



**JIMMA UNIVERSITY
JIMMA INSTITUTE OF TECHNOLOGY
SCHOOL OF GRADUATE STUDIES
FACULTY OF CIVIL AND ENVIRONMENTAL ENGINEERING
CONSTRUCTION ENGINEERING AND MANAGEMENT CHAIR**

**STUDY ON PERFORMANCE FACTORS OF PUBLIC BUILDING
CONSTRUCTION PROJECT IN ASSOSA ZONE**

A Thesis Submitted to the School of Graduate Studies, Jimma University, Jimma Institute of Technology, Faculty of Civil and Environmental Engineering in Partial Fulfillment of the Requirements for the Degree of Master of Science in Construction Engineering and Management

By
Aberham Jibat Kankure

January, 2020
Jimma, Ethiopia

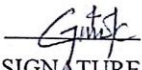
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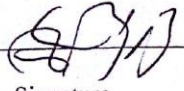
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STUDY ON PERFORMANCE FACTORS OF BUILDING
CONSTRUCTION PROJECT IN ASSOSA ZONE

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DECLARATION

I declare that this research entitled “Study on Performance factors of Public Building Construction Project in Assosa Zone” is my own original work, and has not been submitted as a requirement for the award of any degree in Jimma University or elsewhere.

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ABSTRACT

Construction industry is highly competitive and a job creator for a large number of parties such as clients, consultants, contractors and other stakeholders. Lack of identifying the factor affecting the performance of the construction project is one of the problems of the projects delay in the developing country like Ethiopia. The aim of this research is to assess the effects of factors determining the performance of public building construction project in Assosa Zone.

The research design was quantitative, where the data was collected from 9 clients, 11 consultants, and 13 contractors using questionnaires and interviews. The questionnaire had a list of causes of performance problems of which the respondents were asked to rank each according to the five-point Likert scale. The research data obtained were analyzed by using Relative Important Index and Micro soft excel, and ranked by using the Statistical Package for Social Science (SPSS).

The results of this research identified 74 factors influencing the performance of public building construction project. From among factors escalation of material prices, unavailability of resources as planned through project duration, sequencing of work according to schedule, differentiation of currency prices, leadership skills of project manager, social environment, material and equipment cost, employee attitudes in projects, project location and quality of equipment and raw materials are the top ten significant factors in Assosa zone. The time overrun, cost overrun, and degradation of quality standard enhancement were determined as the impacts of performance factors on public building construction project in Assosa zone.

To accomplish the public building construction project without delay the clients should hire a specialized engineer and the consultant should give training for the project organization. The contractors should be using the qualified employees with good experience to avoid any problems during construction of the project.

Key words: *Client, Consultant, Contractor, Performance factor, Public building construction*

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TABLE OF CONTENTS

DECLARATION.....	i
ABSTRACT.....	ii
ACKNOWLEDGEMENTS.....	iii
TABLE OF CONTENTS.....	iv
LIST OF TABLES.....	vi
LIST OF FIGURES.....	vii
ABBREVIATIONS.....	viii
1. INTRODUCTION.....	1
1.1. Background.....	1
1.2. Statement of the problem.....	2
1.3. Research questions.....	3
1.4. Research Objectives.....	3
1.4.1. General objective.....	3
1.4.2. Specific Objectives.....	3
1.5. Scope and Limitation of the study.....	3
1.6. Significance of the study.....	4
1.7. Thesis structure.....	4
2. LITRATURE REVIEW.....	5
2.1. Management of construction project.....	5
2.2. Construction Management and Performance.....	5
2.3. Factor affecting of performance in construction projects.....	7
2.3.1. Project manager.....	7
2.3.2. Cost factor.....	8
2.3.3. Time factor.....	8
2.3.4. Quality factor.....	9
2.3.5. Client satisfaction factor.....	9
2.3.6. Productivity factor.....	9
2.3.7. Environmental factor.....	10
2.4. Performance factors Investigation and Analysis.....	10
3. RESEARCH DESIGN AND METHODOLOGY.....	11
3.1. Study Area.....	11
3.2. Study Design.....	11
3.3. Population of the study.....	12

3.4. Sample size and Sampling procedures.....	13
3.4.1. Sample size.....	13
3.4.2. Sampling procedures.....	13
3.5. Study variables.....	15
3.6. Data collection.....	15
3.7. Data processing and analysis.....	15
3.7.1. Relative importance index.....	16
3.7.2. Reliability of data.....	16
3.7.3. Correlation Coefficient.....	17
3.8. Ethical considerations.....	17
4. RESULTS AND DISCUSSIONS.....	18
4.1. Introduction.....	18
4.2. General information of the respondents.....	19
4.3. Factors influencing the performance of public building construction projects.....	21
4.3.1. Significant factor influencing performance of public building construction projects.....	23
4.3.2. Ranking of factors influencing performance of public building construction projects.....	26
4.3.3. Test for Agreement on the performance factors.....	28
4.4. Top ten significant factors affecting the Performance of public building construction project according to all categories.....	28
4.5. Ranking of factors affecting the performance of public building construction project according to each factor.....	31
4.6. Reliability Checking - Cronbach's Alpha.....	63
4.7. Case study.....	65
4.8. Impacts of performance factors.....	66
5. CONCLUSION AND RECOMMENDATIONS.....	68
5.1 Introduction.....	68
5.2 Conclusions.....	68
5.3. Recommendations.....	69
REFERENCES.....	71
APPENDIX I.....	74
APPENDIX II.....	81

LIST OF TABLES

Table 3. 1 Values assigned for the Likert scale in the questionnaire	14
Table 4. 1 Questionnaire response rate	19
Table 4. 2 Frequency and Percentage of received respondent job title	19
Table 4. 3 Respondent experience years in the construction field	20
Table 4. 4 Educational level of respondents	20
Table 4.5 The relative importance index (RII) and the rank of factors	21
Table 4.6 Significant factors	24
Table 4.7 The RII and rank of factor according to all categories.....	26
Table 4. 8 Spearman importance rank correlations	28
Table 4. 9 The top ten significant factors	30
Table 4. 10 The relative importance index (RII) and rank of cost factors.....	31
Table 4. 11 The relative importance index (RII) and rank of time factors.....	35
Table 4. 12 The relative importance index (RII) and rank of quality factors	38
Table 4. 13 The relative importance index (RII) and rank of productivity factors	41
Table 4. 14 The relative importance index (RII) and rank of client satisfaction factors	44
Table 4. 15 The relative importance index (RII) and rank of regular and community satisfaction factors	47
Table 4. 16 The relative importance index (RII) and rank of people factors.....	50
Table 4. 17 The relative importance index (RII) and rank of health and safety factors	52
Table 4. 18 The relative importance index (RII) and rank of training and learning factors	54
Table 4. 19 The relative importance index (RII) and rank of environmental factors..	57
Table 4. 20 The relative importance index (RII) and rank of management action factors	60
Table 4. 21 Cronbach's alpha for questionnaires reliability checking of performance factor	64
Table 4. 22 Information on the project of the Case Study of public building construction project in Assosa zone.	65
Table 4. 23 Results of case studies project 1	65
Table 4. 24 Results of case studies project 2	66

LIST OF FIGURES

Figure 3.1: Map of study area	11
Figure 3. 2 Research framework	12
Figure 3. 3 Dependent and Independent variables	15
Figure 4. 1: The outline of data analysis and discussion chapter.....	18
Figure 4. 2 The top ten significant factor affecting of performance	30
Figure 4. 3 Factor affecting of performance related to Cost factor according to all responses.....	34
Figure 4. 4 Factor affecting of performance related to time factor according to all responses.....	38
Figure 4. 5 Factor affecting of performance related to quality factor according to all responses	41
Figure 4. 6 Factor affecting of performance related to productivity factor according to all responses.....	44
Figure 4. 7 Factor affecting of performance related to client satisfaction according to all responses.....	47
Figure 4. 8 Factor affecting of performance related to regular and community satisfaction according to all responses.....	49
Figure 4. 9 Factor affecting of performance related to people factor according to all responses.....	51
Figure 4. 10 Factor affecting of performance related to health and safety factor according to all responses.....	54
Figure 4. 11 Factor affecting of performance related to training and learning factor according to all responses.....	57
Figure 4. 12 Factor affecting of performance related to environmental factor according to all responses.....	60
Figure 4. 13 Factor affecting of performance related to management action factor according to all responses.....	63
Figure 4. 14 Cronbach's alpha value of independent variables.....	64

ABBREVIATIONS

ECI	Early Contractor Involvement
ESI	Early Supplier Involvement
JIT	Jimma Institute of Technology
KM	Kilo Meter
PBCP	Public Building Construction Project
PPI	Project Performance Indicators
PPMS	Project Performance Monitoring System
RII	Relative Importance Index
SPSS V20	Statistical Package for Social Science Version 20

1. INTRODUCTION

1.1. Background

Construction industry is the advanced comes in its nature as a result, it contains an oversized variety of parties as clients, contractors, consultants, stakeholders, shareholders, and regulators, this parties is by moving the performance of the building construction comes and factors like time factor, cost factor, quality factor, client satisfaction factor, productivity factor, health and safety factor (Siddharth, et al., 2015). Construction industry plays a serious role in development and achievement the goals of society. The performance of the development industry is suffering from national economies. Therefore, performance is related to many factors such as time factor, cost factor, quality factor, client satisfaction factor, productivity factor, health and safety factor.

A researcher done by (Alsulamy, et al., 2014) Specified that, in the building construction project, the perception of key stakeholders, including client/government officials, consultants, and contractors regards the failure in construction projects over their different stages that are, conceptual, planning and tender, production and operation. He states that different stakeholders may have different viewpoints about project success as well as the success factors. Hence, as the nature of the construction company's participant is different for different projects, it is not easy to make a comprehensive list of success factors. As such, it was concluded that different performance factors are involved to achieve different objectives for each project.

From the among groups (Enshassi, et al., 2009) discussed that, the most significant factor affecting performances of construction projects. The survey findings indicate that the most important factors affecting the performance of construction projects are: because of 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 was conducted by (Saraf, D.D, 2013).

The strategic decision on client satisfaction, financial stability, efficiency, and effectiveness of the internal business process, and project teams, sustainable projects and delivery of innovative projects to clients are to optimize building project performance. The aim objectives of the research are to assess the effects of factors

determining the performance influencing of the public building construction projects in the Assosa Zone.

1.2. Statement of the problem

In the construction industry, many public building construction projects are finished by the poor performance because of many factors. The construction project delays are the statements of the problem and there are many factors influencing the project delays. As Enshassi, et al., (2009) pointed out, the time factor, cost factor, quality factor, productivity factor, client's satisfaction factor, regular and community satisfaction factor, people factor, health and safety factor, innovation and learning factor and environment factor are the major factors affecting the performance of the construction projects.

Therefore, those factors are influenced by cost factor, time factor, quality factor, productivity factor, client satisfaction factor, people factor, health and safety factor, training and learning factor, environmental factor and management action factors. Poor management of the organization, involvement of unprofessional and unskilled persons to the projects is the factor affecting the project performance.

According to (Nyangwara and Datche, 2015) stated that, poor management and leadership, inappropriate participants, poor relations and coordination, absence of motivation, control, monitor or decision-making systems, inadequate infrastructure, political issues, cultural issues, and economic conditions are the reason for performance problem within the construction projects.

Therefore, the purpose of this study is to assess the factors that affect the performances of public building construction projects in the Assosa zone in order to assist clients, consultants, and contractors to overcome performance problems and to determine the impacts of performance factors on public building construction projects.

1.3. Research questions

The questions that will address during this research work are:

- What are the factors which influence the performance of public building construction project?
- Which factors are mostly affecting the performance of public building construction project in Assosa Zone?
- What are the impacts of performance factors on public building construction project in Assosa Zone?

1.4. Research Objectives

1.4.1. General objective

The general objective of the study is;

- To assess the effects of factors determining the performance of public building construction project in Assosa Zone.

1.4.2. Specific Objectives

The specific Objectives are;

- To identify factors influencing the performance of public building construction project.
- To identify the most significant factors affecting performance of public building construction project in Assosa Zone.
- To determine the impacts of performance factors on public building construction project in Assosa Zone.

1.5. Scope and Limitation of the study

The research is targeted to assess the effects of factors that determining the performance, prioritizing the most significant factors of performance influencing of public building construction projects in Assosa Zone and determining the impacts of performance factors. A structured methodology and technique should be identified to overcome the factors that affecting the performance of projects.

The research did not include another type of construction project except public building construction projects and the research did not study in another area except Assosa Zone, because of the limitation of time availability, cost availability and the project organization has not permission to giving the full information for the researcher like; desk documents.

1.6. Significance of the study

This study is significant for government organization and the stakeholders of public building construction projects in the Assosa zone. Mostly from the zone factors that influence the project delay relating to the project performance are frequently seen. For example, according to (Frimpong, et al., 2003) identified that Causes of delay and cost overruns in construction projects in a developing country. The significant of the study is for effective and efficient coordination and allocation of resources for the achievement of the project objectives and encourages stakeholders.

1.7. Thesis structure

This research consists of five main chapters as followings:

- ▲ Chapter one: Introduction: this chapter shows the main objectives of research, statement of the problem, scope and limitation and significance of the research.
- ▲ Chapter two: Literature review: this chapter shows a historical review from previous studied to identify the main factors affecting the performance of construction projects.
- ▲ Chapter three: Methodology: this chapter shows the main methodologies used in previous studies and the methodology used in this research in order to achieve the required objectives.
- ▲ Chapter four: Results analysis: this chapter shows analysis and discussion of research results.
- ▲ Chapter five: Conclusions and recommendations.
- ▲ Appendix

2. LITRATURE REVIEW

2.1. Management of construction project

Construction projects can be considered as the largest industry in the world. Growth during this industry, in reality, is an indicator of the economic conditions of a country. Since, most construction comes exhibit value overruns, time extensions, and conflicts among parties and dereliction in the safety and quality sector. Design to control practical information for reaching the project objectives is a significant component of project management. The project management is the planning, organizing, directing, and controlling of company resources to achieve specific goals and objectives. In the project management which are cost, time and performance are the main objects, but in the construction project management its cost, time and quality which did not change fundamentally. But maybe take a wider range in referring to people, and the importance of working through others, also in the construction project management client satisfaction is one important key to project success (walker, 2015).

2.2. Construction Management and Performance

Construction comes to need proficient management, as they are difficult and face several challenges and constraints, like value, time rules, materials, and environmental rules or customs. In construction many activities happen, and occur at constant time, however still square measure connected and integrated. Therefore, effective communications and cooperation to manage and control these activities. In the construction industry management is one of the most important factors affecting the performance of works. As Ugwu and Haupt (2007) explicit that, adequate understandings and data of performance are fascinating for archiving social control goals like improvement of institutional transformations, and economical decision-making in style, specification, and construction, at numerous project-level interfaces, and victimization acceptable decision-support tools are the key performance indicators and assessment methods for infrastructure sustainability.

As Cheung, et al., (2004) Studied that, the project performance is related to project. It is remarked that the development of the construction PPMS will assist project managers in exercising construction project performance indicators and might facilitate senior

project management, project administrators and project managers in observation and assessing project performance. Using project management in the organization helped in many ways, like reducing prices, up temporal order and that specialize in results and quality, in the course of smart cooperation across the organization.

In the construction industry delay of construction projects depends mainly on the poor performance in the projects. Inappropriately managed the estimation and coming up with, scheduling, value management, and budget management, resource allocation, collaboration package, communication, quality management, and documentation or administration system and quality of field data is that the essential issue influencing the performance of the public-funded construction comes in Uasin Gishu County-Kenya (Onjure and Wanyoike, 2016). As Gebrehiwet and Luo (2017) Investigated that, corruption, inaccessibility of utilities at the positioning, inflation/price will increase in materials, lack of quality materials, late style, and style documents, slow delivery of materials, late in approving and receiving of complete project work, poor site management and performance, late release budget/funds, and ineffective project designing and planning are the cogent causes of delay in Ethiopian construction project. In addition, the effect of construction project performance on economic development in Nigeria is: improvement in technology, the extension of infrastructures, increase in employment opportunities and government expenditure are conducted by (Olusola, et al., 2016).

As Lamprou and Vagiona (2018) Stated that, the essential factors influencing the success of comes are known and unremarkably associated with the subsequent areas: project (e.g. clear goal, realistic schedule, adequate funds, resources, size, complexity), project manager and leadership (e.g. leadership, management of changes, effective conflict resolution, communication), project team members (e.g. communication, technical background, qualified team), organization (e.g. high management support, responsibility and authority chart) and external setting (client, technological setting, political setting, social setting, physical environment).

According to Akanni, et al., (2014) pointed out, the factors having an impact on building project performance, and they were categorized under clusters; political, legal, construction techniques and resources, economic and financial, sociocultural and physical.

According to Ugwu and Haupt (2007) remarked that each Early Contractor Involvement (ECI) and Early provider Involvement (ESI) would minimize constructability-related performance issues as well as prices related to delays, claims, wastage, and process, etc. system is a very important part to spot factors moving construction project effort for every of the project goals, one or additional Project Performance Indicators (PPI) is required. Generally, the performance of construction projects plays the main role in the success process of the projects. In the construction industry the factors such as time, cost, quality, client satisfaction; productivity, safety, and environment are the performances influencing of the construction projects.

The factor affecting of the performance of construction project that is agreed by the owners, consultants, and contractors in Libya are escalation of material prices; availability of resources as planned through project duration; average delay thanks to closures and materials shortage; convenience of personals with high expertise and qualification; quality of equipment and raw materials in project; and leadership skills for project manager was conducted by (Fathi and Stevovic, 2017).

2.3. Factor affecting of performance in construction projects

2.3.1. Project manager

Chan, et al., (2004) Stated that the projects can be considered as a set of activities that must be completed in accordance with specific objectives that involve the utilization of a company's resources. To meet the objectives of modern projects, which are increasingly complex in nature, it is essential for project managers to be able to use a variety of managerial skills such as the following:

- a. Management knowledge and skills: finance and accounting, sales and marketing, analysis and development, producing and distributions, strategic planning, tactical planning, operational planning, organization structures, structure behavior, personnel administration and managing work relationships.
- b. Technical knowledge and skills: outlined as an understanding of and proficiency in, a specific kind of activity, particularly one involving methods, processes, procedures, or techniques.
- c. Business information and skills: on small projects, this will be a tricky challenge as a result, the project managers are managing the project control operation.

d. Human knowledge and skills: the ability to work with and through other people. The knowledge that may influence potential performance permits project managers to pay special attention to regulate performance additional effectively. It's remarked that effective communication and quick data transfer between managers and participants facilitate to accelerate the building construction method and performance.

2.3.2. Cost factor

The cost has been addressed by many researchers (Ahadzie, et al., 2008) as a very important success criterion, whereas, budget plan and proper cost estimation has been mentioned as prominent success factors. As suggested by the experts, the four areas that are highly relevant to project cost control are: interim payments, variation orders, cost and prolongation claims, and final account forecasts. In addition, the affecting performance under the cost factors group, such as; market share of organization, cost of variation orders, escalation of material prices, waste rate of materials, motivation cost, liquidity of organization, project labor cost, material and equipment cost, and cost of rework are conducted by (Enshassi, et al., 2009).

2.3.3. Time factor

As (Dalcher, 2018) Demonstrated that, time or schedule as one of the most important project success criteria for any project. Time has been self-addressed as a criterion by that to gauge a project's degree of success. It is conjointly been mentioned as an element, which may facilitate the opposite factors/criteria be met. It is found in this study that the definition of "Time" is of great importance. "Time" as the date when a project is most likely to end can be criteria, but "Time" as a manageable component might be considered as a factor.

According to (Shaikh, et al., 2010) Stated that delay is one of the most common, important and serious problems which impacts the time factor with relation to cost of projects in the construction industry, identified four delay factors representing reason of late in development projects. They are client problems, contractor problems, resources problems, and general problems. In addition the time factor group that affects the performance in the building construction projects, such time factors are; average delay because of closures leading to materials shortage, average delay in claim

approval, site preparation time, unavailability of resources as planned through project duration and time needed to rectify defects were conducted by (Enshassi, et al., 2009).

2.3.4. Quality factor

According to (A, Al-Shaaby and A, Ahmed, 2018) thought-about quality management method as a project success issue that facilitates the success of alternative criteria and factors. Quality construction is one of the performances of building construction project, but they are different factors that affect the quality construction. As (Rajkumar, et al., 2016) indicated that, the top factors affecting quality are; low quality raw material, inexperienced staff supervision, non-support by the management, improper equipment utilization in site, drawing with fewer details, negative attitude of contractors and labor, improper records of the labor day work, no raw material access places, time, and health issues those are the factor that influencing the quality performance on the building construction projects.

2.3.5. Client satisfaction factor

Undoubtedly, stakeholders, whether they are directly or indirectly involved in projects and have different views about success, play crucial roles in every project. Stakeholders' satisfaction, both internally and externally (including clients, customers, contractors, managers, etc.), with the final product as a project success criterion is given special importance by almost all researchers (Belout and Gauvreau, 2004) and (Ahonon and Savolainen, 2011). It is worthwhile to note that stakeholders' satisfaction is sometimes paraphrased as satisfying stakeholders' needs or meeting stakeholders' expectations. Major contribution to unsuccessful projects is the lack of understanding or defining project and product scope at the start of the project. A properly defined and managed scope leads to delivering a quality product, in a controlled cost and within specified schedules to the stake-holders were stated by (Mirza, et al., 2014).

2.3.6. Productivity factor

In the construction industry, there are different factors that affect the productivity of construction projects those factors are: lack of material, incomplete drawings, inspection delay, incompetent supervisors, instruction time, lack of tools and instrumentality, poor communication and poor site layout. As (Makulsawatudom and Emsley, 2001) Stated that factors affecting the productivity of the construction industry in Thailand. The construction project could be a key sector of the financial set-up for

countries all around the world, as historically it took up a giant portion in the nation's total employment and its vital contribution to a nation's revenue as a full. However, nowadays, construction industries are still facing a variety of issues concerning low productivity, poor safety, and poor quality. Labor productivity is one of the influencing the performance of construction projects.

As (Chigara and Moyo, 2014) indicated that, inconvenience of materials, late payment of salaries and wages, suitability/adequacy of plant and instrumentation, superior incompetence, and lack of workforce skills, at the highest five most vital factors striking on labor productivity in Zimbabwe. An adequate work coming up with, economical resource procurable systems, timeouts payment of salaries and continuous skilled development for employees, area unit amongst the counseled intervention methods to enhance on-the-scene labor productivity.

2.3.7. Environmental factor

External environmental factors, that embrace political surroundings, economic surroundings and social surroundings, have an effect on the success of housing development comes in developing countries. (Musa, et al., 2016) Were administered to construction professionals who work as developers, consultants or contractors, and those working in public housing agencies. He studies that, the economics factor, social factor and political factor significantly affects public housing project performance. In addition, the researcher (Enshassi, et al., 2009) stated that, air quality, noise level, wastes around the site and climatic condition is the environmental factors that affect the performances of construction projects.

2.4. Performance factors Investigation and Analysis

In order to investigate performance factors, this study were performed with two stages. At the first stage to investigate the performance factors questionnaires and interviews of case studies were prepared and the questioners distributed among the population sample. The interview were interviewed to the consultant offices. Then data obtain from the distributed questionnaires were analyzed by using the SPSS version 20 and the interview were discussed. According to SPSS analysis the largest relative importance index would be had the first rank and this indicate us that factor the first performance factor.

3. RESEARCH DESIGN AND METHODOLOGY

3.1. Study Area

The study area of this research is in Assosa Zone, which is located in west Ethiopia at a distance of about 665 km from the Capital City Addis Ababa.

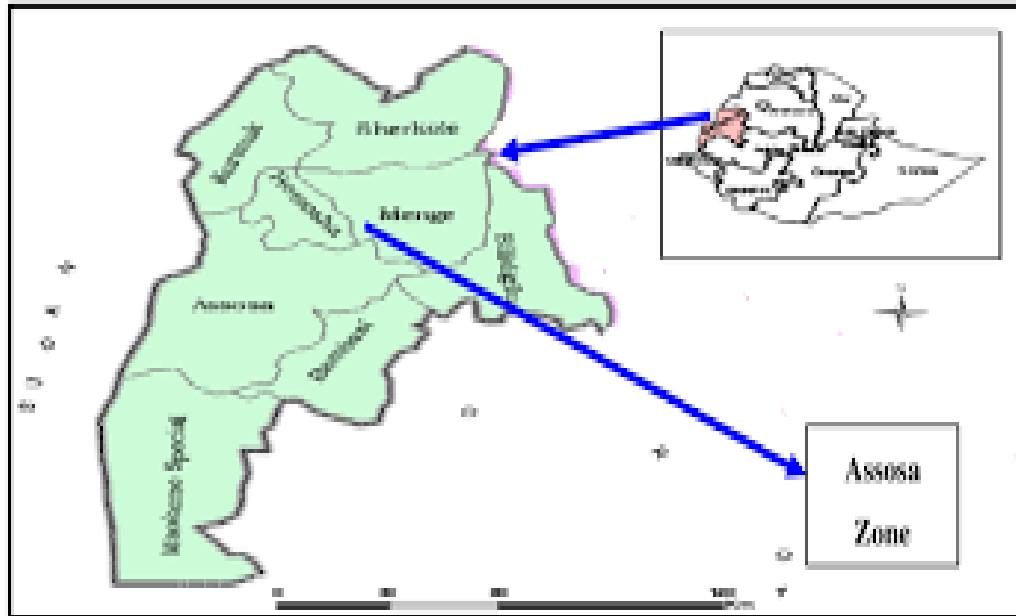


Figure 3.1: Map of study area

3.2. Study Design

In this study quantitative research was used and the data were collected by using the designing of a structured questionnaire survey. The distribution of the questionnaire to the main stakeholder such as clients, consultants, and contractors, and, interview about the project was conducted. The data was analyzed by using the quantitative approach used to gather the factual data to satisfy and to fit the objectives of the study. The research study framework is given in Figure 3.2.

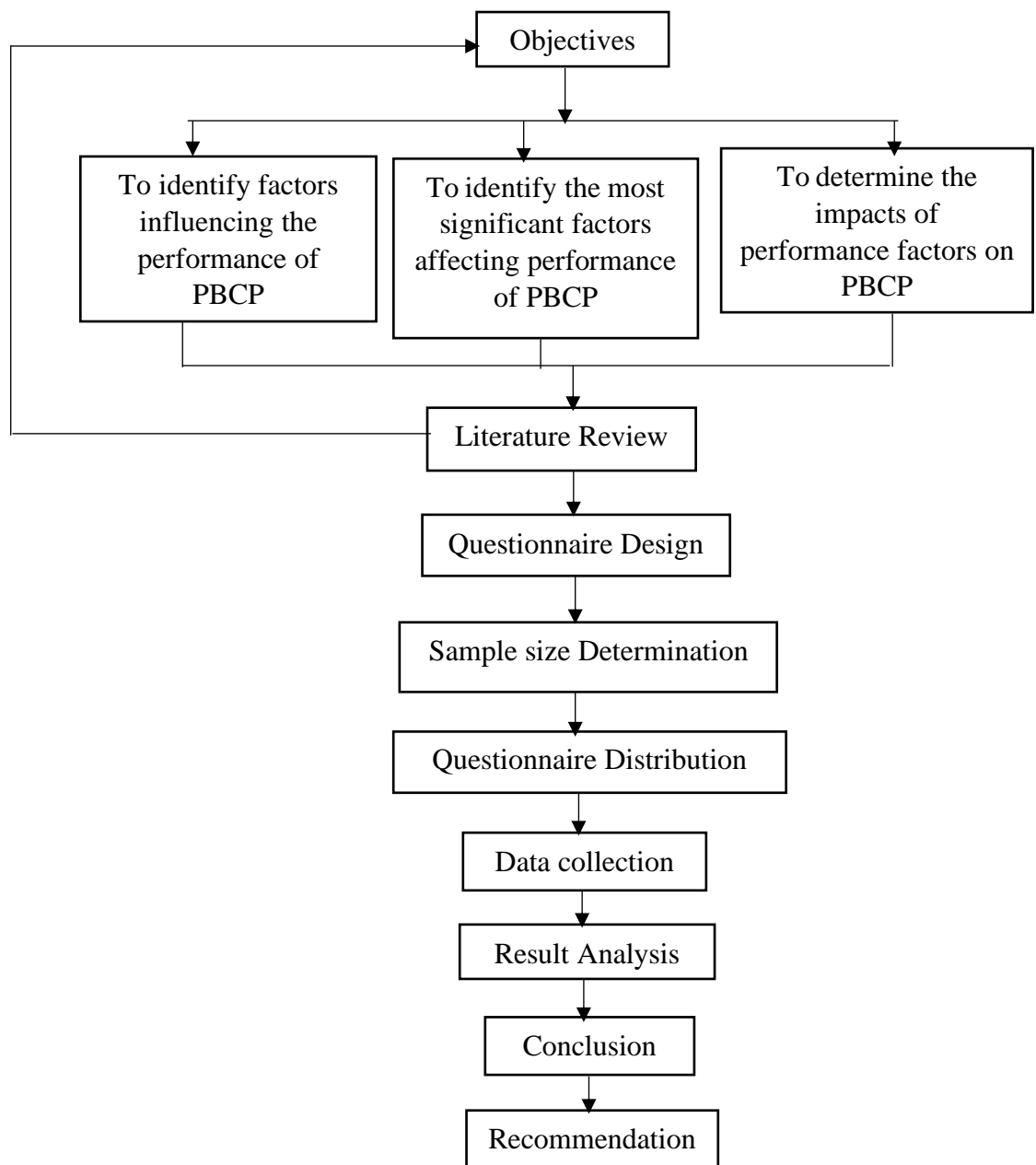


Figure 3. 2 Research framework

3.3. Population of the study

Population of the study is to gathering information during the study of research. This population was the different stakeholders in the construction project. Those experts are the role-play in the construction project. The clients, consultants, and contractors were the population involved in the public building construction project in the Assosa Zone. The populations for this research is 46 consisting of 10 Clients, 16 Consultants and 20 Contractors who are undertaking government-funded public building construction

projects under the Assosa zone. The buildings used in this research was 16(sixteen) the ongoing public building construction project, which are 10 Educational schools, and 6 Health centers had been determined for the research.

3.4. Sample size and Sampling procedures

3.4.1. Sample size

The clients, consultants, and contractors are the targeted groups of this study. According to the Assosa zone, there are 10 Clients, 16 Consultants and 20 Contractors undertaking in the governmental organization funded of Assosa zone. The sample size can be calculated as the following equation, in order to achieve a 94% confidence level (Assaf, et al., 2001 and Moore, et al., 2003).

$$n = n' / [1 + (n'/N)]$$

where: -

N = Total number of populations

n = Sample size from finite population

n' = Sample size from infinite population = S^2/V^2 ; where S is the variance of the population elements and V is a standard error of sampling population. (Usually S= 0.5 and V = 0.06). Therefore, the questionnaire was distributed to 9 Clients, 13 Consultants and 16 Contractors' organizations in order to achieve 94% confidence level.

3.4.2. Sampling procedures

The sampling procedures were used due to the nature of respondents to be involved in the study. Clients, Consultants, and Contractors who were registered in Assosa zone that participated in the public building construction projects. Random sampling was used to select Clients, Consultants, and Contractors. According to Kombo and Tromp (2006), random sampling is the probability whereby people, place or things are randomly selected. Twenty local contractors, sixteen consultants, and ten clients registered located in Assosa zone were randomly selected. And a public building construction project that is constructed by the governmental organization in Assosa zone were selected using purposive sampling.

According to William (2006), purposive sampling is a useful sampling method that allows a researcher to get information from a sample of the population that one thinks knows most about the subject matter. By designing the structured questionnaire survey

assessing the factor influencing the performance in public building projects, a wide range of personal involving in the Assosa zone was randomly selecting. A questionnaire survey is randomly sampling to the person of the client, consultant, and contractor towards the factor affecting the performance of public building construction projects in the Assosa zone and the category level of contractor-grade one to contractor grade five were randomly sampling selected. The designing questionnaire statement is to elicit the respondents' opinions of the significant factor of performance on a five-point Likert scale, with point 1 representing not significant, point 2 representing slightly significant, point 3 representing moderately significant, point 4 representing very significant, point 5 representing extremely significant.

Table 3. 1 Values assigned for the Likert scale in the questionnaire

Scale	1	2	3	4	5
Item	Not significant	Slightly significant	Moderately significant	Very significant	Extremely significant

The sample selected for each of the three groups is described below as:

- ▲ Clients comprising the government agency which is a responsible for the projects,
- ▲ Consultants working in public building construction project
- ▲ Contractors who are involving in the public building construction project.

3.5. Study variables

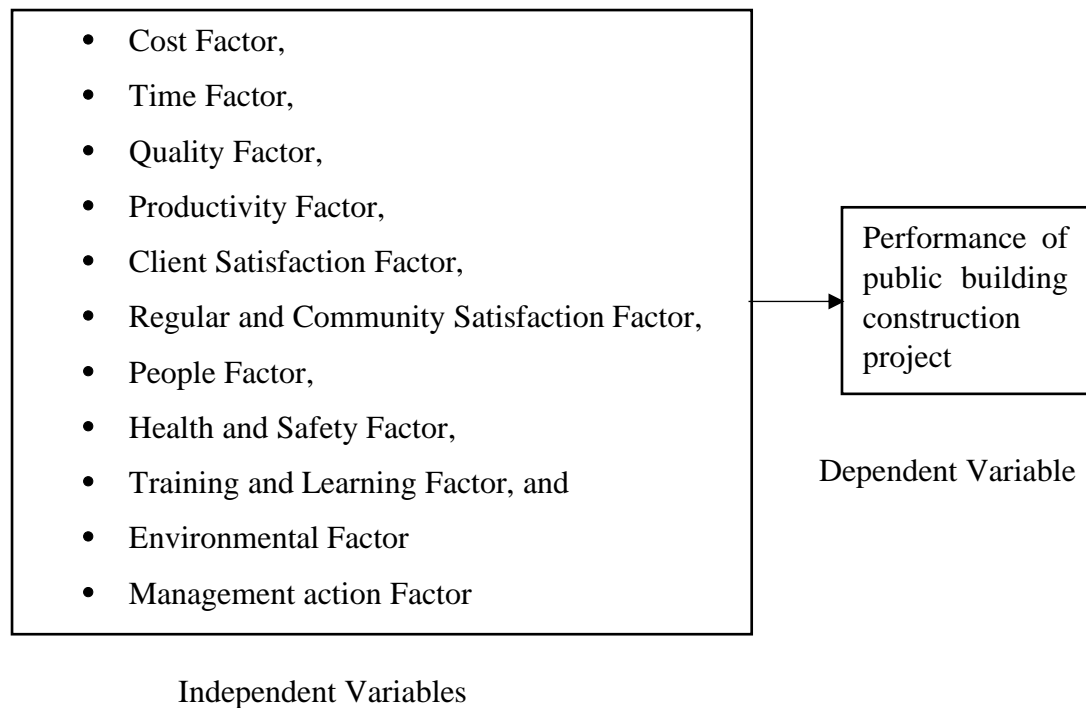


Figure 3. 3 Independent and Dependent variables

3.6. Data collection

The data was collected from primary and secondary sources. Primary data sources include questionnaires and interview while secondary data sources include journals and internet sources.

3.7. Data processing and analysis

The performance factor of public building construction projects was determined according to the questionnaire survey data. The Micro soft excel and SPSS V 20 is the main tool of this research which is the questionnaires were prepared and analyzed. The collected data from respondents was checked for accuracy, completeness, consistency, and reliability across all data sources. The score assigning to each factor by the respondents represents the degree to which the factor contributes to overall performance factors. All the collected information from the survey data to be checking and verifying for the correctness by the principal investigator.

3.7.1. Relative importance index

The relative importance index method (RII) is a statistical method of the determining clients', consultants', and contractors' perceptions of the relative importance of the identified performance factors and ranking the different performance factor. The survey was designed to identify the relative importance of influencing the performance factor of building construction project. The RII is to determine the relative ranking of the factors, sequential ranks to unique values are transformed to importance indices based on the formula:

$$RII = \frac{\sum W}{A * N} = \frac{5 * n5 + 4 * n4 + 3 * n3 + 2 * n2 + 1 * n1}{5 * N} \dots \dots \dots (3.1)$$

Where, W is the weight given to each factor by the respondent, ranging from 1 to 5, (n1 = number of respondents for Not Significant... n5 = number of respondents for Extremely Significant) A is the highest weight (i.e. 5 in the study) and N is the total number of respondents. Analyzing the data from the gathering information and ranging by using RII value between $0 < RII \leq 1$, the highest value of RII, the most significant performance factors.

RII would be used for a ranking of the different performance factors. Those ranking making it possible to cross check the relative importance of the factors as the respondents' perceiving in order to give an overall viewpoint of the most significant performance factors of public building construction projects in Assosa zone. The analyzed data were prioritized and presenting the results by using tables and charts. In order to answered research objectives, study the analysis results, discussion of the results is comparing by using the RII values.

3.7.2. Reliability of data

The reliability of the data in this research is checked by using Cronbach's coefficient alpha. According to a researcher (George and Mallery, 2003), Cronbach's coefficient alpha is designed as a measure of internal consistency. Cronbach's coefficient alpha can be used to check the reliability of the questionnaire. The normal range of Cronbach's coefficient alpha values between 0.0 and + 1.0. The closer the alpha is to 1, the greater the internal consistency of items in the instrument is assumed. The equation used to analyze Cronbach's coefficient alpha is:

$$\alpha = \frac{kr}{1 + (k - 1)r} \dots \dots \dots (3.2)$$

Where:

α = is Cronbach's Coefficient Alpha

K = is items (variables) in the scale and

r = is the average of the inter-item correlations.

The data collected of the performance factors value of Cronbach's coefficient alpha analyzed using SPSS v20 and the result is shown in table 4.21.

3.7.3. Correlation Coefficient

Spearman's Rank Correlation Coefficient Method R_s is a non-parametric test that is used to measure the correlation between two parties' ranking because of the limited number of filled questionnaires. In this research, it is used to show the degree of a ranking of the different factors. The value of R_s ranged from -1 to 1 indicated as if -1 or 1 perfect negative or positive correlation, between -1 to -0.5 or 1 to 0.5, strong negative or positive correlation, between -0.5 to 0 or 0 to 0.5, weak negative or positive correlation and 0 no correlation. Computed using Equation (3.3);

$$R_s = 1 - \frac{6\sum d^2}{n^3 - n} \dots \dots \dots (3.3)$$

Where:

R_s = is the Spearman rank correlation coefficient between two parties,

d = is the difference between ranks and n =is the number of pairs of rank.

The Spearman rank correlation Coefficient between a variable of this research is analyzed by using the SPSS v20 and the result is shown in table 4.8.

3.8. Ethical considerations

The research is free from any political consideration; it is based on the academic perception. The researcher also assuring that the names of respondents were not be reveal in the study and this research is informed to the consent participants.

Finally, the researcher took appropriate measures to ensure the research would cause no physical or psychological harm to research participants. As a general rule, therefore, the study did not raise any ethical concerns.

4. RESULTS AND DISCUSSIONS

4.1. Introduction

This chapter included analysis and discussion of the results that have been collected from field surveys. In this study, a total of thirty-three questionnaire respondents from the study sample were considered. This chapter included the personal information and profile of the respondents, quantitative analysis of questionnaire field survey.

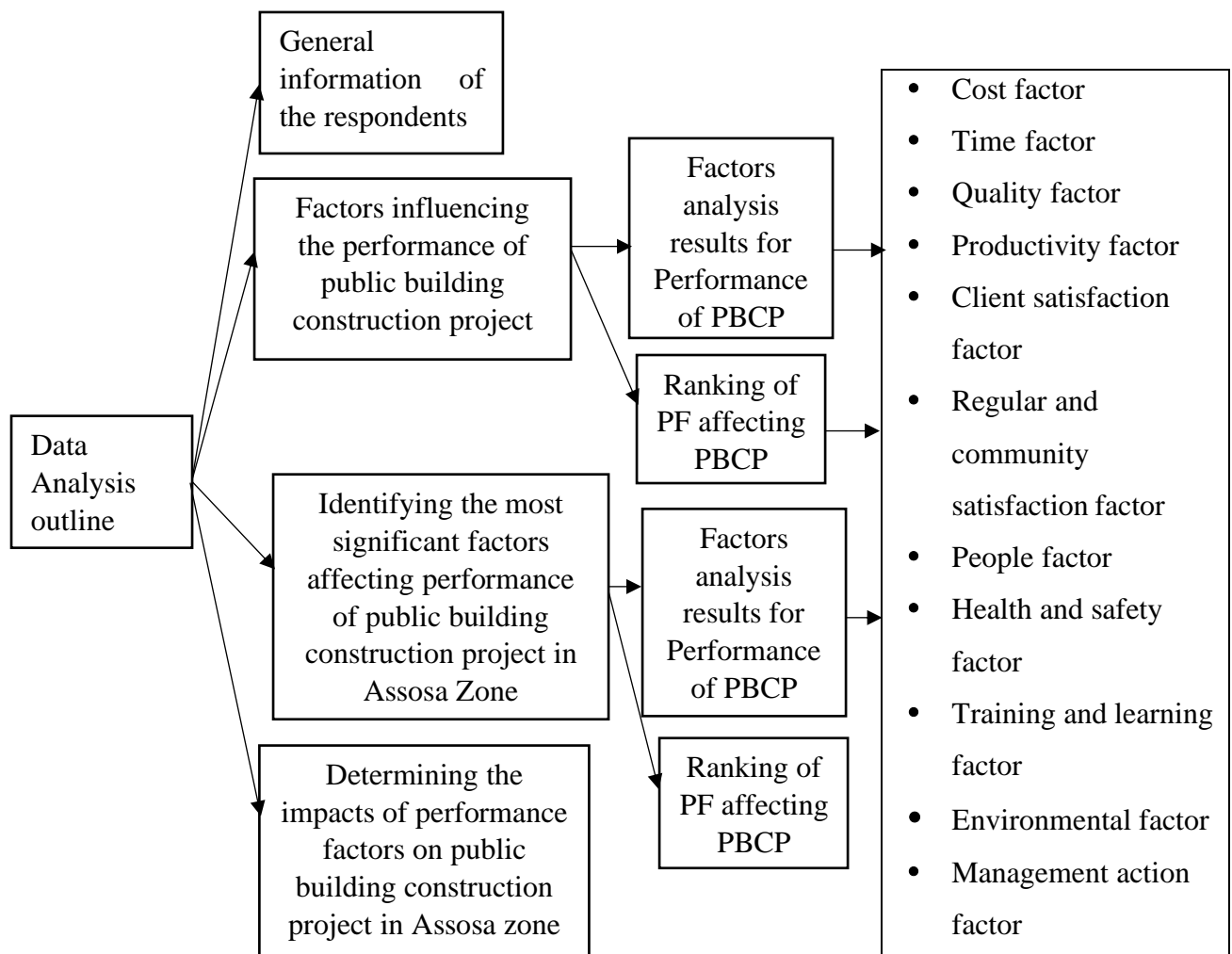


Figure 4. 1: The outline of data analysis and discussion chapter

4.2. General information of the respondents

1. Type of organization

This section of questionnaire mainly designed to provide type of organization about the respondents.

Table 4. 1 Questionnaire response rate

Sector	Distributed questionnaire	Response questionnaire
Client	9	9
Consultant	13	11
Contractor	16	13
Total	38	33

A total of 38 questionnaires distributed 33 were filled and returned representing 86.84% response rate. This response rate was attributed to efforts made by the researcher and the research assistant who personally kept in touch with the respondents and collected the questionnaires promptly.

2.Type of respondent professional

Table 4. 2 Frequency and Percentage of received respondent job title

Job title of respondents	Type of organization					
	Clients		Consultants		Contractors	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Architect	-	-	1	9%	-	-
Project manager	2	22%	1	9%	3	23%
Site Engineer/ Office Engineer	7	78%	9	82%	10	77%
Total	9	100%	11	100%	13	100%

3. Respondent experience years

Table 4. 3 Respondent experience years in the construction field

Years interval	Type of organization					
	Clients		Consultants		Contractors	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Less than 5 years	3	34%	6	55%	4	31%
From 5 to 10 years	3	33%	3	27%	6	46%
From 11 to 15 years	2	22%	2	18%	2	15%
Above 15 years	1	11%	-	-	1	8%
Total	9	100%	11	100%	13	100%

4. Educational level

Table 4. 4 Educational level of respondents

Educational level	Type of organization					
	Clients		Consultants		Contractors	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Certificate	1	11%	-	-	1	8%
Diploma	5	56%	6	55%	8	61%
Degree	3	33%	5	45%	4	31%
Post graduate	-	-	-	-	-	-
Total	9	100%	11	100%	13	100%

4.3. Factors influencing the performance of public building construction projects

The results of the study of factors influencing the performance of public building construction projects according to the respondent's perspectives can be provided by an indication of the relative importance index and rank of factors affecting the performance of public building construction projects in Assosa Zone. Ranking of factors according to clients, consultants and contractors view and each type of targeted group are shown in table 4.5 below.

Table 4.5 The relative importance index (RII) and the rank of factors

Causes of Performance Factors	Client		Consultant		Contractor	
	RII	Rank	RII	Rank	RII	Rank
1. Cost Factor						
Market share of organization	0.400	23	0.418	21	0.554	19
Liquidity of organization	0.511	19	0.400	22	0.523	20
Cash flow of project	0.600	15	0.509	17	0.585	17
Profit rate of project	0.333	25	0.236	29	0.400	27
Overhead percentage of project	0.489	20	0.273	27	0.508	21
Project design cost	0.600	15	0.382	23	0.385	28
Material and equipment cost	0.778	7	0.673	9	0.800	6
Project labor cost	0.578	16	0.436	20	0.462	24
Project overtime cost	0.511	19	0.691	8	0.492	22
Motivation cost	0.711	10	0.673	9	0.677	12
Cost of rework	0.689	11	0.582	14	0.646	13
Cost of variation orders	0.689	11	0.727	6	0.677	12
Waste rate of materials	0.422	22	0.291	26	0.385	28
Regular project budget update	0.667	12	0.509	17	0.615	15
Cost control system	0.622	14	0.600	13	0.600	16
Escalation of material prices	0.933	1	0.909	1	0.923	1
Differentiation of currency prices	0.822	5	0.818	4	0.908	2
2. Time factors						
Site preparation time	0.622	14	0.473	18	0.492	22
Planned time for project construction	0.556	17	0.509	17	0.431	25
Percentage of orders delivered late	0.711	10	0.564	15	0.508	21
Time needed to implement variation orders	0.644	13	0.636	11	0.585	17
Time needed to rectify defects	0.578	16	0.618	12	0.415	26
Average delay in claim approval	0.644	13	0.691	8	0.677	12
Average delay in regular payments	0.644	13	0.582	14	0.569	18

STUDY ON PERFORMANCE FACTORS OF PUBLIC BUILDING CONSTRUCTION PROJECT IN
ASSOSA ZONE

Unavailability of resources as planned through project duration	0.867	3	0.836	3	0.877	3
3. Quality factors						
Conformance to specification	0.711	10	0.636	11	0.477	23
Unavailability of competent staff	0.644	13	0.600	13	0.462	24
Quality of equipment and raw materials	0.778	7	0.655	10	0.785	7
Quality assessment system in organization	0.622	14	0.618	12	0.585	17
Quality training/meeting	0.733	9	0.673	9	0.677	12
4. Productivity factors						
Project complexity	0.289	27	0.255	28	0.246	32
Number of new projects / years	0.267	28	0.273	27	0.277	31
Management-labor relationship	0.756	8	0.727	6	0.692	11
Absenteeism rate through project	0.644	13	0.673	9	0.569	18
Sequencing of work according to schedule	0.889	2	0.855	2	0.825	5
5. Client satisfaction factors						
Information coordination between owner and project parties	0.667	12	0.655	10	0.554	19
Leadership skills for project manager	0.844	4	0.764	5	0.846	4
Speed and reliability of service to owner	0.800	6	0.582	14	0.400	27
Number of disputes between owner and project parties	0.756	8	0.764	5	0.615	15
Number of rework incidents	0.578	16	0.527	16	0.492	22
6. Regular and community satisfaction factors						
Cost of compliance to regulators requirements	0.378	24	0.564	15	0.338	29
Number of non-compliance events	0.578	16	0.600	13	0.477	23
Quality and availability of regulator documentation	0.733	9	0.673	9	0.692	11
Site condition problems	0.756	8	0.636	11	0.754	8
7. People factors						
Recruitment and competence development	0.644	13	0.636	11	0.600	16
Employee attitudes in projects	0.778	7	0.727	6	0.738	9
Employees motivation belonging to work	0.556	17	0.600	13	0.508	21
8. Health and safety factors						
Application of health and safety factors in organization	0.733	9	0.655	8	0.646	10
Project location is safe to reach	0.822	5	0.691	21	0.723	24
Assurance rate of project	0.644	13	0.418	17	0.462	22
Reportable accidents rate in project	0.644	13	0.509	13	0.492	18
9. Training and learning factors						

STUDY ON PERFORMANCE FACTORS OF PUBLIC BUILDING CONSTRUCTION PROJECT IN
ASSOSA ZONE

Learning from best practice and experience of others	0.378	24	0.455	19	0.615	15
Training the human resources in the skills demanded by the project	0.733	9	0.673	9	0.677	12
Work group	0.511	19	0.473	18	0.385	28
Review of failures and solving them	0.600	15	0.673	9	0.477	23
Learning from own experience and past history	0.556	17	0.582	14	0.508	21
10. Environmental factors						
Air quality	0.267	28	0.200	31	0.200	33
Noise level	0.311	26	0.218	30	0.200	33
Wastes around the site	0.267	28	0.236	29	0.308	30
Climate condition	0.644	13	0.618	12	0.631	14
Economic environment	0.600	15	0.636	11	0.477	23
Social Environment	0.778	7	0.727	6	0.800	6
Physical environment	0.622	14	0.309	25	0.415	26
Industrial relations environment	0.689	11	0.709	7	0.677	12
Technology advancement	0.756	8	0.709	7	0.723	10
11. Management action factors						
Communication systems	0.578	16	0.455	19	0.569	18
Control mechanisms	0.600	15	0.509	17	0.523	20
Feedback capabilities	0.444	21	0.418	21	0.462	24
Planning effort	0.556	17	0.473	18	0.462	24
Implication an effective quality assurance	0.489	20	0.345	24	0.523	20
Overall managerial actions	0.622	14	0.564	15	0.508	21
Control sub-contractor's works	0.444	21	0.436	20	0.338	29
Developing appropriate organizational structure	0.533	18	0.291	26	0.508	21
Implementing effective safety system	0.778	7	0.582	14	0.477	23

4.3.1. Significant factor influencing performance of public building construction projects

The main factors influencing the performance of public building construction projects in Assosa zone were: escalation of material prices, sequencing of work according to schedule, unavailability of resources as planned through project duration, differentiation of currency prices and leadership skills for project manager are the most significant factors agreed by the clients, consultants, and contractors.

Table 4.6 Significant factors

Causes of Performance Factors	Client		Consultant		Contractor	
	RII	Rank	RII	Rank	RII	Rank
Escalation of material prices	0.933	1	0.909	1	0.923	1
Sequencing of work according to schedule	0.889	2	0.855	2	0.825	5
Unavailability of resources as planned through project duration	0.867	3	0.836	3	0.877	3
Differentiation of currency prices	0.822	5	0.818	4	0.908	2
Leadership skills for project manager	0.844	4	0.764	5	0.846	4

According to clients, consultants, and contractors; it was obtained that the escalation of material prices results from unexpected rise in the market prices of key construction materials was the most important performance factor as it has the first rank among all factors with relative index (RII) = 0.933 for Clients, 0.909 for consultants and 0.923 for contractors. This agreement between all target groups is traced to the political situation from which affects the Assosa zone.

Public building construction projects in the Assosa zone are suffering from a number of problems because of the unexpected rise in the market prices of key construction materials. These problems can be considered as an obstacle for the cost performance of projects as this effect on the rate at which projects are executed. All clients, consultants, and contractors feel with such a sensitive problem in their projects. The current political situation in Ethiopia is the result of the increment of the market price of construction material.

Sequencing of work according to schedule has been ranked by the clients' respondents in the second position with RII equal 0.889 it has been ranked by the consultants' respondents in the second position with RII equal 0.855 and has been ranked by the contractors' respondents in the fifth position with RII equal 0.825. This is mainly because cash flow affects the project budget and project cost performance problems.

Unavailability of resources as planned through project duration for the construction projects has been ranked by the clients' respondents in the third position with RII equal

0.867. It has been ranked by the consultants' respondents in the third position with RII equal 0.836 and has been ranked by the contractors' respondents in the third position with RII equal 0.877. This factor can be considered as important for three parties and it has an approach rank for all parties as it affects directly the completion of a construction project such as time performance. If resources are not available through construction projects as planned through project duration, the project will suffer from the problem of time and cost performance. Hence the progress of construction projects is not finished according to the schedule. This is because the availability of resources as a planned schedule can improve the time performance of the construction projects.

Differentiation of currency prices has been ranked by the clients' respondents in the fifth position with RII equal to 0.822. It has been ranked by the consultants' respondents in the fourth position with RII equal 0.818 and has been ranked by the contractors' respondents in the second position with RII equal 0.909. Public building construction project in the Assosa Zone it is affected by increasing of dollar prices. This differentiation of currency prices has it happened because of political and economic situation with all of the countries in the earlier years. This factor influencing the liquidity, project budget, and cost performance.

Leadership skills for the project manager have been ranked by the clients' respondents in the fourth position with RII equal to 0.844. It has been ranked by the consultants' respondents in the fifth position with RII equal 0.764 and has been ranked by the contractors' respondents in the fourth position with RII equal 0.846. This factor is considered as more important for contractors and clients than for consultants. This is mainly because that if a project manager has strong leadership skills, then the project performance can be able to plan and execute their construction projects to maximize the project's chances of success with quality and in the scheduled.

4.3.2. Ranking of factors influencing performance of public building construction projects

The causes of the performance factor were analyzed by using the relative important index in according to all responses and were ranked by using SPSS v 20. The results were shown in Table 4.7 below.

Table 4.7 The RII and rank of factor according to all categories.

S. No	Causes of Performance Factors	All Response	
		RII	Rank
1	Escalation of material prices	0.922	1
2	Unavailability of resources as planned through project duration	0.860	2
3	Sequencing of work according to schedule	0.856	3
4	Differentiation of currency prices	0.849	4
5	Leadership skills for project manager	0.818	5
6	Social Environment	0.768	6
7	Material and equipment cost	0.750	7
8	Employee attitudes in projects	0.748	8
9	Project location is safe to reach	0.745	9
10	Quality of equipment and raw materials	0.739	10
11	Technology advancement	0.729	11
12	Management-labor relationship	0.725	12
13	Site condition problems	0.715	13
14	Number of disputes between owner and project parties	0.712	14
15	Quality and availability of regulator documentation	0.699	15
16	Cost of variation orders	0.698	16
17	Training the human resources in the skills demanded	0.694	17
18	Quality training/meeting	0.694	17
19	Industrial relations environment	0.692	18
20	Motivation cost	0.687	19
21	Application of health and safety factors in organization	0.678	20
22	Average delay in claim approval	0.671	21
23	Cost of rework	0.639	22
24	Climate condition	0.631	23
25	Absenteeism rate through project	0.629	24
26	Recruitment and competence development	0.627	25
27	Information coordination between owner and project parties	0.625	26
28	Time needed to implement variation orders	0.622	27

STUDY ON PERFORMANCE FACTORS OF PUBLIC BUILDING CONSTRUCTION PROJECT IN
ASSOSA ZONE

29	Implementing effective safety system	0.612	28
30	Quality assessment system in organization	0.608	29
31	Conformance to specification	0.608	30
32	Cost control system	0.607	31
33	Average delay in regular payments	0.598	32
34	Regular project budget update	0.597	33
35	Percentage of orders delivered late	0.594	34
36	Speed and reliability of service to owner	0.594	35
37	Review of failures and solving them	0.583	36
38	Economic environment	0.571	37
39	Unavailability of competent staff	0.569	38
40	Project overtime cost	0.565	39
41	Cash flow of project	0.565	40
42	Overall managerial actions	0.565	41
43	Employees motivation belonging to work	0.554	42
44	Number of non-compliance events	0.552	43
45	Reportable accidents rate in project	0.549	44
46	Learning from own experience and past history	0.548	45
47	Control mechanisms	0.544	46
48	Time needed to rectify defects	0.537	47
49	Communication systems	0.534	48
50	Number of rework incidents	0.532	49
51	Site preparation time	0.529	50
52	Assurance rate of project	0.508	51
53	Planned time for project construction	0.498	52
54	Planning effort	0.497	53
55	Project labor cost	0.492	54
56	Learning from best practice and experience of others	0.483	55
57	Liquidity of organization	0.478	56
58	Market share of organization	0.457	57
59	Work group	0.456	58
60	Project design cost	0.455	59
61	Implication an effective quality assurance	0.452	60
62	Physical environment	0.449	61
63	Developing appropriate organizational structure	0.444	62
64	Feedback capabilities	0.441	63
65	Cost of compliance to regulators requirements	0.427	64
66	Overhead percentage of project	0.423	65
67	Control sub-contractor's works	0.406	66
68	Waste rate of materials	0.366	67
69	Profit rate of project	0.323	68

70	Number of new projects / years	0.272	69
71	Wastes around the site	0.270	70
72	Project complexity	0.263	71
73	Noise level	0.243	72
74	Air quality	0.222	73

4.3.3. Test for Agreement on the performance factors

Test for agreement on the performance problems of public building construction project between the two parties of the respondents was analyzed in the non-parametric test of Spearman's rho correlation coefficient. All the results of a test agreement between the parties were a positive correlation. The value of Spearman's rho correlation coefficient between Client — Consultant was 0.814** and the value of Spearman's rho correlation coefficient between Consultant — Contractor was 0.781** and Client — Contractor was 0.770** respectively. Therefore, Client — Consultant was a strong positive correlation coefficient than Consultant — Contractor, and Client — Contractor. Therefore, as the results of Spearman's rho correlation coefficient; the respondents are agreed all factors are the performance problems of public building construction project.

Table 4. 8 Spearman importance rank correlations

			Client	Consultant	Contractor
Spearman's rho	Client	Correlation Coefficient	1.000	0.814**	0.770**
		Sig. (1-tailed)	.	0.000	0.000
		N	74	74	74
	Consultant	Correlation Coefficient	0.814**	1.000	0.781**
		Sig. (1-tailed)	0.000	.	0.000
		N	74	74	74
	Contractor	Correlation Coefficient	0.770**	0.781**	1.000
		Sig. (1-tailed)	0.000	0.000	.
		N	74	74	74

** . Correlation is significant at the 0.01 level (1-tailed).

4.4. Top ten significant factors affecting the Performance of public building construction project according to all categories

The performance problems of public building construction project were prioritized in accordance with the most top-ten significant factors. The most significant factors of the

performance of public building construction project in Assosa zone according to the all categories were listed in Table 4.9.

According to all responses, the escalation of material prices was the most important performance factor as it has the first rank among all factors with RII = 0.922. This significant is traced to the rise of the market price of construction materials because of the political situation in the overall of the country and in the Assosa zone. Public building construction projects in the Assosa zone are suffering from complex problems because of cost overrun. These problems can be considered as an obstacle for cost performance.

Unavailability of resources as planned through project duration has been ranked by all responses in the second position with RII equal 0.860. This factor is considered important for all parties as it affects directly project performance such as time. If resources are not available as planned through project duration, the project will suffer from the problem of time and cost performance.

Sequencing work according to schedule has also been ranked by all response in the third position with RII equal 0.856. This is mainly because cash flow affects the project budget and project cost performance. Differentiation of currency prices has also been ranked by all response in the fourth position with RII equal 0.849. Public building construction project in Assosa zone its affected by increasing of dollar prices. This differentiation of currency prices has it happened because of political and economic situation with all of the country in the earlier years. This factor influencing the liquidity, project budget and cost performance.

Leadership skills for project managers has also been ranked by all responses in the fifth position with RII equal to 0.818. If a project manager has strong leadership skills, the project performance can be monitored, controlled and managed with high quality and the project can be finished with their resources and their time scheduled. The social environment has been ranked by all responses in the sixth position with RII equal to 0.768. This factor is significantly related to social awareness to executed the project. Hence, external environmental factors are important for the performance of a construction project to execute the project with a schedule.

Table 4. 9 The top ten significant factors

Causes of Performance Factors	All Response	
	RII	Rank
Escalation of material prices	0.922	1
Unavailability of resources as planned through project duration	0.860	2
Sequencing of work according to schedule	0.856	3
Differentiation of currency prices	0.849	4
Leadership skills for project manager	0.818	5
Social Environment	0.768	6
Material and equipment cost	0.750	7
Employee attitudes in projects	0.748	8
Project location is safe to reach	0.745	9
Quality of equipment and raw materials	0.739	10

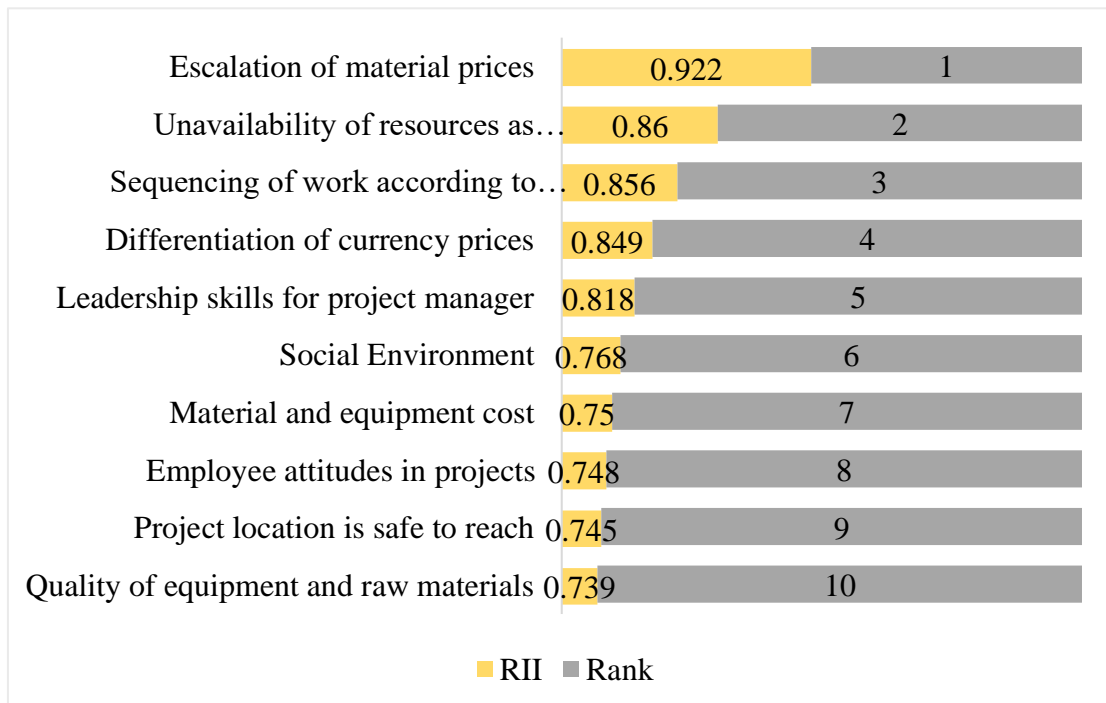


Figure 4. 2 The top ten significant factor affecting of performance

Material and equipment costs has also been ranked by all responses in the seventh position with RII equal to 0.750. This is considered the most important factor because the cost performance of any project depends mainly on the organization's liquidity. Employee attitudes in the project has been ranked by all responses in the eight positions

with RII equal to 0.748. In the public building construction projects, the behavior of the worker is its effects on the construction projects in the Assosa zone.

The project location is safe to reach has been ranked by all responses in the ninth position with RII equal to 0.745. Geographical location affects the performance of the project in the Assosa zone because the geographical location is not safe for the transportation of construction materials. This factor is the suffer problems of the health and safety effects of public building construction project. The quality of equipment and raw materials in the project has also been ranked by all responses in the tenth position with RII equal to 0.739. Quality control is one of the most important duties for the consultant on the site of a construction project. This will lead to owner satisfaction and implementation of the project according to specifications.

4.5. Ranking of factors affecting the performance of public building construction project according to each factor.

1. Cost factors:

Table 4. 10 The relative importance index (RII) and rank of cost factors

Factor	Client		Consultant		Contractor		All Response	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
1. Cost factor								
Escalation of material prices	0.933	1	0.909	1	0.923	1	0.922	1
Differentiation of currency prices	0.822	2	0.818	2	0.908	2	0.849	2
Material and equipment cost	0.778	3	0.673	4	0.800	3	0.750	3
Cost of variation orders	0.689	5	0.727	3	0.677	4	0.698	4
Motivation cost	0.711	4	0.673	4	0.677	4	0.687	5
Cost of rework	0.689	5	0.582	6	0.646	5	0.639	6
Cost control system	0.622	7	0.600	5	0.600	7	0.607	7
Regular project budget update	0.667	6	0.509	7	0.615	6	0.597	8
Project overtime cost	0.511	10	0.382	11	0.492	12	0.565	9

STUDY ON PERFORMANCE FACTORS OF PUBLIC BUILDING CONSTRUCTION PROJECT IN
ASSOSA ZONE

Cash flow of project	0.600	8	0.509	7	0.585	8	0.565	9
Project labor cost	0.578	9	0.436	8	0.462	13	0.492	10
Liquidity of organization	0.511	10	0.400	10	0.523	10	0.478	11
Market share of organization	0.400	13	0.418	9	0.554	9	0.457	12
Project design cost	0.600	8	0.382	11	0.385	15	0.456	13
Overhead percentage of project	0.489	11	0.273	13	0.508	11	0.423	14
Waste rate of materials	0.422	12	0.291	12	0.385	15	0.366	15
Profit rate of project	0.333	14	0.236	14	0.400	14	0.323	16

Clients view

According to the clients' respondents' perspectives; the escalation of material prices has been ranked in the first position with RII equal 0.933. This factor is the most important one for the client because of continuous closures and shortages of construction material and inflation/ escalation of construction materials price in the Assosa zone. This factor is it affects the liquidity of clients' projects and the cost performance of their projects. Differentiation of currency prices has also been ranked by the clients' respondents in the second position with RII equal to 0.822. This factor is an important one for a client because cash flow can give importance to the cost performances and affects the project budget.

Material and equipment costs has also been ranked by the client's respondents in the third position with RII equal to 0.778. This factor is significant for clients because it affects the client's liquidity and cost of the project performance. Motivation cost in the project has been ranked by the clients' respondents in the fourth position with RII equal to 0.711. This factor is significant for clients because motivation cost affects the productivity of the projects and the cost of the project performance. The cost of variation orders and cost of rework has also been ranked by the clients' respondents in the fifth position with RII equal to 0.689 and 0.689 respectively. This factor is significant for the client because it affects the financial related project delay and the cost of the project performance.

Consultant view

The escalation of material prices has been ranked by the consultants' respondents in the first position with RII equal to 0.909. Escalation of construction material prices affects the cost of the project performance because of the shortage of construction material due to the political situation of overall, our country of Ethiopia in the last five years. Differentiation of currency prices has also been ranked by the consultants' respondents in the second position with RII equal to 0.818. Cost project performance factor is related to clients' representative factors such as clients' liquidity and project budget. Public building construction projects in the Assosa zones suffered from the differentiation of cost prices because of the unstable economic situation in the country.

The cost of variation orders has also been ranked by the consultants' respondents in the third position with RII equal to 0.727. The cost of a variation order can give an important factor affects the cost performance of the completion date of a project. Material and equipment costs has also been ranked by the consultant's respondents in the fourth position with RII equal to 0.673. Material and equipment costs are one of the components of the project budget affecting the performance of cost. Motivation cost in the project has also been ranked by the consultants' respondents in fourth positions with RII equal to 0.673. The motivation of cost for engineers in projects it affects the quality of construction projects. The cost control system has been ranked by the consultants' respondents in the fifth position with RII equal to 0.600. This factor is significant for performance of the projects.

Contractor view

The escalation of material prices has been ranked by the contractors' respondents in the first position with RII equal to 0.923. This factor is the most important one for contractors because of the continuous closures of a public building in the Assosa zone to a rapid shortage of construction materials and escalation of construction material prices. This escalation of material prices affects the liquidity of contractors and the profit rate of their projects. Differentiation of currency prices has been ranked by the contractors' respondents in the second position with RII equal to 0.908. Differentiation of cost prices affects the project's profit rate for contractors and the contractors' cost performance.

Material and equipment costs has also been ranked by the contractor’s respondents in the third position with RII equal to 0.800. This factor is considered as one of the project cost components because it affects the contractors’ profit rate and their cost performance. The cost of variation orders has also been ranked by the contractors’ respondents in the fourth position with RII equal to 0.677. This factor is significant for contractors because the cost of variation orders for contractors affects the schedule of the projects and the cost of the project performance. Motivation cost in the project has also been ranked by the contractors’ respondents in the fourth position with RII equal to 0.677. This mainly because the motivation of employees affects the productivity of projects and their cost performance. The cost of rework has been ranked by the contractors’ respondents in the fifth position with RII equal to 0.646. This factor is significant for the contractor because the contractor has the responsibility to construct the project within the project duration. This factor is financial related to the project delay.

Generally, the average of all respondents is the top five significant factor of public building construction projects in Assosa zone are shown in the figure 4.3 below.

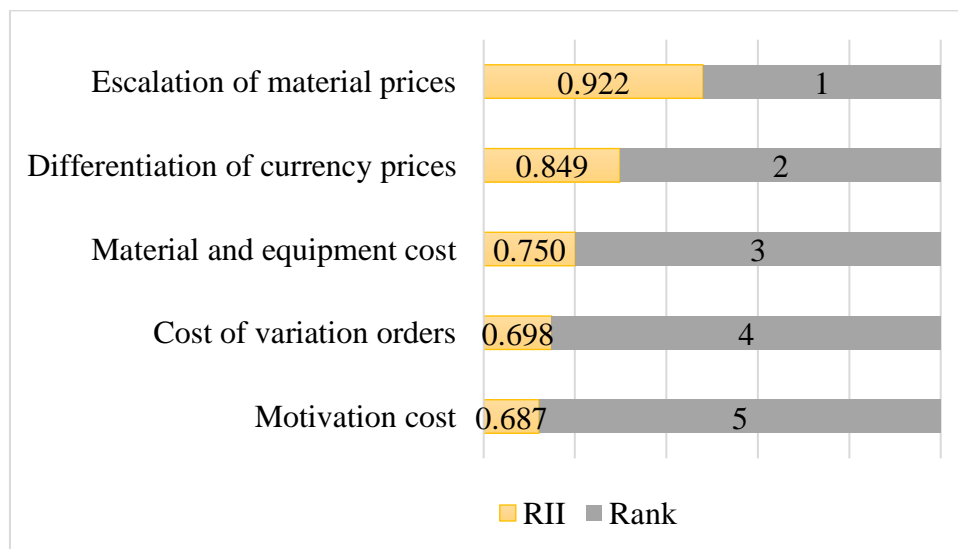


Figure 4. 3 Factor affecting of performance related to Cost factor according to all responses.

2. Time factors:

Table 4. 11 The relative importance index (RII) and rank of time factors

Factor	Client		Consultant		Contractor		All Response	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
2. Time factor								
Unavailability of resources as planned through project duration	0.867	1	0.836	1	0.877	1	0.860	1
Average delay in claim approval from owner to contractor	0.644	3	0.691	2	0.677	2	0.671	2
Percentage of orders delivered late	0.711	2	0.618	4	0.508	5	0.612	3
Time needed to implement variation orders	0.600	5	0.636	3	0.585	3	0.607	4
Average delay in regular payments	0.622	4	0.582	5	0.569	4	0.591	5
Time needed to rectify defects	0.578	6	0.564	6	0.415	8	0.537	6
Site preparation time	0.578	6	0.473	8	0.492	6	0.529	7
Planned time for project construction	0.556	7	0.509	7	0.431	7	0.499	8

Client view

Unavailability of resources as planned through project duration has been ranked by the clients' respondents in the first position with RII equal 0.867. Unavailable of resources as a planned project duration in the construction projects, they can affect the completion time of the project performance. Therefore, this project will suffer from the problem of time and cost performance. The percentage of orders delivered late has been ranked by the clients' respondents in the second position with RII equal to 0.711. This factor is

significant for the clients because it affects the project duration and project performance such as time.

The average delay in claim approval from the client to the contractor has been ranked by the clients' respondents in the third position with RII equal to 0.644. This factor is significant for the client because it affects the time performance of public building construction project such as delay due to the shortages of construction materials. The average delay in regular payments from owner to contractor has also been ranked by the clients' respondents in the fourth position with RII equal to 0.622. This mainly affects the time performance of construction projects. The time needed to implement variation orders has been ranked by the clients' respondents in the fifth position with RII equal to 0.600. This factor mainly affects the basic schedule of the projects and it affects the project performance of time.

Consultant view

Unavailability of resources as planned through project duration has been ranked by the Consultants' respondents in the first position with RII equal 0.836. Unavailability of resources as planned through project duration is a significant factor for consultants because it affects the process of performance and the project is suffered from a problem of time performances. The average delay in claim approval from the owner to the contractor has been ranked by the Consultants' respondents in the second position with RII equal 0.691. These factors mainly affect the project duration. If the owner does not approve the claim of the contractors with the delay approval time, it affects the project's time performance.

The time needed to implement variation orders has been ranked by the Consultants' respondents in the third position with RII equal to 0.636. This factor is mainly affecting the basic schedule of the projects because if the variation order does not implement with the time needed it will delay the projects due to the completion time of the project. Therefore, this will affect time performance. The percentage of orders delivered late has been ranked by the consultants' respondents in the fourth position with RII equal to 0.618. This factor is significant for the consultants because consultants are it represented client satisfaction. Therefore, the percentage of orders delivered late affects the project duration and project performance such as time. The average delay in regular payments from the owner to the contractor has been ranked by the Consultants' respondents in the fifth position with RII equal to 0.582. The average delay in regular

payments from owner to contractor affect the project time performance. If the owner not paying the monthly payment for the contractors, the projects will be affecting the time performance.

Contractor view

Unavailability of resources as planned through project duration has been ranked by the Contractors' respondents in the first position with RII equal 0.877. This factor affects directly contractors' performance through projects. If resources are not available for contractors as planned through project duration, the project will suffer from the problem of time and cost performance. The average delay in claim approval from the owner to the contractor has been ranked by the Contractors' respondents in the second position with RII equal to 0.677. This factor is a significant one for contractors' performance because delay in claim approval from the owner to contractors leads to a delay of contractors' performance and causes a problem in the time performance. The time needed to implement variation orders has been ranked by the Contractors' respondents in the third position with RII equal to 0.585. The time needed to implement variation orders is to affect the project schedule and time performance.

The average delay in regular payments from the owner to the contractor has been ranked by the Contractors' respondents in the fourth position with RII equal to 0.569. Delay in payments is affected overall of the project time performance. The percentage of orders delivered late has been ranked by the Contractors' respondents in the fifth position with RII equal to 0.508. This factor is important for contractors because it is related to contractual relationships with consultants. If the consultants cannot give the project orders to the contractors, the contractor cannot implement any stage through a project without having orders from the project consultant. Therefore, the time needed to implement variation orders is affected by project time performance.

Generally, the average of all respondents is the top five significant factor of public building construction projects in the Assosa zone are shown in figure 4.4 below.

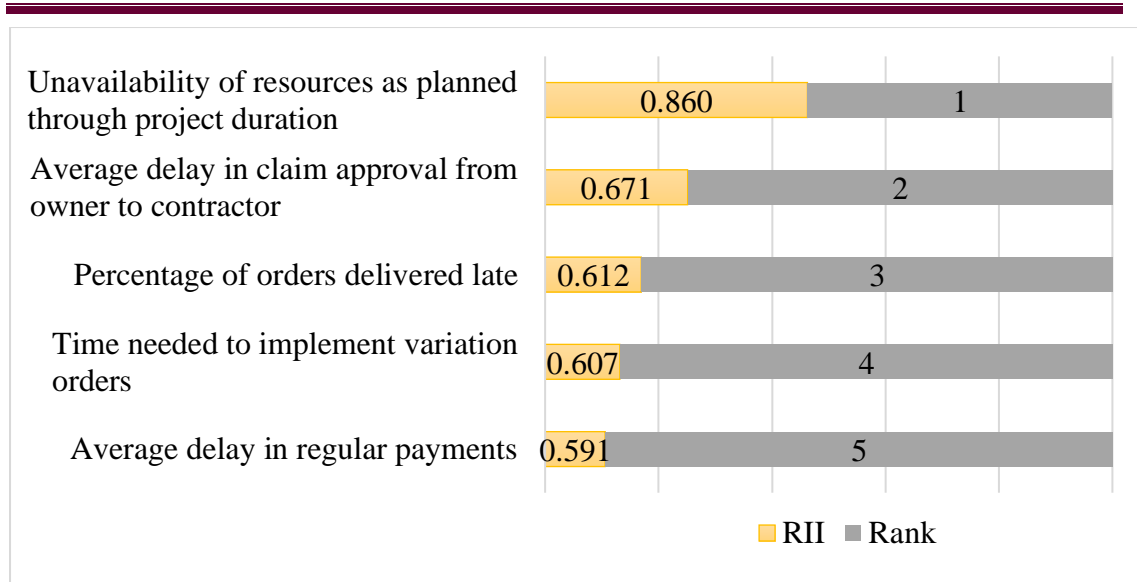


Figure 4. 4 Factor affecting of performance related to time factor according to all responses.

3. Quality factors:

Table 4. 12 The relative importance index (RII) and rank of quality factors

Factor	Client		Consultant		Contractor		All Response	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
3. Quality factor								
Quality of equipment and raw materials	0.778	1	0.655	2	0.785	1	0.739	1
Quality training/meeting	0.733	2	0.673	1	0.677	2	0.694	2
Quality assessment system in organization	0.622	5	0.618	4	0.585	3	0.608	3
Conformance to specification	0.711	3	0.636	3	0.477	4	0.608	3
Unavailability of competent staff	0.644	4	0.600	5	0.462	5	0.569	5

Client view

The quality of equipment and raw materials has been ranked by the clients' respondents in the first position with RII equal to 0.778. This factor is a more significant one for client because the client needs the quality of raw equipment and material for the project

according to the specification and agreement of project. Therefore, the quality of equipment and raw material affects the project quality performance in the Assosa zone.

Quality training/meeting has been ranked by the clients' respondents in the second position with RII equal to 0.733. In Assosa zone quality training in public building construction project is rarely implemented. Therefore, this factor is mainly affecting project quality performance.

Conformance to specification has been ranked by the clients' respondents in the third position with RII equal to 0.711. This factor is significant for clients because this factor is strongly related to client satisfaction. The end product of the project desired is according to the client, specification, and standards, and the client needed the project implemented according to the specification.

Unavailability of competent staff has been ranked by the clients' respondents in the fourth position with RII equal to 0.644. This factor is the most significant one for client because the availability of competent person from the staff it will share with decision-making, this will lead to better implementation of the project and this will satisfy the client with more degree. The quality assessment system in the organization has been ranked by the clients' respondents in the fifth position with RII equal to 0.622. In the Assosa zone, a quality assessment system in an organization is rarely implemented through construction projects.

Consultant view

Quality training/meeting, and has been ranked by the consultants' respondents in the first position with RII equal to 0.673. This factor affects strongly the quality performance of construction projects. The quality of equipment and raw materials has been ranked by the consultants' respondents in the second position with RII equal to 0.655. This factor is most significant for consultants because consultants usually want the quality of equipment and materials to supervise the public building construction project with good quality and according to the specification. Therefore, this factor affects the project quality performance and the degree of the owner's satisfaction.

Conformance to specification has been ranked by the consultants' respondents in the third position with RII equal to 0.636. This factor is important to client representative satisfaction because it is mainly related to owner satisfaction. The quality assessment system in the organization has been ranked by the consultants' respondents in the fourth

position with RII equal to 0.618. This factor is because of the absence of quality assessment which is might be due to different managerial properties.

Unavailability of competent staff has been ranked by the consultants' respondents in the fifth position with RII equal to 0.600. Availability of competent staff of the consultant in the construction project to assist and to satisfy the owner with a successful performance of the project and to satisfy the quality of the projects.

Contractor view

The quality of equipment and raw materials has been ranked by the contractors' respondents in the first position with RII equal to 0.785. This factor is most for a contractor because contractors must implement their projects according to their required and agreed to quality because owners and consultants usually want materials used in a controlled project according to specification and agreement.

Quality training/meeting, and has been ranked by the contractors' respondents in the second position with RII equal to 0.677. This factor is significant for a contractor because the contractor must complete the project with quality according to the specification to be required and agreement.

The quality assessment system in the organization has been ranked by the contractors' respondents in the third position with RII equal to 0.585. The quality assessment system in an organization is rarely achieved or implemented for contractors. This factor is not important to contractors because of the absence of quality assessment systems construction projects. Conformance to specification has been ranked by the contractors' respondents in the fourth position with RII equal to 0.477. This factor is significant for contractors as it is related to consultants, and client satisfaction.

Unavailability of competent staff has been ranked by the contractors' respondents in the fifth position with RII equal to 0.462. This factor is the most important one for contractors because availability competent staff to assist contractors to implement their projects with successful and suitable performance, this factor is very important to contractors because it affects strongly on the quality performance of construction projects. Generally, the average of all respondents is the top five significant factor of public building construction projects in the Assosa zone are shown in figure 4.5 below.

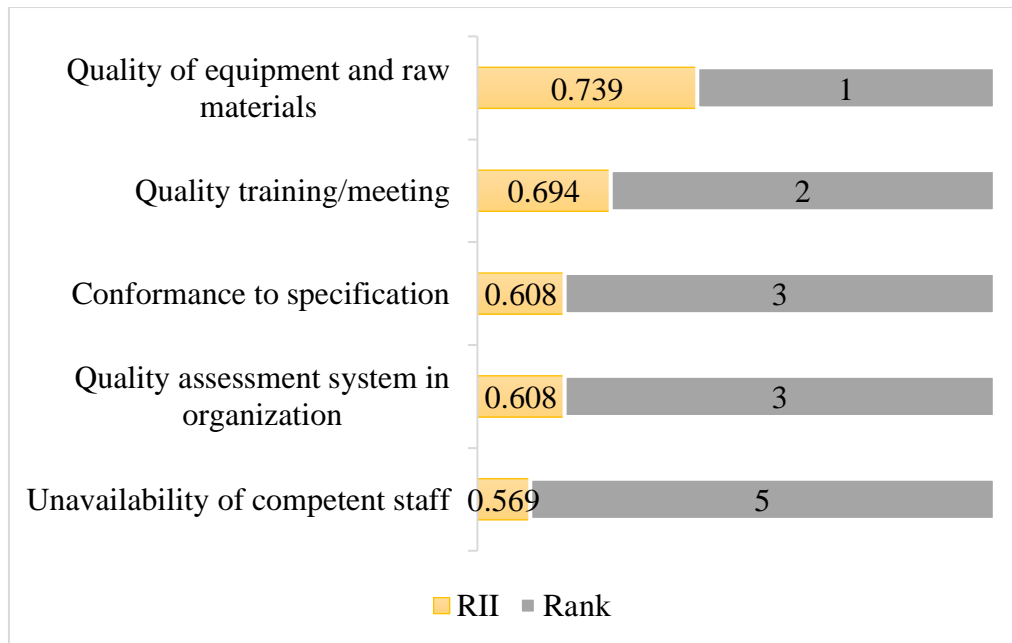


Figure 4. 5 Factor affecting of performance related to quality factor according to all responses

4. Productivity factor

Table 4. 13 The relative importance index (RII) and rank of productivity factors

Factor	Client		Consultant		Contractor		All Response	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
4. Productivity factor								
Sequencing of work according to schedule	0.889	1	0.855	1	0.825	1	0.856	1
Management-labor relationship	0.756	2	0.727	2	0.692	2	0.725	2
Absenteeism rate through project	0.644	3	0.673	3	0.569	3	0.629	3
Number of new projects / years	0.267	5	0.273	4	0.277	4	0.272	4
Project complexity	0.289	4	0.255	5	0.246	5	0.263	5

Client view

The sequencing of work according to schedule has been ranked by the clients' respondents in the first position with RII equal to 0.889. Sequencing of work according to schedule the most significant factors for client because it assists the project according

to schedule time for project completion. Therefore, this factor affects the productivity performance of the project. Management-labor relationship has been ranked by the clients' respondents in the second position with RII equal to 0.756. This factor is most significant for client because the strong coordination between labor level and managerial level will assist in the implementation of the project with success productivity and good performance.

Absenteeism rate through the project has been ranked by the clients' respondents in the third position with RII equal to 0.644. This factor is a significant one for the client because the owner will suffer from a delay in the project. Therefore, Absenteeism through the project will affect the productivity performance of the project. The Project complexity and number of new projects/years has been ranked by the clients' respondents in the fourth and fifth positions with RII equal to 0.289 and 0.267 respectively. These factors are not significant factors for the owner in Assosa zone public building construction projects. This is due to the location and project types.

Consultant view

The sequencing of work according to schedule has been ranked by the consultants' respondents in the first position with RII equal to 0.855. This factor is the most significant for a consultant because the sequencing of work according to schedule assists consultants to deliver a project to the owner according to schedule time for project completion. This factor affects the productivity performance of public building construction project in the Assosa zone.

The management-labor relationship has been ranked by the consultants' respondents in the second position with RII equal to 0.727. Management-labor relationship can assist for strong coordination and motivation between contractor level and consultant level. This will lead to implementing a project with success supervision, and so good performance of consultant, management-labor relationship is significant for the productivity performance of public building construction project.

Absenteeism rate through the project has been ranked by the consultants' respondents in the third position with RII equal to 0.673. The absenteeism rate through the project will affect the productivity and time performance of the project. The number of new projects/year and project complexity has been ranked by the consultants' respondents in the fourth and fifth position with RII equal to 0.273 and 0.255 respectively. These

factors are not significant factors for the owner in Assosa Zone public building construction project. This is due to the location and project types.

Contractor view

The sequencing of work according to schedule has been ranked by the contractors' respondents in the first position with RII equal to 0.825. This factor is significant for a contractor because the sequencing of work according to schedule assists to deliver the project according to schedule time for project completion. Therefore, the contractors will not suffer from time, and cost performance problems.

The management-labor relationship has been ranked by the contractors' respondents in the second position with RII equal to 0.692. This factor is significant for the contractor because a strong relationship between management level and labor level is to implement a project with success productivity and suitable time performance of the project. Therefore, a management-labor relationship is significant for the productivity performance of public building construction project.

Absenteeism rate through the project has been ranked by the contractors' respondents in the third position with RII equal to 0.569. Absenteeism through project implementation is very significant for contractors because it affects the productivity performance of contractors. This is due to the contractor will suffer from time performance problems.

The number of new projects/year and project complexity has been ranked by the consultants' respondents in the fourth and fifth positions with RII equal to 0.277 and 0.249 respectively. These factors are not significant factors for a contractor in Assosa zone public building construction project. This is due to the location and project types. Generally, the average of all respondents is the top five significant factor of public building construction projects in the Assosa zone are shown in figure 4.6 below.

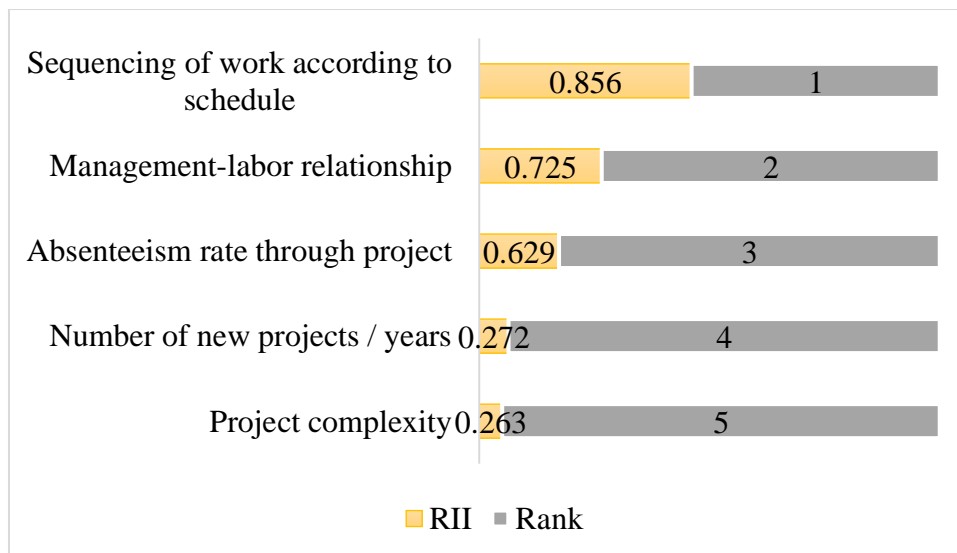


Figure 4. 6 Factor affecting of performance related to productivity factor according to all responses.

5. Client satisfaction factor

Table 4. 14 The relative importance index (RII) and rank of client satisfaction factors

Factor	Client		Consultant		Contractor		All Response	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
5. Client satisfaction factor								
Leadership skills for project manager	0.844	1	0.764	1	0.846	1	0.818	1
Number of disputes between owner and project parties	0.756	3	0.764	1	0.615	2	0.712	2
Information coordination between owner and project parties	0.667	4	0.655	2	0.554	3	0.625	3
Speed and reliability of service to owner	0.800	2	0.582	3	0.400	5	0.594	4
Number of rework incidents	0.578	5	0.527	4	0.492	4	0.532	5

Client view

Leadership skills for the project manager has been ranked by the clients' respondents in the first position with RII equal to 0.844. This factor is significant for client because leadership skills for project managers affect the project performance. Leadership skills for a project manager are significant for the effectiveness of project performance. Speed and reliability of service to owner has been ranked by the clients' respondents in the second position with RII equal 0.800. Speed and reliability of service to client affect the degree of client satisfaction. Rapidity and reliability of service from consultant to owner and from contractor to client most significant factor of client satisfaction and construction project performance. The number of disputes between owner and project parties has been ranked by the clients' respondents in the third position with RII equal to 0.756. This factor is most significant for the client because a number of disputes affect strongly on client satisfaction, and project performance.

Information coordination between owner and project parties has been ranked by the clients' respondents in the fourth position with RII equal to 0.667. A strong relationship between the client and the construction project parties is most significant because the client will be satisfied. Therefore, information coordination between client and project parties affects the performance of public building construction project. A number of rework incidents have been ranked by the clients' respondents in the fifth position with RII equal to 0.578. The number of rework incidents significant for client because it affects the client satisfaction and the project performance.

Consultant view

Leadership skills for the project manager have been ranked by the consultants' respondents in the first position with RII equal to 0.764. This factor is most significant for a consultant because consultants to supervise the project with strong and suitable performance. Therefore, this factor is significant for consultants with regard to client satisfaction. The number of disputes between owner and project parties has been ranked by the consultants' respondents in the first position with RII equal to 0.764. Disputes between owner and consultant will affect the relationship between them and the degree of client satisfaction will be affected. All of that can affects the performance of the project.

Information coordination between owner and project parties has been ranked by the consultants' respondents in the second position with RII equal to 0.655. Information coordination between owner and project parties will lead to a strong relationship between owner and consultant. This factor is significant for client satisfaction and project performance. Speed and reliability of service to owners have been ranked by the consultants' respondents in the third position with RII equal 0.582. Speed and reliability of service from consultant to owner affect the degree of client satisfaction. A number of rework incidents have been ranked by the consultants' respondents in the fourth position with RII equal to 0.527. This factor has an effect on client satisfaction, and project performance.

Contractor view

Leadership skills for the project manager have been ranked by the contractors' respondents in the first position with RII equal 0.846. This factor is the most significant one for contractors because leadership skills for project managers affect the construction contractor's performance, and it is significant for effectiveness on project performance. The number of disputes between owner and project parties has been ranked by the contractors' respondents in the second position with RII equal to 0.615. Disputes between owner and contractor will affect the relationship between them and the degree of client satisfaction will be affected. Therefore, this factor is affecting project performance.

Information coordination between owner and project parties has been ranked by the contractors' respondents in the third position with RII equal to 0.554. Information coordination between owner and project parties will lead to success construction contractor's performance and strong relationship between project parties. This factor is important for contractors because information coordination affects client satisfaction and project performance. A number of rework incidents have been ranked by the contractors' respondents in the fourth position with RII equal to 0.492. This factor has an effect on client satisfaction, and project performance. Speed and reliability of service to owners have been ranked by the contractors' respondents in the fifth position with RII equal 0.400. Speed and reliability of service from contractor to client representative affect the degree of satisfaction with respect to the client. This factor affects strongly on project performance because it affects the client satisfaction degree. Generally, the

average of all respondents is the top five significant factor of public building construction projects in the Assosa zone are shown in figure 4.7 below.

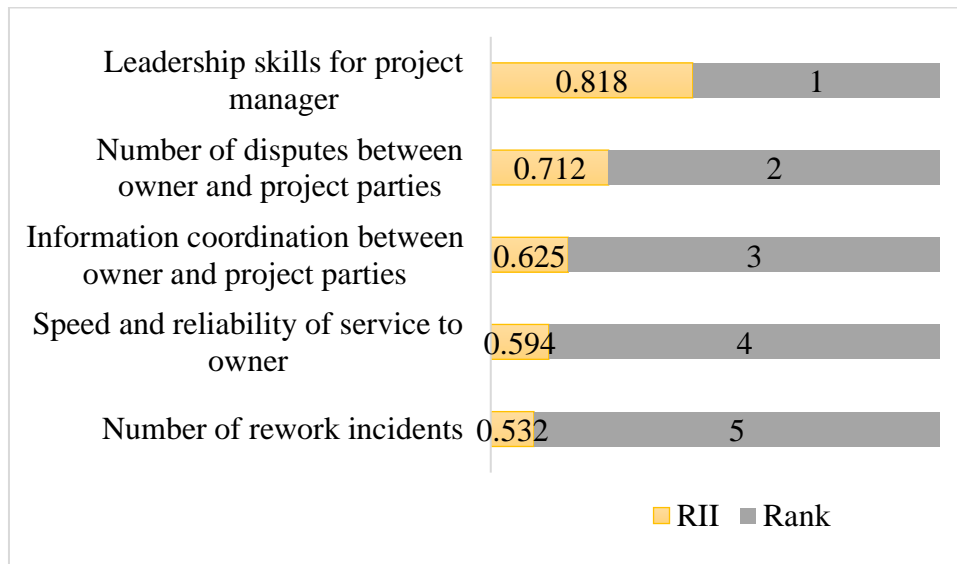


Figure 4. 7 Factor affecting of performance related to client satisfaction according to all responses.

6. Regular and community satisfaction factors

Table 4. 15 The relative importance index (RII) and rank of regular and community satisfaction factors

Factor	Client		Consultant		Contractor		All Response	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
6. Regular and community satisfaction factors								
Site condition problems	0.756	1	0.636	2	0.754	1	0.715	1
Quality and availability of regulator documentation	0.733	2	0.673	1	0.692	2	0.699	2
Number of non-compliance events	0.578	3	0.600	3	0.477	3	0.552	3
Cost of compliance to regulators requirements	0.378	4	0.564	4	0.338	4	0.427	4

Client view

Site condition problems have been ranked by the clients' respondents in the first position with RII equal to 0.756. This factor affects project performance and regular and community satisfaction. Quality and availability of regulator documentation have

been ranked by the clients' respondents in the second position with RII equal 0.733. If building construction projects are not supervised, the projects have not constructed by the quality. Therefore, the quality and availability of regulator documentation are affecting regular and community satisfaction factors and project performance.

The number of non-compliance to regulation has been ranked by the clients' respondents in the third position with RII equal to 0.578. This factor is a significant factor for client because the increase of non-compliance to regulation is the dissatisfaction of Regular and community factors and it affects the project performance.

The cost of compliance with regulatory requirements has been ranked by the clients' respondents in the fourth position with RII equal to 0.378. The cost of compliance with regulatory requirements affects the cost performance of the project. Therefore, it affects regular and community satisfaction.

Consultant view

The quality and availability of regulator documentation has been ranked by the consultants' respondents in the first position with RII equal to 0.673. This factor is most significant for a consultant because consultants are more responsible for the quality of the projects than other parties. Therefore, the quality and availability of regulator documentation affects regular and community satisfaction and project performance.

Site condition problems have been ranked by the owners' respondents in the second position with RII equal to 0.636. The environmental condition of the site is a problem for the construction of public building projects in Assoa zone. This factor is due to the weather condition of the project location. Therefore, Site condition problems affect project performance and regular and community satisfaction of projects.

The number of non-compliance to regulation has been ranked by the consultants' respondents in the third position with RII equal to 0.600. This factor is the most significant factor of regular and community satisfaction because of the increase of non-compliance to regulation, it affects project performance. The cost of compliance with regulatory requirements has been ranked by the consultants' respondents in the fourth position with RII equal to 0.564. This factor is significant because the cost of compliance with regulatory requirements affects the cost performance of the project.

Contractor view

Site condition problems have been ranked by the contractors' respondents in the first position with RII equal to 0.754. This factor as the most significant one for contractors because the contractor suffers from site condition problems. This problem affects the performance of contractors and causes disputes and delays in the project.

The quality and availability of regulator documentation has been ranked by the contractors' respondents in the second position with RII equal to 0.692. Quality and availability of regulator documentation are significant for the contractor because the contractor must be responsible to construct the public building construction project according to the contract agreement to satisfy the regular and community. Therefore, this factor affects regular and community satisfaction, and project performance.

The number of non-compliance to regulation has been ranked by the contractors' respondents in the third position with RII equal to 0.477. This factor is a significant factor because of the more increase of non-compliance to regulation is the dissatisfaction of regular and community for the project. Therefore, this will affect project performance.

The cost of compliance with regulatory requirements has been ranked by the contractors' respondents in the fourth position with RII equal to 0.338. The cost of compliance with regulatory requirements affects the cost performance of the project.

Generally, the average of all respondents is the top significant factor of public building construction projects in the Assosa zone are shown in figure 4.8 below.

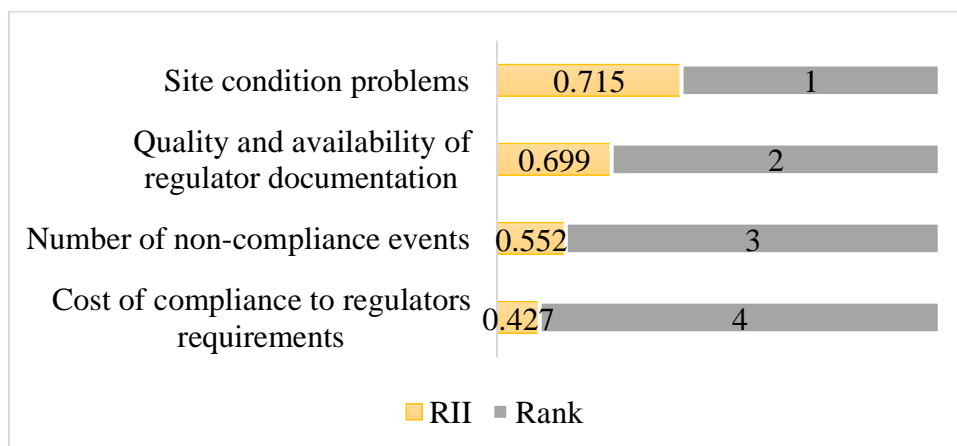


Figure 4. 8 Factor affecting of performance related to regular and community satisfaction according to all responses.

7. People factors

Table 4. 16 The relative importance index (RII) and rank of people factors

Factor	Client		consultant		contractor		All Response	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
7. People factors								
Employee attitudes in projects	0.778	1	0.727	1	0.738	1	0.748	1
Recruitment and competence development	0.644	2	0.636	2	0.600	2	0.627	2
Employees motivation belonging to work	0.556	3	0.600	3	0.508	3	0.555	3

Client view

Employee attitudes in the project have been ranked by the clients' respondents in the first position with RII equal to 0.778. This factor is most significant for the client because attitudes of employees are related to client satisfaction and project performance. Therefore, Employee attitudes affect project performance and client satisfaction. Recruitment and competence development between employees has been ranked by the clients' respondents in the second position with RII equal to 0.644. This factor is significant for client because the competence development between employees is used for the quality and productivity of the construction projects. Therefore, recruitment and competence development between the employee in Assosa zone affects the performance of the projects. Employee's motivation belonging to work has been ranked by the clients' respondents in the third position with RII equal to 0.556. This factor is significant for client satisfaction and project performance.

Consultant view

Employee attitudes in the project have been ranked by the consultants' respondents in the first position with RII equal to 0.727. Employee attitudes affect project performance and owner satisfaction because attitudes of employees are related to client satisfaction and project performance. Recruitment and competence development have been ranked by the consultants' respondents in the second position with RII equal to 0.636.

Recruitment and competence development between employees improve the performance of consultants through projects and the client will be more satisfied. This factor enhances quality and productivity performance of construction projects. Employee's motivation belonging to work has been ranked by the consultants' respondents in the third position with RII equal to 0.600. Employees' motivation leads to more belonging to work and the performance of the project will be improved.

Contractor view

Employee attitudes in the project have been ranked by the contractors' respondents in the first position with RII equal to 0.738. Employee attitudes affect project performance and owner satisfaction. Recruitment and competence development between employees has been ranked by the contractors' respondents in the second position with RII equal to 0.600. This factor is significant for a contractor because it enhances the quality and productivity performance of public building construction projects. Recruitment and competence development between employees improve the performance of the project and the client will be more satisfied. Employee's motivation belonging to work has been ranked by the contractors' respondents in the third position with RII equal to 0.508. Employees' motivation leads to more belonging to work and the performance of the project will be improved.

Generally, the average of all respondents is the top significant factor of public building construction projects in the Assosa zone are shown in figure 4.9 below.

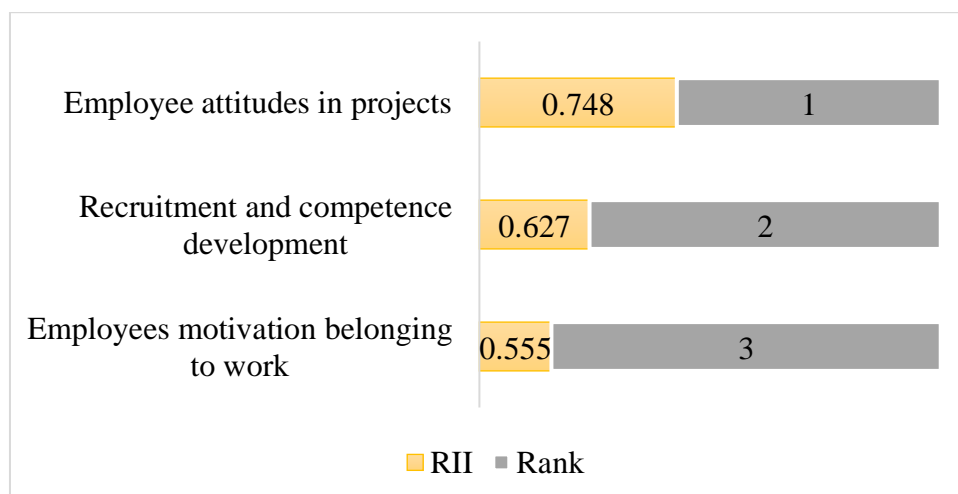


Figure 4. 9 Factor affecting of performance related to people factor according to all responses.

8. Health and safety factors

Table 4. 17 The relative importance index (RII) and rank of health and safety factors

Factor	Client		Consultant		Contractor		All Response	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
8. Health and safety factors								
Project location is safe to reach	0.822	1	0.691	1	0.723	1	0.745	1
Application of health and safety factors in organization	0.733	2	0.655	2	0.646	2	0.678	2
Reportable accidents rate in project	0.644	3	0.509	3	0.492	3	0.548	3
Assurance rate of project	0.622	4	0.418	4	0.462	4	0.501	4

Client view

The project location is safe to reach has been ranked by the clients' respondents in the first position with RII equal to 0.822. This factor is significant for access to the site because the safety of the project will affect the project performance. The application of health and safety factors in the organization has been ranked by the clients' respondents in the second position with RII equal to 0.733. This factor significant for the client because the owner is responsible for the health and safety protection in the organization. Un application of health and safety in public building construction in the Assosa zone will affect the project performance and cause of delay in projects. The reportable accident rate in the project has been ranked by the clients' respondents in the third position with RII equal to 0.644. The reportable accident rate affects the safety performance of construction projects. Assurance rate of the project has been ranked by the clients' respondents in the fourth position with RII equal to 0.622. This factor also significant for client because it affects the cost performance and safety of the projects.

Consultant view

The project location is safe to reach has been ranked by the consultants' respondents in the first position with RII equal to 0.691. This factor is significant for a consultant because the consultant will respond to supervised the projects. If the project location is

unsafe, it affects the quality and productivity construction performance. The application of health and safety factors in the organization has been ranked by the consultants' respondents in the second position with RII equal to 0.655. This factor is the most significant one for consultants because the application of health and safety factors in construction projects will satisfy the labors of the project and protect them. The application of health and safety factors in an organization is significant for consultants because it affects strongly the safety performance in projects. The reportable accident rate in the project has been ranked by the consultants' respondents in the third position with RII equal to 0.509. The reportable accident rate affects the safety performance of construction projects. A number of all accident cases affect the safety and health performance of construction projects. The assurance rate of the project has been ranked by the consultants' respondents in the fourth position with RII equal to 0.418. This factor affects the safety and cost performance of project.

Contractor view

The project location is safe to reach has been ranked by the consultants' respondents in the first position with RII equal to 0.723. This factor is most significant for a contractor because it affects the productivity of construction projects. Therefore, the project location is safe to reach affects project performance. The application of health and safety factors in the organization has been ranked by the contractors' respondents in the second position with RII equal to 0.646. This factor is the most significant one for contractors because the application of health and safety factors in construction projects will improve construction contractors' performance in the project, and it affects strongly the safety performance of project. The reportable accident rate in the project has been ranked by the contractors' respondents in the third position with RII equal to 0.492. The number of all accident cases affects the safety and health performance of construction projects and it affects the overall construction contractor's performance. The assurance rate of the project has been ranked by the contractors' respondents in the fourth position with RII equal to 0.462. This factor affects the safety and cost performance of the construction contractor's project.

Generally, the average of all respondents is the top significant factor of public building construction project in the Assosa zone are shown in figure 4.10 below.

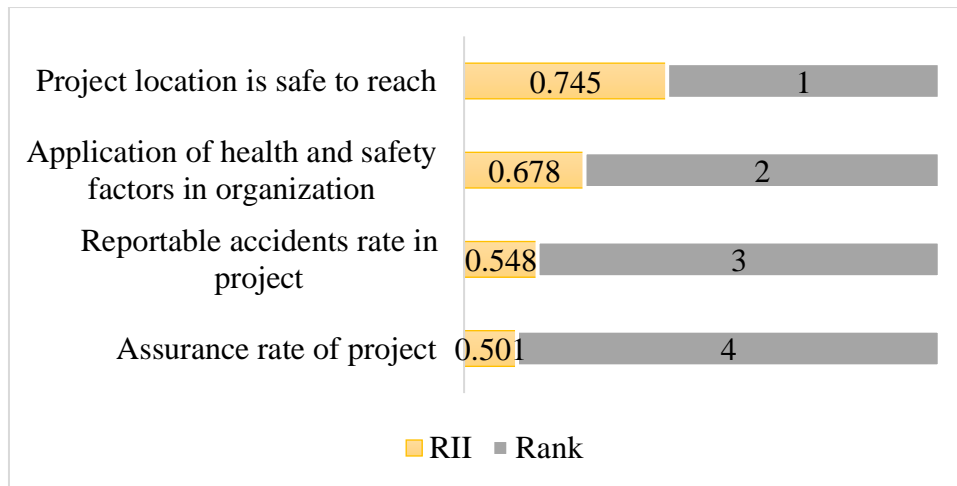


Figure 4. 10 Factor affecting of performance related to health and safety factor according to all responses.

9. Training and learning factors

Table 4. 18 The relative importance index (RII) and rank of training and learning factors

Factor	Client		Consultant		Contractor		All Response	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
9. Training and learning factors								
Training the human resources in the skills demanded by the project	0.733	1	0.673	1	0.677	1	0.694	1
Review of failures and solving them	0.600	2	0.655	2	0.477	4	0.577	2
Learning from own experience and past history	0.556	3	0.582	3	0.508	3	0.549	3
Learning from best practice and experience of others	0.378	5	0.455	5	0.615	2	0.483	4
Work group	0.511	4	0.473	4	0.385	5	0.456	5

Client view

Training the human resources in the skills demanded by the project has been ranked by the clients' respondents in the first position with RII equal to 0.733. Training human resources in the skills is important for construction projects because it affects the quality of the project and project performance. Review of failures and solving them has been ranked by the clients' respondents in the second position with RII equal to 0.600. Unskilled of human resource it affects project performance. Learning from own experience and past history has been ranked by the clients' respondents in the third position with RII equal to 0.556. Learning from own experience and past history in construction project affects the quality and productivity performance of project. Workgroup and Learning from best practice and experience of others have been ranked by the clients' respondents in the fourth and fifth position with RII equal to 0.511 and 0.378 respectively. This factor is affecting project performance.

Consultant view

Training the human resources in the skills demanded by the project has been ranked by the consultants' respondents in the first position with RII equal to 0.673. Consultants should train employees with so that can be helpful to improve skills in order to design and supervise different types of projects. Review of failures and solving them has been ranked by the consultants' respondents in the second position with RII equal to 0.655. This factor will enhance project performance and will satisfy the owner, review of failure and solve them can help to prevent and do not repeat any defect happening during the project executing, so contractor and consultant both of them are responsible for this part to achieve the client satisfaction.

Learning from own experience and past history has been ranked by the consultants' respondents in the third position with RII equal to 0.582. Learning from own experience and past history affects the performance of consultants as it affects the training and learning required for supervision. This is related to clients' satisfaction. Workgroup and Learning from best practice and experience of others have been ranked by the consultants' respondents in the fourth and fifth positions with RII equal to 0.473 and 0.455 respectively. This factor can be considered important for consultants because it can improve and develop the consultant's performance of current and future projects. Learning from the best practice and experience of others affects the performance of

consultants as it affects the training and learning required for supervision. This is related to clients' satisfaction.

Contractor view

Training the human resources in the skills demanded by the project has been ranked by the contractors' respondents in the first position with RII equal to 0.677. Contractors should train their employees with different and improved skills in order to implement different and complex types of projects. Learning from best practice and experience of others has been ranked by the contractors' respondents in the second position with RII equal to 0.615. Contractors considered this factor as the most important one because it can improve and develop construction contractors' performance of current and future projects. This factor is strongly related to the contractors' party. Learning from the best practice and experience of others affects the performance of contractors because it affects the innovation and learning required for construction.

Learning from own experience and past history has been ranked by the contractors' respondents in the third position with RII equal to 0.509. Learning from own experience and past history affects the performance of contractors because it affects the innovation and learning required for construction. Review of failures and solving them has been ranked by the contractors' respondents in the fourth position with RII equal to 0.477. Review of failures and solve them will enhance the contractor's performance and will satisfy the owner, and also this factor will improve the contractor's performance and will satisfy the owner of the project. A workgroup has been ranked by the contractors' respondents in the fifth position with RII equal to 0.385. This factor affects the training and learning of project performance.

Generally, the average of all respondents is the top five significant factor of public building construction project in the Assosa zone are shown in figure 4.11 below.

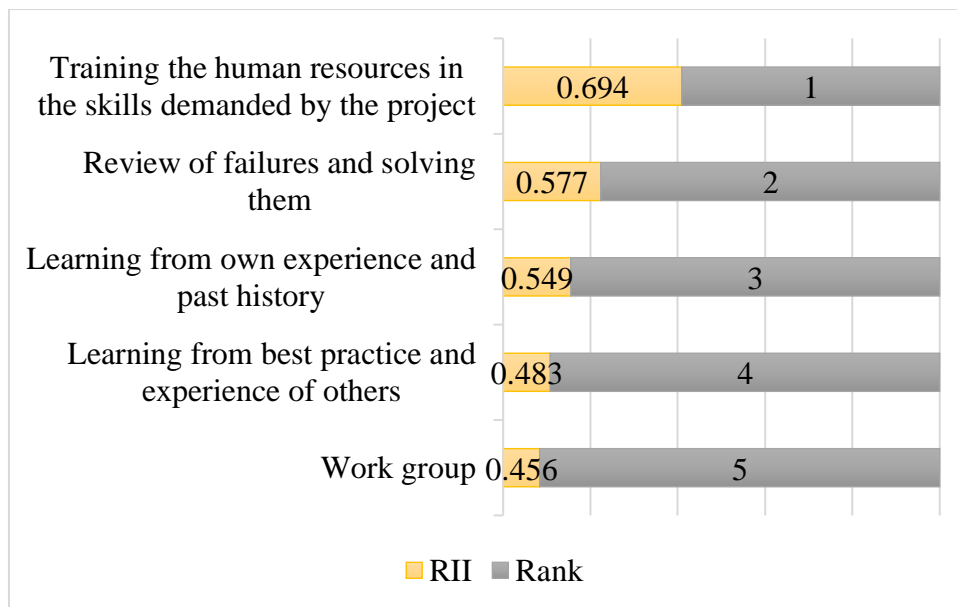


Figure 4. 11 Factor affecting of performance related to training and learning factor according to all responses.

10. Environmental factors

Table 4. 19 The relative importance index (RII) and rank of environmental factors

Factor	Client		consultant		contractor		All Response	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
10. Environmental factors								
Social Environment	0.778	1	0.727	1	0.800	1	0.768	1
Technology advancement	0.756	2	0.709	2	0.723	2	0.729	2
Industrial relations environment	0.689	3	0.691	3	0.677	3	0.686	3
Climate condition	0.644	4	0.618	5	0.631	4	0.631	4
Economic environment	0.622	5	0.636	4	0.477	5	0.578	5
Physical environment	0.600	6	0.309	6	0.415	6	0.441	6
Wastes around the site	0.267	8	0.236	7	0.308	7	0.27	7
Noise level	0.311	7	0.218	8	0.200	8	0.243	8
Air quality	0.267	8	0.200	9	0.200	8	0.222	9

Client view

Social environment has been ranked by the clients' respondents in the first position with RII equal to 0.778. Social awareness is important for the execution of the public building construction project. This factor affects the project performance. Technology advancement has been ranked by the clients' respondents in the second position with RII equal to 0.756. Technology advancement is significant for the client because the client is to know about the function of the development of a construction project. Due to technology advancement, the external environment is affecting project performance.

The industrial relations environment has been ranked by the clients' respondents in the third position with RII equal to 0.689. The industrial relations environment affects project performance because the environment is not related to the industry, the progress of the construction project will be affected by quality and productivity performance. The climate condition has been ranked by the clients' respondents in the fourth position with RII equal to 0.644. This factor is significant for clients because climate conditions in the site affect the productivity and time performance of the project. The economic environment has been ranked by the clients' respondents in the fifth position with RII equal to 0.622. In a developing country economic environment is the factor of the construction projects. Therefore, in the Assosa zone economic environment is the factor effects of the external environment of the construction projects and their project performance.

Consultant view

Social environment has been ranked by the consultants' respondents in the first position with RII equal to 0.727. The social environment is significant for a consultant because the consultant will be responsible for the quality and completion of the project in the scheduled. If the social is not aware of the project the project will be a delay of time. Therefore, the social environment is the factor effect of the external environment and the effects of the project performance. Technology advancement has been ranked by the consultants' respondents in the second position with RII equal to 0.709. Technology advancement is significant for the consultant because technology advancement affects the effectiveness of the consultant's performance.

The industrial relations environment has been ranked by the consultants' respondents in the third position with RII equal to 0.691. The industrial relations environment is

significant for the quality and time performance in the construction project. In the Assosa zone, the environment of the construction is not related to the industry. Therefore, the Industrial relations environment is the effects of the factor of external environment and it affects the project performance. The economic environment has been ranked by the consultants' respondents in the fourth position with RII equal to 0.636. Consultants considered this factor as the most important one because the economic environment affects the cost performance of the project. The climate condition has been ranked by the consultants' respondents in the fifth position with RII equal to 0.618. Consultants considered this factor as the most important one because climate condition in the site affects the productivity and time performance of the project.

Contractor view

Social environment has been ranked by the contractors' respondents in the first position with RII equal to 0.800. The social environment is significant for the contractor because the contractor will be responsible for the productivity and completion of the project in the scheduled. If the social is not aware of the project the project will be a delay of time. Therefore, the social environment is the factor effect of the external environment and the effects of the project performance. Technology advancement has been ranked by the contractors' respondents in the second position with RII equal to 0.723. Technology advancement is significant for the contractor because technology advancement affects the effectiveness of the contractor's performance.

The industrial relations environment has been ranked by the contractors' respondents in the third position with RII equal to 0.677. The industrial relations environment is significant for productivity and time performance in the construction projects. In the Assosa zone, the environment of the construction is not related to the industry. Therefore, the Industrial relations environment is the effect of the factor of external environment and it affects the project performance. The climate condition has been ranked by the contractors' respondents in the fourth position with RII equal to 0.631. Contractor considered this factor as the most important one because climate condition in the site affects the productivity and time performance project. The economic environment has been ranked by the contractors' respondents in the fifth position with RII equal to 0.477. The contractor considered this factor as the most important one

because the economic environment affects the cost performance of the project and affects the contractor profit rate of the project.

Generally, the average of all respondents is the top five significant factor of public building construction projects in the Assosa zone are shown in figure 4.12 below.

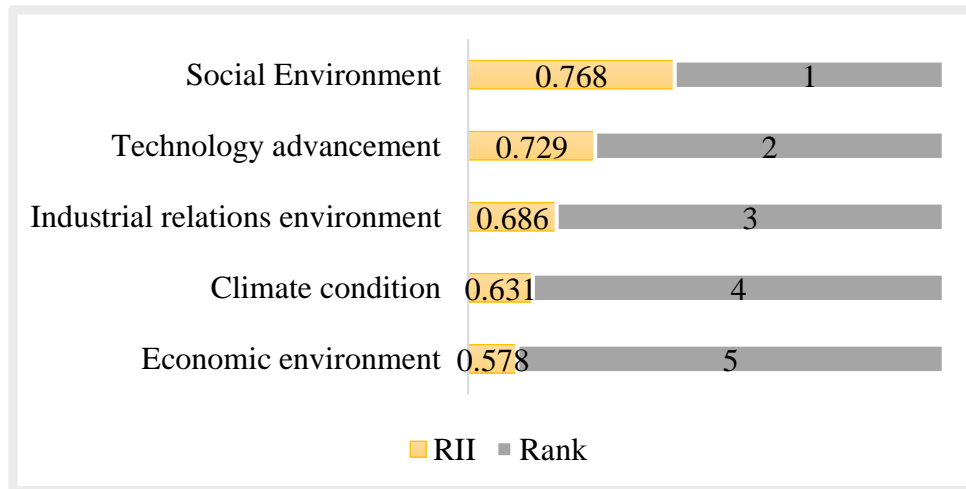


Figure 4. 12 Factor affecting of performance related to environmental factor according to all responses.

11. Management action factors

Table 4. 20 The relative importance index (RII) and rank of management action factors

Factor	Client		Consultant		Contractor		All Response	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
11. Management action factors								
Implementing effective safety system	0.778	1	0.582	1	0.477	4	0.612	1
Overall managerial actions	0.622	2	0.564	2	0.508	3	0.565	2
Control mechanisms	0.600	3	0.509	3	0.523	2	0.544	3
Communication systems	0.578	4	0.455	5	0.569	1	0.534	4
Planning effort	0.556	5	0.473	4	0.462	5	0.497	5
Implication an effective quality assurance	0.489	7	0.345	8	0.446	6	0.427	6

STUDY ON PERFORMANCE FACTORS OF PUBLIC BUILDING CONSTRUCTION PROJECT IN
ASSOSA ZONE

Feedback capabilities	0.444	8	0.418	7	0.431	7	0.431	7
Developing appropriate organizational structure	0.533	6	0.291	9	0.431	7	0.418	8
Control sub-contractor's works	0.444	8	0.436	6	0.338	8	0.406	9

Client view

Implementing an effective safety system has been ranked by the clients' respondents in the first position with RII equal to 0.778. Implementing an effective safety system is significant for the client because the client is responsible for the protection of the project location. Therefore, the safety protection system is affecting the performance of the project. Overall managerial action has been ranked by the clients' respondents in the second position with RII equal to 0.622. The management action over the public building construction projects in the Assosa zone affects the performance of the project and it affects the schedule of the projects. Control mechanisms have been ranked by the clients' respondents in the third position with RII equal to 0.600. Technological control mechanisms in construction projects affect the performance of the projects.

Communication systems has been ranked by the clients' respondents in the fourth position with RII equal to 0.578. Communication systems are the most important for clients because the communication between the clients and consultants is important for the quality construction of the projects. Planning effort has been ranked by the clients' respondents in the fifth position with RII equal to 0.556. This factor important for the clients because clients are responsible for the determination of planning for the construction projects.

Consultant view

Implementing an effective safety system has been ranked by the consultants' respondents in the first position with RII equal to 0.582. Implementing an effective safety system of public building construction in the Assosa zone affects the performance of the projects. This is due to the un implementing a safety system in construction projects. Overall managerial action has been ranked by the consultants'

respondents in the second position with RII equal to 0.564. This factor is significant for a consultant because the consultant has the responsibility for the quality of the project to satisfy the client. Control mechanisms have been ranked by the consultants' respondents in the third position with RII equal to 0.509. The control mechanism of the public building construction projects in the Assosa zone affects the quality, cost and time of the project performance. This is due to poor managerial action in the projects.

Planning effort has been ranked by the consultants' respondents in the fourth position with RII equal to 0.473. This factor is important for the consultants because the consultant has its responsible for the construction projects supervised in the specification and standards. Communication systems have been ranked by the consultants' respondents in the fifth position with RII 0.455. Communication is significant for the consultants because communication and corporation between consultants and other parties has a good construction quality and productivity of the projects.

Contractor view

Communication systems have been ranked by the contractors' respondents in the first position with RII equal to 0.569. A communication system is significant for the contractor because communication and cooperation between the parties are most important for the construction project performance. The good communication between the main contractor and the sub-contractor is the most important for the quality and productivity of the project performance. Therefore, a communication system in the construction project affects project performance.

The control mechanism has been ranked by the contractors' respondents in the second position with RII equal to 0.523. Control mechanism important for the contractor because the contractor controls the sub-contractors to construct the projects within the quality and productivity of the projects. Overall managerial action has been ranked by the contractors' respondents in the third position with RII equal to 0.508. The contractor is responsible to manage the overall works of the subcontractor. Therefore, overall managerial action is a significant factor for a contractor and it affects the productivity of the projects. Implementing an effective safety system has been ranked by the contractors' respondents in the fourth position with RII equal to 0.477. This factor is significant for the contractor because the contractor has its responsible for advice by

the consultant to react to the project according to the specification. The contractor has responsibility for implementing an effective safety system because it is responsible for the employee safety. Planning effort has been ranked by the contractors' respondents in the fifth position with RII equal to 0.462. It is significant for a contractor because without planning determination they are not performed.

Generally, the average of all respondents is the top five significant factor of public building construction project in the Assosa zone are shown in figure 4.13 below.

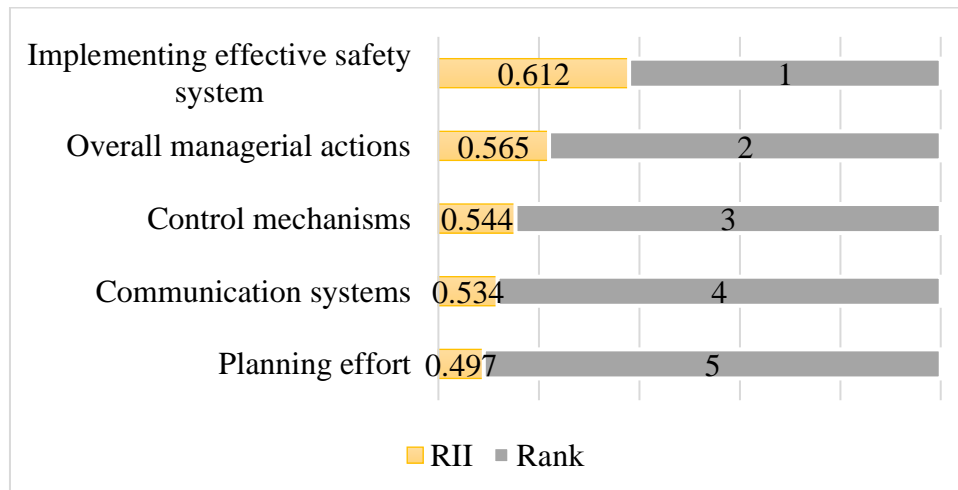


Figure 4. 13 Factor affecting of performance related to management action factor according to all responses.

4.6. Reliability Checking - Cronbach's Alpha

Statically Package for Social Sciences version 20 (SPSS v20) is used to analyze the reliability checking of research data. Therefore, the reliability research data were analyzed by using SPSS v 20. This SPSSv20 was used to run the value of Cronbach's alpha and the results of variables are shown the table 4.21 below. The reliability consistency of the performance factor in this research was checked by the reliability checking of Cronbach's alpha value. The value of Cronbach's alpha 0.8 to 1 is high-reliability consistency and 0.5 to 0.8 is moderated reliability consistency. Therefore, the research questionnaire is reliable and ready for distribution for the population sample.

Table 4. 21 Cronbach's alpha for questionnaires reliability checking of performance factor

S.No	Independent Variables	Cronbach's Alpha value	Number of Items
1	Cost factors	0.947	17
2	Time factors	0.923	8
3	Quality factors	0.703	5
4	Productivity factors	0.997	5
5	Client satisfaction factors	0.812	5
6	Regular and community satisfaction factors	0.873	4
7	People factors	0.971	4
8	Health and safety factors	0.970	4
9	Training and learning factors	0.722	5
10	Environmental factors	0.974	9
11	Management action factors	0.649	9

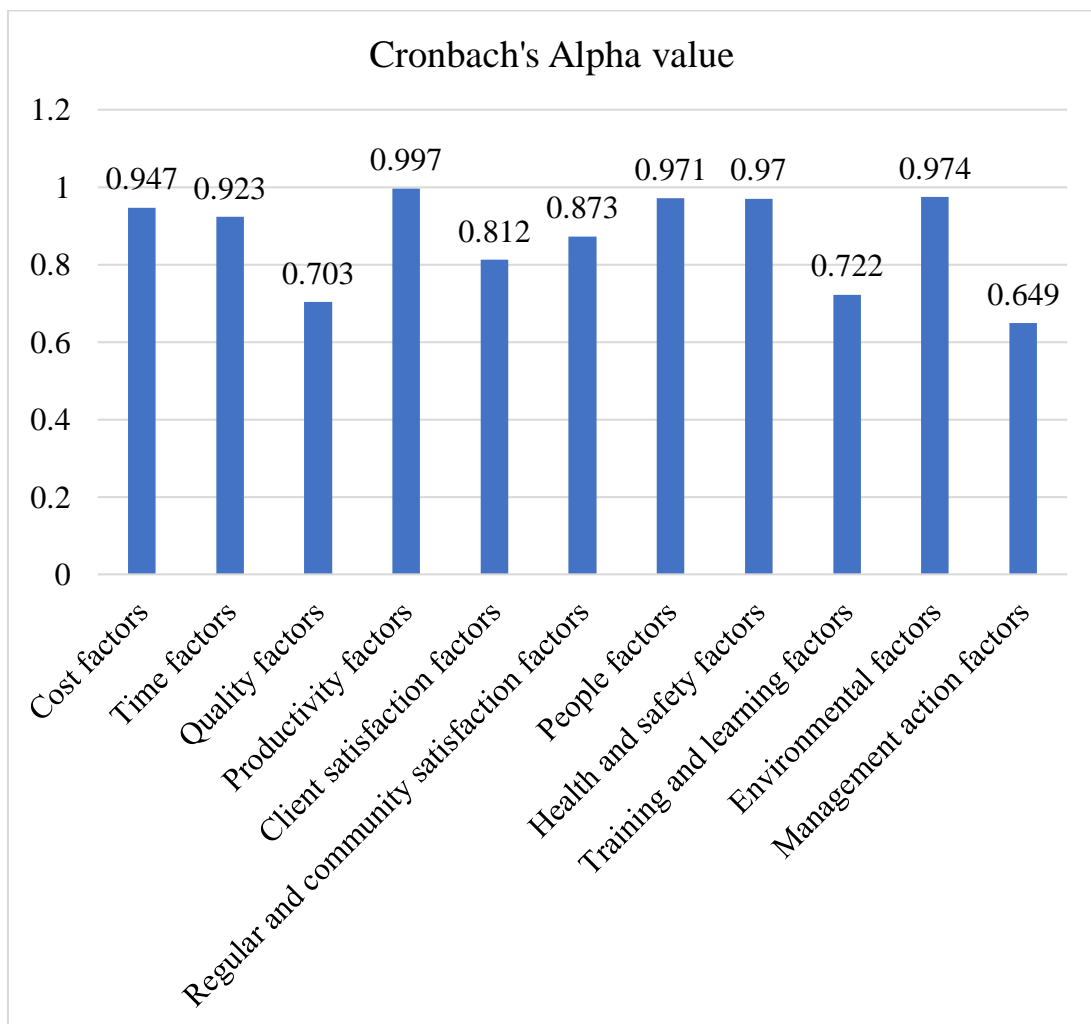


Figure 4. 14 Cronbach's alpha value of independent variables

4.7. Case study

The data of case studies were collected from the interview of the consultant offices of public building construction project in the Assosa zone. The information about the case studies of the projects are listed under table 4.22 shown.

Table 4. 22 Information on the project of the Case Study of public building construction project in Assosa zone.

Projects	Project 1	Project 2
Project location	Assosa Town	Assosa zone, Menge Woreda
Project client	A	A'
Contractor	B	B'
Consultant	C	C'
Project title name	Selamber elementary school	Health center
Delivery system	DBB	DBB
Contract amount	ETB 20,047,883.90	ETB 15,880,000
Revised contract amount	ETB 23,137,596.75	ETB 17,933,125.43
Variations cost amount	ETB 3,089,712.85	ETB 2,053,125.43
Commencement date	September 21,2016	May 7,2018
Completion date	August 5,2018	May 26,2019
Contract period	684 calendar days	365 calendar days
Extension of time	148 calendar days	127 calendar days
Project status	85%	73%

Table 4. 23 Results of case studies project 1

Project 1	
Factor affecting of project performance	Impacts of performance factors
Unavailability of resources as planned through project duration	Time overrun
Change of material	
Change of specification	
Increase in price of construction materials	Cost overrun

Increase in price labor	Degradation of quality standard
Problems in estimated cost	
Sequencing of work according to schedule	
Social conflict/ negative social impact	
Quality of equipment and raw materials	
Quality assessment system in organization	

Table 4. 24 Results of case studies project 2

Project 2	
Factor affecting of project performance	Impacts of project performance factors
Unavailability of resources as planned through project duration	Time overrun
Errors and Omissions of drawing	
Change of specification	
Material and equipment cost	Cost overrun
Cost of variation order	
Additional works	
Shortages of material	
Change in project scope	
Social conflict/ negative social impact	Degradation of quality standard
Sequencing of work according to schedule	
Conformance to specification	

4.8. Impacts of performance factors.

Interview and case studies had been conducted, and discussed about the impacts of performance factors on the public building construction projects in Assosa zone. There are sixteen ongoing public building construction projects in Assosa zone, from which two case studies have made conducted from the consultant offices.

The findings of the interview and case study conducted revealed that the impacts of performance factors on public building construction project in Assosa zone were time overrun, cost overrun, and degradation of quality standard. Time overrun on the public

building construction project was due to a change of specification, error and omission of drawing, unavailability of resources as planned through project duration and change of material on the progress of construction project. In the case study made with Selamber elementary school construction project, there are about 148 calendar days of extension time, and the projects' status has been 85 percent and the case study made with Health center construction project, there are about 127 calendar days of extension time, and the project status has been 73 percent, and those projects are not finished until today. Therefore, time overrun resulted on public building construction project.

Cost overrun on the public building construction project has resulted due to price of construction materials, problems in a controlled cost, cost of variation order and additional works of construction project in the Assosa zone. In the case study of Selamber elementary school construction project, about 3,089,712.85 ETB variations cost amount to be added to the contract amount and the case study of Health center construction project, 2,053,125.43 ETB variations cost amount are added to the contract amount, and those projects are not finished until today. Therefore, cost overrun also occurred on public building construction project.

Degradation of quality standard of public building construction project in the Assosa zone related with quality of equipment and raw materials, quality assessment system in the organization, sequencing of work according to schedule and conformance to specification. Therefore, the degradation of quality standard enhancement was observed on the performance of public building construction projects.

Therefore, time overrun, cost overrun, and degradation of the quality standard was determined as the impacts of performance factors on public building construction project in the Assosa zone.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This section establishes conclusions based on the findings of the study and in accordance with the research objectives. The conclusions are established in consideration of findings. Recommendations are offered to public building construction project stakeholders, with particular regards to construction organization sectors.

5.2 Conclusions

The conclusions of the research were established in the context of the three main objectives set in the primary chapter of the study.

The responses are agreed all factors are the performance problems of public building construction project. The significant value of Spearman's rho correlation coefficients are all the results of the test agreement between the parties was a positive correlation. The reliability of data was checked by using Cronbach's alpha, the internal consistency of performance factors in the research was high-reliability consistency and moderate reliability consistency. This reliability data of the research was analyzed by using SPSS v20.

From the survey conducted and analysis, it was seventy- four factors of performance influencing were identified from the response questionnaire. From the identified factors the top ten significant factor affecting of performance of public building construction projects were: escalation of material price, unavailability of resources as planned through project duration, sequencing of work according to schedule, differentiation of currency prices, leadership skills for project manager, social environment, material and equipment cost, employee attitudes in projects, project location and quality of equipment and raw materials. According to the interviews, and the case studies find that, it was three impacts of performance factors on public building construction projects in Assosa zone. Those impacts of performance factors on public building construction projects are time overrun, cost overrun, and degradation of quality standard enhancement according to the contract document.

5.3. Recommendations

Recommendations for clients

Clients should consider the following:

- Clients are recommended to determine project duration by their professional engineers because thus to avoid a change in the schedule.
- The client is recommended to hire a consultant who specializes in the nature of work.
- The client is recommended to request everything they need in the contract from the beginning and avoid any requirements after the implementation of works and develop a clear vision for projects.
- The client is recommended to give contractors a period of enough time for reviewing the drawings and give their notes and feedback.
- The client is recommended to provide clear criteria for the selection of contractors according to the nature of the project and to have a good reputation and great experience.
- The client is recommended to provide the consultant with sufficient time to prepare bidding documents to avoid any mistakes or misunderstandings.

Recommendations for consultants

Consultants should consider the following:

- The consultants must detail site investigation consider during the tender stage.
- The consultants are recommended to search and explore the equipment and materials that are available in the country and how to deal with it.
- The consultants are recommended to re-design the project according to the request from the client so that the contractor must get variation (cost and time) for additional work which happens from re-design.
- The consultants are recommended to choose engineers with high efficiency to perform the work carefully to avoid any error in the future and review and audit the design by several engineers.
- The consultants are recommended to create direct communication among parties and the engineers must give training for the project organizations.

Recommendations for contractors

Contractors should consider the following:

- Contractors are recommended that before studying the tender and pricing, they must make site visits of the site to see all obstacles and take into account in the bid.
- Contractors are recommended to take into consideration the days when work stop due to the bad weather condition for the employees.
- The contractors must use the qualified workers, engineers, and project manager with good experience to avoid any problems at work.
- The contractor must provide all documents (i.e. certificates) and experience for the staff and get approval on all subcontractors.
- The contractor must give the monthly salary for employees timely and bonus to accelerate the project productivity.

Recommendation for governmental organizations

- The governmental security and the project organization must work together to produce the projects within a schedule.
- Governmental organizations must work to stabilize the political situation in the project site location.
- Governmental organizations recommended taking training for the society about the project functionality.

REFERENCES

- A, Al-Shaaby and A, Ahmed (2018). How Do We Measure Project Success? A Survey, *Journal of Information Technology & Software Engineering*. 08(02): 1-5.
- Ahadzie, D. K., Proverbs, D. G. and Olomolaiye, P. O. (2008). Critical success criteria for mass house building projects in developing countries, *International Journal of Project Management*. 26(6): 675–687.
- Ahonen, J. and Savolainen, P. (2011). The Presence of the Customer and the Supplier Perspectives in Studies on Software Development Project Success, *Scientific Journal of Riga Technical University. Computer Sciences*. 43(1): 72–79.
- Akanni, P. O., Oke, A. E. and Akpomiemie, O. A. (2014). Impact of environmental factors on building project performance in Delta State, Nigeria. *HBRC Journal. Housing and Building National Research Center*. 11(1): 91–97.
- Alsulamy, S., Gupta, N. and Sloan, B. (2014). Factors influencing municipal construction project performance, *Proceedings of the Institution of Civil Engineers Municipal Engineer*. 167(2): 108–117.
- Assaf, S. A., Bubshait, A.A., Atiyah, S. and Al-Shahri, M. (2001). The Management of construction company overhead costs, *International Journal of project Management*. 19: 295-303.
- Belout, A. and Gauvreau, C. (2004). Factors influencing project success: The impact of human resource management, *International Journal of Project Management*. 22(1): 1–11.
- Chan, A. P. C., Scott, D. and Chan, A. P. L. (2004). Factors Affecting the Success of a Construction Project, *Journal of Construction Engineering and Management*. 130(1): 153–155.
- Cheung, S. O., Suen, H. C. H. and Cheung, K. K. W. (2004). PPMS: A Web-based construction Project Performance Monitoring System, *Automation in Construction*. 13(3): 361–376.
- Chigara, B. and Moyo, T. (2014). Factors Affecting Labor Productivity on Building Projects in Zimbabwe, *International Journal of Architecture, Engineering and Construction*. 3(1): 57–65.
- Dalcher, D. (2018). Book Review: *Global Project Management Handbook: Planning, Organizing, and Controlling International Projects*. Second Edition. Project Management.

- Enshassi, A., Mohamed, S. and Abushaban, S. (2009). Factors Affecting the Performance of Construction Projects in the Gaza Strip, *Journal of Civil Engineering and Management*. 15(3): 269–280.
- Fathi, E. and Stevovic, S. (2017). Measurement the efficiency of building project management, *Ekonomika*. 62(4):129–140.
- Frimpong, Y., Oluwoye, J. and Crawford, L. (2003). Causes of delay and cost overruns in construction of groundwater projects in a developing countries: Ghana as a case study, *International Journal of Project Management*. 21(5):321–326.
- Gebrehiwet, T. and Luo, H. (2017). Analysis of Delay Impact on Construction Project Based on RII and Correlation Coefficient: Empirical Study. *Procedia Engineering*. 196(1):366–374.
- George, D. and Mallery, P. (2003). *SPSS for window Step by Step*. fourth edition.
- Ragunath, K.S. and Hameed, S. M. (2018). Ranking of key delay factors in multi storey building *Papers*.05(6):1582-1585.
- Kombo, D., K., and Tromp, D.A. (2006). *Proposal and thesis writing. an introduction*. 2nd reprint. Pauline Publication Africa. Kenya.
- Lamprou, A. and Vagiona, D. (2018). Success criteria and critical success factors in project success : a literature review, *International Journal of Real Estate and Land Planning* .1(1): 276–284.
- Makulsawatudom, A. and Emsley, M. (2001). Factors Affecting the Productivity of the Construction Industry in Thailand: the Project Managers Perception, *Association of Researchers in Construction Management*. 1: 281-291
- Mirza, M. N., Pourzolfaghar, Z. and Shahnazari, M. (2014). Significance of Scope in Project Success, *Procedia Technology*. 9(1):722–729.
- Moore, D., McCabe, G. D. and W, Sclove. S. (2003). *The Practice of Business Statistics*. Freeman. New York.
- Musa, M. M., Amirudin, R. B., Sofield, T. and Musa, M. A. (2016). Influence of External Environmental Factors on the Success of Public Housing Projects in Developing Countries, *Construction Economics and Building*.15(4):30–44.
- Nyangwara, P. O. and Datche, E. (2015). Factors Affecting the Performance of Construction Projects : A Survey of Construction Projects in the Coastal Region of Kenya. *International Journal of Scientific and Research Publications*. 5(10):1–43.
- Olusola, S. O., Emmanuel, A. O., Omoregie, D. A. and Sakiru, S. A. (2016). Effect of Construction Project Performance on Economic Development of Nigeria. *Journal*

- of Economics and Sustainable Development. 7(12): 142-149.
- Onjure, C. O. and Wanyoike, D. M. (2016). Influence of Monitoring and Evaluation Practices on Performance of National Government Funded Construction Projects in Uasin Gishu County-Kenya. *International journal of innovative research and development*. 5(12):78–95.
- Rajkumar, K., Kavin, S. and Jagadeesh, S. (2016). An Empirical Study on Factors Affecting the Quality in Construction Project, *International Journal of Innovative research in Science and Engineering*. 1032–1039.
- Saraf, D. D. (2013). Study of Factors Affecting Performance of Construction Project, *International Journal of Science and Research*. 14(5): 2319–7064.
- Shaikh, A. W., Muree, M. R. and Soomro, A. S. (2010). Identification of critical delay factors in construction, *Sindh Univ. Res. Jour. (Sci. Ser.)*. 42(2): 11–14.
- Siddharth, J., Vyas, C. M. and Pitroda, J. (2015). A critical literature review on comparative analysis of construction equipments rent and buy, *Journal of international academic research for multidisciplinary*. 2(12):130-141.
- Ugwu, O. O. and Haupt, T. C. (2007). Key performance indicators and assessment methods for infrastructure sustainability. A South African construction industry perspective. *Building and Environment*. 42(2) : 665–680.
- Walker, A. (2015). *project management in construction*. Sixth Edition.
- William M.K. Trochim. (2006). *Research methods knowledge bases*.

APPENDIX I

Questionnaire

Mr. ABERHAM JIBAT

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2 July,2019

Questionnaire for Academic Research

Study on performance factors of Public Building Construction Project in Assosa Zone

Dear participants' greetings:

Firstly, I want to thank and appreciate your kindness to give me a part of your valuable time to fill out my questionnaire and I am a student undertaking a Masters in Construction Engineering and Management degree with Jimma Institute of Technology at Jimma University. I am carrying out an academic research on Study on performance factors of Public Building Construction Project in Assosa Zone and you have been identified as a useful respondent in the study.

Attached herewith please find a questionnaire which you are kindly requested to respond to as honestly and completely as you possibly can. You do not have to include your name in the questionnaire and all information that you may provide will be treated with utmost confidentiality.

Kindly when completed the questionnaire it delivers to me alternatively call the mobile number provided.

Thank you for your help and support

Yours faithfully,

Mr. Aberham J.

Instructions:

1. The questionnaire has two sections and you are gently requested to respond to all questions.
2. Please tick (√) in the appropriate bracket.
3. All information will be treated with utmost confidentiality.

Section 1: General Information

- 1) Gently indicate the type of organization.
 I Owner () II Consultant () III Contractor ()
- 2) Gently indicate your professional.
 I Architect () III. Site Engineer/ Office Engineer ()
 II. Project manager () V. Others () please specify _____
- 3) Gently indicate number your experience in the construction field.
 I Less than 5 years () III From 11 to 15 years ()
 II. From 5 to 10 years () V Above 15 years ()
- 4) Gently indicate company size (Number of employees).
 I. Less than 50 () III. From 100 to 150 ()
 II. From 50 to less than 100 () V. More than 150 ()
- 5) Gently indicate your educational level.
 I Certificate () III Degree ()
 II Diploma () V Post graduate ()

Section 2. The factor affecting performance of public building construction projects in Assosa Zone.

As your experience, please express your opinion on the significance of factors affecting performance of public building construction projects in Assosa Zone.

According to the below numbers of factors affecting performance of public building construction projects. (please tick (√) the appropriate box).

1= Not Significant, 2 = Slightly Significant, 3 = Moderately Significant,
4 = Very Significant, 5 = Extremely Significant

Performance factors	1	2	3	4	5
1. Cost factors					
Market share of organization					

STUDY ON PERFORMANCE FACTORS OF PUBLIC BUILDING CONSTRUCTION PROJECT IN
ASSOSA ZONE

Liquidity of organization					
Cash flow of project					
Profit rate of project					
Overhead percentage of project					
Project design cost					
Material and equipment cost					
Project labor cost					
Project overtime cost					
Motivation cost					
Cost of rework					
Cost of variation orders					
Waste rate of materials					
Regular project budget update					
Cost control system					
Escalation of material prices					
Differentiation of currency prices					
If any other, please specify					

	1	2	3	4	5
2. Time factors					
Site preparation time					
Planned time for project construction					
Percentage of orders delivered late					
Time needed to implement variation orders					
Time needed to rectify defects					
Average delay in claim approval from owner to contractor					
Average delay in regular payments from owner to contractor					

STUDY ON PERFORMANCE FACTORS OF PUBLIC BUILDING CONSTRUCTION PROJECT IN
ASSOSA ZONE

Unavailability of resources as planned through project duration					
If any other, please specify					

	1	2	3	4	5
3. Quality factors					
Conformance to specification					
Unavailability of competent staff					
Quality of equipment and raw materials					
Quality assessment system in organization					
Quality training/meeting					
If any other, please specify					

	1	2	3	4	5
4. Productivity factors					
Project complexity					
Number of new projects / years					
Management-labor relationship					
Absenteeism rate through project					
Sequencing of work according to schedule					
If any other, please specify					

	1	2	3	4	5

STUDY ON PERFORMANCE FACTORS OF PUBLIC BUILDING CONSTRUCTION PROJECT IN
ASSOSA ZONE

5. Client satisfaction factors					
Information coordination between owner and project parties					
Leadership skills for project manager					
Speed and reliability of service to owner					
Number of disputes between owner and project parties					
Number of rework incidents					
If any other, please specify					

	1	2	3	4	5
6. Regular and community satisfaction factors					
Cost of compliance to regulators requirements					
Site condition problems					
Quality and availability of regulator documentation					
Number of non-compliance to regulation					
If any other, please specify					

	1	2	3	4	5
7. People factors					
Recruitment and competence development between employee					
Employee attitudes in the project					
Employees motivation belonging to work					
Recruitment and competence development between employee					
If any other, please specify					

STUDY ON PERFORMANCE FACTORS OF PUBLIC BUILDING CONSTRUCTION PROJECT IN
ASSOSA ZONE

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	1	2	3	4	5
8. Health and safety factors					
Application of health and safety factors in organization					
Project location is safe to reach					
Assurance rate of project					
Reportable accidents rate in project					
If any other, please specify					

	1	2	3	4	5
9. Training and learning factors					
Learning from best practice and experience of others					
Training the human resources in the skills demanded by the project					
Work group					
Review of failures and solving them					
Learning from own experience and past history					
If any other, please specify					

	1	2	3	4	5
10. Environmental factors					
Air quality					
Noise level					
Wastes around the site					
Climate condition					

STUDY ON PERFORMANCE FACTORS OF PUBLIC BUILDING CONSTRUCTION PROJECT IN
ASSOSA ZONE

Economic environment					
Social Environment					
Physical environment					
Industrial relations environment					
Technology advancement					
If any other, please specify					

	1	2	3	4	5
11. Management action factors					
Communication systems					
Control mechanisms					
Feedback capabilities					
Planning effort					
Implication an effective quality assurance					
Overall managerial actions					
Control sub-contractor's works					
Developing appropriate organizational structure					
Implementing effective safety system					
If any other, please specify					

APPENDIX II

1. Cause study

Projects	Project 1	Project 2
Project location		
Project client		
Contractor		
Consultant		
Project title name		
Delivery system		
Contract amount		
Revised contract amount		
Variations cost amount		
Commencement date		
Completion date		
Contract period		
Extension of time		
Project status		