation of all those involved to produce the product, service or result of the project on time, within authorized cost, and to the required quality and requirement, and to the satisfaction of participants (Fewings, 2005).

### 2.2.1 Application of project management information systems in construction industry

Project management refers to the usage of current management methods and systems when a project is being carried out from the beginning to the end; the importance of the usage of project management techniques in the construction industry has increased exponentially over the last years. The main aim of utilizing project management techniques to attain the set out objectives for a project which includes its scope, time allocation, budgetary and allocation and to fulfil the expectations of the relevant stakeholders; the usage of PMIS is therefore recommended to those in charge of the management of projects as to help them attain the goals of the project within the allocated time frame and within the allocated budget while maintaining the quality standards of the project (Ali, et al., 2008).

Currently the usage of a powerful PMIS has become a requirement in the management of any program, it ensures efficiency and effectiveness while helping project managers in their decision making processes (Havelka & Rajkumar, 2006). The main advantage of PMIS systems is that they increase the productivity of the project management team while increasing their efficiency and effectiveness and ensuring that relevant information is passed on seamlessly improve employee performance. As compared to other information management systems, projects management systems are more volatile and very context and project specific; therefore, they require more customization so as to enhance their functionality (Cheruiyot, 2017).

A report generated during the EASEC-11(Eleventh East Asia-Pacific Conference on Structural Engineering & Construction) that happened on November 2008 revealed that the complexity of construction programs was increasing due to a constant increase in the number of those participating in the projects and the amount of information that was being generated by the programs; this revealed the increased need for project management tools that are effective and that are able to manage, integrate and communicate project needs and decisions (Nazech, et al., 2008).

In environments where firms are not utilizing project management information system, project participants such as project managers and project engineers are unable to relay the status of the project to the upper management sufficiently; the usage of PMIS systems allows for the relay of sufficient information to the management of an organization on the status of the project (Raymond & Bergeron, 2008).

## 2.3 Project Management Information System software and project success

Raymond & Bergeron argued that at the technical level, the first element indirectly influencing the impact of a PMIS on project success is PMIS quality. The system's ease of use, flexibility, accessibility, response time, learning ease and system integration play an important role in producing quality information, as perceived by the project manager and other managers or employees. This means that project information quality requires sophisticated, well-serviced information systems (Raymond & Bergeron, 2008). These findings support other researches who argued that, above a certain performance level, system utilization does not allow for the development of a distinct profile (Pellerin , et al., 2013). Indeed, PMIS quality is a strong predictor of the quality of information to be obtained from

the system. The usage of PMIS systems increases the chances of a project succeeding by 75% if a PMIS system of high quality is used correctly (Raymond & Bergeron, 2008).

In the case of a higher-quality PMIS, the information output is more available, reliable, precise, comprehensive and secure. Conversely, a PMIS that produces information of poor quality would be a system that is more difficult to use, less flexible, and less integrated to other organizational information systems used by the project manager from the best-performing projects. Also, the performance of the projects appears to be linked to the usage time of the software: the more the software usage time increases, the better the CPI of the project is.

The quality of a system refers to the characteristics that one requires from a PMIS; it is characterized by the ease of using the system, how flexible the system is, how reliable it is, the ease of mastering the system and how intuitive, responsive, sophisticated and flexible the system is. The quality of the PMIS has a significant impact on the project that its being used in and in the entire organization as a whole; this is because a high quality system ensures that the quality of information produces, its usefulness, the decision making process and the satisfaction of the stakeholders is also increased (Petter & Randolph, 2009).

## 2.4 Quality of information output and project success

The quality of information that has been used to make decision among other things in a project can greatly affect the outcome of the project; if wrong/ inadequate information is generated it will lead to wrong decisions being made and consequently negatively affect the outcome of the project. Project Management Information System should provide project team members with useful information that can be used in decision making by storing, keeping, processing and managing the information resources (Lee & Yu, 2011). According to Swanson (1974, cited in (Lee & Yu, 2011) the quality of information generated by the project management information system determines the quality of the system itself. Zmud (1979, cited in Lee *et al*., 2011) insists that accuracy and timeliness of the information are critical determinants of information quality.

The quality of the information refers to the quality that project managers require from the outputs provided by the management information system of their choice; the quality of the information produced is a measure of the outputs of the information system as opposed to a measure of its performance; the quality of the information produced by the system has a huge

effect on the decision making process by the upper management of the organization (DeLone & McLean, 1992).

The quality of the information generated by a PMIS is defined by how accurate, relevant, available, reliable, complete, personalized, secure, consistent, timely and how easy it is to understand (Raymond & Bergeron, 2008) and (DeLone & McLean, 2003). The quality of the information produced is a great determinant of if the users of the PMIS will be satisfied or not; therefore, the quality of the information produced is difficult to discern since it is also a measure of the satisfaction of the users. As a result it is difficult to measure the quality of the information generated by an IS, a scale to measure the quality of the information produced, while other scales have been developed using the previous literature that has been generated on the subject (Wixom & Watson, 2001; Gable , et al., 2003).

Information provides the intelligence for managing a project. Information must be processed so that decisions can be made and executed with a high degree of assurance so that the results will contribute to the project's success. In the project planning role, information provides the basis for generating project action plans, schedules, network diagrams, projections, and other elements of planning. Information is essential to promote understanding; establish project objectives, goals, and strategies; develop mechanisms for controls; communicate status; forecast future performance and resources; recognize changes; and reinforce project strategies (Ogero, 2014). Matthew argues the project planning function establishes a structure and a methodology for managing the information resources, which encompass defining, structuring, and organizing project information, anticipating its flow, reviewing information quality, controlling its use and source, and providing a focal point for the project's information policies (Matthews, 2004).

## 2.5 Project Management Information System use and project success

Caldwell suggests that a Project Management Information System does not necessarily mean a state-of-the-art technology tool that provides features for every project because every project has different information needs both in quality and in quantity. Every project requires different levels of technologies to satisfy its basic information management needs, a small project with small needs will suffice with simple technologies, but large projects with large information needs can benefit from more extensive technological solutions (Caldwell, 2004).

There are four level of technology required in PM. The four levels help define the technology required based on the information requirements of a project. The first is paper based system, the second is common software (word and excel), the third one is database and analysis package and the last one is fully integrated system. It is very advantageous to use a specialized project management information system for it provides the project team and manager to use to correct amount and thus quality information (Caldwell, 2004).

During the life of a project the levels may alter, while on the other hand, a project manager with several projects, programs, and sectors may have each one at a different location on the range (Caldwell, 2004). A project needs to determine its information requirements and match it with the appropriate technology. The use of project management information system in this study were measured by determining extent to which planning, monitoring, controlling, evaluating and reporting function tools were used by the project managers.

One of the major purposes of project management information system is the smooth sharing of information among project stakeholders and therefore, when the use of PMIS is expanded among them, and not restricted to individual users, the effects become greater. In other words, positive effects of improved quality of project management information system should lead to intention of use, not limited to satisfaction with its use, thereby expanding its use; then, smooth information sharing and systematic information management would be enabled, thereby enhancing efficient and effective construction management (Caruan , 2002).

## 2.6 Project Success

Project success was initially defined whether the final output of the project functioned or not. It then evolved into the triple constraint of time, cost and quality. Project Management Institute instructs that success criteria should be established at the very beginning of the project or before starting a new phase of the project. Doing so can improve deliverable acceptance, customer and stakeholder satisfaction (Project Management Institute, 2013). Wateridge adds that unless the project team agrees on the success criteria before the project starts, the individuals involved will travel in different directions and some will see the project as a failure (Wateridge, 1998).

Projects will use as a means to achieve business objectives that has increased over the past decades (Papke-Shields, et al., 2010) and (Todorovic, et al., 2015). Along with increased business practice and growth in membership of project management professional bodies the

subject of project management has received large interest from scholars (Cooke-Davies, 2002). However, despite column-miles of studies and publications the academia fails to present a consistent interpretation of the term "project success" (Baccarini, 1999) and (Thomas & Fernandez, 2008). In an extensive review of literature on project success Müller and Jugdev concludes that no clear definition exists and stresses the need for measurable constructs of project success (Muller & Jugdev, 2012).

PMI describes the fundamental success criteria of delivering project scope on time and on budget (project management Institute, 2004). Project success is measured against the overall objectives of the project whereas project management success is measured against the traditional measures of performance such as completing project within time, cost, and meeting scope and quality (Cooke-Davies, 2002). Project success is among the most researched topics in project management because of the importance in understanding how to define success and what factors contribute to achieving it. Despite this the term project success still remains diffuse and often in the eye of the beholder (Judgev & Muller, 2005). The measures used to judge the success or failure of a project, called success criteria, and are the dependent variables that measure success per (Morris & Hough, 1987). Defining and agreeing upon project success criteria to make project success measurable is a way to overcome the subjective interpretation of project success (Muller & Turner, 2007).

Among the duty of project manager, determining the success of ongoing project in terms of cost, time and expectation of stakeholders are the major once. As stated by Scott, the main indicator of success of the project is comprised of on time completion of work, not face cost overrun and finish the work under budget, and most significantly meet the minimum expected quality standard for the desire of customers (Scott, 2013). As found in several literature works that ultimate success of a project lies in the accomplishment of the proposed reason. One significant part to ensure the success of the project is associated with expressing deliverables of the project. Another view from other relevant researcher has provided the concept that consideration of time and spending of money on the objective of project purpose usually define success. The assurance of project success is associated with administrators of organization that connects all assets, abilities and unpredictable parameters of project (Scott, 2013).

With project management research still in its early stages studies on project success focused on the three aspects of cost, time and quality (Cooke-Davies, 2002), also called the "iron-triangle" (Papke-Shields, et al., 2010). These dimensions of performance are still considered highly relevant and frequently used in practice for assessment of project success (Scott-Young & Samson, 2008) and (Papke-Shields, et al., 2010).

### 2.6.1 Components of Project Success

As mentioned earlier project management success it is necessary to elaborate further on how project management success is measured. As mentioned earlier project management success is measured according to the traditional "iron-triangle" of time, cost, and quality.

#### Time

All projects are constrained to a time frame during which they are to be completed. No projects are intended to continue forever. Thus, one of the basic requirements that control project management and determine its success is whether it is completed on established schedule (Pinto, 2013).

#### Cost

All projects are constrained to a limited budget; no company has unlimited resources to spend on projects. Projects also compete for resources between each other. In order to use resources efficiently projects must adhere to approved budget. Thus, the second requirement that control project management is whether it is completed within budget guidelines or not (Pinto, 2013).

#### Quality

All projects are produced to meet some form of technical specification determined at project initiation. Thus, measuring success equals determining to what extent the project fulfils the specification (Pinto, 2013).

## 2.7 Theoretical framework

The basis of this study was the Information Systems (IS) concept which has been acknowledged worldwide as the correct basis for the examination and evaluation of PMIS; these models have been utilized by a large number of empirical studies to evaluate the success and performance of Information Systems (IS) (DeLone & McLean, 1992) and (Raymond & Bergeron, 2008). Various studies have been carried out in which the success factors of the models are applied to the evaluation of IS success or performance.

### 2.7.1 DeLone and McLean Information Success Model (ISSM) (1992)

(DeLone & McLean, 1992), introduced the first IS success model which was based on (Shannon & Weaver, 1948) theory of communication. DeLone and McLean's model present different features differentiated by the two essential concepts: system quality and information quality. The utilizing of the system has a clear impact on the way individuals accomplish their performance. This impact may eventually effect on the organizational performance. It was among the first studies to impose some order in IS researchers' choices of success measures (Seddon, et al., 1999). The model is based on theoretical and empirical research conducted by a number of researchers in the 1970's and 1980's. To construct the model, DeLone and McLean reviewed 100 papers containing empirical IS success measures published in seven publications during 1981-1987. They distilled the resulting huge range of Information system success measures into an integrated view of IS success, represented by the following the six dimensions: system quality, information quality, information use, user satisfaction, individual impact and organizational impact.

While the model integrates the comprehensive dependent variables used by IS researchers, it received several criticisms. Ten years later, DeLone and McLean presented an updated model reflecting the criticisms by other researchers and the situation at the time. As the service concept was added to IT with the use of the Internet, they increased the number of information system success factors to seven, including service quality, and analysed the interdependence and correlation of these seven factors (DeLone & McLean, 2003). Figure 1 represents the updated ISSM model of DeLone and McLean (2003)

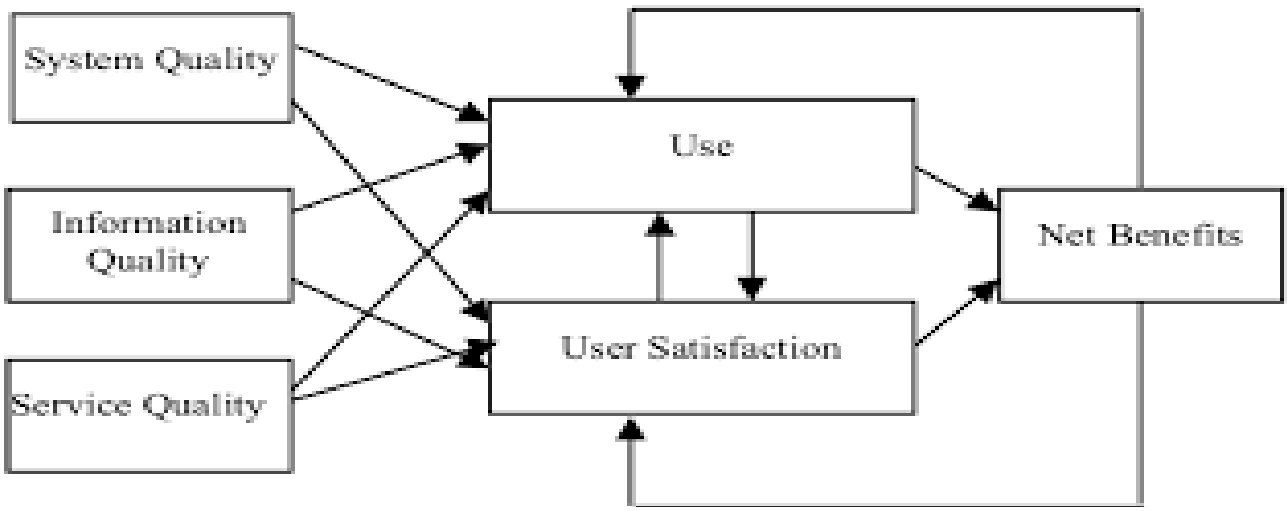


**Figure 1: The Updated Information System Success Model (ISSM) (DeLone, McLean 2003)**

In conclusion, the study was based on the ISSM (information system success model) model that was derived by DeLone and McLean in 1992 and later restructured in 2003. This model includes the quality of information and quality of the system as a precursors of the usage of information system which affects the effects of that the usage of these IS system has on its users and the projects that they are being used on as its effects effectiveness and efficiency (Raymond & Bergeron, 2008). The ISSM gives an explanation of IS phenomenon that has been accepted by many researchers and has been proved using presentations and is collaborated by the research done by numerous researches (Lee & J- H, 2012), (Lee & Yu, 2011) and (Rai, et al., 2002).

## 2.8 Empirical Analysis of Relevant Studies

(Raymond & Bergeron, 2008) did their research in Canada whose study was to empirically assess the quality of the PMIS presently used in organizations and to examine their impact on project managers and project performance. Analysis of data was done by likert scale where they confirmed the significant contribution of PMIS to successful project management. Improvements in effectiveness and efficiency in managerial tasks were observed here in terms of better project planning, scheduling, monitoring and control. Improvements were also observed in terms of timely decision-making. Advantages obtained from PMIS use are not limited to individual performance but also include project performance. These systems were found to have direct impacts on project success, as they contribute to improving budget control and meeting project deadlines as well as fulfilling technical specifications.

Similarly, (Kahura, 2013) did her research in Nairobi and seek to find the contribution of these information systems towards project success. The quality of the software, the quality of information output, the influence of the PMIS user on the project success was tested. Data were measured on a Likert scale. The research found out that the use of the software to generate quality information needed by the user (project manager) to perform project tasks helped the project managers perform their tasks in a more professional manner thus increasing the success rate of the project. The three independent variables (quality of software, quality of information output and influence of the user) were transformed to get a single variable PMIS which had a strong and positive correlation (0.954) with the dependent variable (project success). It was therefore concluded that the use of PMIS helped in the achievement of the project success.

Contrary (Caniels & Bakens, 2011) did their research in Netherlands on the effects of PMIS on decision making in a multi project environment based on a survey among 101 project managers the interactions between six factors related to PMIS information quality and usage and their effect on decision making are examined in a multi project environment. Using structural equation modelling, new insights were gained in these complex relationships. Results indicate that the use of a project management information system is advantageous to project managers, while no adverse effects were observed due to project and information overload. PMIS information quality is positively related to quality of the decisions, satisfaction of project managers with PMIS and use of PMIS information.

(Pellerin , et al., 2013), researched on project management software utilization and project performance in Canada. Statistical tests were performed using The Mann Whitney test (non-parametric test of differences in means) on the basis of quantified data resulting from 21 large engineering projects executed by the firm. The results show that the less-performing projects present significantly lower system utilization levels than the other projects. The performance of the projects appears to be linked to the usage time of the software: the more the software usage time increases, the better the CPI of the project is. Similarly, project performance also seems to be related to the intensity of use of four software subsystems: Project definition, document control, cost management and construction activity management. The more intensively one or the other of these subsystems is used, the better the CPI of the project is.

(Karimu, 2011) used regression analysis to examine PMIS factors: an empirical study of their Impact on project management decision making in United Kingdom and found that PMIS plays a part to project success events in each phase of the project life cycle. Thus, to facilitate

manage decision making effectively; project managers should consider using the PMIS that corresponding the characteristics of phases and with qualified and highly professional decision makers in each phase of the project life cycle.

Similarly, (Ogero, 2014) did her research in Nairobi and seek to find the contribution of these information systems towards project performance. The quality of the software, the quality of information output, system use and the influence of the PMIS user on the project performance was tested. Data were measured on a Likert scale. The four independent variables (quality of software, quality of information output system use and influence of the user) were transformed to get a single variable PMIS which had a strong and positive correlation (0.926) with the dependent variable (project performance). It was therefore concluded that the use of PMIS helped in the achievement of the project performance. From these finding Project management information system and Quality of Information had the most significant influence on project performance followed by project management information system use and project management information system user.

(Kombe, 2015) did his research in Tanzania on 'impact of project management information system on project success? The aim of this study was to examine the impact of PMIS on project success. More specifically the study aimed at analysing the quality of PMIS software, analyse the quality of information output by PMIS and examining PMIS utilization level by project team. From the findings it can be concluded that well trained PMIS users have the capacity to utilize effectively the system which is of good quality and ensure proper input of the information which will lead to quality decision making by management and hence results to successful projects.

(Nguyen, 2012) did his research on critical factors affect users' intention of using Project Management Information System in Vietnam farmers' union? Using regression analysis, the examined relationship of information quality, system quality and system complexity effects to intention of using PMIS. This result makes an important contribution to making a strategy on project management for Vietnam farmers' union (VNFU) which implements various kinds of projects.

The above literatures by measuring different PMIS variables has shown that PMIS has led to success of Projects where by in this research report and quantitative data analysis has been used to prove PMIS contribution to project success, by measuring both PMIS variables and project success variables.

## 2.9 Conceptual Framework

The current research considers figure 1 on how research variables are linked between independent, dependent variables (A & B respectively). The independent variables are derived from project management information system which are quality of software, quality of information and PMIS use. The dependent variable is the project success. The Project success depends on the use of the PMIS and the quality information processed by the software.

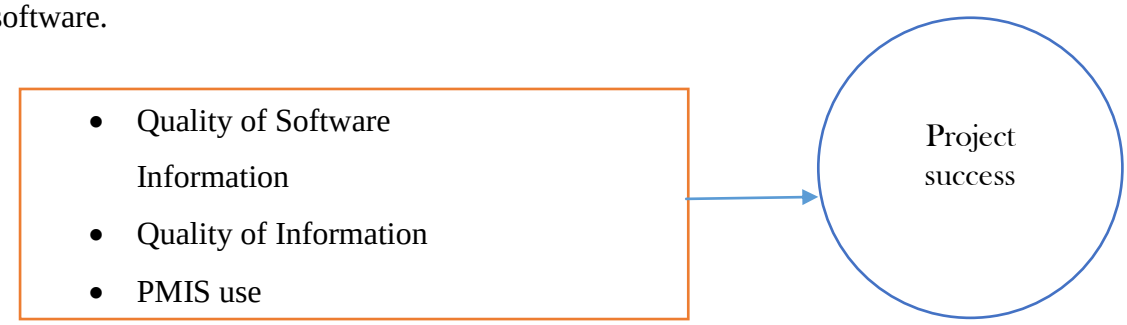


Figure 2: The Conceptual Framework

Source: Adapted from Kombe (2015)

# Chapter Three
# Research Design and Methodology

## 3.1 Introduction

In this chapter, the research methodology that was used during the study is explained. It describes the research approach, research design, sources of data & data collection techniques, target population & sampling methods, ethical consideration, method of data analysis, validity and reliability and lastly operational definition of variables.

## 3.2 Research Approach

In this research, Defense Construction Enterprise is considered as a case company to study the influence of Project Management Information System on Project success. The objectives of the study and the availability of relevant information of this study used quantitative research. Quantitative research is a formal, systematic process that describes the relationships among variables. Quantitative methods emphasize objective measurements and the statistical, mathematical or numerical analysis of data collected through survey.

Different research works reviewed to adopt the survey questionnaire instead of developing a new one which will help in getting a concrete finding and was amended the questionnaire to suit the culture of DCE and the country in general. So, in order to meet the objective of the study, answer the given research question and to examine the relationship between the dependent variable and the independent variables the study will apply Quantitative research method.

## 3.3 Research Design

The research used both descriptive and explanatory survey design. This is because descriptive research does not involve modifying the situation under study or determining the cause-effect relationship. Churchill and Brown observe that descriptive research design is appropriate where the study seeks to describe the characteristics of certain groups, estimate the proportion of people who have certain characteristics and make predictions (Churchill & Brown, 2004). And it also uses explanatory design since the main objective of this research was to study the influence of Project Management Information System on the success of a project. As a result, this design enables to assess and explain the influence of Project Management Information System On the success of a project in Defence Construction Enterprise in Building Construction and Real Estate Development Projects in Addis Ababa Ethiopia. To analyse this relationship quantitative type of research design was deployed.

## 3.4 Sources of Data

The sources of information in research often can be classified into two. These are primary source of data and secondary source of data. For these research both primary and secondary data are used. The study uses primary data to obtain information through the use of questionnaire survey. In addition, some reports related to project management, project management information system and other relevant documents like journals and published and unpublished materials that helps and strength the title are used.

## 3.5 Data Collection Techniques

Questionnaires are used as primary data collection instrument. Owen recommends use of questionnaires for its potential to reach out to a large number of respondents within a short time; ability to accord respondent's adequate time to respond; offers a sense of privacy and

confidentiality to the respondent (Owens, 2002). Therefore, this instrument is selected as a quick and cost effective way to collect data.

The data was collected using questionnaire adopted from Ogero (2014) on her study "Influence of Project Management Information System on Project Performance in Construction Industry: A Case of NAIROBI Country, Kenya (Ogero, 2014). And Cheruiyot (2017) on his study "Influence of Implementation of Project Management Information System On Project Performance in the Construction Industry: A Case of KERICHO Country, Kenya" (Cheruiyot, 2017).

Accordingly, the questionnaire is hand delivered to 40 respondents physically by the researcher. Subsequently, follow ups conducted through phone & emails. Moreover, the researcher also approaches the respondents physically to encourage them to finalize the questionnaires timely with their genuine feedbacks.

The filled questionnaires were collected on the target date given to the respondents. Out of the total number of distributed questionnaires, only two respondents couldn't return the questionnaire due to different reasons and 38 were collected. which gives a response rate of 95% found to be complete and valid to be used for the analysis of the study. Data cleaning was conducted for possible omissions, missing items and errors. The data collected using the questionnaire were then logged and tracked on SPSS version 23. Eventually, SPSS Software used to analyse all the data based on the objective of the study.

## 3.6 Target population

Target population refer to the entire group of individuals or objects from which the study seeks to generalize its findings (Cooper & Schindler, 2014). The target population for the study was 40 people from 8 construction projects (Project managers, construction managers, project supervisors and case team leaders listed in Defence Construction Enterprise in Building Construction and Real Estate Development Projects in Addis Ababa, Ethiopia). Project managers, construction managers, project supervisors and case team leaders working under the listed sections was considered as a target population and the study used census as the number of populations is small. This technique was done in order to identify and select information with rich samples and to maximize efficiency and validity of the study. All project managers, construction managers, project supervisors and case team leaders from all 8

projects that are ongoing in the Defence Construction Enterprise in Building Construction and Real Estate Development Projects in Addis Ababa, Ethiopia are used.

## 3.7 Ethical Considerations

The researcher ensured that proper authority was sought from the relevant authorities before commencement of the study. The researcher also ensured the respondents who participated in the research with the full knowledge of what their participation involved. During fieldwork, the respondents were enlightened on the purpose, duration and potential use of the research results would not be beyond academic purposes; any other research related information as might be of interest to the respondents were clarified before any data was collected. The respondents were also informed that no piece of information gathered in the course of the study will be used to jeopardize their welfare. They were also assured of their anonymity during publication of the research findings.

## 3.8 Method of Data Analysis

The data was collected and analysed using both quantitative and qualitative data analysis methods. The data analysis for the questionnaire was done using SPSS (Statistical Package for Social Science). After giving numerical code for each response paper. SPSS is selected for the reason that it is readily available and user-friendly analysis tool with which the researcher is familiar with. In qualitative data analysis, descriptive statistics such as percentage, frequency and measures of central tendency (mean and standard deviation) were used to summarize the responses. The collected data from the study presented with Descriptive method, in tabulated form to make all the data readable and understandable by all concerned parties. In qualitative data analysis inferential statistical analysis (correlation and multiple linear regression methods) were utilized using statistical package for social sciences (SPSS) software. The use of these statistical tools and methods of presentation are described below.

**a) Correlation**

Correlation (r) is used to describe the strength and direction of relationship between two variables. Since all variables are measured as an interval level, Pearson product moment correlation was used. Correlation "r" output always lies between -1.0 and +1.0 and if "r" is positive, there exists a positive relationship between the variables. If it's negative, the relationship between the variables is negative.

**b) Multiple Regression Analysis**

Multiple regression analysis is a major statistical tool for predicting the unknown value of a variable from the known value of variables. And it is about finding a relationship between variables and forming a model. The Model for this study was developed using three Project Management Information System factors or predictors which have influences on Project Success. So in this research there is one dependent variable (project success) and three independent variables (project management information system software, quality of information output, project management information system use).

$$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \cdots + \beta nXn + \varepsilon$$

Where Y is the dependent variable and the independent variables are those which explain the response ranges from X1 to Xn.

### Tests of Regression Model

**Normality Distribution Test**

Multiple regressions require the independent variables to be normally distributed. If the underlying distribution of the data is normal, the points will fall along a straight line. Deviations from this line correspond to various types of non-normality. If the standardized residuals are normally distributed, the scatter should fall on or tightly close to the normal distribution line. Shows that the scatters of the residuals basically fall straight on the normal distribution line, indicating a normal distribution of residual.

**Linearity of the Relationship Test**

The second assumption for computing multiple regressions is test of the linearity of the relationships between dependent and the independent variables.

**Multi collinearity Test**

Multi collinearity refers to the situation in which the independent/predictor variables are highly correlated. In order to check if there is multi collinearity among the variables, tolerance & variance inflation factor (VIF) values were examined. According to Pallant, tolerance is an indicator of how much of the variability of the specified independent variable is not explained by another independent variable in the model and if its value is less than 0.1, it indicates that the multiple correlation with other variables is high, implying possibility of multi collinearity (Pallant, 2005). Whereas, VIF is the inverse of tolerance value (1 divided by tolerance). If VIF value is above 10, it signals chance of multi collinearity.

## 3.9 Validity and Reliability

### 3.9.1 Validity

The content validity of the questionnaire was established by the researcher by seeking the opinions of experts in the field of study especially the JIMMA University lecturers in the department of Accounting and Finance. Validity relates to the extent to which the research data and the methods for obtaining the data are accurate, honest and on target (Denscombe, 2003). Before using a research instrument, it is important to ensure that it has some validity.

### 3.9.2 Reliability

This study used survey questionnaires which are already tested and applied on an international research level. But due to some modification on the adapted instrument to check it is understood by the respondents or not, 10 pilot tests were distributed for the selected stuffs subject matter experts to ensure the Internal consistency of items which is the level of homogeneity of a scale was measured and incorporated in the instrument to be checked by using Cronbach's alpha coefficient on SPSS Version 23.0. Cronbach's alpha is a coefficient that is used to measure reliability or internal consistency of items; it indicates how closely the items are related to each other, and how free they are from bias (Sekaran & Bougie, 2009). If Cronbach's alpha value is more than 70% for all variables, then reliability is assumed. Table (3.1) shows that Cronbach's Alpha coefficients for all variables are more than 70%, therefore reliability is assumed. (Tavakol & Dennick, 2011).

Table 3-1: Cronbach's Alpha Values

| Variable | Cronbach's Alpha | No of Items |
|---|---|---|
| PMIS software | 0.815 | 8 |
| Quality of Information | 0.820 | 6 |
| PMIS use | 0.842 | 24 |
| Project Success | 0.867 | 3 |
| **All measurement items** | **0.877** | **41** |

As indicated in table (3.2), the Cronbach's Alpha test reveals that the instrument's internal consistency as 87.7% which is well above the acceptable value (i.e. 70%). Therefore, the research instrument is reliable, and the forthcoming findings & conclusions are acceptable and concrete.

## 3.10 Operational Definition of Variables

| Variable | Indicator | Measurement scale | Data Collection Methods | Tools of Analysis | Data analysis |
|---|---|---|---|---|---|
| Project Management System Software | Accessibility<br>Response time<br>Flexibility | Nominal | Questionnaire | Mean<br>Std.<br>Deviation | Correlation<br>Regression |

| | | | | | |
|---|---|---|---|---|---|
| | Ease of Use<br>Learning Ease<br>System Integration<br>Multi-project Capability | | | Correlation<br>Regression | |
| Quality information | Availability<br>Relevance<br>Reliability<br>Precision<br>Comprehensiveness<br>Security | Nominal | Questionnaire | Mean<br>Std. Deviation<br>Correlation<br>Regression | Correlation<br>Regression |
| Project Management Information System use | Planning function tools<br>Controlling function tools<br>Monitoring function tools<br>Evaluating function tools<br>Reporting function tools | Nominal | Questionnaire | Mean<br>Std. Deviation<br>Correlation<br>Regression | Correlation<br>Regression |
| Project Success | Respecting deadlines<br>Respecting budgets<br>meeting quality specification | Nominal | Questionnaire | Mean<br>Std. Deviation<br>Correlation<br>Regression | Correlation<br>Regression |

Table 3-2: Operational Definition of Variables

Source: Adapted from Ogero (2014)

# Chapter Four

## Data Presentation, Analysis and Interpretation

### 4.1. Introduction

This section deals with the analysis and interpretation of data collected from the survey questionnaire. Responses for the measures on the questionnaire are summarized and presented using tables, graphs and charts to facilitate easy understanding. Of the 40 questionnaires distributed, 38 filled questionnaires were collected. The response rate is 95%. According to Mugenda 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 (Mugenda, 2003); therefore, this response rate is adequate for analysis and reporting. The adopted questionnaire was developed using five scales ranking i.e. Linkert scale; where 1 represents Very Low 1, 2 Low, 3 Moderate, 4 High and 5 Very High. To analyse the collected data with that of the objective set for this research, Statistical procedures were carried out using SPSS Statistics version 23. Since the data collection was administered by the researcher, the usability of the questionnaires was checked upon collection and respondents were asked to refill for any missing values.

### 4.2. Demographic characteristics of respondents

The study sought to establish the background information of the respondents which includes the respondents' gender, age bracket, level of education, work experience and their role in the project. The demographic data was inserted because it allows better understanding about certain background characteristics of the respondents.

#### 4.2.1. Distribution of respondents by Gender

The study sought to find out the gender of the respondents. The findings obtained are as shown in below.

Table 4-1: Distribution of Respondents by Gender

| | Frequency | Percentage |
|---|---|---|
| Male | 26 | 68.4 |
| Female | 12 | 31.6 |
| Total | 38 | 100 |

*Source: Own Survey, 2020*

From table 4.1, 26 (68.4%) of the respondents were males and represented the highest percent. The female respondents were 12 (31.6%) which is a fair representation of gender equality.

### 4.2.2. Age bracket of the respondents

The study also sought to establish the age bracket of the respondents. Age bracket was important in order to know which age bracket formed the majority of those who utilised the system in project management. The findings were as shown in the table below.

Table 4-2: Distribution of Respondents by Age

| | Frequency | Percent |
|---|---|---|
| 21-30 | 21 | 55.3 |
| 31-40 | 8 | 21.1 |
| 41-50 | 9 | 23.7 |
| Total | 38 | 100 |

*Source: Own Survey, 2020*

### 4.2.3. Project Management Experience

The respondents were requested to indicate their experience in project management. The researcher obtained the following results.

Table 4-3: Distribution of Respondents by their Project Management Experience

| | Frequency | Percent |
|---|---|---|
| 0-3 | 15 | 39.5 |
| 4-7 | 16 | 42.1 |
| 8-11 | 5 | 13.2 |
| Above 12 | 2 | 5.3 |
| Total | 38 | 100 |

*Source: Own Survey, 2020*

From the findings, 39.5% of the respondents indicated that they had an experience of between 0 -3 years in project management, 42.1% indicated that they had 4-7 years of experience, 13.2% indicated that they had an experience of between 8 -11 years while 5.3% indicated that they had an experience of more than 12 years. These findings show that most the project managers had an experience of between 4 and 7 years in project management.

### 4.2.4. Level of Education of the respondents

The study also sought to establish the respondents' highest level of education. The level of education was important in order to determine the capability of the respondents to utilize Project Management information system. The findings were as shown in the table below.

Table 4-4: Distribution of Respondents by their highest level of education

| | Frequency | Percent |
|---|---|---|
| Graduate | 4 | 10.5 |
| Under graduate | 32 | 84.2 |
| Diploma | 2 | 5.3 |
| Total | 38 | 100 |

*Source: Own Survey, 2020*

From the findings in table 4.3, 10.5% of the respondents indicated that their level of education was masters, 84.2% indicated it was undergraduate, 5.3% indicated it was a diploma. These findings show that most of the project managers had bachelor degree as their highest level of education which implies that the respondents are capable to utilize project management information systems.

### 4.2.5. Management category of respondent

The researcher used all project managers, construction managers, supervising managers and case team leaders in the projects. The findings were as shown in the table below.

Table 4-5: Distribution of Respondents by Management Category

| | Frequency | Percent |
|---|---|---|
| Project manager | 9 | 23.7 |
| Construction manager | 9 | 23.7 |
| Supervising manager | 9 | 23.7 |
| Case team leader | 11 | 28.9 |
| Total | 38 | 100 |

*Source: Own Survey, 2020*

From the finding in 4.5 there are 9 project managers, 9 construction managers and also 9 supervising managers. There is one project manager, one construction manager and one for supervising manager for every project in Defence Construction Enterprise in Building Construction and Real Estate Development Projects in Addis Ababa Ethiopia.

## 4.3. Descriptive Analysis of Project Management Information System

As per the below Table (4.6), it shows that the mean values of the Project Management information system variables are ranged between "3.87 to 4.05" with standard deviation ranges between "0.529 to 0.655". It means that there is an agreement among respondent about the importance of the Project Management Information System variables. The average mean value of Project Management information system variables is 3.94 with standard deviation 0.605, which also mean there is a high importance for Project Management information system. For all variables, the maximum response is Very High and the minimum is Moderate for project management information system software and Low for quality of information and project management information system use. The result shows that the level of project managers information system is moderately high among the listed PMIS variables. QIO have high mean value. As per the result, all the listed PMIS dimensions are equally important that the respondents consider the importance and agree to the points raised. Also, the deviation from average mean value is not that much far by significant figures.

Table 4.6: Project Management Information System

| PMIS Variables | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|
| PMISS | 3 | 5 | 3.87 | .529 |
| QIO | 2 | 5 | 4.05 | .655 |
| PMISU | 2 | 5 | 3.92 | .632 |
| PMIS Average | | | 3.94 | .605 |

*Source: Own Survey, 2020*

### 4.3.1. Project Management Information System Software

The study sought to find out the influence of Project Management Information System software on the Success of construction project. The respondents were requested to rate various aspects of general performance of Project Management Information System in their organization. The results are shown in table 4.7 below.

Table 4-7: Project Management Information System Software

| PMISS Indicators | Mean | Std. Deviation |
|---|---|---|
| Accessibility | 4.21 | .777 |
| Respond Time | 3.82 | .609 |
| Flexibility | 3.82 | .609 |
| Ease of Use | 3.87 | .704 |
| Querying Ease | 3.71 | .732 |
| Learning Ease | 3.71 | .654 |
| System Integration | 3.29 | .802 |
| Multi-Project Capability | 3.61 | .790 |
| PMISS Average | 3.75 | .709 |

*Source: Own Survey, 2020*

According to the findings, the respondents rated accessibility high in their organization as shown by a mean of 4.21 and a standard deviation of 0.777. The respondents also indicated with a mean of 3.87 and a standard deviation of .704 that the general performance of Ease of use in their organization was high. Further, the respondents indicated with a mean of 3.82 and a standard deviation of .609 that the general performance of Respond time and Flexibility in their organization was high. Additionally, the respondents rated the general performance of Querying Ease and Learning Ease in their organization as high as shown by a mean of 3.71 and a standard deviation of 0.732 and 0.654 respectfully. Also, the respondents indicated with a mean of 3.61 and a standard deviation of 0.790 that the general performance Multi-Project Capability in their organization was high. In addition, the general performance of System Integration was rated as moderate as indicated by a mean of 3.29 and a standard deviation of .802.

According to the findings, the highest value given by respondents was accessibility with a mean of 4.21, meaning that PMISS is accessible to the organization and the lowest value was System Integration with a mean of 3.29, meaning the PMISS somehow lacks to integrate the system. In general mean values are ranging from 3.29 to 4.21 with average value of 3.75 and standard deviation ranging from 0.609 to 0.802 with average value 0.709. Such results indicate that there is an agreement between respondents on high importance of Project Management Information System Software items.

### 4.3.2. Quality of Information Output

The study sought to investigate the influence of quality information on the Success of construction project. The respondents were further asked to rate the impact of various aspects of quality of information produced by Project Management Information System in project implementation in their organizations. The findings are shown in table 4.8 below.

Table 4-8: Quality of Information Output

| QIO Indicators | Mean | Std. Deviation |
|---|---|---|
| Availability | 4.24 | .714 |
| Relevance | 4.18 | .652 |
| Reliability | 4.00 | .771 |
| Precision | 3.53 | .725 |
| Comprehensive | 3.63 | .751 |
| Security | 3.34 | .669 |
| QIO Average | 3.82 | 0.713 |

*Source: Own Survey, 2020*

From the findings, the respondents indicated with a mean of 4.24 and a standard deviation of 0.714 Availability of information produced by Project Management Information System in project implementation in their organizations was high. In addition, the respondents indicated with a mean of 4.18 and a standard deviation of 0.652 that Relevance of information produced by Project Management Information System in project implementation in their organizations was high. Also, the Reliability of information produced by Project Management Information System in project implementation was rated as high as shown by a mean of 4.00 and a standard deviation of 0. 771. Additionally, the respondents indicated with a mean of 3.63 and a standard deviation of 0.751 that Comprehensiveness of information produced by Project Management Information System in project implementation in their organizations was high. Precision of information produced by Project Management Information System was rated as moderate as shown by a mean of 3.53 and a standard deviation of 0.725. Lastly, the respondents indicated with a mean of 3.34 and a standard deviation of 0.669 that security of information produced by Project Management Information System in project implementation in their organizations was also moderate.

According to the findings, the highest value given by respondents was Availability with a mean of 4.24, meaning that quality of information output was available to the organization

and the lowest value was security with a mean of 3.34, meaning that the quality of information provided by the PMIS somehow lacks to secure the output data. In general, mean values are ranging from 3.34 to 4.24 with average value of 3.82 and standard deviation ranging from 0.652 to 0.751 with average value 0.713. Such results indicate that there is an agreement between respondents on high importance of Quality of information output items.

### 4.3.3. The System Use

The use of the Project Management Information System was measured by establishing the degree to which various system functions and their associated tools were actually used by project managers (Raymond, Bergeron 2007). The PMIS functions were divided into five categories: planning function tools, monitoring function tools, controlling function tools, evaluating function tools and reporting function tools. The results were as shown below.

#### 4.3.3.1 Planning Function Tools

The respondents were asked to indicate how often various planning function tools were utilized within the Project Management Information System in project implementation in their organizations. The results are presented below.

Table 4-9: Planning Function Tools

| PFT's Indicators | Mean | Std. Deviation |
|---|---|---|
| Work breakdown structure | 3.92 | .749 |
| Resource allocation | 3.89 | .798 |
| Overall schedule | 4.16 | .638 |
| Gantt chart | 3.63 | 1.051 |
| PERT | 3.42 | .948 |
| CPM | 3.66 | .938 |
| PFT's Average | 3.78 | 0.853 |

*Source: Own Survey, 2020*

According to the findings, the respondents indicated with a mean of 4.16 and a standard deviation of 0.638 that Overall schedule was highly utilized in project implementation in their organizations. In addition, the respondents indicated with a mean of 3.92 and a standard deviation of 0.749 that Work breakdown structure was highly utilized in project implementation in their organizations. Further, the respondents indicated with a mean of 3.89 and a standard deviation of 0.798 that Resource allocation was highly utilized in project

implementation in their organizations. In addition, the respondents indicate with a mean of 3.66 and a standard deviation of 0.938 that CPM was highly utilized in project implementation in their organizations. Additionally, the respondents indicated with a mean of 3.63 and a standard deviation of 1.051 that Gantt Chart was highly utilized in project implementation in their organizations. Lastly, the respondents indicated with a mean of 3.42 and a standard deviation of 0.948 that PERT was moderately utilized in project implementation in their organizations.

According to the findings, the highest value given by respondents was Overall Schedule with a mean of 4.16, meaning that in PMISU in planning function tool the organization highly use for the overall schedule and the lowest value was PERT with a mean of 3.42, meaning that in PMISU in planning function tool the organization use it moderately. In general mean values are ranging from 3.42 to 4.16 with average value of 3.78 and standard deviation ranging from 0.638 to 1.051 with average value 0.853. Such results indicate that there is high agreement between respondents on the importance of Project Management Information System use for planning function.

#### 4.3.3.2 Controlling Function Tools

The respondents were asked to indicate how often various controlling function tools were utilized within the Project Management Information System in project implementation in their organizations. The results are presented below.

Table 4-10: Controlling Function Tools

| CFT's Indicators | Mean | Std. Deviation |
|---|---|---|
| Fine- Tune Forecast | 3.29 | .802 |
| Modifying Tasks | 3.47 | .725 |
| Reassigning Resource to Low Cost | 3.24 | .786 |
| Cancel Task | 2.97 | .885 |
| Modify Cost of Resource | 3.39 | .790 |
| CFT's Average | 3.27 | 0.79 |

*Source: Own Survey, 2020*

According to the findings, the respondents indicated with a mean of 3.47 and a standard deviation of 0.725 that Modifying Tasks is moderately utilized in project implementation in their organizations. Further, the respondents indicated with a mean of 3.39 and a standard deviation of 0.790 that Modifying Cost of Resource was moderately utilized in project implementation in their organizations. Additionally, the respondents indicated with a mean of 3.29 and a standard deviation of 0.802 that Fine-Tune Forecast was moderately utilized in project implementation in their organizations. The respondents also indicated with a mean of 3.24 and a standard deviation of 0.786 that Reassigning Resources to Lower the Costs was moderately utilized in project implementation in their organizations. Lastly, the respondents indicated with a mean of 2.97 and a standard deviation of 0.885 that Cancelling Tasks was moderately utilized in project implementation in their organizations.

According to the findings, the highest value given by respondents was Modifying Tasks with a mean of 3.47, meaning that in PMISU in planning function tool the organization uses for Modifying Tasks and the lowest value was Cancelling Tasks with a mean of 2.97, meaning that in PMISU in controlling function tool cancelling tasks is moderately used. In general mean values are ranging from 2.97 to 3.47 with average value of 3.27 and standard deviation ranging from 0.725 to 0.885 with average value 0.79. Such results indicate that there is moderate agreement between respondents on the importance of Project Management Information System use for controlling function.

#### 4.3.3.3. Monitoring Function Tools

The respondents were also requested to indicate how often various monitoring function tools were utilized within the Project Management Information System in project implementation in their organizations. The results are shown in table 4.11 below.

Table 4-11: Monitoring Function Tools

| MFT's Indicators | Mean | Std. Deviation |
|---|---|---|
| Project Report | 4.34 | .669 |
| Completed Tasks | 4.00 | .805 |
| Percentage of Completed Tasks | 4.08 | .784 |
| Effective Schedule | 3.87 | .777 |
| Remaining Tasks | 3.84 | .679 |
| Remaining Days to Complete | 4.03 | .788 |
| MFT's Average | 4.02 | 0.75 |

*Source: Own Survey, 2020*

According to the findings, the respondents indicated with a mean of 4.34 and a standard deviation of 0.669 that Project Reports were highly utilized in project implementation in their organization. Also, the respondents indicated with a mean of 4.08 and a standard deviation of 0.784 that the Percentage of Completed Tasks were highly utilized in project implementation in their organization. Also, the respondents indicated with a mean of 4.03 and a standard deviation of 0.788 that Remaining Days to Complete a project were highly utilized in project implementation in their organizations. In addition, the respondents indicated with a mean of 4.00 and a standard deviation of 0.805 that the Completed Tasks were highly utilized in project implementation in their organizations. Further, the respondents indicated with a mean of 3.84 and a standard deviation of 0.679 that Remaining Tasks was highly utilized in project implementation in their organizations. Lastly, the respondents indicated with a mean of 3.84 and a standard deviation of 0.679 that Effective Schedule was highly utilized in project implementation in their organizations.

According to the findings, the highest value given by respondents was Project Reports with a mean of 4.34, meaning that in PMISU in planning function tool the organization uses Project Reports highly and the lowest value was Effective Schedule with a mean of 3.84, but in PMISU in controlling function tool Effective Schedule is highly used too. In general mean values are ranging from 3.84 to 4.34 with average value of 4.02 and standard deviation ranging from 0.669 to 0.805 with average value 0.75. Such results indicate that there is high agreement between respondents on the importance of Project Management Information System use for monitoring function.

#### 4.3.3.4 Evaluating Function Tools

The respondents were asked to indicate how often various evaluating function tools are utilized within the Project Management Information System in project implementation in their organizations. The results are presented in table 4.12 below.

Table 4-12: Evaluating Function Tools

| EFT's Indicators | Mean | Std. Deviation |
|---|---|---|
| Identification of cost | 3.66 | .815 |
| Identification of Schedule Variation | 3.58 | .758 |
| Tracking the use of Resource | 3.45 | .724 |
| EFT's Average | 3.56 | 0.76 |

*Source: Own Survey, 2020*

According to the findings, the respondents indicated with a mean of 3.66 and a standard deviation of 0.815 that Identification of Cost was highly utilized in project implementation in their organizations. In addition, the respondents indicated with a mean of 3.58 and a standard deviation of 0.758 that the identification of Schedule Variation was highly utilized in project implementation in their organizations. Lastly, the respondents indicated with a mean of 3.45 and a standard deviation 0.724 that Tracking the Use of Resources was moderately utilized in project implementation in their organizations.

According to the findings, the highest value given by respondents was Identification of cost with a mean of 3.66, meaning that in PMISU in planning function tool the organization uses Cost Identification highly and the lowest value was Tracking the use of Resource with a mean of 3.45. In general mean values are ranging from 3.45 to 3.66 with average value of 3.56 and standard deviation ranging from 0.724 to 0.815 with average value 0.76. Such results indicate that there is moderate agreement between respondents on the importance of Project Management Information System use for evaluating function.

#### 4.3.3.5. Reporting Function Tools

The respondents were also asked to indicate how often various reporting function tools are utilized within the Project Management Information System in project implementation in their organizations. The results are shown in table 4.13 below.

Table 4-13: Reporting Function Tools

| RFT's Indicators | Mean | Std. Deviation |
|---|---|---|
| Overview of project | 4.11 | .727 |
| Overview on work in progress | 4.05 | .804 |
| Budget overruns | 3.45 | .950 |
| Task and schedule slippage | 3.53 | .762 |
| RFT's Average | 3.78 | 0.810 |

*Source: Own Survey, 2020*

From the findings, the respondents indicated with a mean of 4.11 and a standard deviation of 0.727 that the Overview of the Project was highly utilized in project implementation in their organizations. Additionally, the respondents indicated with a mean of 4.05 and a standard

deviation of 0.804 that the Overview of the Work-in-Progress was highly utilized in project implementation in their organizations. Also, the respondents indicated with a mean of 3.53 and a standard deviation of 0.762 that the Task and Schedule Slippage were moderately utilized in project implementation in their organizations. Lastly, the respondents indicated with a mean of 3.45 and a standard deviation of 0.950 that Budget Overruns was moderately utilized in project implementation in their organizations.

According to the findings, the highest value given by respondents was Overview of the Project with a mean of 4.11, meaning that in PMISU in planning function tool the organization uses for Overview of project is high and the lowest value was Task and schedule slippage with a mean of 3.45. In general mean values are ranging from 3.45 to 4.11 with average value of 3.78 and standard deviation ranging from 0.727 to 0.950 with average value 0.810. Such results indicate that there is high agreement between respondents on the importance of Project Management Information System use for reporting function.

## 4.4. Descriptive Analysis of Project Success

The respondents were asked to rate the influence of PMIS on the general project success. The findings are shown in table 4.14 below.

Table 4-14: Influence of PMIS on Project Success

| PS's Indicators | Mean | Std. Deviation |
|---|---|---|
| Meeting deadline | 4.26 | .503 |
| Respecting budget | 4.16 | .679 |
| Meeting quality specification | 3.71 | .565 |
| PS Average | 4.04 | 0.58 |

*Source: Own Survey, 2020*

According to the findings, the respondents indicated with a mean of 4.26 and a standard deviation of 0.508 that respecting budgets had high contribution on the general project Success. Also, the respondents indicated with a mean of 4.16 and a standard deviation of 0.679 that meeting deadlines had high contribution on the general project Success. Lastly, the respondents indicated with a mean of 3.71 and a standard deviation of 0.565 that meeting quality specification had a high contribution as well on the general project Success. In

general mean values are ranging from 3.71 to 4.26 with average value of 4.04 and standard deviation ranging from 0.503 to 0.679 with average value 0.58. Such results indicate that there is high agreement among respondents on the importance of Project Success variables.

## 4.5. Relationship between Project Management Information System and Project Success

One of the major objectives of the study is to assess the influence of Project Management Information System on Project success. For this purpose, inferential statistics of correlation & regression analysis have been used & the results are presented in the below sections.

### 4.5.1. Pearson Product-moment Correlation analysis

Correlation analysis studies the joint variation of two or more variables for determining the strength and direction of the relationship among the variables (Kothari, 2004). Accordingly, in order to identify whether the dependent variable & independent variables have a joint variation, Pearson's product moment correlation coefficient was computed. Pearson correlation results range between 1 (perfectly linear positive correlation) to -1 (perfectly linear negative correlation). When the correlation value is 0, no relationship exists between the variables understudy and when the correlation value is lies in the middle between 1 & -1 (excluding 0) the below interpretation guide (Table 4.15) developed by (Marczyk, et al., 2005) becomes handy. Accordingly, this guide has been used to interpret the results which are summarized in the coming sections.

Table 4.15: Correlation result interpretation guide

| **Correlation value in range** | **Interpretation** |
|---|---|
| 0.00 to 0.19 | Weak/ very low correlation |
| 0.20 to 0.39 | Low correlation |
| 0.40 to 0.59 | Moderate correlation |
| 0.60 to 0.79 | High correlation |
| 0.8 to 1.0 | Very high correlation |

Source: Marczyk, DeMatteo, Festinger (2005)

Table 4.16: Pearson's Correlation Among All Variables

| | | PS | PMISS | QIO | PMISU | PMIS |
|---|---|---|---|---|---|---|
| | | | | | | |
| PS | Pearson Correlation | 1 | | | | |
| | Sig. (2-tailed) | | | | | |
| | N | 38 | | | | |
| PMISS | Pearson Correlation | .688** | 1 | | | |
| | Sig. (2-tailed) | .000 | | | | |
| | N | 38 | 38 | | | |
| QIO | Pearson Correlation | .714** | .488** | 1 | | |
| | Sig. (2-tailed) | .000 | .002 | | | |
| | N | 38 | 38 | 38 | | |
| PMISU | Pearson Correlation | .741** | .615** | .663** | 1 | |
| | Sig. (2-tailed) | .000 | .000 | .000 | | |
| | N | 38 | 38 | 38 | 38 | |
| PMIS | Pearson Correlation | .878** | .766** | .839** | .861** | 1 |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | |
| | N | 38 | 38 | 38 | 38 | 38 |

**. Correlation is significant at the 0.01 level (2-tailed).

*Source: Own Survey, 2020*

From the correlation analysis, the study found that there is a positive relationship between the project management information system software and project success, where the correlation coefficients were 0.688 and a p-value of 0.000. The study also found that the quality of information and project success correlate positively with correlation coefficients of 0.714 and p-value of 0.000. The study further established that there is a positive relationship between project management information system use and project success with a correlation coefficient of 0.741 and p-value of 0.000. Lastly, the study found that there is a positive relationship between the Project Management Information System and Project Success with a correlation coefficient of 0.878 and a p-value of 0.000. According to table the correlation between project Management Information System ranges between values ($r=0.488$, $p<0.01$) and ($r=0.663$, $p<0.01$). Based on table (4.16) interpretation guide there is positive moderate correlation between the independent variables.

These findings clearly show that all the three independent variables (Project management information system software, Quality of Information and PMIS use) had a significant influence on the dependent variable (Project Success). This is because the p-value in all the relationships was 0.000 which is less than the alpha value (level of significance) 0.01. From these findings we can infer that Project management information system use and Quality of Information had the most significant influence on project success followed by project management information system software.

However, the fact that there is significant positive relationship between dependent and independent variables does not indicate or measure the cause effect relationship. Hence, beyond correlation analysis, regression analysis is conducted to measure the cause effect relationship between Project Management Information System and Project Success.

### 4.5.2 Tests of Regression Model

Before running multiple linear regression analysis, the researcher has conducted basic assumption tests for the model. These are normality of the distribution, linearity of the relationship between the independent and dependent variables and multi collinearity tests. Each test is explained below and the result is found in Appendix 3.

**Normality Distribution Test**

As depicted in the below Normal PP plot of regression standardized residual, the scatter falls close to the normally distributed line. The P-P plot is shown in Appendix 3.

**Linearity of the Relationship Test**

The second assumption for computing multiple regressions is test of the linearity of the relationships between dependent and the independent variables. As depicted in the below scatter the visual inspections of the scatter plot shows there exists a linear relationship between project management information system and project success. The scatter plot is shown in Appendix 3.

**Multi collinearity Test**

VIF is the inverse of tolerance value (1 divided by tolerance). If VIF value is above 10, it signals chance of multi collinearity. Accordingly, the result in Appendix 3 shows that there is

no possibility of multi collinearity among the variables in the model since all the tolerance values are above 0.1 and the corresponding VIF values are below 10. Therefore, for the current data multi collinearity is not an issue.

### 4.5.3. Multiple Regression analysis

Regression is a measure of association between two sets of variables. Thus, in order to determine the statistically significance effect of the independent variables on the dependent variable, multiple regression analysis was used. As an extension of simple regression, the goal of multiple regression is to enable a researcher to assess the relationship between a dependent (predicted) variable and several independent (predictor) variables.

On this study it is aimed to identify the influence of (Project Management Information System Software, Quality of information output and Project Management Information System Use) on a Project Success. Accordingly, on the correlation analysis section, it is identified that all the independent variables have significant positive correlation with project success. Based on this, multiple regression has been conducted to know their impact on project success. Accordingly, adjusted R2 values were referred to indicate the percentage variance in the dependent variable (Success) explained by the independent variables (Project Management Information System Software, Quality of information output and Project Management Information System Use) and the statistical significance of this relationship is also tested.

**Table 4.17: Results of Multiple Regressions Analysis of Project management information system against project success.**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .839[a] | .703 | .677 | .296 |

a. Predictors: (Constant), PMISU, PMISS, QIO
b. Predictors: (Constant), PMISU, PMISS, QIO

*Source: Own Survey, 2020*

Inferring from table 4.17, adjusted R2 value of 0.677 then the independent variable can explain 67.7% of variance on dependent variable, success is explained by project Management Information System. Which states “project Management Information System

influences project success". As per the analysis of regression on the above Table 4.17, the adjusted R square was 0.677 the model estimated shows that there was 67.7 % positive variation in project success as a result of changes in the Project Management Information System as explained by model. 32.3 % of the variation in project success was explained by other factors other than Project Management Information System. In other way, it is noted that 67.7 % of the changes in the project success variables could be attributed to the combined effect of the predictor variables or there is 67.7 % of variation in project success due to project Management Information System.

**Durbin-Watson test**

The assumption of autocorrelation is that the covariance between the error terms over time is zero. It is assumed that the errors are uncorrelated with one another. If the errors are correlated with one another, it would be stated that they are "auto correlated" or that they are serially correlated (Brooks , 2008). To confirm either there is auto correlation or not the Durbin Watson test (DW) rule for autocorrelation was applied in this study and the null hypothesis being there is no autocorrelation. The regression result of DW as shown in Appendix 3 was 2.085 DW test result fall in the non-rejection region.

**ANOVA**

The regression model overall fit can be examined with the help of ANOVA. Accordingly, table 4.18 of this study shows that the value of R and R2 found from the model summary is (F=26.84), (P<0.001). This indicates that over all, the regression model statistically significantly predicts the outcome variable that is the supply chain performance.

**Table 4.18 ANOVA Model fit**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 7.031 | 3 | 2.344 | 26.839 | .000[b] |
| | Residual | 2.969 | 34 | .087 | | |
| | Total | 10.000 | 37 | | | |

a. Dependent Variable: PS
b. Predictors: (Constant), PMISU, PMISS, QIO

*Source: Own Survey, 2020*

## Standard Beta Coefficient

Not all factors are retained in an analysis and only factors that are statistically important should be retained. The standardized coefficients are the coefficients which can explain the

relative importance of explanatory variables. These coefficients are obtained from regression analysis after all the explanatory variables are standardized.

**Table 4.19 Beta Coefficient**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | .635 | .388 | | 1.636 | .111 |
| | PMISS | .323 | .118 | .329 | 2.748 | .010 |
| | QIO | .278 | .100 | .350 | 2.780 | .009 |
| | PMISU | .252 | .115 | .306 | 2.194 | .035 |

a. Dependent Variable: PS

Source: Own Survey, 2020

Standardized beta values indicate the contribution of the variables in the model for the prediction of the dependent variables which enables to rank the variables based on their contribution (Pallant, 2005). Therefore, in this case, QIO takes the higher share in contributing for project success since it has the highest standardized coefficient beta value of B=0.350 followed by PMISS B=0.329 and PMISU B=0.306, by descending order. Besides, the individual t-test significance values, which are all below 0.05, imply that the practices are positive significant predictors of project success.

From the above table (4-17), it can be concluded that the Project Management Information System have an effect on project success in Defense Construction Enterprise. In short, the results indicate that Project Management Information System (Project Management Information System Software, Quality of information output and Project Management Information System Use) influence Project Success. As per the output of the standard Beta coefficient, 35 % of the total variation of project success is explained by QIO. Better quality of information output increases the opportunity of the project management information system being used, which in turn allows the system to have a positive impact on the project manager. As such, the quality of information output by the project management information system leverages the project manager's work as a professional. Ali & Money through several studies also concluded that information quality has the greatest total effect on the use of project management software (Ali & Money , 2005). According to the finding, the next highest determinant factor of project success is PMISS. As shown in table 4.17, PMISS

makes a contribution of 33 % of the total variance project success. Finally, PMISU made a contribution of 30.6% of the total variance.

There is a significant statistical Influence of Project Management Information System on Project Success in Defense Construction Enterprise in Building Construction and Real Estate Development Projects in Addis Ababa Ethiopia.

## 4.6 Discussion of Findings

The objective of this research was to have a better understanding of the elements (the system software, quality of information, and the system use) that contribute to the influence of a project management information system on project success. The study results are discussed in terms of the objectives and their direct and indirect effects of project management information system on project success.

The system software ease of use, flexibility, response time, learning ease, accessibility, querying ease, multi project capability and system integration play an important role in producing quality information, as perceived by the project manager. Indeed, the system is a strong predictor of the quality of information to be obtained. A project management information system that produces information of poor quality would be a system that is more difficult to use, less flexible, and less integrated to other organizational information systems used by the project manager and other managers or employees.

The quality of information is directly and strongly related to project management information system use and to the system's impacts on the project manager. Information quality is not an end by itself however, as it leads only indirectly to project success. It is only through the actual use of the project management information system by – and the system's impacts on – the project manager that the quality of information can influence project success. Cleland agrees that the best information loses its value if it is not available to people who need it to make decisions and direct actions (Cleland, 2004).

Better quality of information output increases the opportunity of the project management information system being used, which in turn allows the system to have a positive impact on the project manager. As such, the quality of information output by the project management information system leverages the project manager's work as a professional. Several studies also concluded that information quality has the greatest total effect on the use of project

management software (Ali, et al., 2008). This suggests that project managers are more eager to accept project management information system on the basis of the quality of the information output and that they are more likely to use software that provides them with an appropriate level of details that fits their work needs, is free of complexity, and is easy to understand and communicate with the project team.

Raymond noted from his studies that among the managers who participated in the study, a number indicated strong impacts of the Project Management Information System upon the successful completion of their projects, while others did not (Raymond & Bergeron, 2008). The results of this study also indicate that, in general, the low use of Project Management Information System depended upon a system of lower quality that produced lower quality information; hence they used their system less and were less supported in their project management task. Whereas project managers who used project management information system use highly were those who the sufficient conditions were met, that is, system quality, information quality, project management information system use and positive impacts on managerial work.

In summary, if it is to make a significant contribution to the attainment of project objectives, i.e., to make an impact in terms of project budget, schedule, and specifications, a project management information system must first be sufficiently sophisticated and serviced to produce information of sufficient quality. It must then be used with sufficient depth and breadth by project managers and it must have a sufficiently beneficial impact on their work. In environments where firms are not utilizing project management information system, project participants such as project managers and project engineers are unable to relay the status of the project to the upper management sufficiently; the usage of PMIS systems allows for the relay of sufficient information to the management of an organization on the status of the project (Raymond & Bergeron, 2008).

# Chapter Five
# Summary of Findings, Conclusions and Recommendations

## 5.1 Introduction

This chapter presents the discussion of key data findings, conclusions drawn from the findings highlighted and recommendations made. The conclusions and recommendations drawn were focused on addressing the objectives of the study.

## 5.2 Summary of Findings

The study sought to examine the influence of project management information system software on project success, assess the influence of quality information output on success of project, and establish the influence of the project management information system use on success of Defense Construction Enterprise in Building Construction and Real Estate Development Projects in Addis Ababa Ethiopia.

### 5.2.1 The Project Management Information System Software

Raymond & Bergeron argued that at the technical level, the first element indirectly influencing the impact of a PMIS on project success is PMIS quality. PMIS quality is a strong predictor of the quality of information to be obtained from the system (Raymond & Bergeron, 2008). According to the findings, the respondents' accessibility had an excellent response in their organization with a mean of 4.21 and a standard deviation of 0.777. However, most of the respondents were not very confident with the ability of the system to integrate with a mean of 3.29 and std. deviation of 0.802. On average the system was rated great, with a mean of 3.75 and std. deviation of .709. This meant that the users felt that the system played an important role in the success of their tasks. Also the project management information system had high correlation with project success with correlation coefficients of 0.688 and a p-value of 0. 000. And based on the regression analysis the result shows that project management information system software has a positive effect on project success by 32.9%. It was noted that the system played an important role in generating the information to be used in management of the projects.

### 5.2.2 Quality of Information

According to Swanson (1974, cited in Lee *et al*., 2011) the quality of information generated by the Project Management Information System determines the quality of the system itself. The quality of the information produced by the system has a huge effect on the decision making process by the upper management of the organization (DeLone & McLean, 1992). So

from the findings, the availability and relevance of the information generated by the software were the characteristics that were rated highly with means of 4.24 and 4.18 respectively. This meant that the information was readily available and was also appropriate for the task at hand. On average the system was rated great, with a mean of 3.82 and std. deviation of .713. This meant that the users felt that the quality of information output played an important role in the success of their tasks. Also the quality of information output had high correlation with project success with correlation coefficients of 0.714 and a p-value of 0. 000. A nd based on the regression analysis the result shows that quality of information output has a positive effect on project success by 35%. They also felt that with the availability of quality information they were able to make better informed decisions as well as perform tasks in a more professional manner.

### 5.2.3 The System Use

The use of the various function tools i.e. planning, monitoring, Evaluation and reporting tools within the system had helped the managers improve on success of their project tasks thus improving the probability of project performance. From the findings, monitoring function tools generated by the PMISU were the characteristics that were rated highly with means of 4.02 and std. deviation of 0.75. Next to monitoring function tool, planning function tool and reporting function tools were highly used with a mean of 3.78 and std. deviation of 0.853 and 0.810 respectfully. Lastly evaluation function tools and controlling function tools were used moderately with a mean of 3.56 and 3.277 and std. deviation of 0.76 and 0.79 respectfully. This meant that the organization uses the PMISU in their day to day activities. On average the PMISU was rated great, with a mean of 3.92 and std. deviation of .632. This meant that the users felt that PMISU played an important role in the success of their tasks. Also the PMISU had high correlation with project success with correlation coefficients of 0.741 and a p-value of 0. 000. And based on the regression analysis the result shows that PMISU has a positive effect on project success by 30.6%.

## 5.3 Conclusions

The aim of this study was to determine the influence of Project Management Information Systems upon project success. More specifically, one objective was to determine the influence of the system on the success of construction projects. Another objective was to establish the influence of quality information on success of construction projects. Last objective was to assess the influence of the system use on success of construction projects in order to get a better understanding of the contribution of these systems to the success of

projects. Thus, based on the major findings stated above, the following conclusion has been reached.

The study has found that the usage of PMIS was imperative to most project managers, construction managers, supervising managers and case team leaders. As seen in the descriptive part the importance of PMIS is high in the organization. It means that there is an agreement among respondent about the importance of the Project Management Information System Variables (the system, quality of software and system use). And also the correlation and regression analysis done in this research found that there was significant influence of PMIS on Project Success in Defense Construction Enterprise in Building Construction and Real Estate Development Projects in Addis Ababa Ethiopia. Quality of information output has the greatest influence on project success followed by project management information system software and finally project management information system use.

Following the conclusions of previous research that project management information system success models should continue to be validated and challenged, the results of this research show that the use of a project management information system is in fact advantageous to construction project managers. Improvements in effectiveness and efficiency in managerial tasks were observed in terms of better project planning, scheduling, monitoring, and reporting. Improvements in productivity were also observed in terms of timelier decision-making and proper budgeting. It defines the project's cost, time and quality. It also defines the team, people, organization and their roles and produces standard and custom reports. Advantages obtained from project management information system use are not limited to individual performance but also include project performance. It should also be noted that the systems must provide reliable and accurate information that will enable the project team to perform their tasks efficiently and effectively. It is not the complexity of the software that matters but the quality of the information generated by the system and the ability of the user to use the information to manage the project. This information helps the user's / project managers to perform their tasks in a much professional manner.

From the research study, it can be concluded that project management information system makes a significant contribution to project success and should continue to be the object of project management research. Overall the usage of PMIS has an influence on project success.

## 5.4 Recommendations

It is recommended that:

- The results of this research show that organizations should adopt the use of Project Management Information System in the management of their projects. This is because they guarantee better management of project since it generates quality information needed for the effective and efficient management of the project
- The results of this research show that the use of a project management information system is advantageous to project managers (PMIS Users). This is due to the fact that improvements in effectiveness and efficiency in managerial tasks were observed in terms of better project planning, scheduling, monitoring, and reporting. Improvements in productivity were also observed in terms of timelier decision-making
- Prepare and design continuous programs for project managers aiming at providing them with the capabilities and personal skills to work with PMIS at all organizational levels.
- Develop reflection sessions between project managers and their teams to review, identify, and improve the usage of PMIS.
- When recruiting for a new managerial position, put standard tests to see their familiarity with PMIS software as criteria for selecting candidates.
- Always measure the status of the project against the plan to know its success or failure in regards to using the PMIS software.

## 5.5. Limitation of the Study & Suggestions for future research

The study is intended to examine the influence of project management information system on project success. In this regard, the research obtained valuable results however there are some potential limitations discussed below.

- This study is done on a single organization which makes it indicative but not fully conclusive. Thus, future studies in this area could be done by including other firms to increase conclusiveness of the findings.
- Among different project management information system variables and project success variables, this study used limited ones and get reliable result with other studies. So, in the future studies including more variables will help to know the influence better.
- The study is also done on projects that are located in Addis Ababa, so further studies could be done on a broader geographic scope.

- Evaluate success from the client's perspective, that is, evaluate if the influence of the Project Management Information System on project outcomes provide an adequate solution to the client's problem.

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# Appendix 1: Letter of Transmittal of Data Collection Instrument

Date: 11th February, 2020.

Haymanot Getachew,

Ethiopia

Dear Sir/Madam

RE: REQUEST FOR PARTICIPATION IN A RESEARCH STUDY

I am a Postgraduate student at the JIMMA University ABH campus, pursuing a Master's degree in project Management and Finance. As partial fulfilment for the degree I am conducting a research study on "Influence of Project Management Information System on Project Success: in the Case of Defence Construction Enterprise in Building Construction and Real Estate Development Projects in Addis Ababa Ethiopia."

Therefore, I would appreciate if you could spare a few minutes of your time to answer the following questions in regard to how Project Management Information system (PMIS) influences project Success in your organization. All the information provided will be purely used for academic purposes and your identity will be treated with utmost confidentiality.

Your assistance will be highly appreciated and thank you in advance.

Yours faithfully,

Haymanot Getachew

Mobile Number: +251 913393089

Email abaalove475@gmail.com

# Appendix 2: Questionnaire

IMPORTANT NOTE:

Information provided through the questionnaire will be treated with confidentiality and will be exclusively for academic purpose. All answers will be considered right.

INSTRUCTION: i. do not write your name on the questionnaire. ii. Please read each question carefully. iii. Kindly answer all the questions by ticking or filling in the spaces provided.

SECTION ONE: BACKGROUND INFORMATION

1. Gender: Male ☐ Female ☐

2. Age: I) 21- 30years ☐ ii) 31-40 years ☐ iii) 41 – 50years ☐

iv) Over 51 years ☐

3. For how long have you held the position?

I) 0- 3years ☐ ii) 4-7 years ☐ iii) 8–11years ☐ iv) Over 12 years ☐

4. Level of Education

I) Masters ☐ ii) Undergraduate ☐ iii) Diploma ☐

iii) Other please specify? _____

5. Which category of management are you representing?

I) Project Manager ☐ ii) Construction Manager ☐ iii) Supervising Manager ☐

iv) Case Team Leader ☐

SECTION TWO: PROJECT MANAGEMENT INFORMATION SYSTEM IN USE AT THE ORGANISATION

Please mark with a Tick in the applicable box with regard to the current Project Management Information System used in your organization.

**A. Project Management Information System Software**

How would you rate the general performance of Project Management Information System in your organization in the following areas? Please Tick

| | Very Low | Low | Moderate | High | Very High |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Accessibility | | | | | |
| Response Time | | | | | |
| Flexibility | | | | | |
| Ease of use | | | | | |
| Querying Ease | | | | | |
| Learning Ease | | | | | |
| System Integration | | | | | |
| Multi-project Capability | | | | | |

**B. Quality of Information output**

In your opinion, how would you rate the impact of the quality of information produced by Project Management Information System in project implementation? Please Tick

| | Very low | Low | Moderate | High | Very high |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Availability | | | | | |
| Relevance | | | | | |
| Reliability | | | | | |
| Precision | | | | | |
| Comprehensiveness | | | | | |
| Security | | | | | |

**C. The Project Management Information System Use**

In your opinion, how often are the following functions within the Project Management Information System utilized in project implementation? Please Tick

| **Planning Function Tools** | Very low | Low | Moderate | High | Very high |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Work Breakdown Structure (WBS) | | | | | |
| Resource Allocation | | | | | |
| Overall Schedule | | | | | |
| Gantt Chart | | | | | |
| PERT | | | | | |
| CPM | | | | | |
| **Controlling Function Tools** | Never | Rarely | Occasional | Often | Very often |
| | 1 | 2 | 3 | 4 | 5 |
| Fine-Tune Forecast | | | | | |
| Modify Tasks | | | | | |
| Reassign resources to low cost | | | | | |
| Cancel Tasks | | | | | |
| Modify cost of Resources | | | | | |
| **Monitoring Function** | Never | Rarely | Occasional | Often | Very often |
| | 1 | 2 | 3 | 4 | 5 |
| Project Reports | | | | | |
| Completed tasks | | | | | |
| Percent Project Completed | | | | | |
| Effective Schedule | | | | | |
| Remaining Tasks | | | | | |
| Remaining days to complete | | | | | |
| **Evaluating Function Tools** | Never | Rarely | Occasional | Often | Very often |
| | 1 | 2 | 3 | 4 | 5 |
| Identification of cost | | | | | |
| Identification of Schedule variation | | | | | |
| Tracking the use of Resources | | | | | |
| **Reporting Function Tools** | Never | Rarely | Occasional | Often | Very often |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| An Overview of project | | | | | |
| Overview on work-in-progress | | | | | |
| Budget overruns | | | | | |
| Task and schedule slippage | | | | | |

**E. Impact of PMIS on Project Success**

How would you rate the general project performance in the following areas? Please tick

| | Very Low Contribution | Low Contribution | Moderate Contribution | High Contribution | Very High Contribution |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Meeting Deadlines | | | | | |
| Respecting Budgets | | | | | |
| Meeting quality specifications | | | | | |

Thank you very much for your time and participation!!

# Appendix 3: Correlation and Regression Results

### Correlation Among All Variables

| | | PS | PMISS | QIO | PMISU | PMIS |
|---|---|---|---|---|---|---|
| PS | Pearson Correlation | 1 | | | | |
| | Sig. (2-tailed) | | | | | |
| | N | 38 | | | | |
| PMISS | Pearson Correlation | .688** | 1 | | | |
| | Sig. (2-tailed) | .000 | | | | |
| | N | 38 | 38 | | | |
| QIO | Pearson Correlation | .714** | .488** | 1 | | |
| | Sig. (2-tailed) | .000 | .002 | | | |
| | N | 38 | 38 | 38 | | |
| PMISU | Pearson Correlation | .741** | .615** | .663** | 1 | |
| | Sig. (2-tailed) | .000 | .000 | .000 | | |
| | N | 38 | 38 | 38 | 38 | |
| PMIS | Pearson Correlation | .878** | .766** | .839** | .861** | 1 |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | |
| | N | 38 | 38 | 38 | 38 | 38 |

**. Correlation is significant at the 0.01 level (2-tailed).

**Model Summary[b]**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change | |
| 1 | .839[a] | .703 | .677 | .296 | .703 | 26.839 | 3 | 34 | .000 | 2.085 |

a. Predictors: (Constant), PMISU, PMISS, QIO

b. Dependent Variable: PS

**ANOVA**[a]

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 7.031 | 3 | 2.344 | 26.839 | .000[b] |
| | Residual | 2.969 | 34 | .087 | | |
| | Total | 10.000 | 37 | | | |

a. Dependent Variable: PS

b. Predictors: (Constant), PMISU, PMISS, QIO

## Beta Coefficient

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | .635 | .388 | | 1.636 | .111 |
| | PMISS | .323 | .118 | .329 | 2.748 | .010 |
| | QIO | .278 | .100 | .350 | 2.780 | .009 |
| | PMISU | .252 | .115 | .306 | 2.194 | .035 |

a. Dependent Variable: PS

**Coefficients**[a]

| Model | | Collinearity Statistics | |
|---|---|---|---|
| | | Tolerance | VIF |
| 1 | PMISS | .610 | 1.640 |
| | QIO | .550 | 1.819 |
| | PMISU | .449 | 2.229 |

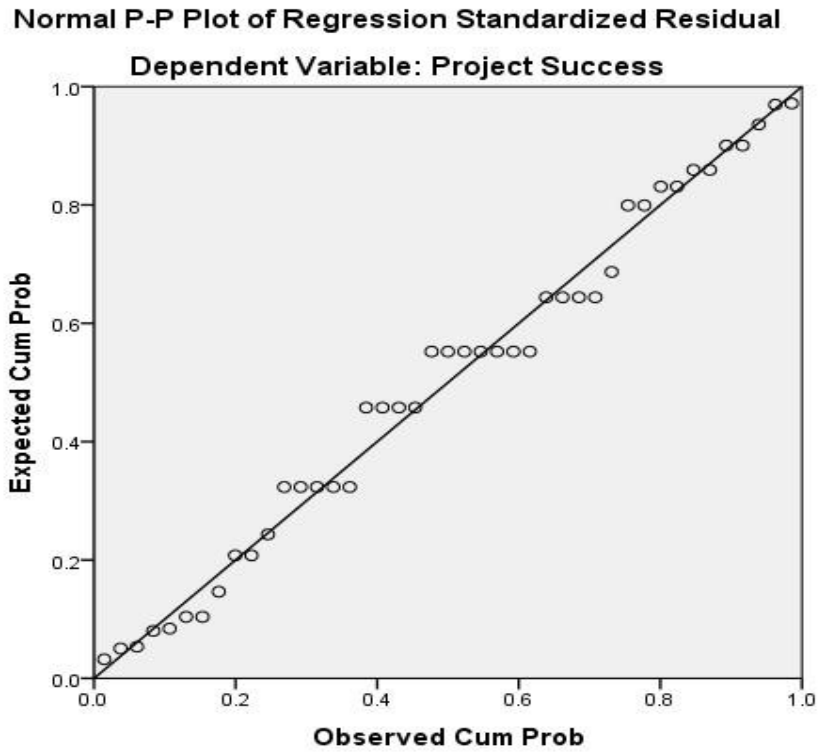
a. Dependent Variable: PS

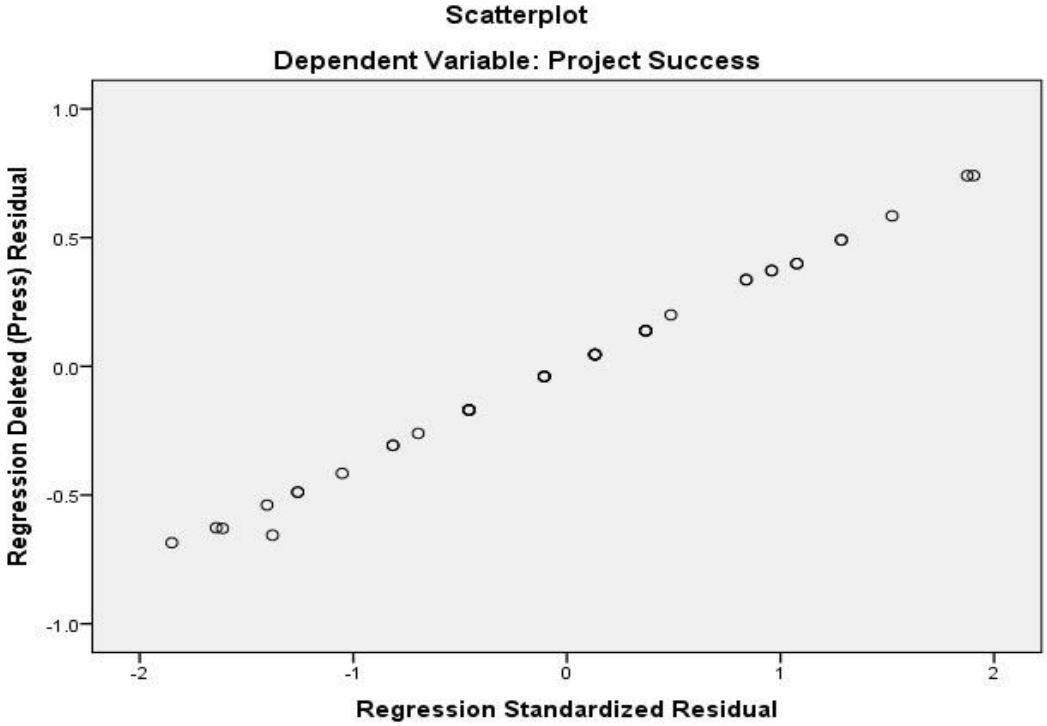
**Model Summary**[b]

| Model | Durbin-Watson |
|---|---|
| 1 | 2.085[a] |

a. Predictors: (Constant), PMISU, PMISS, QIO

b. Dependent Variable: PS


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Project Success
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Scatterplot
Dependent Variable: Project Success
Regression Deleted (Press) Residual
Regression Standardized Residual
1.0
0.5
0.0
-0.5
-1.0
-2
-1
0
1
2