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**Assessment of Project Implementation and Rating of  
Critical Factors Affecting Project Success in  
Construction Projects: In the case of Bamacon  
Engineering**

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**A Project work submitted to the School of Graduate Studies at Addis  
Ababa University, College of Business and Economics in Partial  
Fulfillment of the Requirements for the Degree of Master of Arts in  
Project Management**

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**Jun, 2020**

## School of Graduate Studies

This is to certify that the thesis prepared by *Tsedenya Yohannes*, entitled: **Assessment of Project Implementation and Rating of Critical Factors Affecting Project Success in Construction Projects: In the case of Bamacon Engineering** submitted in partial fulfillment of the requirements for Degree of Master of Arts **in Project Management** complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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## **Statement of Declaration**

I, Tsedenya Yohannes, declare that the work contained in this thesis (Assessment of Project Implementation and rating of critical factors affecting project success in Construction Projects: In the case of Bamacon Engineering) is my own original work. This study has not been presented for the award of any other Degree, Diploma and other similar titles of any other university or any other institution. I have carried out the work with the guidance of my advisor.

By: Tsedenya Yohannes

Signature: \_\_\_\_\_

Date \_\_\_\_\_

## *Abstract*

*The study aimed to assess the current project implementation practice of Bamacon Engineering P.L.C and identify factors which affect the construction performance in accordance with their severity. The study used both qualitative and quantitative research approaches. The qualitative approach was used for documents review and open ended questions that were included in the questioner and the quantitative approach for closed ended questions. Accordingly, data were collected through questionnaire from sample respondents. The target populations for this study were skilled laborers of five projects namely: DHI, Century 1, Century 2, Nomiyan Apartment and Metrpolitan Apartment located in Addis Ababa. The total population was 78. Sampling technique that the researcher used was Census Method. Out of 78 respondents, 52 workable data were obtained. Those data were, then, analyzed through descriptive and explanatory statistics. In the descriptive analysis, the data were presented in Histogram and Pi-chart form and from there described the situation of project implementation practice. Explanatory analysis using regression (Multiple Linear) was employed to analyze the severity of the factors affecting project success. The finding revealed that the five project success factors (Project, Client, Contractor, Consultant and supply chain) altogether account about 61% of the variance in project success; Project related factor, Consultant related factor and Contractor related factor have statistically significant contribution to the success of projects. It was also noted that projects run under the risk of cost overrun and time delay but keep the quality as required in the specifications. From the documents review, it was noted that there is a minimum of 26 days delay and work productivity of unskilled labor is less than required.*

Key words - Project, Project management, Project Implementation, Project success, Key performance indicators, Project success factors, Project success variables

## **Acknowledgement**

I would like to thank the Almighty God who helped me through life and completion of this paper. Also I would like to thank my advisor Dr Mengsitu for his advice in this study. My cordial gratitude goes to all the respondents, who have made this research come true. I would also like to thank Engineer Esubalew Assafe (Project Manager of DH1) for his cooperation in distributing the questioners. So also my deepest gratitude goes to Bamacon Engineering for their unreserved cooperation.

A special thanks goes to my beloved husband Mr. Eskinder Amabye for his motivation, inclusive encouragement and overall support he gave me throughout the study period. Deepest gratitude goes to my family and friends for the valuable support and contribution they rendered for the completion of my MA program in general and for this study in particular.

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## **ACRONYMS AND ABBREVIATIONS**

PM -Project Management

PS-Project success

KPIs -Key performance indicators

KBPPIs -Key Building Project Performance Indicators

HR-Human resource

SD- Standard deviation

# CHAPTER ONE

## INTRODUCTION

In this section, the rationale or driving reason for conducting the research will be discussed.

### 1.1 Background of the study

The construction industry plays a vital role in the economy of most countries of the world, including our country Ethiopia. This is manifested, as described in ILO (2001), in providing employment opportunity, in its contribution to the Growth Domestic Product (GDP) and its relationship with other sectors of the economy (e.g. the manufacturing industry-goods and materials, tools and machinery etc.)

The construction industry is realized by projects and project implementation which undergo many difficult and complex processes from inception to the completion of the project. Project implementations are internally realized by the time input devoted on human, financial and technical elements as part of the project management.

Project is defined as a temporary endeavour undertaken to create a unique product or service. Temporary 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 or services (PMI, 1996, p.4). By its basic definition, a project comprises a defined time frame to completion, a limited budget, and a specified set of performance characteristics.

Project Implementation as Nutt (1996), puts is a series of steps taken by responsible organizational agents to plan change process to elicit compliance needed to install changes. The implementation phase keeps the project plan on track with careful monitoring and control processes to ensure the final deliverable meets the acceptance criteria. This phase is typically where approved changes are implemented. Success of construction project depends on its performance.

Projects are often initiated in the context of a turbulent, unpredictable, and dynamic environment. Consequently, the project manager would be well served by more information about those specific factors critical to project success. Project success factors

(PSFs) are factors or characteristics that, when present, improve the likelihood that projects will be implemented successfully (Kerzner, 1997, 2003; Pinto & Slevin, 1987). Kerzner (1987) also defined Project Success Factors as "elements required to create an environment where projects are managed consistently with excellence".

According to Omran (2012), the success of construction depends on its performance which is measured based on timely completion, within the budget, required quality standards. Has it been finished within the time framework and the budget allocated? The outcome means the end result of the project. Is it a functional project meeting the intended result with satisfactory quality?

Construction projects are typically characterized by large investment, long-time duration, and numerous stakeholders (Tait et al., 2009). A construction project has various stakeholders depending on conditions of which the primary ones are the Project Owner (the client), the Contractor and the Consultant.

This paper attempts to assess the project implementation practice and to rate critical factors affecting project success of a first class contractor named Bamacon Engineering PLC, based in Addis Ababa. It is believed that this construction firm is one of the leading contractors engaged in building construction projects.

## **1.2 Problem Statement**

There are several reasons for the success or failure of a project and/or project implementation. Idako, (2008) noted that "projects in the developing countries face considerable time and cost overruns. They fail to realize their intended benefit or are even terminated and abandoned before and after their completion". The Ethiopian construction industry also shares most of the problems and challenges the industry is facing in other developing countries perhaps with greater severity.

There is evidence of the existence of a very strong relationship between construction activity and economic growth. As an investment sector, construction has the potential to impact positively on short-run growth. Construction can thus be regarded as a major component of investment programmes, particularly for developing economies like

Ethiopia. Construction industry plays a major role in Ethiopia and also in other developing countries but there is poor level of performance of the industry in those countries, improving the performance of the industry needs to be a priority action (Yimam, 2011). In this regard, project implementation is a critical stage for the success or failure of a project, where in expected and unexpected risks and challenges may happen which may be manifested and expressed in the form of time laps and budget overrun.

Efficient and competent Project management comes in the forefront to curb or minimize this situation. Carrying out continuous follow-up and critical assessment at every stage of the implementation period from the start to the end of the project effectively and efficiently by the management team or the manager is essential to the failure and success of the project. Jeffrey (1998), writes "... to successfully implement a construction project is usually difficult and complex. The project manager has to devote more time on human, financial and technical variables as key to the realization of project implementation."

Project management has evolved over the past couple decades as researchers and practitioners have attempted to identify the causes of project failure and the various factors that lead to project success. Traditional project management skills were developed from the requirements of construction and defence industries to plan, control and manage large and complex 'tangible' projects (Morris, 1994; Bourne and Walker, 2004). But apart from project management and implementation problems mentioned above, there are several other reasons and factors that contribute to the performance of a project. The nature of the project itself (its geographical location and infrastructural conditions, accessibility in terms of roads, water and power supply), and stakeholders' related factors and the supply chain as related to skilled and unskilled labor force, finance, material and availability of tools and machinery in quality and quantity contribute and influence the performance, i.e. the success or failure of projects.

These problems have been portrayed in the building construction projects Bamacon Engineering P.L.C is currently undertaking in one way or another. The researcher discussed with Engineer Esubalew and Engineer Melat on Jan 2020, while working on DH1 project and understood that there are performance variations between the different

projects, depending on the influence of the client and the consultant. Some projects had been performed well while others had not. Understanding where exactly the company needs to improve its performance by understanding which factors are more sensitive or are affecting the project implementation practice would take the company one step closer to a better project implementation practice. This intern guarantees the success of the project in terms of key performance indicators, (cost, time and quality).

Prior researches, such as Endale(2019) and Genzeb(2018) conducted researches to assess factors affecting effective implementation practice in several companies but had not pointed out which of the factors took major roles in affecting the project implementation practice. Simultaneously, though there are many researches worldwide which focus on factors affecting project implementation success, they haven't shown which factors are more serious and how the factors affect project performance in terms of measurement criteria like cost, time and quality. Saraf (2013), Christopher and Debadyuti (2015), Zarina et al. (2014) are some of worldwide researchers who have developed conceptual frameworks. These and other factors should be studied and their severity should be known in order to have a better project implementation practice. This research begins with project implementation assessment and identifies which of the factors affect project performance that in turn affects the success of the project. So, this research has attempted to fill the gap by prioritizing the top affecting factors in order to overcome the major problems.

### **1.3 Research Questions**

The major research questions to be answered in this research paper are:

- What does the project implementation look like?
- What are the main factors that affect the success of project implementation practices in Bamacon Engineering?
- Which factors play the major role in the lagging of time, budget overrun and poor quality projects?

## 1.4 Objectives

### General Objective

The general objective of the study is assessing project implementation of construction projects in the Case of Bamacon Engineering P.L.C

### Specific Objectives

To meet the general objective, the study is focused on the following specific objectives:

- To assess the current implementation practices of Bamacon Engineering P.L.C.
- To identify the main factors that hinder the success of project implementation practice in Bamacon Engineering P.L.C.
- To evaluate and rank the severity of the factors that challenge the success of the implementation in terms of project success (cost, time and quality)

## 1.5 Research Hypothesis

To achieve the research objective, the following research hypothesis were developed for the study

- H1: There is significant relationship between Project related factor and project success
- H2: There is significant relationship between Client related factor and project success
- H3: There is significant relationship between Consultant related factor and project success
- H4: There is significant relationship between Contractor related factor and project success
- H5: There is significant relationship between Supply chain related factor and project success

## 1.5 Significance of the study

The finding of the study is very beneficial for the self-assessment of Bamacon Engineering in terms of their project implementation practice. Knowing or understanding which factors are affecting their performance and which once are critical will be a stepping stone to a better performance in the future. It will enable the organization to check and evaluate its project management methodologies. The findings, conclusion and

recommendations of this study will enable Bamacon to overcome its challenges in project implementation by addressing the root causes of the problems.

The researcher believes that the research findings will contribute to other organizations to know the importance of project management practices in construction projects and learn from the findings of the study and apply suggested recommendations. The study would give a better insight to concerned bodies (Client, Contractor and Consultant) the major problems affecting projects negatively. Information of the problems would create solutions and better work environment. For future researchers, the study would suggest further research to build on factors affecting project implementation practices in terms of different KPIs.

### **1.6 Scope of the study**

As mentioned earlier, this research is focused on the Project Implementation practice of Bamacon Engineering, which is a grade one contractor company. Due to the limitation of time and money, from among the projects that are under construction the researcher has chosen only five projects which are located in Addis Ababa. To choose the respondents of the questioner, the researcher has carried out census survey to address the skilled labor force working on the projects. Please note that, this paper has been performed in the short period of time of the second semester schedule.

### **1.7 Limitation of the study**

Due to the pandemic disease, Covid 19, the number of workers on the site has decreased so the researcher had to add two more projects on the previously selected three projects, which has proved time taking. It was also impossible to assess libraries due to the same reason.

### **1.8 Definition of Terms**

All the definitions are taken from PMBOK Guideline, 5th edition

*Project manager-* A project manager is the person assigned by the performing organization to lead the team that is responsible for achieving the project objectives.

*Stakeholder-* A stakeholder is an individual, group, or organization who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project.

*Project management process success-* This focuses upon the project process and, in particular, the successful accomplishment of a project on cost, time, and quality objectives.

*Project life cycle-* A project life cycle is the series of phases that a project passes through from its initiation to its closure.

*Client-* A Client is the owner of the Project which conceptualizes a project idea and eventually translates his idea in to design/construction intent by employing expert vendors.

*Consultant (architect or engineer) -* acts as the project coordinator. His or her role is to design the works, prepare the specifications, produce construction drawings, administer the contract, tender the works, and manage the works from inception to completion (Ratnasa Bapathy, 2008).

*Contractors-* are usually private firms or individuals who undertake construction of a project under certain terms and conditions as suggested by the client while agreeing to comply with the design and specifications provided in a Contract Document.

*Project success variables-* statements listed in each factors.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

This chapter is mainly concerned about presenting a view of literatures that are related to the research questions that are being analyzed. This section includes definition of project, project management, project life cycle, project implementation, and construction projects. It also deals with projects success criteria and illustrates the findings of different researches regarding which success factors should be used to measure project success. Finally, this chapter shows the conceptual framework used for the study.

#### **2.1 Theoretical literature review**

##### **2.1.1 What is project?**

Everyone experiences project in one way or another way but developing a definition of what exactly a project is often difficult. As Cleland and Ireland (2002); Crawford and Pollack (2007), explained that project definition participants debate against developing a comprehensive definition of what a project is has remained elusive over the years." The term project is described in different words by different authors but, almost all the authors agree on some characteristics of a project. Some of them are presented here.

Project is series of activities that have a common or specific objective and project must be completed with certain specifications. Projects are resource constrained. Wysocki (2014) defines project in a broader way as a "sequence of unique, complex, and connected activities that have one goal or purpose and that must be completed by a specific time, within budget, and according to specification." The author also notifies that "projects are business focused." Project is also described as a "value creation undertaking based on specifics, which is completed in a given or agreed timeframe and under constraints, including resources and external circumstances" by (Ohara, 2005, p.15).

Construction projects also possess same characteristics as projects, so one can refer construction as a project. Construction is an organized process of constructing, renovating and refurbishing a building, road, bridge structure. The process of construction goes through changing requirements; the change is developed through the

creation of a brief feasibility study, option studies, design, financing and construction. Different professionals participate to produce a unique design that delivers a single product.

### **2.1.2 Project management**

Like the definition of project, project management also has different definition stated by different literatures. Some of them are discussed below.

Roberts and Wallace (2004), also state that project management is concerned with the life cycle of the project: planning and controlling the project from inception to completion. It is, therefore, about deciding the various success and failure criteria of a project and then organizing and running the project as a single entity so that all the success criteria are met.

Tan (1996), illustrated that the concept of project management can be applied to a simple like office renovations or complex and complicated projects like the design and construction.

### **2.1.3 Project life cycle**

"The concept of project life cycle is a useful frame work for looking at the project dynamics over time. One method that has been used with some regularity in order to help managers conceptualize the work and budgetary requirements of a project is to make use of the idea of the project life cycle." (Jeffrey & Pinto Dennis 2015)

Literature has many definitions of project life cycle and how many stages it contains. Ford and McLaughlin (2013), argue that a project life cycle exists and that the individual stages can be distinguished from each other. This stage is referred by Adams and Barndt (1988), as Conceptual; Planning; Execution; and Termination. And Geddes and Hastings (1990) said that "every project goes through the same phases: definition, planning and resourcing, implementation, and hand-over".

A project is managed in most industries and disciplines according to a project life cycle. This cycle describes a period of time when a project is initiated, planned, executed, and closed (Project Management Institute, 2013). The phases can be broken down by functional or partial objectives, intermediate results or deliverables, specific milestones within the overall scope of work, or financial availability. Phases are generally time bounded, with a start and ending or control point. A life cycle can be documented within a methodology. The project life cycle can be determined or shaped by the unique aspects of the organization, industry, or technology employed. While every project has a definite start and a definite end, the specific deliverables and activities that take place in between vary widely with the projects (PMI, 2013). Since from among all stages of project life cycle, execution or implementation require the most attention in terms of human, budgetary, and technical variables. Jeffrey and Pinto (2015), also agree with the above statement. They stated that “the third stage of project cycle requires more attention and is usually very complex.

#### **2.1.4 Project Implementation**

After finishing planning stage of a project the next phase is project implementation which is the third phase of project management life cycle. It is an action phase. The project manager takes a lot of responsibility to accomplish this action. Coordinating and managing the resources to meet the objective of the project is one of the responsibilities of project implementation. Jeffrey (2015) stated that Projects are usually stimulated within the context of a turbulent, unpredictable, and dynamic environment. The project manager should also make sure that the project meets service delivery needs consistent with government's strategic dimension and companies' business objectives, selecting and assigning appropriate professional expertise, establish accountability and responsibility in clear lines with documentation.

Project implementation success has been defined in many ways. Jeffrey (2012) pointed out that a project is said to be implemented successfully if it comes in one schedule, comes in one budget, and achieves basically all goals originally set for it and acceptance of the clients. Different researchers argue that there are several requirements other than cost, time and quality for a project to be successful.

Implementation of construction projects reveals that the projects are not completed without any rework being performed upon them (Love et al., 2010; Ahadzie et al., 2008). In addition, most of the projects are neither completed in time nor meet budgetary requirements (Kamrul and Indra, 2010). Further construction activities are said to be very unsafe, (Billy et al., 2006; Haslam et al., 2005; Ortega, 2000) and that they can easily be derailed by disputes (Tabish and Jha, 2011).

### **2.1.5 Project implementation in construction projects**

Many research studies have been conducted to evaluate and improve performance in the construction industry (Soewin and Chinda, 2018). Sandanayake and Wadugodapitiya stated that the construction industry has been always criticized for its underperformance due to its uniqueness in nature. Also according to past researchers, there is lack of an appropriate Project Management system to improve construction performance. Therefore, it is necessary to measure the building construction project performance using a scientific PM System.

### **2.1.6 Project success**

The concept of project success still remains ambiguously defined. It seems that the identification of project success is complicated (Neyestani & Juanzon, 2016). For the improvement of project delivery effectiveness studying project success and critical success factors (CSFs) should be considered (Chan et al., 2004). By its nature, construction is a risky business. Current project management practices of organizations in the construction industry sector do not always ensure project success.

To evaluate the performance or success of a project, there is lack or absence of standard evaluating benchmarks. Due to this reason project managers' effort to succeed in managing construction projects is usually not coming true. The success of a project has been defined and the projects performance measured in various ways by different clients over the course of time has not been confirmed (Saraf, 2013).

According to Omran (2012), the success of construction depends on its performance which is measured based on timely completion, within the budget, required quality

standards and customers satisfaction. Kagioglouet *al.* (2001), argued that traditional indicators such as cost, time and quality do not in isolation, provide a balance view of the projects' performance. Success is measured both objectively (cost and time) and subjectively (quality and satisfaction) (Wit, 1988).

### **2.1.7 Critical Success Factors**

There are arguments about which critical success factors must be used. Different authors developed many critical success factors for measuring project performance. But still there is a lack of a multi-dimensional approach to quantify construction project performance and hence, there is a need to develop a multidimensional perspectives and Key Building Project Performance Indicators (KBPPIs) for construction project performance evaluation (Soewin and Chinda, 2018).

Quality of construction projects are also influenced by design changes, lack of quality systems, contractor selection, ineffective use of information technology and inter-organizational interactions significantly influence the quality of construction projects (Alwaer and Clements-Croome, 2010; Love et al., 2010).

## **2.2 Empirical literature review**

This section contains reviewed literature that was relevant to this study. Literature reviewed show that there are different literatures indicating different critical success factors and KPPIs

Tabish & jha (2012) stated from their survey of 112 questionnaires, from among different critical success factors, time (89%), cost (79%) and quality (74%) are respectively taken as the most important factors for successful projects. Therefore, these three factors are the most reliable, countable, and controllable notions that managers and practitioners are used to considering as main criteria of project success. Zwickau & Smirk (2011), also agree that their research model explained the success of a project can be affected by: schedule overrun, cost overrun, project performance.

Sara (2013) indicated that stakeholders meaning Contractors, Engineers and project owners agree that most important factors affecting project performance are improper planning, improper designing, site management, decision making, construction methods,

shortage of labor and technical personnel, quality and shortage of materials, construction mistakes and defective work productivity. The paper reports findings of a survey targeting the three parties. The summary of the relative importance index and rank perspective of contractor is shown on the table.

Table 2.1 relative importance index and rank perspective of contractor. (Sara, 2013)

No.	Critical Factors By Engineers Perspective	Rank
01	Construction methods	1
02	Improper planning	2
03	Site management	3
04	Construction mistakes and defensive work	4
05	Shortage of labor and technical personnel	5
06	Productivity	5

Zaria et al. (2014) developed a conceptual framework but haven't showed which factors are more serious and how the factors affect project performance in terms of measurement criteria like cost, time and quality. These and other factors should be studied and their severity should be known in order to have a better project implementation practice. The aim of this paper is to assess the implementation practice of Bamacon Engineering P.L.C, to identify the main factors that hinder the project implementation practice in Bamacon Engineering P.L.C and to evaluate and rank the severity of the factors that challenge the success of the implementation in terms of major project success factors (cost, time and quality).

Christopher and Debadyuti (2015), in their article named performance evaluation framework of construction projects: Insights from literature, developed a framework to evaluate performance of construction projects.

1. Project related factors during project construction regarding the size, type and complexity of construction

2. Client-related factors stress mainly on clients' experience and project management capability
3. Consultant-related factors is mainly about preparation of design documents, drawing details, changes in design documents, specifications of the project, etc.
4. Contractor-related factors which are responsible for quality management practices adapted by the contractors, their technical expertise, site management and supervision skills, etc.
5. Supply chain-related factors encompass those factors relating to the selection of Suppliers, procurement of the right materials and equipment, availability of skilled and unskilled labor in quality & quantity, etc.
6. External environment-related factors which deal with the economic, social, political, technological and ecological environment affecting the success of a construction project.

### **2.3 Conceptual Framework**

To make sure the project delivery on time, Critical success factors (CSFs) which encompasses many elements and are inputs to project management practice must be synchronized. These factors lead directly or indirectly to project success (Zarina et al, 2013).

Due to the variation of the independent variables or factors that affect the performance of project Implementation selecting Independent variables for this study was very difficult. Among the researches, C. Ngacho and D. Das (2015) categorized the factors into six broad headings based on various characteristic features affecting each individual KPI of a construction project. To develop the framework the researchers conducted a very intensive literature review and received a feedback from experts. The factors are project, client, consultant, contractor, supply chain and environmental related factors. On the finding they showed that all the categories except environmental related factors have a direct effect on the overall performance of construction projects.

For this paper, the researcher has used five of the factors that have direct effect on the performance of the construction projects. The factors include related variables within them. They are presented with brief explanations as follows.

*Project related factors* include Project location, design complexity, project managerial action, communication and collaboration among project participants and formal structural organization of the company.

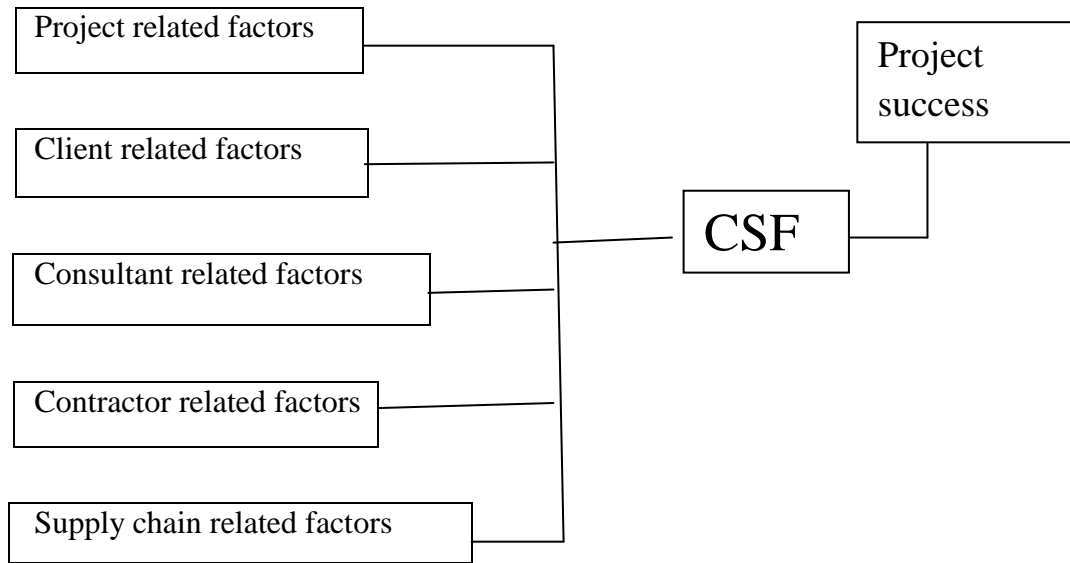
*Client related factors* comprise variables like financial capacity and payment schedule of the client, clients' choice on fast and low cost constructions, and long process of project approval, client experience and ability to make timely decision on different questions that affect project performance.

*Consultant related factors* like consultants' concern to insure the compliance of the construction work according to specification, adequacy of design, specifications and documentations, design team experience and technical skills and delay in production of design documents.

*Contractor related factors* containing variables such as management skill of site manager, contractor's technical skills and experience, size and skill of the labor force, construction method adopted and the capacity of contractors to pay to workers and sub-contractors on time.

*Supply chain related factors* concerned with the availability of skilled and experienced workers, the required materials in quantity and quality, and suitable equipment.

The conceptual framework illustrates the factors for project performance which were applied to capture the relevant data about the variables and their effect on the project success in terms of cost, quality and time.



**Fig 2.1 Conceptual framework**

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

As Polit and Hungler (2004) stated, research methodology is all about obtaining, organizing and analyzing data. This chapter discusses the research settings and how the research objective has been met. It includes research approach, methods and design being used by the study, sample size determination, and data collection instrument.

#### **3.1 Research approach and design**

##### **3.1.1 Research approach**

There are three research approaches: qualitative, quantitative, and mixed methods. Creswell (2014) stated that the approaches are not totally opposite or are distinct categories but they are different ends of a continuum. According to Kothari (2004), quantitative method involves the generation of data in quantitative form which can be subjected to rigorous quantitative analysis in a formal and rigid fashion, whereas, qualitative method is concerned with subjective assessment of attitudes, opinions and behavior. The researcher used both qualitative and quantitative research approaches. The qualitative approach for documents review and for open ended questions that was included in the questionnaire and the quantitative approach for closed ended questions.

##### **3.1.2 Research Design**

The research design reflects the purpose of the inquiry. The design approaches can be categorized as one or more of Exploration, Description, Explanation, Prediction, Evaluation and History. The research design is like a working guideline or a blue print to the next steps which analyze data and present the results. This study adopted both descriptive and explanatory research design.

Descriptive research describes the characteristics of a population or phenomenon. It answers questions such as Who, What, Where, When, Why and How. Descriptive analysis was used to assess the implementation practice of Bamacon and to understand the phenomena. The aim of explanatory research is to identify any causal links between the factors or variables that pertain to the research problem. Regression determines not only whether variables are related but also the degree to which they are related (Gay,

Mills, & Airisan, 2009). In this regard, to answer the third research question (Which factors play the major role in the lagging of time, budget overrun and poor quality projects) and to know if there exist a link between the dependent and independent variables with their significance level, multiple regression analysis was conducted.

Even though there are a number of stakeholders to complete a single project, the majority of project implementation work is performed by the contractor. The contractor is the main actor or performer who does the actual/practical building work and who changes the idea into reality. Therefore, it is reasonable to investigate the performance of the PI process in Bamacon Engineering Plc. So descriptive research type helps to know what the varying nature of the problems are.

### **3.2 Research population and sampling**

Neuman (2000) defined Target population as “a set of all elements that belong to a certain defined group to be studied and used to generalize the result of the study.” As a Grade I Building Contractor, Bamacon Engineering P.L.C has many projects that are under construction and many more had been constructed. This research focuses only on five projects that are being carried out in Addis Ababa. The projects are DH1 project which is a diplomatic residence building, Century 1 and 2 mixed use buildings and Metropolitan and Numiyen Apartment. The projects were selected because all are under construction or under implementation stage and they are huge construction sites, where more complicated project implementation practices are expected to be present and because of their proximity, (they are located in Addis Ababa.)

The target group of the study is skilled laborers of the projects under study. To identify factors that affect the performance of construction and understand their impact according to their seriousness, the respondents should be skilled and should directly involve on the implementation practice. Since there were a limited number of skilled laborers (73) on all projects, the researcher has used census survey which is recommended for small number target population.

Skilled labor includes different professionals such as managing directors, project managers, quantity surveyors, planning managers, site execution team including site Engineers, quality inspectors, document controllers and safety supervisors.

### **3.4 Data collection**

The research method consists of how the researcher collects, analyzes, and presents the data in the study (Creswell, 2009). The study aimed to assess the current project Implementation practice of a single construction firm and identify factors which are affecting the construction performance in accordance to their severity; hence in order to collect data that could answer the research paper the researcher has used primary and secondary data collection methods. Technological advances have led to vast amounts of data that have been collected, compiled, and archived, and have made it easily accessible for research nowadays (Melissa, 2014). The first stage was to execute an extensive search of books, articles, other related researches and the internet.

Data were collected from documents review of the projects. Documents such as the weekly report, monthly report and contract documents have proved useful sources. "When data are collected directly from the original source, it is said to be Primary data." said (chandran, 2004). To conduct this research, primary data were collected through questioner. The questioner includes both open and closed ended questions. Kothari stated that questioner method which is one of data collection methods is more appropriate tool relative to other tools because it is economical in terms of time and cost. It gives freedom to respondents to express their views. This paper collects relevant data from respondents through a questioner. Detail and relevant information about the socio-demographic, behavioral and work environment characteristics, the practices of project implementation in the study area, challenges to proper implementation of projects, Causes of project implementation delay, what major factors cause extravagance and poor quality of work were collected.

To increase the validity of the research result, the researcher sent the questioner to project managers virtually on telegram so they can give orientation to their workmates. Five Likert scale survey was used to assess the project implementation practices. Response

choices on the questionnaire have been coded as 1= Strongly Disagree, 2 = Disagree, 3= Neutral, 4=Agree and 5= Strongly Agree

### **3.5 Data analysis**

After the necessary and adequate data are captured, the data were organized in a suitable way to be analyzed using both quantitative and qualitative data analysis methods. The collected data from closed ended questioner were coded into SPSS and were analyzed using explanatory analyses and descriptive analysis. Frequencies and percentages were used to present result of descriptive analysis. This helped to assess the project Implementation practice of Bamacon. Explanatory analysis using regression (Multiple linear) was employed to analyze the severity of the factors affecting project success. Open ended question and document review helped to asses and identify if there are other factors that affect the success of project implementation that were not included on the questioner.

### **3.6 Ethical Consideration of Research**

On the base of Saunders, et al. (2009) suggestion the privacy of participants were maintained, voluntary nature of participation and the right to withdraw partially or completely from the research process was granted and communicated, maintenance of the confidentiality of data provided by individuals or identifiable participants and their anonymity was secured.

## **CHAPTER FOUR**

### **RESEARCH FINDINGS AND DISCUSSION**

This chapter contains data presentation, analysis and discussion on findings about the factors that affect the project implementation practice in Bamacon Engineering, in understanding the assessment practice and identifying the main variables that have critical impact on the project success that are measured in terms of key performance indicators (cost, time and quality). In this regard, data were analyzed from answers obtained from the questioners (both open and closed ended questions). Descriptive and Explanatory statistics were used to analyze variables. Before the data analysis, data cleaning has been done and extreme values were checked, and only complete and non-extreme responses were used for the data analysis.

The chapter is organized in to demographic characteristics of the study participants, analysis of distribution of responses: - among project related factors, client related factors, consultant related factors, contractor related factors and supply-chain-related factors.

#### **4.1 Data Cleaning**

As stated in the previous chapter on the methodologies, 73 questionnaires were distributed and 60 were returned for analysis. Meanwhile, when the data were checked for its completeness and practical response pattern, only 52 valid responses were found. So this means 8 responses were rejected and cancelled from this study. From among the rejected responses 5 of them were incomplete and 3 of them have extreme patterns. Therefore, 52 workable responses were used for data analysis.

#### **4.2 Response rate**

Koltler, (1997) " ...The response rate is the extent to which the final set of data includes sample members and is calculated from the number of people who filled and returned the questionnaires divided by the total number of people in the entire sample, including those who refused to participate and those who were unavailable." The response rate was equal

to 82.2%. This rate is considered to be excellent since it is more than 70% as stated by (Mugenda and Mugenda 1999).

### 4.3 Missing value test

Missing test is used to assess whether the data were missed or not. Missing test of each demographic characteristic are presented in the respective sub title.

### 4.4 Demographic Characteristics of Respondent

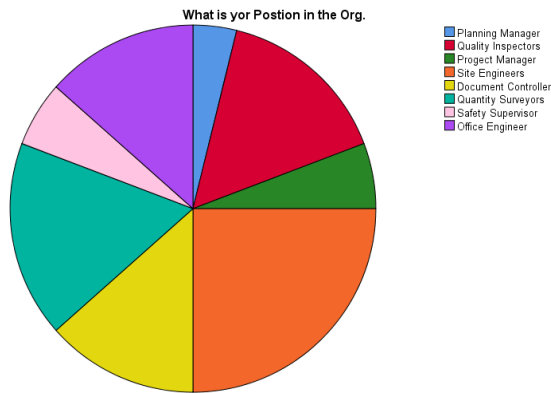
#### 4.4.1 Position in the organization

**Table 4.1 Missing test of position of respondents in the organization**

N	Valid	52
	Missing	0
Std. Deviation		2.32851
Percentiles	100	10.0000

*Source: Own Survey, computed in SPSS, 2020*

**Fig 4.1 Position of respondents in the organization**



*Source: Own Survey, computed in SPSS, 2020*

From among few work positions listed out in the questioner and on the open space provided to mention if the respondents position is other than the mentioned, 13 of the respondents were site Engineers, 3 Project managers and 9 were Quantity surveyors. 2 of the respondents were Planning managers while 7 of them were office Engineers. The analysis showed that 8 Quality inspectors, 7 Document controllers and 3 Safety supervisors responded.

This shows that the majority of them are site Engineers (25%) and Quantity surveyors (17.35%). Both portfolios are main professionals that have a bigger contribution to the construction performance.

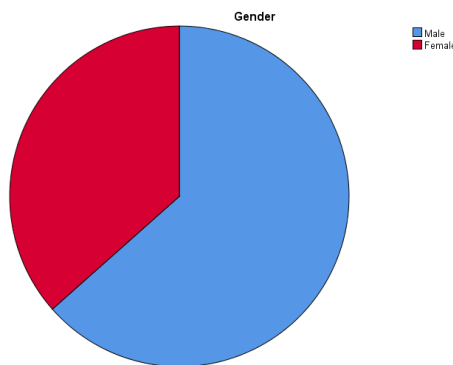
#### 4.4.2 Gender

**Table 4.2 Missing test of Gender**

N	Valid	52
	Missing	0
Std. Deviation		.48624
Percentiles	100	2.0000

*Source: Own Survey, computed in SPSS, 2020*

**Fig 4.2 Gender of respondents**



*Source: Own Survey, computed in SPSS, 2020*

As presented on the chart, 63.5% of the respondents were male and 36.5% of them were female. This shows that there are more male employees than female employees in the five projects selected for this study. The gender of the employees had no effect on the success of the projects because the sample population of the study was skilled laborers working in the five projects selected. So, as far as the employees are skilled their gender doesn't matter on the performance.

#### 4.4.3 Work experience of the respondents

Missing test and level of work experience of the respondents in Bamacon Engineering is presented on the below. From the findings, 26.9% of the respondents have more than five years of experience in Bamacon Engineering, 26.9% of respondents had 2-5 years of

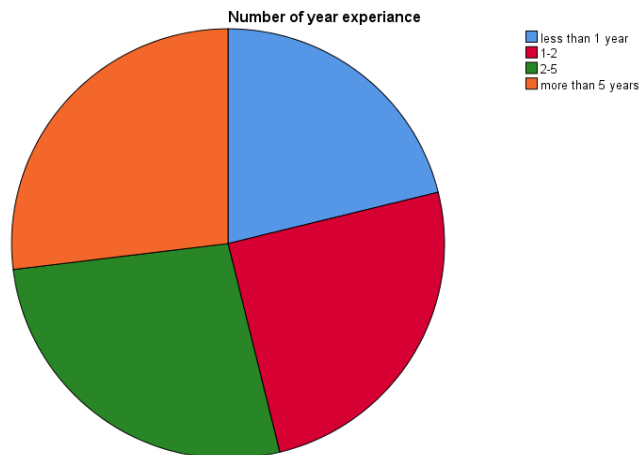
working experiences, 25% of them had above 1 year and less than two years of experience in Bamacon while 21.2% of the respondents had less than one year of working experience. From the result, 78.8 % of the respondents had more than 2 years of work experiences in the organization. It shows that the participants were experienced enough to providing reviews or a valuable response about the project implementation practices of Bamacon Engineering.

**Table 4.3 Missing test of work experience of respondents**

N	Valid	52
	Missing	0
Std. Deviation		1.10719
Percentiles	100	4.0000

*Source: Own Survey, computed in SPSS, 2020*

**Fig 4.3 Work experience of the respondents**



*Source: Own Survey, computed in SPSS, 2020*

#### 4.4.4 Level of education

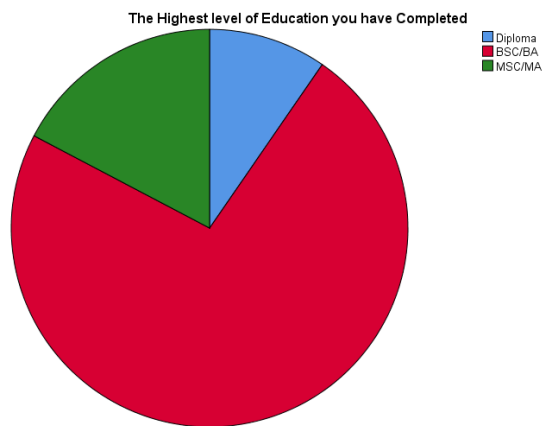
According to the respondents replay to the questioner to identify which level of education they are, 9.6% of them had diploma, 73.1% of the respondents were degree holders and 17.3% had second degree while none of them had a PhD. Thus, the majority of the respondents were degree holders.

**Table 4.4 Missing test of level of education**

N	Valid	52
	Missing	0
Std. Deviation		.51815
Percentiles	100	3.0000

*Source: Own Survey, computed in SPSS, 2020*

**Fig 4.4 Level of education of respondents**



*Source: Own Survey, computed in SPSS, 2020*

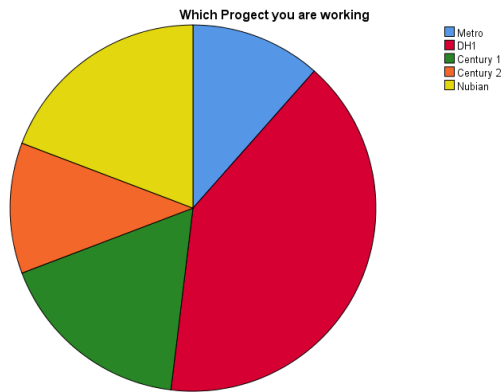
#### 4.4.5 Which project respondents were working

**Table 4.5 Missing test of which project respondents work**

N	Valid	52
	Missing	0
Std. Deviation		1.32885
Percentiles	100	5.0000

*Source: Own Survey, computed in SPSS, 2020*

**Fig 4.5 Respondents working project**



*Source: Own Survey, computed in SPSS, 2020*

From among the five projects selected to be studied in this research, the result of the analysis showed that 21 of the respondents work in DH1 project, 9 of them were from Century 1, 6 were from Century 2, and 6 were from Metropolitan Real State while 10 of the respondents were from Numian apartment building.

#### **4.5 Data analysis of assessment of project Implementation practice of Bamacon Engineering.**

##### **4.5.1 Project related factors**

Different variables were listed out with in project related factors in the questioner. The respondents were asked about their level of agreement on the impact of the variables in the construction performance procedure at a rate of 5-point Likert scale. The scales were 1= Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5= Strongly Agree.

Frequency is used to understand the number of respondents who agreed on the corresponding rating point while percentage of the respondents is to know what percent of respondents agreed from the total respondents. The Mean is used to understand the average rating while standard deviation is to tell how measurements are spread out from the mean (average).

**Table 4.6 Mean and std. Deviation of project related factor**

	N	Mean	Std. Deviation
Project Related FactorS1	52	3.2692	1.22259

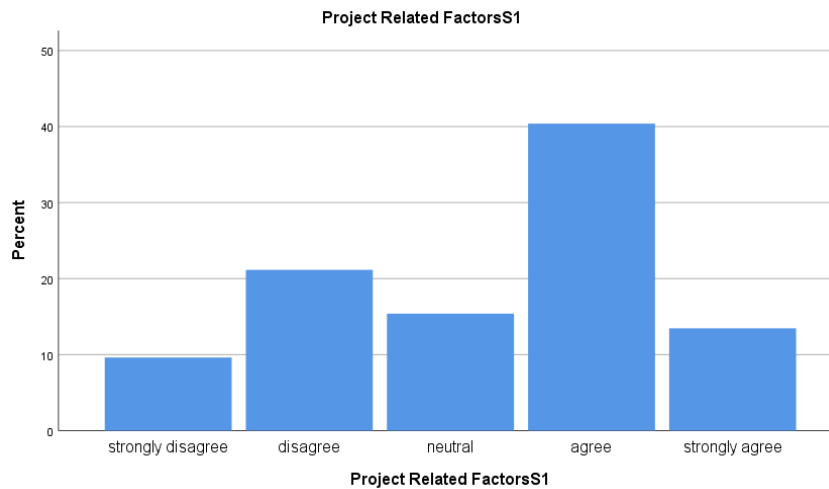
Project Related FactorS2	52	3.1154	.96312
Project Related FactorS3	52	4.2115	1.07259
Project Related FactorS4	52	3.7308	1.10463
Project Related FactorS5	52	3.6923	1.24520

Source: Own Survey, computed in SPSS, 2020

#### 4.5.1.1 Project location and site conditions

Project Related Factor S1 is the first statement, Project location and site conditions have an effect on project performance.

**Fig 4.6 Result data of Project Related Factor S1**



Source: Own Survey, computed in SPSS, 2020

Respondents were asked whether project location and site condition have an effect on project performance of the project they were conducting or not. With regarding to the above statement, the mean value is 3.2692 and standard deviation 1.22259.

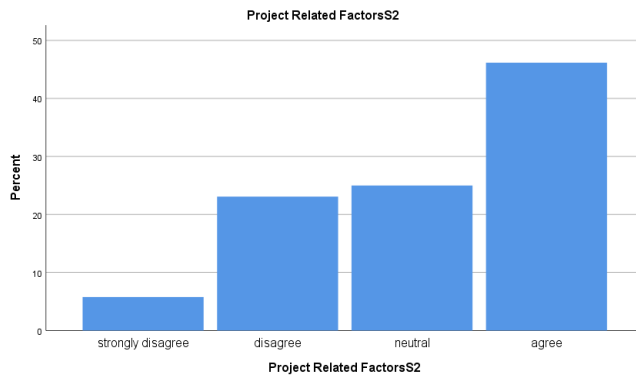
MohdNajib (1994) suggested that for Likert type scale starting from 1 and ends at 5, the resulting mean score can be interpreted as Low when it is from 1.00 to 2.33, Moderate when the value is ranging from 2.34 to 3.64 and its said High when it is from 3.68 to 5.00. On the above interpretation the average rating was between 2.34 and 3.64 indicates it was a moderate result. This result also manifested that 53.9% (40.4%+13.5%) of the

responses agree and strongly agree about the statement, 15.4% neutral and 30.8% (21.1% + 9.6%) disagree and strongly disagree.

#### 4.5.1.2 Design complexity of project

Project Related Factor S2, the second statement which is the Design complexity of project (type, nature and number of floors) is a problem on site. Regarding this statement 5.8% respondents strongly disagreed, 23.0 % disagreed, 25.0% stayed neutral, 46.2% agreed and 7% strongly agree. The mean value was 3.1154 and standard deviation was .96312, this also was a moderate result.

**Fig 4.7 Result data of Project Related Factor S2**

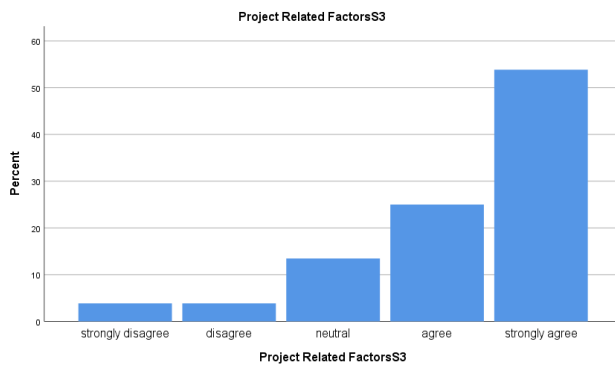


*Source: Own Survey, computed in SPSS, 2020*

#### 4.5.1.3 Project managerial action

Project Related Factor S3 was with regarding the statement project managerial action matter for effective delivery of project related factors

**Fig 4.8 Result data of Project Related Factor S3**



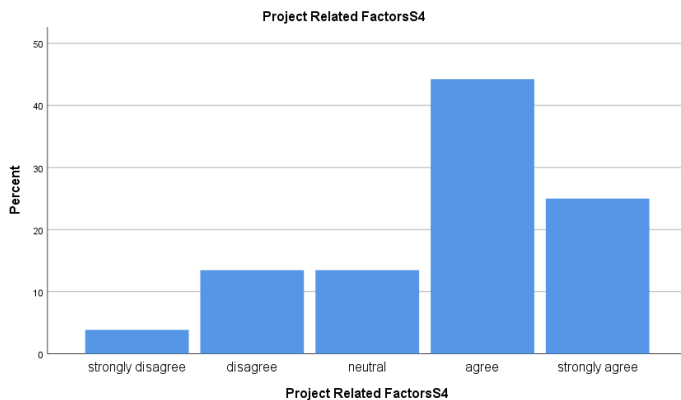
*Own Survey, computed in SPSS, 2020*

78 % of the respondents agree and strongly agree that Project managerial action (planning, follow up and control of project activity) really matters for the success or failure of the project. This shows that there were problems regarding project managerial skills in the projects understudy. The mean value was 4.2115 and SD value was 1.07259. Since the mean was greater than 3.68 it's considered as high level of agreement towards the statement.

**4.5.1.4 Communication system and collaboration among the project participants**

The other project related variable listed was about the communication system and collaboration among the project participants, stated as this variable hinders effective construction performance respondents (project related factor S3). As shown on Table 4.15, 69.2 % of the response indicated that communication gap due to the system and collaboration among the project participants was affecting the project implementation practice. The mean was 3.7308 and SD 1.10463. A major and challenging area of study within the project-based engineering and construction industry is communication for efficient knowledge sharing across an organization (Javernick Will, 2011). Armstrong (2001) believed that good communication in a construction environment leads to achieve coordinated results, good change management, employee's motivation and better understanding of workforce's needs. In 2001, Cheng concluded that inter-organizational communication should take place in the alliance teams composed of several joint parties. It was suggested that representatives from each organization should play the communicating role with other entity's team members.

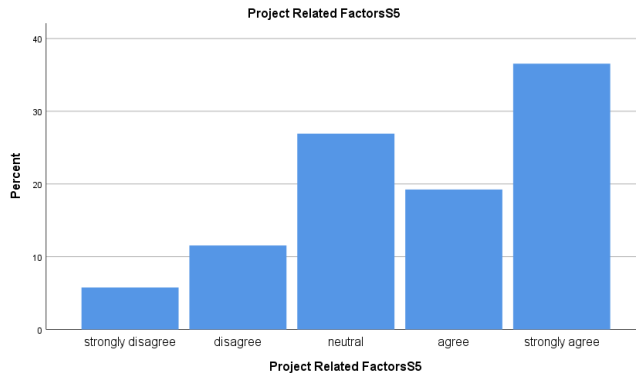
**Fig 4.9 Result of Project Related Factor S4**



*Own Survey, computed in SPSS, 2020*

#### 4.5.1.5 Organizational structure of the company

**Fig 4.10 Result data of Project Related Factor S5**



*Own Survey, computed in SPSS, 2020*

36.5% of the respondents strongly agree with the last statement of project related factor which is organizational structure of the company (in the respective sites) had gaps that affect the implementation practice 19.2% agree, 26.9% neutral while 11.5% disagree and 5.8% strongly disagree. The mean value was 3.7308 and standard deviation 1.10463.

The questioner also contained open ended question regarding what other challenges had come across while constructing, other than the variables listed out on the closed ended questions. From among 52 responses 67% respondents agreed that workload of the skilled labor, lack of safety equipment and lack of awareness about safety, number of stockholders and their management skills and workers' productivity of unskilled labor are issues that affect the deliverables of the project ( cost , time and quality). 29% also stated that not understanding the contract document when making an agreement and communication gap between the project team are challenges for a proper implementation of the construction performance. 3% said that language is a barrier for a smooth communication between daily labors and site Engineers.

#### 4.5.2 Client related factors

Likewise project related factors ,client related variables were listed for respondents in a closed ended questions asking whether respondents agree with the effect or negative impact of the variables towards project implementation practice of the construction or not.

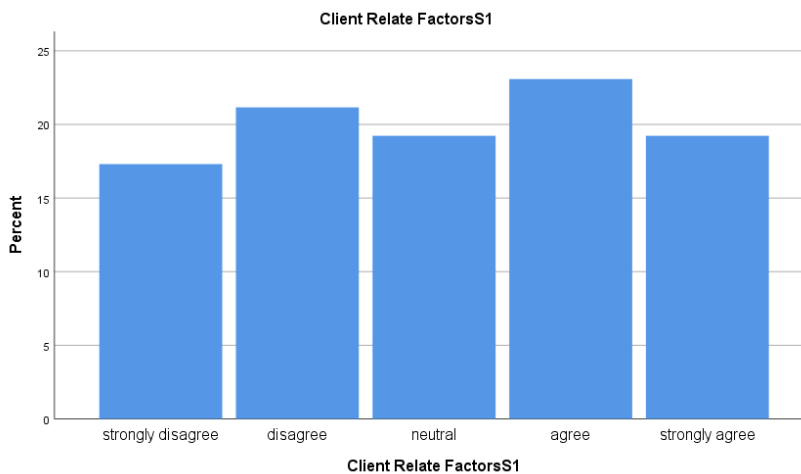
**Table 4.7 Mean and std. Deviation of Client related factor**

	N	Mean	Std. Deviation
Client Relate FactorsS1	52	3.0577	1.39204
Client Relate FactorsS2	52	3.0577	1.14470
Client Relate FactorsS3	52	2.4038	.99528
Client Relate FactorsS4	52	3.3269	1.20002
Client Relate FactorsS5	52	2.5962	1.53724
Client Relate FactorsS6	52	3.2115	1.55092

*Own Survey, computed in SPSS, 2020*

**4.5.2.1 Financial capacity and payment schedule of the client**

**Fig 4.11 Result data of Client Relate Factor S1**

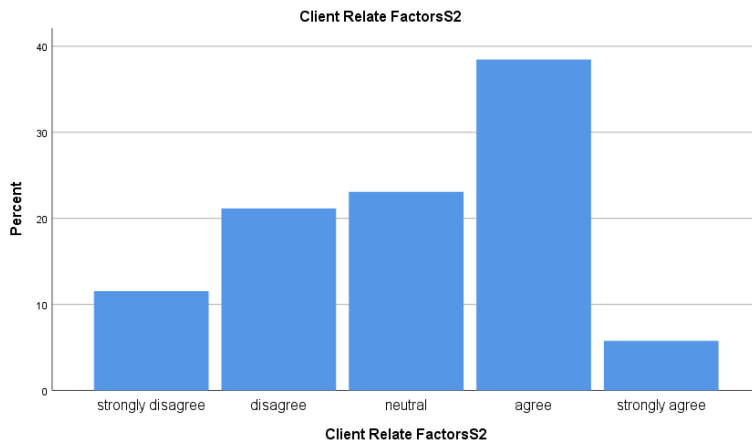


*Own Survey, computed in SPSS, 2020*

Financial capacity and payment schedule of the client is a problem for smooth flow of construction process. Regarding this statement, 17.3% strongly disagree, 21.2% Disagree, 19.2% neutral, 23.1% agree and 19.2% strongly agree. The mean value was 3.0577 and standard deviation 1.39204. The result illustrates that there is only 3.81% difference between agreement and disagreement. The mean score indicates that there is a moderate level of agreement from the respondents.

#### 4.5.2.2 Process of project approval

**Fig 4.12 Result data of Client Related Factors S2**

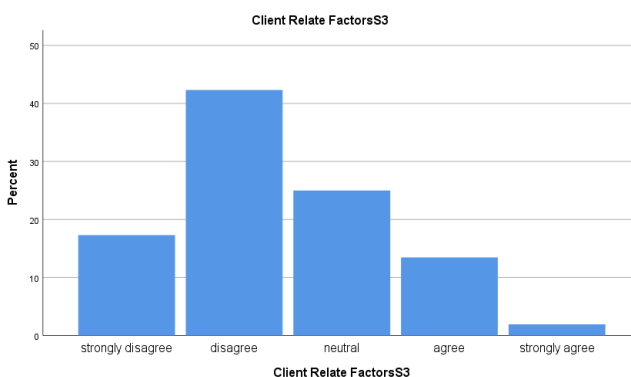


*Own Survey, computed in SPSS, 2020*

The other variable stated on client related factor was the process of project approval affects project Implementation practice, regarding this statement. 38.5% of the response agrees that the approval process affects the construction performance while 21.2% of them disagree. 23.1% of the respondents neither agree nor disagree, 5.8% strongly agreed and 11.5 % strongly disagreed. The mean and the standard deviation were 3.0577 and 1.14470 respectively.

#### 4.5.2.3 Client experience

**Fig 4.13 Result data of Client Relate Factor S3**

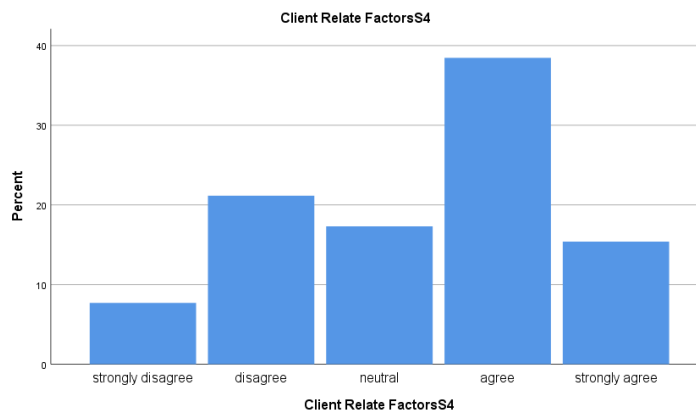


*Own Survey, computed in SPSS, 2020*

Client experience has a negative effect on project Implementation practice (project related factor S3), towards this statement from among the total of 52 valid respondents 17.3% of them strongly disagree and 42.3% of them disagree, 25.0% stayed neutral while 13.5% of them agree and 1.9%.strongly agree. The mean value is 2.438 and standard deviation 0.99528. This manifested that more than half of the respondents disagree that the client experience had an effect.

#### 4.5.2.4 Client ability to make timely and objective decision

**Fig 4.14 Result data of Client Relate Factor S4**

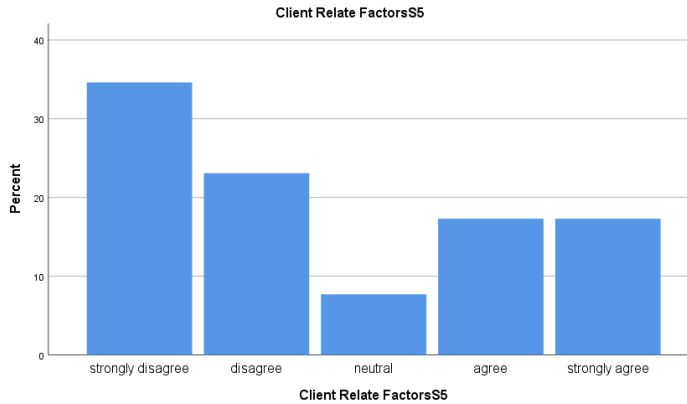


*Own Survey, computed in SPSS, 2020*

Against the statement of Clients ability to make timely and objective decision is contributing to problems 7.7% of the respondents strongly disagree, 21.2% said they disagree , 17.3 % of them stayed neutral while 38.5% of them agree and 15.4 strongly agree. The mean value were 3.3269 and stranded deviation 1.20002. This also shows a moderate level of agreement. 53.9% of the respondents said that the lack of ability to make timely and objective decision was a challenge to effectively implement the projects.

#### 4.5.2.5 Clients emphasis on quick construction instead of quality

**Fig 4.15 Result data of Client Relate Factor S5**

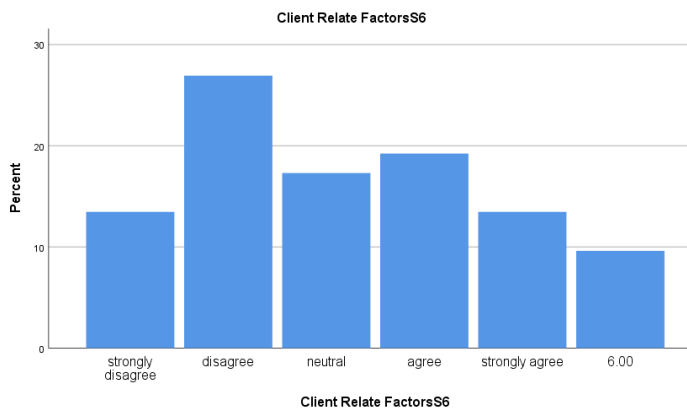


*Own Survey, computed in SPSS, 2020*

Client emphasis on quick construction instead of quality is a bad influence on construction performance; this statement concerned about client interest affecting the performance got a respond of 57.7% disagreement, agreement 34.6%, 7.7% neutral. The mean value was 2.5962 and standard deviation 1.53724. More than 50 percent of the respondents do not agree with the statement. This shows that Clients emphasis on quick construction is not that much an issue.

#### 4.5.2.6 Clients emphasis on low construction

**Fig 4.16 Result data of Client Relate FactorS6**



*Own Survey, computed in SPSS, 2020*

As indicated above on the Histogram, 15.42% of respondents strongly disagree, 28.28% disagree, 19.2% neutral, 21.12% agree and 15.42 disagree. The man score is 3.2115 and SD 1.55092

In the open ended questions, respondents listed out different client related variables that are not listed in the questioner and they believe affected the project implementation. Some of them are listed below.

- client interference on decision and technical factors of other stakeholders
- delay of approval of design change
- Inflexibility of the project cost affects using a better working material (e.g. using power float finish instead of using epoxy floor finish)
- Client instruction to conduct work out of construction design.

#### 4.5.3 Consultant related factors

In the questioner the consultant related factors also include different variables. Based on the respondents' agreement level, the analysis is presented below in Table 4.24.

**Table 4.8 Mean and Std. Deviation of Consultant related factors**

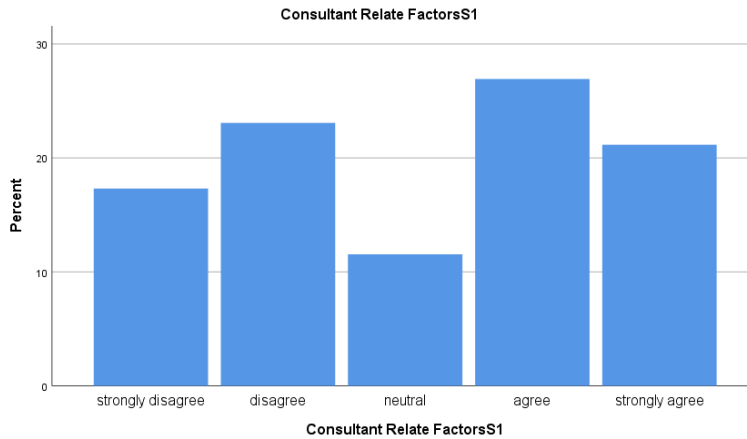
	N	Mean	Std. Deviation
Consultant Relate FactorS1	52	3.1154	1.43696
Consultant Relate FactorS2	52	3.5385	1.14552
Consultant Relate FactorS3	52	2.9423	1.19498
Consultant Relate FactorS4	52	3.2308	0.87706
Consultant Relate FactorS5	52	3.8462	0.93692

*Own Survey, computed in SPSS, 2020*

##### 4.5.3.1 Consultant's commitment to ensure compliance of construction work according to the Specification

17.3 % of the respondents strongly disagree, 23.1% disagree, 11.5% neutral, 26.9% agree and 21.2 % strongly agree about the statement "Consultant's commitment to ensure compliance of construction work according to the Specification affects construction." The mean was 3.1154 and SD was 1.43696. This illustrates there is a moderate level of agreement.

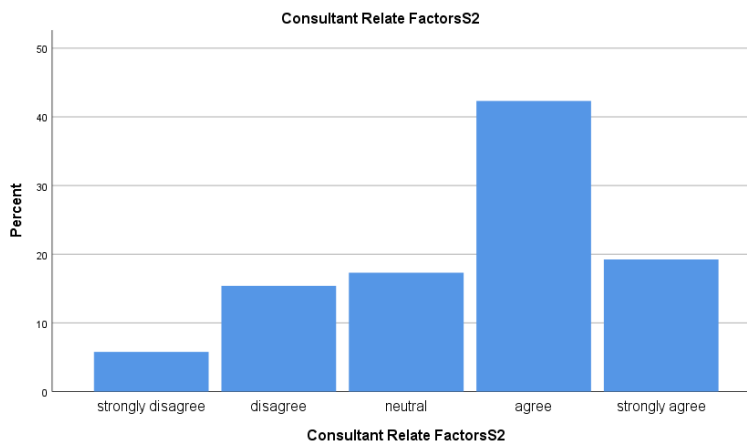
**Fig 4.17 Result data of Consultant Related Factor S1**



*Own Survey, computed in SPSS, 2020*

#### 4.5.3.2 Inadequacy of design, specifications and documentations

**Fig 4.18 Result data of Consultant Relate Factor S2**

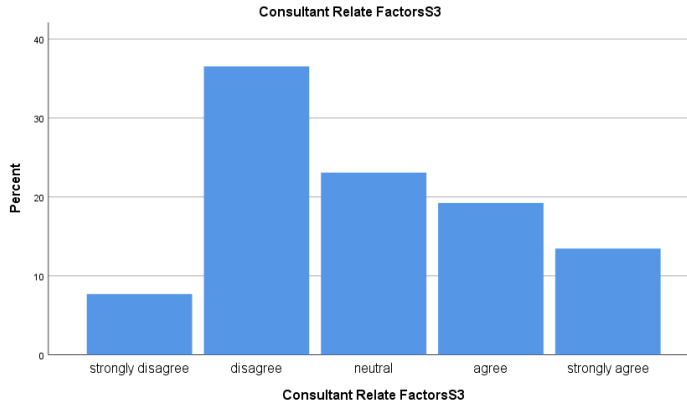


*Own Survey, computed in SPSS, 2020*

Inadequacy of design, specifications and documentations could be a cause of ineffective project performance. Against this statement from among the respondents, 5.8% of them strongly disagree and 15.4% disagree. The remaining 42.3% of them agree and 19.2% strongly agree. The mean value was 3.5385 and the standard deviation 1.14552. This is also a moderate level of agreement.

#### 4.7.3.3 Design team experience and technical skills

**Fig 4.19 Result data of Consultant Related FactorS3**

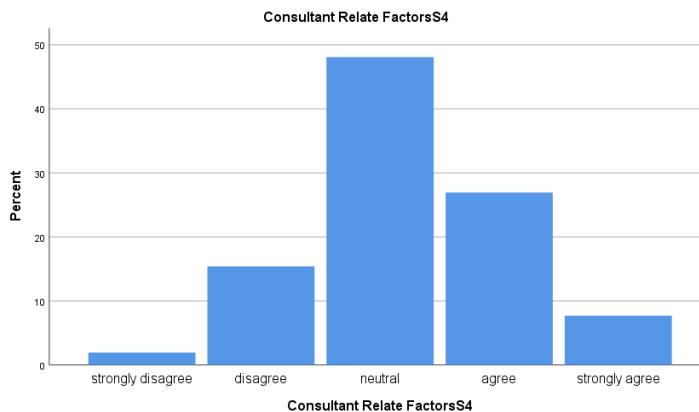


*Own Survey, computed in SPSS, 2020*

The next statement is about the Design team experience and technical skill and its direct impact on project implementation practice. The statement illustrates that the experience has an impact on this issue. 13.5% of the respondents strongly disagree, 19.2% disagree while 36.5% agree and 7.7% strongly agree. The mean and standard deviation result were 2.9423 and 1.19498 respectively. This indicates the low level of agreement.

#### 4.7.3.4 Delay in production of design documents

**Fig 4.20 Result data of Consultant Relate Factor S4**



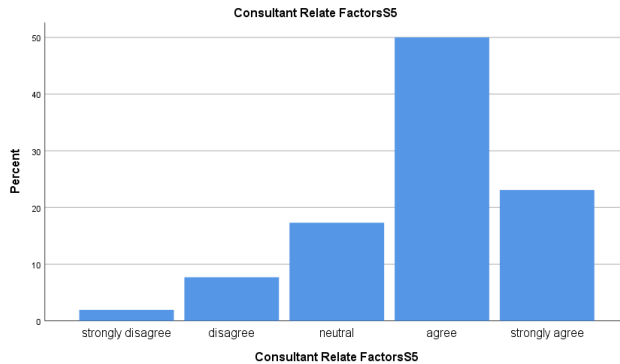
*Own Survey, computed in SPSS, 2020*

15.4% of the respondents disagree that delay in production of design documents is affecting construction performance but 26.9% of them agree, 1.9 % respondents said that they strongly disagree against the statement while 7.7% of them strongly agree. 48.1% of

the respondents preferred to stay silent. The mean value was 3.2308 and standard deviation 0.87706. This is also a moderate level of agreement

#### 4.5.3 Variation to the original design during construction

**Table 4.21 Result data of Consultant Relate FactorS5**



*Own Survey, computed in SPSS, 2020*

Variation from the original design during construction causes inconvenient work condition. Responses to this statement show that 17.3% respondents stayed neutral, while 50% of them agree and 23.1% strongly agree. 7.7% disagree and 1.9% strongly disagrees. The mean value was 3.8462 and SD=0.93692. Compared to the other client related factor variables variation of the design during construction got a high level of agreement from the respondents. Previous studies noted that "Design changes have always been an innate feature of the construction industry." Despite the various project management techniques, many building construction projects still fail to achieve their time and cost objectives. Therefore, the understanding of error and change and its iterative impact is a key to reduce multiple feedback processes, particularly, in concurrent design and construction (Sang, 2000). "Design change can arise from gap between the planned work scope and the actual work scope, due to errors and changes." Design problems can be caused by several different reasons. Such as design change, delay in design approval, contradictions of design documents, Constructability problems, etc. This design problems may likely cause increase in project cost as well as duration.

#### 4.5.4 Contractor related factors

The mean and SD scores of participants' opinion against the statement provided in the closed ended questions regarding contractor related variables are listed on Table 4.30.

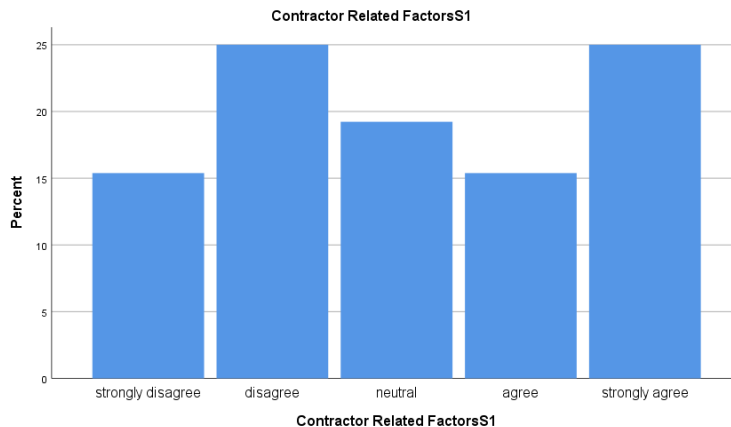
**Table 4.9 Mean and std. deviation of contractor related factors**

	N	Mean	Std. Deviation
Contractor Related FactorS1	52	3.0962	1.43157
Contractor Related FactorS2	52	2.9038	1.31745
Contractor Related FactorS3	52	3.7885	1.16040
Contractor Related FactorS4	52	2.8846	1.26264
Contractor Related FactorS5	52	3.4615	1.29041

*Own Survey, computed in SPSS, 2020*

#### 4.5.4.1 Management skill of site managers (in controlling workers and sub-contractors)

**Fig 4.22 Result data of Contractor Related Factor S1**

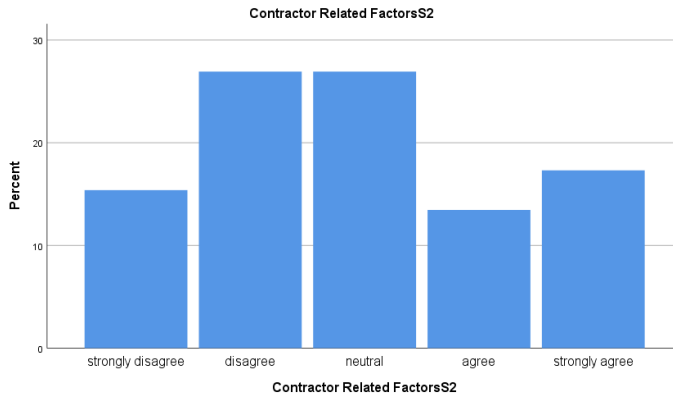


*Own Survey, computed in SPSS, 2020*

Is management skill of site managers (in controlling workers and sub-contractors) a problem in construction? (Contractor related factorS1). Against this statement 25.0 % of the respondents disagree, 15.4% strongly disagree, 19.2% stayed neutral. 15.4% agree and 25.0% strongly agree. The mean value was 3.4615 and SD value was 1.43157. Using MohdNajib (1994) mean value interpretation, mean value from 2.34 to 3.64 mean is considered as moderate level of agreement, 3.4615 is also considered as moderate.

#### 4.5.4.2 Inadequacy of Contractor's technical skills and experience

Fig 4.23 Result of Contractor Related FactorS2

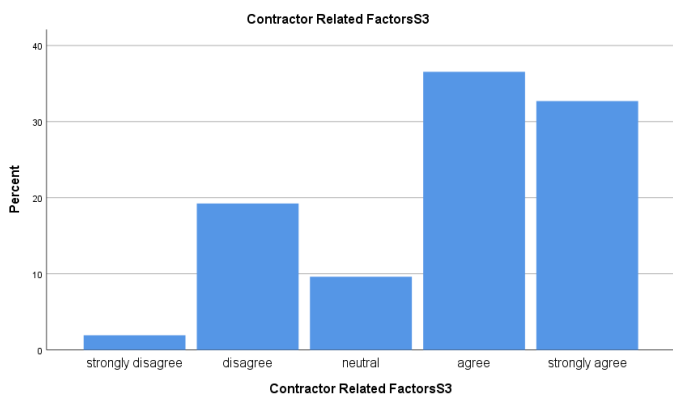


*Own Survey, computed in SPSS, 2020*

The opinion of skilled labor of the five projects on inadequacy of Contractor's technical skill and experience affecting the performance of the construction: - 15.4% strongly disagree, 26.9% disagree, 26.9% neutral, 17.3% agree and 17.3% strongly agree. The mean and standard deviation values which were 2.9038 and 1.31745 respectively imply that there is a low level of agreement towards the statement.

#### 4.5.4.3 Skills of the labor force

Fig 4.24 Result of Contractor Related factor S3



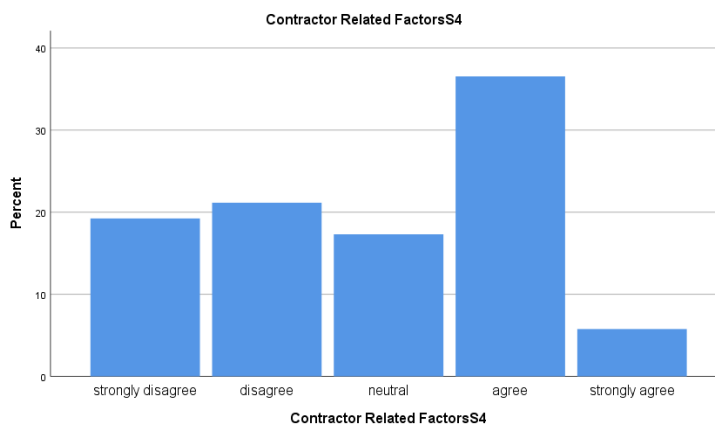
*Own Survey, computed in SPSS, 2020*

Participants' responses against the statement "skill of the labor force is affecting project implementation practice" are as follows. 1.9% of them strongly disagree, 19.2% disagree, 9.6% are neutral, 36.5% agree and 32.7% strongly agree. The mean value is 3.7885 and

SD 1.16040. This indicates there is a high level of agreement of respondents that the size and skill of labor force influence the success of construction project. Human resources represent the most variable, uncontrollable, and important element in production (Kazaz and Ulubeyli, 2007) and labor's sheer magnitude is the reason why underlying influences (both positive and negative) significantly determine the outcome of projects. Skill of labor force was one of the top ranked variables that affect the project performance. The labor force must be held accountable for work done while opportunities must be available to improve the skill of labor. Several recommendations are made.

#### 4.5.4.4 Construction method adopted

**Fig 4.25 Result of Contractor related factorS4**



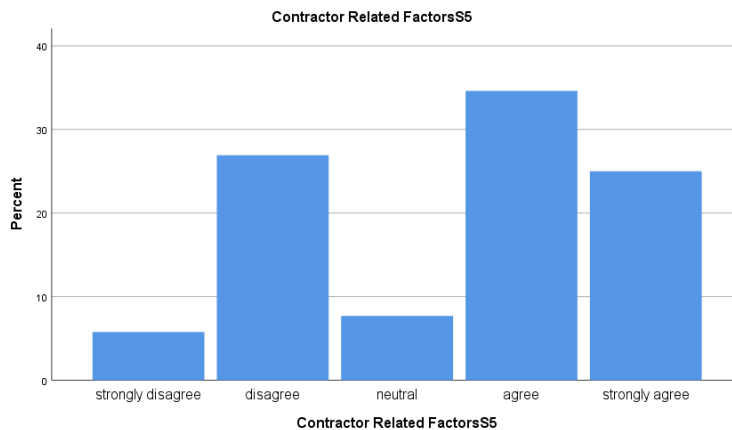
*Own Survey, computed in SPSS, 2020*

The Construction method adopted by Bamacon is not enough to maintain quality, according to the respondents of the questioner. The responses for this statement were 19.2% strong disagreement, 21.2% disagreement, 17.3% neutral, 36.5% agreement and 5.88% strong disagreement. The mean score is 2.8846 while SD result is 1.26264.

#### 4.5.4.5 Capacity of the of contractor to pay sub-contractors and workers

Response of the participants for the statement against the capacity of the of contractor to pay sub-contractors and workers were 5.8% strong disagreement, 26.9% disagreement, 7.7% neutral, 34.6% agreement and 25% strong disagreement. The mean 3.4615 and SD value is 1.29041

**Fig 4.26 Result of contractor related factorS5**



*Own Survey, computed in SPSS, 2020*

For the open ended question, asked if there are contractor related problems that affect implementation of the construction or the project, the respondents stated the following problems. Reading and interpreting drawings incorrectly sometimes leads to destruction work for rectification result in cost and time addition. Poor comprehension of the terms and conditions of the Contract Document prevents Contractors not only to defend their contractual rights and the unfair and unnecessary pressures, mainly, from the Owner, but also to fulfill their rights and duties. These often lead to misunderstanding and clash that create negative consequences on the project implementation.

Other pinpointed problems that affect project implementation are lack of proper methodology, project managers don't stay long in their assignment, (E.g. Project managers had to be changed three times for a specific project, DH1), lack of experience due to the uniqueness of the project, communication gap between the head office and the project sites and delay in material delivery and decision making.

#### 4.5.5 Supply chain related factors

**Table 4.10 Mean and Std. Deviation of Supply chain related factors**

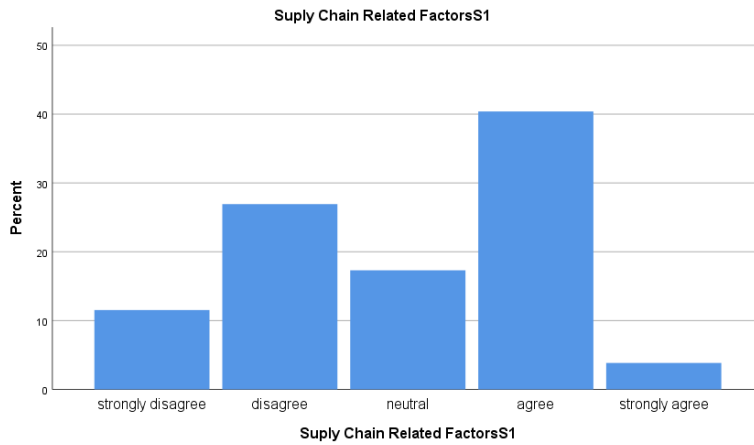
	N	Mean	Std. Deviation
Supply Chain Related FactorsS1	52	2.9808	1.14601
Supply Chain Related FactorsS2	52	3.1346	1.31401
Supply Chain Related	52	3.0577	1.07400

FactorsS3			
Supply Chain Related FactorsS4	52	3.0385	1.06571

*Own Survey, computed in SPSS, 2020*

#### 4.5.5.1 Unavailability of skilled and experienced workers

**Fig 4.27 Result of Supply Chain Related FactorS1**

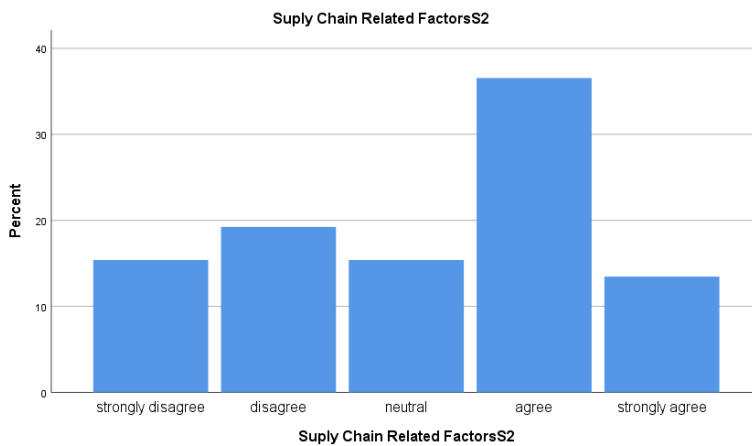


*Own Survey, computed in SPSS, 2020*

Responses about the shortage or unavailability of skilled and experienced workers being a challenge to construction were 11.5% strong disagreement, 26.9% disagreement, 17.3% neutral. 40.4% agreement and 3.8% strong agreement. The mean value is 2.9808 and the standard deviation is 1.14601.

#### 4.5.5.2 Unavailability of right material that comply with the specification

**Fig 4.28 Result of Supply Chain Related FactorS2**

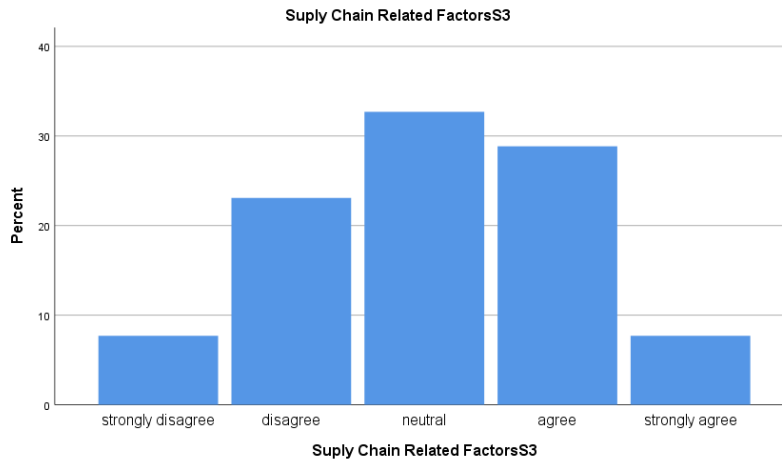


*Own Survey, computed in SPSS, 2020*

Against the statement “unavailability of right material is an issue for ineffective work performance;” 15.4% of the respondents strongly disagree, 19.2% disagree, 15.4% were neutral, 36.5% agree and 13.5% strongly agree. The mean is 3.1346 and 1.31401 SD value

#### 4.5.5.3 Inadequacy of working capital

**Fig 4.29 Result of Supply Chain Related FactorsS3**



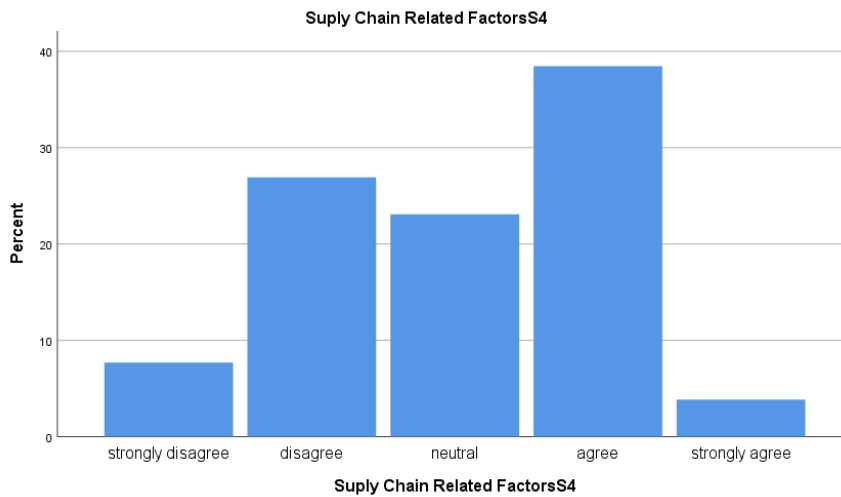
*Own Survey, computed in SPSS, 2020*

The third variable stating about inadequacy of working capital is a factor which affects construction, respondents shared their idea and as the result shows 7.7% of them strongly disagree, 23.1% disagree, 32.7% are neutral, 28.8% agree and 7.7% strongly agree. The mean is 3.0577 while SD is 1.07400.

#### 4.5.5.4 Unavailability of suitable equipment

Unavailability of suitable equipment is a challenge on site, towards this statement 7.7% respondents strongly disagree, 29.6% disagree, 23.1% are neutral, 38.5% agree and 3.8% strongly agree. The mean value is 3.0577 and the SD is 1.07400

**Fig 4.30 Result of Supply Chain Related FactorS4**



*Own Survey, computed in SPSS, 2020*

For the open ended question where respondents were asked to write other challenges other than the variables listed above, they stated Incapability of adopting a new work environment in terms of work methodology, experience of sub-contractor, bureaucracy of the head office to receive material and equipment (slow procurement), difficulty to get the standard formwork in the country, lack of precise planning of resource, late purchase order, etc...

#### 4.5.5 Project management success measured criteria

The questioner included questions about respondent’s submission about the project being conducted on schedule, on time and if they meet specification requirements based on quality standard.

**Table 4.11 Mean and Std. Deviation of project management success measure criteria**

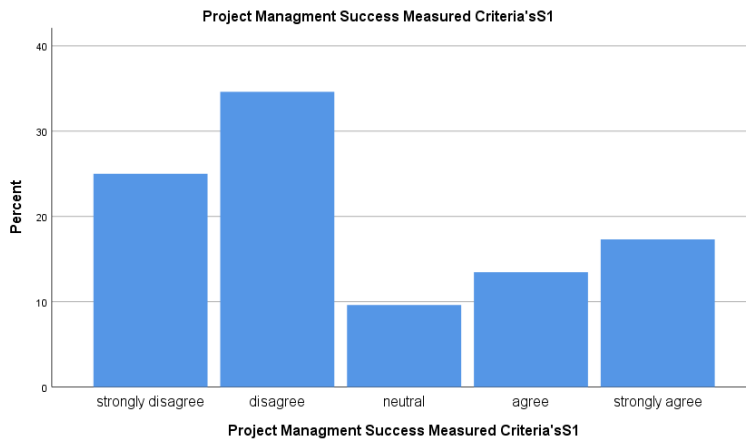
	N	Mean	Std. Deviation
Project Management Success Measure Criteria'sS1	52	2.6346	1.44207
Project Management Success Measure Criteria'sS2	52	2.9934	1.02164

Project Management Success Measure Criteria'sS3	52	3.4615	1.25965
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*Own Survey, computed in SPSS, 2020*

#### 4.5.1.1 Projects were going on schedule

**Fig 4.31 Result of Project Management Success Measure Criteria'sS1**

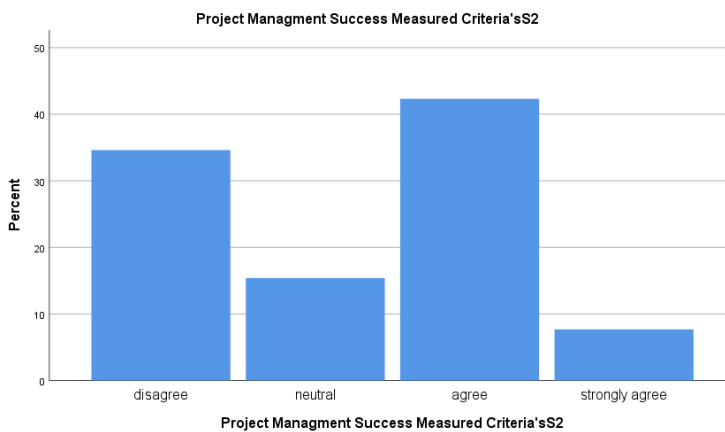


*Own Survey, computed in SPSS, 2020*

25% of the participants strongly disagreed, 34.6% disagreed, 9.6% stayed neutral, 13.5% agreed and 17.3% strongly agreed on the statement projects were going on schedule. The mean is 2.6346 and SD= 1.44207. This illustrates that there exist time delay in the projects under study.

#### 4.5.1.2 Projects were conducted under or on budget

**Fig 4.32 Result of Project Management Success Measure Criteria'sS2**



*Own Survey, computed in SPSS, 2020*

Towards the statement “projects were conducted under or on budget”, 3.9% of the respondents strongly disagree, 46.1% disagree, 15.4% are neutral, 34.6% agree, none strongly agree. The mean is 2.9934 and SD is 1.25965. Understanding from the result, only 18 respondents agree from 52 respondents that the projects were going under budget. One can observe that there is a problem of conducting projects on budget.

**4.5.1.2 Projects meet all specification requirement based on quality standards.**

**Fig 4.33 Result Project Management Success Measure Criteria S3**



*Own Survey, computed in SPSS, 2020*

On the statement projects meet all specification requirement based on quality standards, 3.8% of skilled labor of the selected projects disagree, 26.9% disagree, 15.4% are neutral, 26.9% agree, 26.9% strongly agree. The mean is 3.4615 and SD is 1.25965. There was a high level of agreement that projects meet all specification requirements in the projects under construction. Unlike the other two key performance indicators, majority of the respondents said they hadn't faced problems of meeting quality standards.

From the document review, it was observed that the projects are late from their schedule at least by 26 days. The work productivity of unskilled laborer report always shows under value of expectation. This report is done on weakly bases, if for example a carpenter with one daily labor per day is expected to work 40 sq.m slab formwork, three carpenters are expected to perform 720 sq. per 6 days. On the projects low level of productivity is noticed. On the other hand from the contract document review it was understood that unlike DH1 project the other projects had a client and a consultant as a stockholder but DH1 had different stakeholders including project and construction manager, design

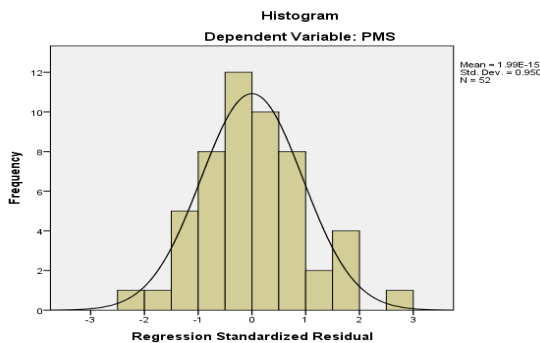
consultant and quantity surveyor and inter designer. Note that other projects had project managers and quantity surveyors as an employee of the contractors not as a stakeholder.

## 4.6 Multiple Linear Regression Analysis

### 4.6.1 Normality

In conducting multiple regression analysis using regression equation, as suggested by Saunders, Lewis, & Thornhill (2009), key assumptions should be met. Consequently, to perform the regression analysis involving multiple independent variables, the researcher must check for the variables have, homogeneity of variances, normality of both predictor and predicted variables; and there is no collinearity between independent variables (to determine the separate effect of project success factors). In this regard, the assumptions for required statistics and their result are presented as follows.

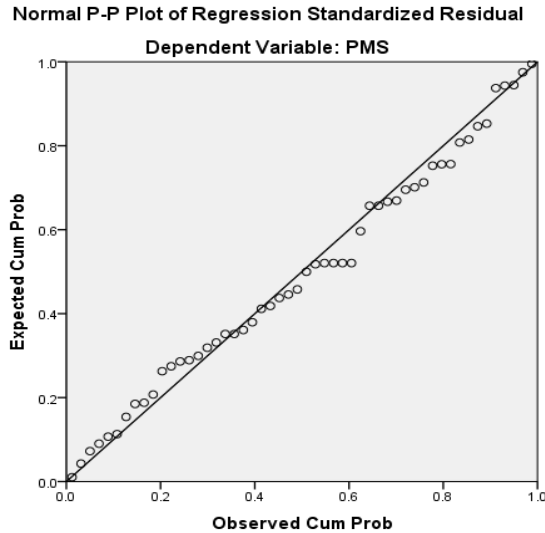
Fig 4.34 Normality



Source: Own Survey, computed in SPSS, 2020

As Garson (2012) and Field (2009) noted, normal distribution take the form of a symmetric bell shaped curve. Accordingly, as we observed from the above figure (figure 1), the histogram look like a normal distribution (bell-shaped curve) and the distribution is roughly normal. Moreover, the histogram (the curve) is perfectly skewed (symmetrical). Therefore, we can conclude that, we have good model for the data; and possibly, we can infer to the population.

**Fig 4.34 Normally distributed errors**



*Source: Own Survey, computed in SPSS, 2020*

The normal probability plot also shows up deviations from normality. The straight line in this plot represents a normal distribution, and the points represent the observed residuals. Therefore, in a perfectly normally distributed data set, all points will lie on the line (Field, 2009). Likewise, as we seen in the above figure (figure 4.34), the dots are closely plotted to the straight line, which indicate a small or no deviation from normality and there are no extreme cases observed. Therefore, the assumption of linear regression has been met and we can possibly assume that the model is accurate and can probably generalize to the population.

#### 4.6.2 Multicollinearity

The collinearity statistics result for both project success factors constituents were performed on SPSS and presented as follows.

**Table 4.12 Collinearity Diagnosis**

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		

	PRLF	.687	1.455
	CRF	.631	1.584
	CORF	.712	1.405
	CONRF	.567	1.762
	SCHRF	.704	1.421

a. Dependent Variable: PS

*Source: Own Survey, computed in SPSS, 2020*

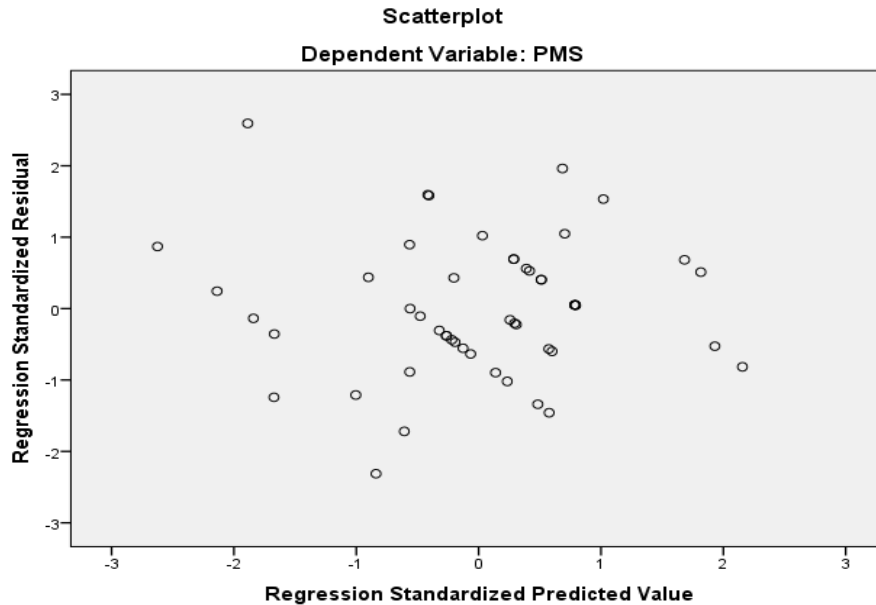
According to Saunders, et al. (2009), most regression programs can compute variance inflation factors (VIF) for each variable and as a rule of thumb; VIF above 5.0 suggests problems with multicollinearity. Moreover, Field (2009), also underline that, values for “Tolerance” below 0.1 indicate serious problems, although several statistician suggests that values for “Tolerance” below 0.2 are worthy of concern. Accordingly, as we seen in the above colliearitytable (table 21), multicollinearity is not the problem of this model, because VIF (variance inflation factor) of the model is well less than 5.0 and the tolerance is not less than .10 The value of VIF ranges between 1.405 to 1.762 and the tolerance of the variables ranges between .567 and.712. Therefore, the variables are not overlapped and they are free from collinearity effect which possibly hinders the prediction ability of the model and “Stepwise” mode is not necessary for this output.

#### **4.6.3 Homoscedasticity**

Homoscedasticity is the extent to which the data values for the dependent and independent variables have equal variances, as Saunders, et al. (2009) noted. Based on the explanation by Field (2009), at each level of the predictor variables, the variance of the residual terms should be constant. This just means that the residuals at each level of the predictors should have the same variance, therefore checking for this assumption is helpful for the goodness of the regression model. In this regard, to plot the homoscedasticity analysis, as suggests by Field (2009), the researcher plot the standardized residuals, or errors (ZRESID) on the Y axis and the standardized predicted

values of the dependent variable based on the model (ZPRED) on the X axis and the result is presented as follows.

**Figure 4.35: Homoscedasticity**



*Source: Own Survey, computed in SPSS, 2020*

According to Garson (2012), homoscedasticity helps as to check for the relationship under investigation is the same for the entire range of the dependent variable and lack of homoscedasticity is shown by higher errors (residuals) for some portions of the range, which can be seen on the scatterplot. In this regard, as Field (2009) describes, the graph of \*ZRESID and \*ZPRED should look like a random array of dots evenly dispersed around zero, if the assumption of homoscedasticity has to be met. Likewise, as shown in the above figure (figure 4.35), the points are randomly and evenly dispersed throughout the plot and there are no obvious outliers on this cloud of dots which are spaced around zero. Therefore, we can conclude that the assumption of random errors and homoscedasticity have been met.

The above section discussed and presented the assumptions for conducting regression analysis. So after testing for different assumptions, the following section examined to what extent individual project success factors (components) affect project success; and

help us to identify which factors play the major role in lagging of time, budget overrun and poor quality projects than the others.

**Table 4.13: (Model Summary) PRLF, CRF, CORF, CONRF, SCHRF as Predictor on PMS**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.804 <sup>a</sup>	.646	.608	.37450

a. Predictors: (Constant), SCHRF, CRF, CORF, PRLF, CONRF

b. Dependent Variable: PS

*Source: Own Survey, computed in SPSS, 2020*

As indicated in the above model summary table (table 13), considering the effect of all predictors (**PRLF, CRF, CORF, CONRF, SCHRF**), the overall model accounts for almost 61% of the variance in PS. This means, around 39% of the variance on project success is explained by other factors. In simple terms, whether there is success or failure in a project, a given project experienced 60.8% of the variance explained by the five project success factors in BAMACON. In other words, the five project success factors altogether account about 61% of the variance in project success.

**Table 4.14: (ANOVA) PRLF, CRF, CORF, CONRF, SCHRF as Predictor on PMS**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	11.779	5	2.356	16.798	.000 <sup>b</sup>
	Residual	6.451	46	.140		
	Total	18.231	51			

a. Dependent Variable: PS

b. Predictors: (Constant), SCHRF, CRF, CORF, PRLF, CONRF

*Source: Own Survey, computed in SPSS, 2020*

The above ANOVA table (table 14), help us to make sure the above model (on model summary table) statistically significant predictor of the outcome (PS) and it is evidenced that the model is statistically predictor of PS because the p value is less than .001. Thus, a significant amount of project success is influenced by components of

Project success factors; and it can be concluded as, the overall regression model is significant,  $F(5, 46) = 16.798$ ,  $p < .001$ ,  $R^2 = .608$  (i.e., the regression model is a good fit of the data).

**Table 4.15: (Coefficients) PRLF, CRF, CORF, CONRF, SCHRF as Predictor on PMS**

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	.732	.335		2.185	.034
1 PRLF	.271	.080	.396	3.399	.001
CRF	.035	.083	.046	.418	.678
CORF	.237	.076	.327	3.123	.003
CONRF	.181	.089	.215	2.037	.047
SCHRF	.056	.095	.061	.587	.569

a. Dependent Variable: PS

Source: Own Survey, computed in SPSS, 2020

Based on the statistical data obtained from the above model summary table (table 15), both Project success factors (components) together explain about 61% the variance in PS and the regression equation is:-

$$PS = .732 + .271(PRLF) + .035(CRF) + .237(CORF) + .181(CONRF) + .056(SCHRF)$$

From this influence exerted on project success (PS), project related factor PRLF, CORF and CONRF have statistically unique contribution for the outcome with Beta Value of .271 ( $p = .001$ ), .237 ( $p = .003$ ) and .181 ( $p = .047$ ) respectively. With this statistical data, and the standardized beta value, (which has been converted to the same scale), we can conclude as, PRLF have strongest contribution than CORF and CONRF to explain the change in PS, since .271 is greater than .237 and .181. This result is in line with the finding of Singh and Sharma (2020), they inferred from the results that for the success of the construction projects, project related and contractor related factors needed to be addressed efficiently.

#### 4.7 Summary of the Proposed Hypothesis

To validate the hypothesis, multiple linear regression analysis was employed on SPSS and discussed the result in section 4.6.3. Consequently, based on the regression model summary, ANOVA and coefficients results (table 13, 14 and 15), project related factor, Consultant related factor and Contractor related factor have statistically unique contribution for the outcome with Beta Value of .271 ( $p=.001$ ), .237 ( $p=.003$ ) and .181 ( $p=.047$ ) respectively.

H1- The coefficient of **project** related factor ( $\beta=0.271$ ), shows that a unit increase in project related factor performance will lead to a 27.1% unit increase in project Success. Project related factor has a statistically significant influence on project performance (i.e.-value= $0.001 < 0.05$ ). Therefore H1 is accepted.

H2- The coefficient practice of **Client** related factor ( $\beta=0.035$ ), shows that a unit increase in project related factor performance will lead to a 3.5% unit increase in project Success. Client related factor has no statistically significant influence on project performance (i.e.-value= $0.678 > 0.05$ ). Therefore H2 is rejected.

H3- The coefficient practice of **consultant** related factor ( $\beta=0.237$ ), shows that a unit increase in consultant related factor performance will lead to a 23.7% unit increase in project Success. Consultant related factor has a statistically significant influence on project performance (i.e.-value= $0.003 < 0.05$ ). Therefore H3 is accepted.

H4- The coefficient practice of **Contractor** related factor ( $\beta=0.181$ ), shows that a unit increase in Contractor related factor performance will lead to 18.1% unit increase in project Success. Contractor related factor has a statistically significant influence on project performance (i.e.-value= $0.047 < 0.05$ ). Therefore H4 is accepted.

H5- The coefficient practice of **Supply chain** related factor ( $\beta=0.056$ ), shows that a unit increase in Supply chain related factor performance will lead to a 5.6% unit increase in

project Success. Supply chain related factor has no statistically significant influence on project performance (i.e.-value=0.569>0.05). Therefore H3 is rejected.

## CHAPTER FIVE

### SUMMARY, CONCLUSION, AND RECOMMENDATIONS

This chapter aims at summarizing major findings, drawing conclusions based on the findings, forwarding recommendations and pointing out areas of future research direction.

#### 5.1 Summary

In this study, the researcher was interested in assessing the current project implementation practice and investigating which factors affect the success of the project implementation according to their severity. To meet the research objective, the researcher collected data from skilled laborers working on five different projects and used descriptive and explanatory research design.

The demographic characteristics of the respondents indicate that; the majority of the respondents were male (63.5%), 78.8% of the workers had 2 and above years of working experience in the company, Bamacon Engineering, (73.1% ) of them were degree holders and 40.4% were from only one project site named DH1.

The descriptive analysis result revealed that, mean score for Project related factors range between 4.2115 and 3.1154. Accordingly, the highest mean score ( $M= 4.21$ ,  $SD=1.07$ ) attribute to Project managerial action (planning, follow up and controlling of the project action) and the lowest mean score ( $M=3.11$ ,  $SD=0.96$ ) is for design complexity of the project, which manifest that project managerial action in terms of planning and control of project activities is a problem that affects the construction practice more than any of the variables of project related factors listed.

Mean score of client related factors range between 3.3269 and 2.4038. Accordingly, the highest mean score ( $M=3.32$ ,  $SD=1.20$ ) attribute to the Client's ability to make timely and objective decision and the lowest mean score ( $M=2.40$ ,  $SD=0.99$ ) is for the Client's experience. This result verifies that the most challenging client related factor that is affecting the construction is the client's ability to make timely and objective decisions and the least affecting variable is the client's experience.

The mean value of consultant related factors ranges between 3.8462 and 2.9423, the highest mean score (M=3.85, SD=0.94) is for Variation from the original design during construction and the lowest mean (M=2.94, SD= 1.19) result is for Design team's experience and technical skills. The result indicates that variation from the original design during construction is the most challenging factor when compared to other variables.

The mean score of contractor related factors range from 3.7885 to 2.8846; highest mean score (M= 3.79, SD= 1.16) was for skills of the labor force while the lowest score (M=2.88, SD=1.26) was for construction method adopted which was not enough to provide the intended quality. The result indicates that majority of the respondents agree that the size and skill of the labor force is the most affecting challenge that hinder project success. The construction method adopted was the least affecting variable.

The mean score of supply related factors range from 3.1346 to 2.9808, the highest mean score (M=3.13, SD=1.31) is unavailability of the required material while the lowest mean (M=2.98, SD=1.14) is for unavailability of skilled and experienced workers. The result indicates that the required materials were not available but finding skilled and experienced workers was not as challenging as other factors listed out.

The mean score for the statement 'projects were on schedule,' is 2.6345, 'projects were on budget' is 2.9934 and 'projects meet all quality requirements of the specification' is 3.4615. There is a moderate level of agreement that the 'projects were going on time' and 'within budget'; and there is a high level of agreement that 'projects meet quality requirements of specification.'

The responses to the open ended questions manifested that there are problems of effective project implementation practice in Bamacon; - very heavy workload on the skilled laborers, lack of safety equipment and lack of awareness about safety, productivity of unskilled laborers, communication gap between the project team members and language

barrier for smooth communication between daily laborers and site Engineers were among project related challenges. Client interference in decision making and technical factors of stakeholders, delay in approval of design changes & payments, inflexibility of project cost affects using better working materials (e.g. instead of using epoxy floor finish using power float finish); Client's instructions and orders to conduct work out of contract agreement including designs were client related problems.

Other pinpointed problems that affect project implementation negatively, are lack of proper methodology, the problem of project managers quitting their assignment of work without working long enough; (E.g. Project managers had to be changed three times for a particular project, DH1); lack of experience to new technology and the unique nature of the projects, communication gap between the head office and the project sites, poor procurement system and delay in decision making.

On the other hand, Contractors are not able to defend their contractual rights to overcome the unfair pressures from the client and/or the consultant. Incapability of adopting new work environment in terms of work methodology, experience of sub-contractors, Bureaucracy of the head office to receive material and equipment, difficulty to get the standard formwork within the country, lack of precise planning of resource, late purchase order were some additional supply chain related problems faced during construction.

The multiple linear regressions also revealed that, among the Five factors, project related factor, Consultant related factor and Contractor related factor have statistically unique contribution for the outcome with Beta Value of .271 ( $p=.001$ ), .237 ( $p=.003$ ) and .181 ( $p=.047$ ) respectively. The combined effect of **PRLF**, **CRF**, **CORF**, **CONRF**, **SCHRF**, R Square value calculated using was 0.608. This means the overall model accounts for almost 61% of the variance in PS. This shows that if the CSFs are managed properly construction project has a major chance of successful completion.

## 5.2 Conclusion

From the findings, the projects operate under the risk of cost overrun and time delay but keep the quality of works as required by the specification. Respondents stated that the current implementation practice face problems such as unwise use of human resource

(HR); (e.g. Overloading of work on the few skilled labor-force and the low productivity of unskilled laborers); Clients' involvement in technical matters: - they require works to be conducted without design or with a different design from the original. And the Contractors are incapable of defending such pressures because they either don't read the Contract Documents or they don't understand them.

The other problem is lack of effective communication between the head office and the projects. This could be attributed to poor procurement management caused by incompatible demand and supply of materials and equipment, caused, probably, by poor preparation of Bill of Quantities.

Project, Client, Contractor, Consultant and supply chain related factors affect the performance of project implementation. Whether there is success or failure in a project, a given project experienced 60.8% of the variance explained by the five project success factors in Bamacon. In other words, the five project success factors altogether account about 61% of the variance in project success. Project related factor, Consultant related factor and Contractor related factor have statistically significant contribution to the success of projects. This means that these three factors contribute to the success of construction more than the other two factors which are client and Stakeholder related factors.

Severity order of factors, in hindering the success of project implementation in terms of cost, time and quality are listed below.

1. Project related factor
2. Consultant related factor
3. Contractor related factor
4. Supply chain related factor
5. Client related factor

## **5.3 Recommendation**

### **5.3.1 Recommendation for actions**

Depending on the conclusion of the study, and the established research problem, the following practical recommendations are provided.

- Before starting execution of the project, a clear guideline of communication system must be developed, both within the company and with stakeholders in order to overcome the gap created due to communication.
- The HR structure of the company both at the head office and on the sites shall be considerate enough to utilize maximum potential of the employees, to minimize bureaucracy in allocating resources and to decrease workload of skilled manpower while increasing efficiency of the unskilled labor force.
- Contractors shall give due concern to lift up the capacity of project managers. Most of them have not taken project management courses but manage construction projects because they have had experience in project activities. Contractors shall also work on enhancing the skill of labor force by providing suitable platforms like training, refresher courses, and creating learning work environments.
- Consultants shall carry out post design site visit (feasibility study) to produce compatible designs and should design specific and detailed enough designs.
- The company should give concern and work on the main factors according to their severity to overcome problems that hinder success of project.

### **5.3.2 Recommendation for future research**

More researches could be carried out on the other critical success factors (CSFs) of projects.

This research has used the traditional KPPI. It's advisable if future researchers could use contemporary key performance indicators including customer satisfaction, business value etc.

Construction projects have different stakeholders. This research or study has focused only on one stakeholder, the contractor. So, it might be more interesting, broader and advisable, if future researchers could incorporate clients and contractors.

## REFERENCES

*Alwaer, H. and Clements-Croome, D.J. (2010) 'Key performance indicators (KPIs) and priority setting in using the multi attribute approach for assessing sustainable intelligent buildings', Building and Environment, Vol. 45, No. 4, pp.799–807*

*Armstrong, M. A handbook of MANAGEMENT techniques: the best-selling guide to modern management methods. Kogan Page Publishers, 2001.*

*Cheng, E.WL, Li, H., Love.P, and Irani.Z., "Network communication in the construction industry." Corporate Communications: An International Journal 6, no. 2 (2001): 61-70.*

*Cleland, D. I., & Ireland, L. R. (2002).Project management: Strategic design and implementation.4th ed. New York: McGraw-Hill.*

*Creswell, J.W. (2003), Research Design, Quantitative and Mixed Approaches. (2nd ed.).*

*Field, A. (2009), Discovering statistics using SPSS: Third edition. London: SAGE Publications Ltd .*

*Garson, D. (2012), Testing statistical assumptions. NewYork: Statistical Associates Publishing.*

*Gul Polat, Ferzan okay and Ekin Eray(2014)' factors affecting cost overruns in micro-scaled construction companies', Creative construction companies, Vol 1, p1*

*Haslam, R.A., Hide, S.A., Gibb, A.G.F., Gyi, D.E., Pavitt, T., Atkinson, S. and Duff, A.R. (2005) 'Contributing factors in construction accidents', Applied Ergonomics, Vol. 36, pp.401–415.*

*Hendrickson, C & Au, T. (1989), "Project Management for Construction" Fundamental Concepts for Owners, Engineers, Architects and Builders. Prentice Hall, Englewood Cliffs, New Jersey*

*Idoko, L. A. (2008), Developing local capacity for project management - Key to social and business transformation in developing countries. PMI Global Congress 2008. Project Management Institute*

*ILO (2001) 'The construction industry in the twenty first century: its image, employment prospects and skill requirements', International Labor Office, Geneva*

*Kagioglou M, Cooper R and Aouad G (2001) "Performance Management in Construction: A Conceptual Framework." Construction Management and Economics 19(1): 85-95.*

*Kazaz, A., Manisali, E. and Ulubeyli, S. (2008), "Effect of basic motivational factors on construction workforce productivity in Turkey", Journal of Civil Engineering and Management, Vol.14, No.2, pp.95-106.*

*Kerzner, H. (2003). Project management: A systems approach to planning, scheduling, and controlling. 8thed. Hoboken, NJ: John Wiley.*

*Koushki, P.A., Al-Rashid, K. and Kartam, N. (2005) 'Delays and cost increases in construction of private residential projects in Kuwait', Construction Management and Economics, Vol. 23, No. 3, pp.285–294.*

*Love, P.E.D., Tse, R.Y.C. and Edwards, D.J. (2005) 'Time-cost relationships in Australian construction projects', ASCE Journal of Construction, Engineering and Management, Vol. 131, No. 2, pp.187–194.*

*Neyestani, B., & Juanzon, J. B. (2016). Identification of A Set of Appropriate Critical Success Factors (CSFs) for Successful TQM Implementation in Construction, and Other Industries. International Journal of Advanced Research, 1581-1591*

*Ngacho C and Das D 2014 A performance evaluation framework of development projects: An empirical study of Constituency Development Fund (CDF) construction projects in Kenya International Journal of Project Management 32 492-507*

*Ngacho\*, Christopher and Das Debadyuti (2015) , A performance evaluation framework of construction projects: insights from literature, Project Organisation and Management,*

*Ohara, S. (2005).Project and Program Management for Enterprise Innovation. PMAJ*

*Pinto and Slevin (2015), Critical Success Factors in Effective Project implementation, <https://www.researchgate.net/publication/267559698>*

*Pinto and Slevin (2015),balancing strategy in project implementation, sloan management review ( 1986-1998 )*

*Pinto, J., & Slevin, D. (1988). Project Success: Definitions and Measurement Techniques. Project Management Journal, 67-73.*

*PMI, (2013),Project Management Body of Knowledge (PMBOK Guide) (5th ed.).*

*Saraf D, (2013) , Study of Factors Affecting Performance of Construction Project, Journal of Science and Research ISSN (Online): 2319-7064, Vol 4, p 1341*

*Sandanayake Y G and Oduoza C F (2007) “Design of a performance measurement system for just-in time production: a methodological framework.” International Journal of Manufacturing Technology and Management, 10(2/3): 276 - 293.*

*Saunders, M., Lewis, P., & Thornhill, A. (2009). Research methods for business students fifth edition. Edinburgh Gate Harlow, England: Pearson Education Limited.*

*Soewin t and Chinda T (2018) Factors affecting construction performance: exploratory factor analysis, IOP Conf. Ser.: Earth Environ. Sci. 140 012102*

*Tabish, S., & Jha, K. N. (2012). The impact of anti-corruption strategies on corruption free performance in public construction projects. Construction Management and Economics, 21-35.*

*Tan, A.A.L (1996) "Project Management in Malaysia" Synergy Books International Malaysia.*

*Tabish, S.Z.S. and Jha, K.N. (2011) 'Analysis of irregularities in public procurement in India', Construction Management and Economics, Vol. 29, No. 3, pp.261–274.*

*Wit A. d. (1988). Measurement of Project Success. International Journal of Project Management, 164-170.*

*Wadugodapitiya, sandanayake and thurairajah , Building Project Performance Evaluation Model,*

*Wysocki, R. K. (2014). Effective project management: traditional, agile, extreme. John*

*Yimam, A. H. (2011). Project Management Matrity in the Construction Industry of Developing Countries. The case of Ethiopian Contractors.*

*Zarina, Zawawi, Yusof and Aris, (2014) Determining Critical Success Factors of Project Management Practice: A conceptual framework, online at [www.sciencedirect.com](http://www.sciencedirect.com).*

*Zwikael, O., & Smyrk, J. R. (2011). Project management for the creation of organizational value. Springer*

## **APPENDIX**

**Addis Ababa University College of Commerce**

**PM Department**

**Assessment of Project Implementation and Rating of Critical Factors  
Affecting Project Success in Construction Projects: In the case of  
Bamacon Engineering**

### **Questionnaire**

**Dear respondents,**

It is a great pleasure to know that you are filling this questioner with your honest and valuable response. Your corporation makes the research fruitful so I would like to thank you in advance. This paper is being conducted as a partial fulfillment for my master's degree in project management at Addis Ababa University, school of commerce. The aim of this research is to assess the project implementation practice in Bamacon engineering, identify the factors that are affecting the performance in accordance with their severity. The questioner includes both closed and open ended questions. Please fill free to write your answers on the space provided for open ended questions and select the option that is most suitable to reflect your opinion in a more accurate way.

The information you provide will only be used for academic purpose and is confidential so please do not hesitate to provide the necessary information to the best of your knowledge about the subject matter. Do not write your name

If you have any ambiguity or a question contact me

Tsedenya Yohannes

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## I. General Question

Please indicate your response by ticking on the box provided

1. What is your position in the organization?

Managing director  Project manager  Quantity surveyors

Planning manager  Site Engineers  Time kipper

Quality inspectors  Document controller  Safety supervisor

If other please specify .....

2. Your Gender

Female

Male

3. Number of years you have been working in this organization

Less than 1 year  1 -2 years

2-5 years  More than 5 years

4. The highest level of education you have completed

Diploma

BSC/BA

MSC/MA

PhD

5. Which project you are working on

Metro

Century 1

DH1

Century 2

Nomiyan

## II. Issues Related with the study area

The questioner includes five factors that include different variables. The variables are stated on the first column. There are rating points according to the degree of agreement to the statements. Tick appropriately according to the level of agreement on the specified practices. **Please evaluate the statement based on the reality in Bamacon Engineering and consider the variables effect on project success of a project (cost, quality and time)**

**1 = strongly disagree 2=disagree 3=neutral 4=agree 5 =strongly agree**

### 7. Project related factors

Statement	Rating point				
	1	2	3	4	5
Project location and site conditions has an effect on project performance					
Design complexity of project (type, nature and number of floors) is a problem on site					
Project managerial actions (planning, follow up and control of project activities) matter for effective delivery of project deliverables					
Communication system and collaboration among project participants is hindering effective performance					
Formal organizational structure of the company have					

gaps that affects project performance					
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8. What other project related issues/challenges have you come across while constructing on your site?

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**10. Client relate factor**

**1 = strongly disagree 2=disagree 3=neutral 4=agree 5 =strongly agree**

Statement	Rating point				
	1	2	3	4	5
Financial capacity and payment schedule of the client is a problem for smooth flow of construction process					
The process of project approval affects project Implementation practice					
Client experience have a negative effect on project Implementation practice					
Clients ability to make timely and objective decision is contributing to problems					
Clients emphasis on quick construction instead of quality is a bad influence on construction performance					

Clients emphasis on low construction cost is a challenge for effective construction					
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11. What other client related issues/challenges have you come across while constructing on your site?

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**13 consultant related factors**

**1 = strongly disagree 2=disagree 3=neutral 4=agree 5 =strongly agree**

Statement	Rating point				
	1	2	3	4	5
Consultant's commitment to ensure compliance of construction work according to Specification is affecting construction					
Inadequacy of design, specifications and documentations is a cause of ineffective project performance					
Design team experience and technical skills have an impact in project implementation practice					
Delay in production of design documents is affecting construction performance					
Variation to the original design during construction causes inconvenient work condition					

14. What other consultant related issues/challenges have you come across while constructing on your site?

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.....

**16. Contractor related factors**

**1 = strongly disagree 2=disagree 3=neutral 4=agree 5 =strongly agree**

Statement	Rating point				
	1	2	3	4	5
Management skill of site manager ( in controlling workers and sub-contractors ) is a problem in construction					
Contractor's technical skills and experience is inadequate to perform project successfully					
Size and skills of the labor force is affecting project implementation practice					
Construction method adopted is not enough for quality					
Cash flow of contractor (payment to sub-contractors and workers ) is a barrier to effective project performance					

17. What other contractor related issues/challenges have you come across while constructing on your site?

.....  
 .....  
 .....

**19. Supply chain related factors**

**1 = strongly disagree 2=disagree 3=neutral 4=agree 5 =strongly agree**

Statement	Rating point				
	1	2	3	4	5
unavailability of skilled and experienced workers is a challenge in construction					
unavailability of right material is an issue for ineffective work performance					
Inadequacy of working capital is a factor which affect construction					
unavailability of suitable equipment is challenge on site					

20. What other supply chain related issues/challenges have you come across while constructing on your site?

.....  
 .....  
 .....

**22. Project management success measured criteria's**

**1 = strongly disagree 2=disagree 3=neutral 4=agree 5 =strongly agree**

Statement	Rating points				
	1	2	3	4	5
Projects are going on schedule, with no time delay					
Projects are being conducted under or on budget					
Projects meet all specification requirement based on quality standards.					

Thank you.