ASSESSMENT OF PERFORMANCE FOR PUBLIC BUILDING CONSTRUCTION PROJECTS IN HAWASSA CITY

MSc. THESIS

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ABBREVIATIONS

CBPP	Construction Best Practice Program
KPIs	Key Performance Indicators
PM	Performance Management
RII	Relative Importance Index
SNNPRS	Southern Nation, Nationalities and Peoples Regional State
SPSS	Statistical Package for the Social Sciences
CINRC	Construction Industry National Research Council
UK	United Kingdom

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ABSTRACT

Construction industry has complexity in its nature because it contains large number of parties as clients, contractors, consultants, shareholders, regulatory bodies and others. In Hawassa the number of building projects is increasing from time to time. However, it has become difficult to complete projects in the allocated cost, time and quality. The aim of this thesis is to assess performance of public building construction projects in Hawassa city. Data collection techniques used included literature review, interviews and questionnaire surveys. As outcome 58 factors were identified as factor affecting performance of construction projects. The factors classified in to nine categories (cost, time, quality, productivity, client satisfaction, community and regulatory satisfaction, health and safety, innovation and learning and environment) related factors. For the analysis of the data, statistical analysis SPSS software is used. A survey finding confirmed that major factors that affecting performance has been escalation of material prices, material and equipment cost, availability of resources as planned through project duration, sequencing of work according to schedule, number of disputes between owner and project parties, cost of variation order, incomplete drawing and application of health and safety factors in organization. The main key performance indicators have been cost, time, quality and productivity. Finally based on the findings and results some recommendations were given.

Key words: *Performance, Public building, Construction project and Key performance indicators*

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The construction industry can be described as the sum of all economic activities related to civil and building works: their conception, planning, execution and maintenance. Such works normally comprise capital investment in the form of roads, railways, airports, ports and maritime structures, dams, power generating stations, irrigation schemes, health centers and hospitals, educational institutions, warehouses, factories, offices and residential premises. It is also defined generally as an economic activity directed to the creation, renovation, repair or extension of fixed assets in the form of buildings, land improvements of an engineering nature, and other such engineering constructions as roads, bridges, dams, etc. (Aschalew, 2017). The construction industry is vital for the development of any nation. In many ways, the pace of the economic growth of any nation can be measured by the development of physical infrastructures, such as buildings, roads and bridges (Takim, 2002). Especially a developing country, like Ethiopia, where consecutive economic growth has been registered, demands high rate of investment and consequently the need for construction of adequate public facilities to serve the development of the country.

The contribution of the sector to the overall economic development of a country is significant (Ethiopian Economic Association, 2007). It is among the major economic activities for the development of social, political, and economical welfare of the society. Didenko and Konovets (2008) indicated that the construction industry is one of the most used examples of project based industries. However, construction projects are also dynamic and challenging which attracts capital, new technologies and over brilliant.

According to U.S. Construction Industry National Research Council (USCINRC, 2009) the industry is segmented by analysts and practitioners into at least four distinct sectors residential, commercial, industrial, and heavy construction. These sectors differ from each other in terms of the, the characteristics of project owners, their sophistication, and their involvement in the construction process, Complexity of project and the source and magnitude of financial capital.

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The construction project subjected to number of factor which interface their smooth completion.The performance of construction industry is one of the major development constraints in developing countries since their development highly depends on the growth of their physical infrastructures (Wubishet, 2004). As a matter of this fact, developing countries allocate a considerable amount of their scarce financial resources towards the development of their infrastructure needs. However; most of these infrastructure projects in developing countries encounter considerable low performance in terms of time, cost, and quality, etc.

Construction sector is an important sector. Growth in this sector is critical for growth in national economy as it was among the largest sectors that generates employment within the country as well as a key indicator of the economy of Ethiopia (Wubishet, 2004).

A number of studies have been conducted to examine factors impacting on project performance in developing countries. Shortage of skills of manpower, poor supervision and poor site management, poor workmanship, client satisfaction, unsuitable leadership, shortage and breakdown of equipment among others contribute to construction delays (Mohammed, 2015).

The construction industry of Ethiopia suffers from many problems and complex issues in performance. Performance is related to many topics and factors such as time, cost, quality, client satisfaction, productivity and safety. As a result of many factors which affect the successful completion of the project, especially time, cost and quality of the projects. Therefore, this research work try to found out mainly factors affecting performance of public building construction projects; key performance indicator of building construction public building construction projects.

1.2 Statement of the Problem

The failure of these projects is related to the problems and failure in performance. There are many reasons and factors which attribute to such problem and appear through different directions. Project performance can be measured and evaluated using large number of performance indicators that could be related to various dimension such as time, cost, quality, client satisfaction, productivity, health and safety etc. In Ethiopia, construction industry plays an essential role in socio-economic development of the country. Since construction project comprises from many processes starting from initiation to completion. It passes several activities in each stage to accomplish the project goals. In Hawassa construction project

performance problems appears through different direction. Due to several reason many construction projects in Hawassa city have performance problems instead of achieving their planned goals.

Therefore, this research is designed to assess performance of the public building construction projects and assist owners, consultants and contractors to improve performance of their construction projects.

1.3 Research Questions

1) What are the main factors influencing the performance of public building construction projects in Hawassa city?
2) What are the main key performance indicators of the public building construction projects in Hawassa city?
3) What are the remedial measures to be taken to improve project performance problems?

1.4 Objectives of the Study

1.4.1 General Objective

The general objective of this study is to assessment of performance for public building construction projects in Hawassa city.

1.4.2 Specific Objectives

The specific objectives of the study are:

1) To identify the main factors affecting performance of the public building construction projects in Hawassa city.
2) To determine the main key performance indicators /KPI/ of the public building construction projects in Hawassa city.
3) To give remedial measures for project performance problems in Hawassa city public building construction projects.

1.5 Scope of the Study

The study area is limited only to public building construction projects in Hawassa city which are financed by SNNPRS construction authority, Sidama zone and Hawassa city administration budgets. Furthermore, the study has been undertaken by taking active construction projects in Hawassa city.

The research is limited to factors affecting building projects performance, key performance indicators and formulate conceptually framework for evaluation of performance of the public building construction projects in Hawassa city.

1.6 Significance of the Study

The importance of this research paper is first, it may benefit the different stakeholders involving in construction projects in general and particularly for new construction projects related to project performance. Second, it helps owners, contractors and consultants to know the causes and effects of performance problems in construction projects and the thirdly to take remedial measures to prevent the occurrence of the problems and assist improve performance of the construction projects.

1.7 Organization of the Study

This particular study was organized into five chapters.

Chapter one: - Provides an introduction to the study including background of the study, statement of the problem, general and specific objectives, research questions, significance, scope, limitation and organization of the study.

Chapter two: - Literature review: this chapter shows a detail review from concepts and definitions to identify the factors affecting the performance and key performance indicators in building construction projects.

Chapter three: - Discusses the research methodology adopted for the study and design for carrying out the primary and secondary data collected and to how was analysed.
Chapter four: - Presents the data analysis and discussion part of the research and finally,
Chapter five: - Presents the research conclusions and recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1 Definitions and concepts

Performance can be considered as an evaluation of how well individuals, groups of individuals or organizations have done in pursuit of a specific objective (Ankrah and Proverbs, 2005). These objectives vary significantly, but from an industry or organizational perspective, they generally revolve around satisfying the key stakeholders such as customers, employees, shareholders, the various suppliers, government and society as a whole. In construction, because of the numerous participants who contribute towards the achievement of project objectives, performance has been defined in one sense as a participant's (client, consultant or contractor) contribution to the execution of the task required to complete the project (Mullins, 2005). The characteristics of the construction industry are such that a project is often a major business endeavor representing a major investment by the client, however the most research published in the construction management literature on performance in the construction context mainly focus attention on the contractor's role (Hobday, 2000).

This implies that ultimately it is the project performance that determines overall business performance. These characteristics make project performance critical. Project performance focuses on evaluation projects efficiently and identifying important improvement and leading project and organizational management practice. It advises how these can be put in place to give stakeholder confidence in the control. Performance measurement during project is to know how things are going so that the problem has identified so this might get in the way of achieving project objective. Iyer and Jha (2005) stated that measuring the performance of any construction project is a very complex process because modern construction projects are generally multidisciplinary in nature and they involve participation of designers, contractors, subcontractors, specialists, construction managers, and consultants. With the increasing size of the project, number of participants in the project also increases.

Many previous researches had studied performance of construction projects. The researcher remarked that one of the principle reasons for the construction industry's poor performance has been attributed to the inappropriateness of the chosen procurement system. It was also identified that the main performance criteria of construction projects as financial stability, progress of work, standard of quality, health and safety, resources, relationship with clients,

relationship with consultants, management capabilities, claim and contractual disputes, relationship with subcontractors, reputation and amount of subcontracting (Mutaz, 2015).

Reichelt and Lyneis (1999) remarked three important structures underlying the dynamic of a project performance which are: the work accomplishment structure, feedback effects on productivity and work quality and effects from upstream phases to downstream phases.

Cheung *et al.* (2004) identified project performance categories such as people, cost, time, quality, safety and health, environment, client satisfaction, and communication. It is obtained by Navon (2005) that a control system is an important element to identify factors affecting construction project effort. For each of the project goals, one or more Project Performance Indicators is needed. Cheung *et al.* (2004) obtained that human factors played an important role in determining the performance of a project.

2.2 Project Performance Measurement

Kuprenas (2003) stated that project performance measurement means an improvement of cost, schedule, and quality for design and construction stages. According to Sapri & Pitt (2005) performance measurement is defined as process of assessing progress toward achieving predetermined goals, including information on the efficiency with which resources are transformed into goods and services (outputs), the quality of those outputs (how well they are delivered to clients and the extent to which clients are satisfied) and outcomes (the results of a program of activity compared to its intended purpose.

Navon (2005) defined performance measurement as a comparison between the desired and the actual performances. For example, when a deviation detects construction management analyzes the reasons for it. The reasons for deviation can be schematically divided into two groups:

i. Unrealistic target setting (i.e., planning) or
ii. Causes originating from the actual construction (in many cases the causes for deviation originate from both sources).

It was also stated that performance measurement is needed not only to control current projects but also to update the historic database.

The performance measurement was a basis for progressive improvement and monitoring of company productivity. Traditionally, PM in construction is approached in two ways: in relation to the product as a facility and in relation to the creation of the product as a process. Although a similar set of process stages is involved in every project, the construction industry is a project-oriented industry where each project is unique and can considered as a prototype. Therefore, measuring construction performance focuses more on projects rather than the construction organization's (Kog et al., 1999).

Tangen (2004) obtained that performance measurement is a complex issue that normally incorporates at least three different disciplines: economics, management and accounting. Measurement of performance has garnered significant interest recently among both academics and practitioners. It was also remarked the choice of a suitable measurement technique depends on a number of factors, including the purpose of the measurement; the level of detail required; the time available for the measurement; the existence of available predetermined data; and the cost of measurement. According to previous studies, it was conclude that performance measurement is a process includes the key performance indicators.

Iyer and Jha (2005) stated that measuring the performance of any construction project is a very complex process because modern construction projects are generally multidisciplinary in nature and they involve participation of designers, contractors, subcontractors, specialists, construction managers, and consultants. In the construction industry's present scenario, the systematic ways of performance measurement have influenced many construction firms, government sectors, public and private clients and other project stakeholders.

Performance measurement has been used in collecting and reporting information about inputs, efficiency and effectiveness of construction projects. Again, construction firms use performance measurement to judge their project performances both in terms of the financial and non-financial aspects and to compare and contrast the performance with others in order to improve programmer efficiency and effectiveness in their organizations (Kingsley, 2010).

It was also stated that, performance measurements are needed to tract, forecast and ultimately control those variables that are important to the success of a project, and this has been agreed by many researchers and practitioners. It has been mentioned that in assessing the performance of contractors, a common approach is to evaluate performance on the extent to which client objectives like cost, time and quality were achieved. These traditional measures have become

so popular and entrenched due to the objectivity and simplicity surrounding their measurement. Again, in today's construction environment, timely completions within budgetary allocations are highlighted as critical to client requirement in order to attain 'first in the market' advantage over competitor (Kog et al., 1999).

2.3 Key Performance Indicators

The purpose of the key performance indicators (KPIs) is to enable measurement of project and organizational performance throughout the construction industry. Traditionally, three indicators have been used to evaluate the success of construction projects: cost, time and quality. Kog et al. (1999) contend that these measures are insufficient, and that many other factors exist that can influence customer satisfaction and the client's willingness to pursue a given procurement route in the future. It has been proposed, for example, that project success should also take into account the project's psychosocial outcomes, which refer to satisfaction of interpersonal relations with project members. Cost, time and quality are the three common parameters of project performance.

Project performance can be measured and evaluated using a large number of performance indicators that could be related to various dimensions (groups) such as time cost, quality, client satisfaction (Salleh, 2009). Time, cost and quality are, however, the 3 .predominant performance evaluation dimensions. Another interesting way of evaluating project performance is through 2 common sets of indicators. The first set is related to the owner, users, stakeholders, and the general public; the groups of people, who will look at project performance from the macro viewpoint.

The second set comprises the developer and the contractor; the groups of people who will look a project performance from the micro viewpoint satisfaction, client changes, business performance, health and safety (Mohammed, 2015).

According to Kingsley (2010) performance indicators specify the measurable evidence necessary to prove that a planned effort has achieved the desired result. In other words, when indicators can be measured with some degree of precision and without ambiguity they are called measures. However, when it is not possible to obtain a precise measurement they are usually referred to as performance indicators. Other indicator aside from schedule and budget

and budget performance, monitor the number and types of issues, changes and the degree to which they are addressed.

A wide variety of key performance indicators have been identified and used to measure the success of construction projects. The identified indicators were client satisfaction, stakeholder engagement, service delivery, investment return, defect minimization, dispute avoidance, safety and standard. The most commonly cited KPIs are on-time completion (time), within agreed budget (cost) and non-defective workmanship as specified (quality). Time, cost and quality necessarily interact.

It was well understood in the industry and in the literature that trade-offs occur between optimizing performance for any of these key performance indicators. For example, accelerating completion of a project will usually involve extra cost, reducing cost will tend to lower quality, and increasing quality standards will take more time to deliver (Tsegaye, 2016).

Different authors founded that construction projects often suffer from poor performance in terms of time delays, cost overruns and quality defects. Time, cost and quality are the three most important indicators to measure construction project performance Successful building construction projects are those projects finished on time, within budget, in accordance with specifications and to stakeholders' satisfaction (Meng, 2012).

The key performance indicators also allow tracing which processes and capabilities must be competitive and distinctive, and which merely need to be improved (Cheung, 2004). Key performance indicators consists of seven project performance indicators construction cost, construction time, cost predictability, time predictability, defects, client satisfaction with product, client satisfaction with service and three business performance indicators namely: safety, profitability, and productivity (Tunji, 2014).

One of the earliest works from the construction industry in developing performance indicators was done by construction best practice program (CBP) in UK, which launched the key performance indicators' (KPIs) of construction (CBP, 1999). The KPIs framework consists of seven main groups, within which range of indicators has been developed to analyses either project or company performance and they comprise client satisfaction (product); client satisfaction (service); defect; predictability (cost); predictability (time); profitability; productivity; construction cost; construction time (Samson & Lema, 2002).

The UK working groups on key performance indicators (KPIs) have identified 10 parameters most of these indicators, such as construction cost, construction time, defects, client satisfaction with the product and service, profitability and productivity, promote result-orientated thinking, whereas predictability of design cost and time, and predictability of construction cost and time, and safety can be regarded as process-orientated thinking. It is therefore important to identify parameters performance indicators for benchmarking projects at the project selection phase in order to achieve good project performance (Takim, 2002).

Egan (1998) put the most KPIs, such as Construction cost, Construction time, Defects, Client, satisfaction (product), Client satisfaction (service), Profitability, Productivity, Safety, Cost predictability (const.), Time predictability (const.), Cost predictability (design), Time predictability (design). These indicators are targeted at assessing industry-wide performance and individual companies as well. However, the findings fail to show any explicit link between the performance factors measures based on project phases (e.g., selection phase, execution phase). There is no key factor linking one phase to another. In addition, the working groups provide no indicators on the performances of the stakeholders involved in the project.

Akintoye (2002) studied the development of key performance indicators to measure performance such as cost of pricing the tender as a percentage of contract value, cost of pricing the tender as a percentage of contract value, no. of times base tender price changed, time from the first tender to actual award of contract, average delay in payment of base claim, average delay in payment of agreed variations, average time for approval of agreed variations.

Community satisfaction is the ultimate goal of every construction project performance and hence the same cannot be used as one of the metrics of construction project performance but as an outcome of the overall construction project performance. It is manifested through the community's wellbeing in terms of improved healthcare, education development, provision of employment opportunities and enhanced business activities (Ngacho, 2013).

Cheung *et al.* (2004) remarked seven main key indicators for performance which are: time, cost, quality, client satisfaction, client changes, business performance, and safety and health. Takim and Akintoye (2002) identified good project performance consists of seven key project performance indicators: construction cost, construction time, cost predictability, time predictability, defects, client satisfaction with the product and client satisfaction with the service. They also divide company performance indicators in to three, namely: safety, profitability and productivity.

Takim and Akintoye (2002) in their research result found out in table 2.1 a form of tabular the performance indicators in relation to stakeholders' performances based on three-phases of project life cycle (procurement, project and phasing-out stage).

Table 2.1: Performance indicators in relation to stakeholders' performances based on phases of project life cycle (Source: Takim & Akintoye, 2002)

Client	Consultant	Contractor	Supplier	End-user	Community
1. PROCUREMENT STAGE – PERFORMANCE					
• Client attribution • Project attribution • Procurement & delivery Strategy • Project viability • Contractual arrangement • Briefing Process • Communication • Decision effectiveness • Risks & opportunities • Excessive bureaucracy • Commitment from employees • Interactive Process • Social Obligations	• Project management capabilities • Good working relations • Competency • Consultation mode • Commitment • Strategic cost advise • Meeting functional requirements • Meeting technical specification • Proper communication • Interactive process • Efficiency of technical approval authorities	• Level of experience • Financial stability • Financial management • Past performance • Management capabilities • Performance of project personnel • Construction method & technology • Manpower & technical capabilities • Project innovation	• Quality assurance on products • Quality control system • Product life span • Replacement value • Product mechanization • Track record • Level of service • Team turn-over rate • Capabilities of key personnel • Top management support	• Involvement in need definition • Contribution of ideas & requirements • Commitment via representatives • Involvement in decision making process • Joint evaluation on procurement selection	• Pressures • Demands • Community involvement • Community Policy • Battleground • Closer relationship

2. PROJECT PHASE – PERFORMANCE					
• Management structure • Project interfaces • Fragmentation • Conflicts • Control measures • Political, economic, social, legal & environment influences • Loyalty • Quality of work life	• Team Management • Project interfaces • Coordination • Accountability • Conflicts management style • Communications & reporting • Quality control system • Quality assurance • Dispute resolution process	• Performance standard • Good working relationship • Construction method & technology • Labour utilization & relaxation • Productivity rate • Safety • Constructability • Communications & reporting • Cost control mechanism • Efficiency	• Material Procurement • Co-operation • Commitment • Coordination • Ability to deliver • Product reliability • Delivery time • Contractual agreement • Product defects	• Continuous participation • Involvement in maintenance • Documentation	• Support • Co-operation • Disruptions • Expedite • Environmental effect
3. PHASING-OUT STAGE – EXPECTATION					
• Meets pre-stated objectives • Meets time • Meets budget • Technical specification • Acceptable quality • Meets Corporate priorities	• Profitability • Future Jobs • Learning & growth • Generated positive reputation • Harmony	• Profitability • Achieve business purpose • Learning & growth • Settlements of conflicts • Minimum risk • Business relationship	• New market penetration on products • Future potential • Exploit technology • Profitability	• Meets requirements • Functionality • Desired outcomes • Free from defects • Meets quality thresholds • On-time deliveries	• Benefits • Use of it • Safety • Pleasant environment (blend to the surroundings)

• Harmony • Absence of any claims & proceedings • Reduction of conflicts/ disputes • Transfer of experience • Investment opportunity • Value for money	• Absence of any legal claims & proceedings • Increase the level of professional	• New market penetration • Generated positive reputation • Develop new knowledge & expertise		• Minimum cost of ownership • Required future service • Safety • Flexibility • Usable life expectancy • Easy to maintain • Depreciation and exploitation • Costs	• Public image

The summary stated below in table 2.2 shows the key performance indicators for construction projects with their respective authors from the above literatures.

Table 2. 2: The summary of key performance indicators for building construction projects

	Authors	**Key Performance Indicators**
1	(Takim R. and Akintoye A., 2002)	⇒ Cost, time, client satisfaction, safety, profitability & productivity.
2	Cheung et al. (2004)	⇒ Time, cost, quality, client satisfaction, client changes, business performance, health & safety.
3	Tunji-Olayeni et al. (2014)	⇒ Construction cost, construction time, cost predictability, time predictability, defects, client satisfaction with product, client satisfaction with service, safety, profitability, and productivity.
4	Egan (1998)	⇒ Construction cost, construction time, defects, client, satisfaction, profitability, productivity, safety.
5	Samson & Lema (2002)	⇒ Time, cost, quality, client satisfaction, client changes, business performance, and safety and health.

Based on the summarized table and discussions above, the key performance indicators are listed below.

- ❖ Cost
- ❖ Time
- ❖ Quality
- ❖ Productivity
- ❖ Client satisfaction

- ❖ Regulatory and Community satisfaction
- ❖ Health and safety

2.4 Success Factors in Construction Project

The term "Success" implies different meaning for each person. There does not exist an exclusive definition of project success due to the fact that the meaning is different for each person, project team and company. Project success should be assessed based on different criteria, which usually change depending on the eye of the beholder. The most appropriate criteria to measure project success are the project objectives (Arcila, 2012).

Nguyen (2013) provided a definition of project success as "the project is considered an overall success if the project meets the technical performance specification and/or mission to be performed, and if there is a high level of satisfaction concerning the project outcome among key people in the parent organization, key people in the project team and key users or clientele of the project effort". In the construction industry, the concept of project success varies among different projects depending on participants, project size, scope of services, and the time required to implement a project. Nevertheless, there are common threads across the industry concerning the perceptions and expectations of the designer, owner, or contractor. Contractor selection is an important event for project.

Success is a result much better than expected or normally observed in terms of cost, schedule, quality, safety and participant satisfaction (Salleh, 2009). Project success can be also defined as meeting the required expectation of the stakeholders and achieving its intended purpose. Project success requires creating a well-planned project schedule as well as understanding of the key success factors. Project managers would have a clear understanding of which aspects of projects might be critical for their successful completions (Aschalew, 2017). Salleh (2009) defined the success of construction projects as the degree to which project goals and expectations are met. These goals and expectations may include technical, financial, social, and professional aspects. The study covered all the project phase, including design, construction and maintenance**.**

Mamaru (2017) eliminates a conceptual difference between 'success criteria' and 'success factors. He stresses that success criteria belong to specific measurement which needs to be formulated in order to conclude whether project succeeds or fails. However, success factors are

more about particular levers that can be used by project manager to increase a probability of successful outcome of a project. Project success factors are the elements of a project that can be influenced to increase the likelihood of success; these are independent variable that makes success more likely.

Various project success factors have been identified in different projects around the world. Community involvement, project objectives, technical innovation, uncertainty, politics, schedule duration urgency, financial contract, legal factors and implementation process were established as the critical success factors in projects (Salleh, 2009). The construction industry has been characterized as dynamic in nature as a result the increasing uncertainties in technology, budgets, and development processes. In recent time, building projects are becoming much more complex and require a careful integrated process management tools and techniques. A building project is completed as a result of a combination of many events and interactions, planned or unplanned, over the life of a facility, with changing participants and processes in a constantly changing environment. Certain factors are more critical to project success than others. These factors are called critical success factors (Mamaru et al., 2017).

These objectives are also different depending on the person or the company that is assessing them success is a result much better than expected or normally observed in terms of cost, schedule, quality, safety and participant satisfaction (Salleh, 2009). Project success can be also defined as meeting the required expectation of the stakeholders and achieving its intended purpose. Project success requires creating a well-planned project schedule as well as understanding of the key success factors.

Nguyen et al. (2004) identified nine top critical success factors that would act as enablers for successful implementation of ICT projects in construction as cost of development, top management support, availability of appropriate tools, development team knowledge and understanding of construction processes, ease applications, clear definition and understanding end user, clear communication, standardization issues & change management o organization level. Many literatures indicate that without identifying the evaluation criteria, it is not possible to adequately assess the performance of a project (Salleh, 2009).

Many researches have been conducted to investigate the success factors of construction projects with the aim of providing contract parties with valuable insight into how to consistently achieve superior results for their projects. Although construction projects, by their

nature, are repetitive activities, each one has its own characteristics and circumstances. According to its nature and complexity, the factors that affect one project differs from the other. A factor that could affect the success of one project might not affect the other (Aschalew, 2017). Therefore, identification of the success factors is considered as the key to achieving success in projects.

Critical success factors are those inputs to the project management system that directly increase the likelihood of achieving project success. According to Abraham (2002) the main determinants of project success are budget performance, schedule performance and quality performance.

Source: Project success model cited in (Gaba, 2013).

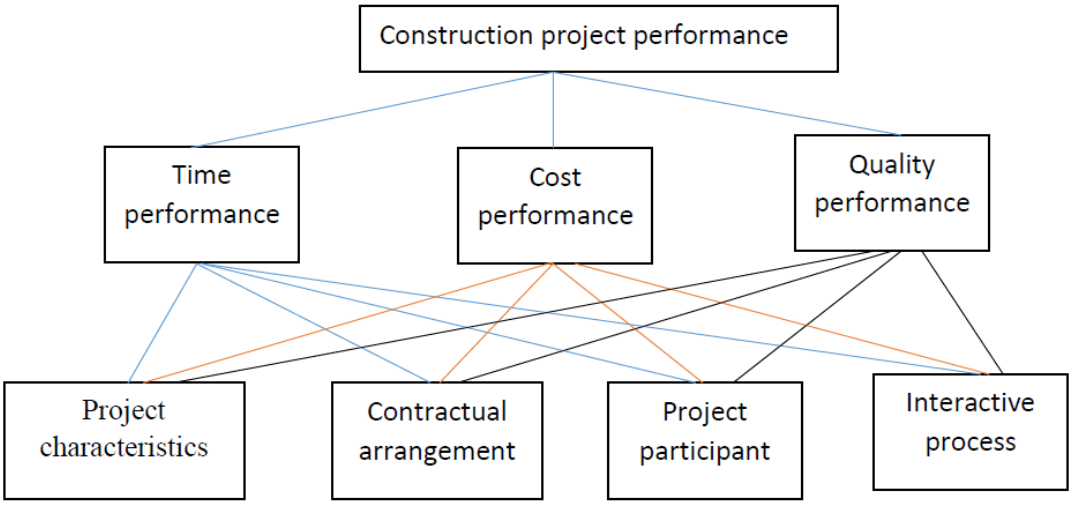

Figure 2.1: Construction performance factors model

The level of success in carrying out construction project development activities will depend heavily on the quality of the managerial, financial, technical and organizational performance of the respective parties, while taking into consideration the associated risk management, the business environment, and economic and political stability (Takim R. and Akintoye A., 2002).

Public construction projects involve numerous stakeholders, such as designers, contractors, subcontractors, construction managers, consultants, and specialists from different disciplines. In a multi-agency work environment, it is natural to have clash of objectives and interests among the different stakeholders. The objective of public project management is to ensure the

success of a project which not only involves managing the schedule, cost, and quality, generally known as ‘the iron triangle’, but also satisfying a number of other performance criteria, such as avoiding disputes, and complying with safety norms (Aschalew, 2017).

The researchers identified the success criteria list for each of the contract parties: owner, designer, and contractor. Some of the owner success criteria included being on schedule, being on budget, and return on investment. Examples of the designer success criteria were; client satisfaction, quality architectural product, well defined scope, and social acceptability. Finally, contractors’ criteria for measuring success included meeting the schedule, profit, being under budget (savings obtained for owner and/or contractor), safety, and client satisfaction (Salleh, 2009).

Nguyen et al. (2004) identified and grouped success factors under four categories which are referred to as the ‘four COMs’, viz., comfort, competence, commitment and communication. Comfort component emphasizes that successful projects include the involvement of stakeholders. This includes both primary stakeholders who have a legal relationship to the project (e.g., subcontractors) and secondary stakeholders who do not form a direct part of the project. The competence component identifies the following four aspects as being central to successful project management in the construction industry, i.e. technology, past experience, competent team having comprehensive skills and awarding bids to the right project manager/contractor. Commitment emphasizes the support of top management, commitment to the project, clear objectives and scope, and political support. The support of top management goes beyond the provision of funds and making resources available. Communication plays an important role in leading, integrating people, and Taking decisions to make a project a success. There must be shared project vision, where the project manager identifies the interests of all relevant stakeholders and ensures that there is buy-in to the project.

2.5 Problem of Performance in Construction Project

The failure of any construction project is mainly related to the problems and failure in performance. Moreover, there are many reasons and factors which attribute to such problem. Shaban (2008) stated that the construction industry performance problems in developing economies can be classified in three layers: problems of shortages or inadequacies in industry infrastructure, problems caused by clients and consultants and problems caused by contractor incompetence/inadequacies.

Biyadglign (2017) stated that a number of unexpected problems and changes from original design arise during the construction phase, leading to problems in cost and time performance. It is found that poor site management, unforeseen ground conditions and low speed of decision making involving all project teams are the three most significant factors causing delays and problems of time performance in local building works.

Okuwoga (1998) stated that, cost and time performance has been identified as general problems in the construction industry worldwide. It was also remarked that project complexity, client type, experience of team and communication are highly correlated with the time performance; whilst project complexity, clients and contractor characteristics are highly correlated with the cost performance.

2.6 Performance and Project Management

Project management defined as the application of knowledge, skills, tools and techniques to project activities in order to meet project requirements. Project management is a specialized management technique necessary for the planning, organization and control of projects under one strong point of responsibility (Tadese et al., 2016). Lack of sound project management by owners or contractors on projects on the other hand leads to construction delays & extra costs for both parties application of sound. Project management practices provides construction project stakeholders with the means to meet their objectives which is described in terms of meeting the intended, purpose, the level of quality, time, cost & safely, while, protecting the environment (Tadesse et al., 2016). The function of construction project management is therefore to predict as many of the risk and problems as possible & to plan, organize & control activities so that the project is completed successfully.

Ling et al. (2007) investigated project management practices adopted by Singaporean construction firms. It was determined that the performance level of their projects in China; identifies PM practices that led to better performance; and recommended key PM practices that could be adopted by foreign construction firms in China to improve project performance.

Management in construction industry is considered as one of the most important factors affecting performance of works. Pheng and Chuan (2006) stated that project management one of the many criteria upon which project performance is contingent. It was also stated that an adequate understanding and knowledge of performance are desirable for archiving managerial

goals such as improvement of institutional transformations, and efficient decision making in design, specification and construction, at various project-level interfaces, using appropriate decision-support tools.

2.7 Factors Affecting Construction Project Performance

A number of studies have been conducted to examine factors impacting on project performance in developing countries. Mohammed (2004) reported that shortage of skills of manpower, poor supervision and poor site management, unsuitable leadership; shortage and breakdown of equipment among others contribute to construction delays.

Okuwoga (1998) stated that cost and time performance has been identified as general problems in the construction industry worldwide. It was also remarked that project complexity, client type, experience of team and communication are highly correlated with the time performance; whilst project complexity, clients and contractor characteristics are highly correlated with the cost performance. Mohammed (2004) examined causes of client dissatisfaction in the South African building industry and found that conflict, poor workmanship and incompetence.

Iyer and Jha (2005) conducted factor affecting cost performance of Indian construction project and they found that; project manager's competence, top management support, project managers coordinating and leadership skill, monitoring and feedback by participant, coordinating among project participant and owners' competence and favourable climatic condition are the critical success factors obtained by analysis. However, conflict among project participant, ignorance and lack of knowledge, presence of poor project specific attributes and nonexistence of cooperation, hostile socio economic and climatic condition, reluctance in timely decision, aggressive competition at tender stage and short bid preparation time are factors adversely affect the cost performance of project.

There are also factors affect construction project time performances identified by many researchers. Chan and Kumarasway (1996) found that lack of sufficient site investigation geared toward delay in projects. Compressive site investigation, accompanied by the though and properly detailed design of ground works and foundation and prior to commencing construction, is likely to improve control and enhance the chance of contract completion with in the schedule.

According to Chan and Kumaraswamy (1996) poorly prepared contract document, together with poor communication and relationship between building team members, often results in many delay. Iyer and Jha (2005) and Navon (2005) identifies the factor affecting the performance of construction project, such as escalation of material prices, differentiation of local currency price against the dollar, average delay because of closures and material shortage, neighbours and site condition problem , belonging to work and location of project.

According to Ajayi et al. (2010) the choice of contractor(s) is a critical factor for the project manager and usually has a significant impact on the success or failure of a project. The performance of a contractor will definitely correlate with the performance of the contract.

Mohammed (2004) found in his report the cause for the failure of performance of construction contractors. These are: lack of experience in the line of work, replace key personnel, assigning project leader in the site, labour productivity and improvement, use of project management techniques, procurement practices, claims, internal company problems, owner's absence from the company, using computer applications, frauds, neglect, low margin profit due to competition, cash flow management, bill and collecting effectively, poor estimation practices, employee benefits and compensations, controlling equipment cost and usage, increased number of projects, increased size of projects, change in the type of work, lack of managerial maturity, national slump in the economy, construction industry regulation and bad weather.

Construction project performance is influenced by a set of factors, for instance project attributes such as size, cost, environment and other, contract and specifications, the relationship and cooperation between stakeholders, qualification of engineers and teamwork (Cheung, 2004).

In their contribution Shenhar et al. (2002) propose that "different factors influence the success different kinds of projects and that future scholarship of project management must adapt a more project specific approach to identify the exact causes of project success and failure". Based on information collected on 127 projects executed in Israel, they identified three different types of success factors: factors which are independent of the project characteristics, factors which are solely influenced by uncertainty and factors which are solely influenced by scope.

Belassi and Tukel (1996) provided a framework for grouping project performance factors (they called them success factors) into factor groups under each of which are several other factors which are viewed as the indicators for measuring a particular factor group. These are: factors

related to the project, the project manager, the project team, the clients' organization and the external environment.

Table 2.3: Factors affecting the performance of construction projects

Performance factor groups	Factors
a) Factors relating to the project manager	➢ Ability to delegate authority, ability to trade-off, ability to coordinate, perception of his role & responsibilities, competence, commitment
b) Factors relating to the project team members	➢ Technical background, communication skills, trouble shooting, commitment
c) Factors relating to the project	➢ Size and value, uniqueness of project activities, density of a project, life, urgency.
d) Factors relating to the organization (firm)	➢ Top management support, project organizational structure, functional managers' support, project champion
e) Factors relating to the external environment	➢ Political environment, economic environment, social environment, technological environment, nature, client, competitors, sub-contractors.

Generally, performance dimensions may have one or more indicators, and could be influenced by various project characteristics. For example, Dissanayaka and Kumaraswamy (1999) found that project time and cost performances get influenced by project characteristics, procurement system, project team performance, client representation's characteristics, contractor characteristics, design team characteristics and external conditions.

Similarly, Iyer and Jha (2005) identified many factors as having influence on project cost performance, these include: project manager's competence, top management support, project manager's coordinating and leadership skills, monitoring and feedback by the participants, decision-making, coordination among project participants, owners' competence, social condition, economic condition, and climatic condition. Coordination among project

participants the most significant of all the factors, having maximum influence on cost performance.

Kaming et al. (1997) conducted a research on the cost overrun in the construction projects and found some common factors that are weather condition, change in material rates, inaccurate estimation of cost, complexity of projects, contractors less experience about the site geography, contractor less experience about the project and non-familiarity with local regulations.

The nine factors that are considered as critical include incomplete design at the time of tender, additional work at owner's request, changes in owner brief, lack of cost planning and monitoring during pre and post contract stages, poor soil conditions at site, adjustment of prime cost and provisional sums, re measurement of provisional works, logistics due to site location and lack of cost reports during construction stage.

2.7.1 Factors Affecting Performance of Construction Project Managers

Projects can be considered as a set of activities that must be completed in accordance to specific objectives which involve the utilization of a company's resources (Tsegay, 2016). In order to meet the objectives of projects, 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; research and development; manufacturing and distributions; strategic planning; tactical planning; operational planning; organization structures; organizational behavior; personnel administration; managing work relationships .
B. **Technical knowledge and skills**: defined as an understanding of and proficiency in, a specific kind of activity, particularly one involving methods, processes, procedures, or techniques
C. **Business knowledge and skill**: on small projects, this can be a tough challenge because project managers are also managing the project control function.
D. **Human knowledge and skills**: the ability to work with and through other people. Knowledge that would influence potential performance enables project managers to pay special attention to control performance more effectively. It's remarked that effective communication and fast information transfer between managers and participants help to accelerate the building construction process and performance (Mutaz, 2015).

Chan and Kumaraswamy (2002) remarked that effective communication and fast information transfer between managers and participants help to accelerate the building construction process and performance. Kuprenas (2003) studied the impact of the use of a project management based organizational structure, project manager training, frequency of design meetings, and frequency of design reports on design phase cost performance. The process of a design team meeting frequency and the process of written reporting of design phase progress were found to be statistically significant in reducing design phase costs. Kuprenas (2003) identified the importance of the working environment variables for the performance of a project manager in the private and public sectors according to three main groups which are job condition, project characteristic and organizational related categories.

The result revealed that working hours, physical condition of project site, complexity of project, material and supplies, project size, duration of project and time availability were viewed differently in terms of importance by the contractors and consultants groups. Team relationship was ranked as the most important variable affecting the performance of a project manager. It is obtained that project managers' experiences do not have much effect on how they perceive their working environment below shows summary of factors that affect the performance of project managers' from the above different authors.

2.7.2 Factors Affecting Cost and Time Performance

One of the most important problems in the construction industry is time and cost overruns. Time and cost overruns occur in every construction project and the magnitude of these delays and cost overruns varies considerably from project to project. So it is essential to define the actual causes of time and cost overruns in order to minimize and avoid the delays and increasing cost in any construction project. Time overruns is defined as the extension of time beyond planned completion dates traceable to the contractors. Delays are incidents that impact a project's progress and postpone project activities; delay causing incidents may include weather delays, unavailability of resources, design delays, etc. In general, project delays occur as a result of project activities.

Ahsen et al. (2018) researched the causes that affect time completion in the construction industry in Lebanon. They conclude that owners had more concern with financial problems; contractors regarded contractual relationships the most important, while consultants considered

project management issues to be the most important factors causing time overrun in construction projects.

Kuprenas (2003) stated that process of a design team meeting frequency and the process of written reporting of design phase progress were found to be statistically significant in reducing design phase costs. Otherwise, the use of project manager training and a project management based organizational structure were found to be processes that do not create a statistically significant in reducing design phase costs.

Ahsen et al. (2018) investigated the contractors and consultants in Jordan construction industry and founded top ten factors that cause time overrun. These factors are owner interference, inadequate contractor experience, financing and payments problems, labor productivity, slow decision making, improper planning and subcontractor's related issues. A research conducted on the cost overrun in the construction projects and found some common factors that are weather condition, change in material rates, inaccurate estimation of cost, complexity of projects, contractors less experience about the site geography, contractor less experience about the project and non-familiarity with local regulations. He also studied the cost overrun in high risk construction projects of Indonesia. The researcher pointed out four main factors that affect the cost overrun in construction projects that are increase in material cost, incorrect management of quantity take-off, productivity of labor and increase of labor wages in markets.

Dissanayaka & Kumaraswamy (1999) remarked that project complexity, client type, experience of team and communication are highly correlated with the time performance; whilst project complexity, client characteristics and contractor characteristics are highly correlated with the cost performance.

According to Amare (2008);

- Inadequate investigations by the designer during the design phase,
- Delay in site mobilization,
- Ambiguities, mistakes, and inconsistencies in specifications and drawings,
- Poor site management and supervision by contractor,
- Ineffective planning and scheduling of project by contractor,
- Equipment breakdowns,
- Difficulties in financing the project by the contractor,
- Shortage of equipment required,

- Late procurement of materials by the contractor,
- Poor qualification of consultant/ engineer's staff assigned to the Project,
- Type of project bidding and award (Selection based on least evaluated bidder),
- Shortage of technical professionals in the contractor's organization, and
- Cash flow problems faced by the contractor are identified as the most severe causes of time overrun from the contractor, consultant and client point of views.

Cost overrun causes

- Financial difficulties of owner
- Inadequate contractor experience
- Failure to provide site
- Exceptionally low bids
- Slowness of the owner's decision-making process
- Poor planning and scheduling of the project by the contractor
- Owner's lack of experience
- Financial constraints
- Material procurement
- Architects' incomplete drawing

2.7.3 Factors Affecting Quality Performance

The definition of quality depends on the point of view of the people defining it; some view it as "conformance to specification". Others view it as "performance to standards or value paid for the price" (Saunders, 2009). For construction firm quality is nothing but the satisfaction of customers and fulfilling of their requirements within a specified budget. Quality is one of the important key performance indicators of a construction project which may cause cost overrun and time delays.

Managing quality in projects must be addressed from two different perspectives: the quality of the product of the project, and the project quality management process. Issues associated with product quality, such as quality metrics and required tools and techniques, are very specific to the nature of the product. For example, the quality issues to be addressed and approaches to be used in building a convention centre will be significantly different from those of manufacturing a jet engine. On the other hand, the project quality management process is applicable to a whole

spectrum of projects, with wide variation in the nature of the product from project to project (Aschalew, 2017). It includes all necessary activities undertaken by the project organization to ensure that the needs of the project and the purpose for which it was initiated are fully met, such as determining quality policies, objectives, and responsibilities. The project quality management process facilitates the implementation of a quality management system through policies, procedures, and the sub processes of quality planning, quality assurance, and quality.

In construction projects lack of quality results in delays, cost overrun and unsafe structure (Ahmad et al., 2015). The factors that affect process quality in the three phases design, (construction, and operation) of the life cycle of a building project are identified and ranked by degree of importance.

Quality is affected by shortages of materials, equipment's, design changes, error in cost estimation and lack of budget (Ahmad et al., 2015). The other factors affecting quality are deficiencies in scheduling, inappropriate planning and unclear evaluation standards. The significance of these factors depends on type of projects, working environment and local culture.

The perceptions of long-time practitioners are obtained by means of a questionnaire survey. The findings indicate that management commitment to continuous quality improvement, management leadership in promoting high process quality; quality training of all personnel, efficient teamwork to promote quality issues at the corporate level, and effective cooperation between parties taking part in the project are generic factors that affect process quality.

2.7.4 Factors Affecting Productivity Performance

The term "productivity" expresses the relationship between outputs and inputs. Output and input differ from one industry to another. Also, the productivity definition varies when applied to different areas of the same industry. Labor is one of the basic requirements in the construction industry. Labor productivity usually relates manpower in terms of labor cost to the quantity of outputs produced. Achieving better productivity requires detailed studies of the actual labor cost. Various labors have different variables affecting their productivity (Mutaz, 2015).

Type of Project: To accomplish substantial productivity, every member of a crew requires adequate space to perform task without being affected with/by the other crew members. When

more labors are allotted to perform particular task, in a fixed amount of space, it is probable that interference may occur, thus decreasing productivity. Additionally, when multiple trades are assigned to work in the same area, the probability of interference rises and Productivity may be reduced. Interference among the various crews and laborers is due to mismanagement on construction sites. For example, a steel-fixture crew has to wait before fixing the reinforcement rods if the carpenter's framework is incomplete. The types of activities and construction methods also influence labor productivity (Saunders, 2009).

Safety: Accidents have high impacts on labor productivity. Various accident types occur at the site, such as an accident causing death and resulting in a total work stoppage for a number of days. An accident that causes injured person to be hospitalized results in a work decrease of the crew for which the injured employee worked. Small accidents resulting from nails and steel wires can stop work and, thus, decrease productivity (Saunders, 2009).

Supervision: Generally, projects come across some design, drawings and specification Changes during construction. If drawings or specifications are with errors and unclear Productivity is expected to decrease since laborers in the field are uncertain about what needs to be done. As a result, task may be delayed, or have to be completely stopped and postpone it until clear instruction. There is a 30% loss of productivity when work changes are being performed (Thomas *et al*., 1999). Work inspection by the supervisor is an essential process to proceed.

Material/Tools: Material management is one of the most important factors in construction industry. Productivity can be affected if required materials, tools, or construction equipment for the specific are not available at the correct location and time. Selection of the appropriate type and size of construction equipment often affects the required amount of time it is, therefore, essential for site managers to be familiar with the characteristics of the major types of equipment most commonly used in construction. In order to increase job-site productivity, it is beneficial to select equipment with the proper characteristics and a size most suitable for the work conditions at a construction site. Laborers require a minimum number of tools and equipment to work effectively to complete the assigned task. If the improper tools or equipment is provided, productivity may be affected.

Political factors: Law and order, stability of government, etc. are essential for high productivity in the construction industry.

2.8 Summary of Factors Affecting Performance of Construction Projects

In table 2.4 described that summary of the factors sourced from the different literature were presented.

Table 2.4: Summary of the factors affecting performance

No	Group factors	Factors	References
1	**Cost related factors**	➢ Market share of organization ➢ Cash flow of project ➢ Profit rate of project ➢ Material & equipment cost ➢ Inadequate labour ➢ Project overtime cost ➢ Cost of rework ➢ Cost of variation orders ➢ Escalation of material prices ➢ Motivation cost ➢ Lack of coordination between designer and	• Dissanayaka & Kumaraswamy (1999); Okuwoga (1998); Reichelt & Lyneis (1999); Shaban (2008); Ugwu & Haupt (2007); Ankrah (2007); Le-Hoai et al. (2008); Cheung et al. (2004).

2	**Time related factors**	➢ Poor project management assistance ➢ Project complexity ➢ Time needed to rectify defect ➢ Financial constraints ➢ Average delay in claim approval ➢ Time to implement variation ➢ Delay in payments from owner to contractors ➢ Planned time for construction	○ Dissanayaka & Kumaraswamy (1999); Okuwoga (1998); Reichelt and Lyneis (1999); Shaban (2008); Ugwu and Haupt (2007); Ankrah (2007); Le-Hoai et al. (2008); Cheung et al. (2004); Iyer et al. (2005); Takim and Akintoye (2002).
3	**Quality related factors**	➢ Availability of professionals ➢ Quality of equipment ➢ Conformance specification ➢ Quality assessment system in organization ➢ Quality training ➢ Incomplete drawing	○ Reichelt and Lyneis (1999); Shaban (2008); Ugwu and Haupt (2007); Cheung et al. (2004); Iyer et al. (2005); Takim and Akintoye (2002).
4	**Productivity related factors**	➢ Project size and complexity ➢ Management-labour relationship ➢ Absenteeism rate through project ➢ Number of new projects per year ➢ Sequencing of work according to schedule ➢ Local climate conditions ➢ Wedges amount	○ Dissanayaka & Kumaraswamy (1999); Reichelt and Lyneis (1999); Ugwu and Haupt (2007); Iyer et al. (2005); Takim and Akintoye (2002).

5	**Client satisfaction related factors**	➢ Leadership skills for project manager ➢ Number of disputes between owner and project parties ➢ Number of rework incidents ➢ Information coordination b/n owner and project parties ➢ Poor workmanship and incompetence workers	○ Shaban (2008); Cheung et al. (2004); Iyer et al. (2005); Takim and Akintoye (2002).
6	**Regulatory and community satisfaction related factors**	➢ Site condition problems ➢ Quality and availability of regulator documentation ➢ Cost of compliance to regulators requirements ➢ Number of non-compliance regulations	○ Shaban (2008); Iyer et al. (2005).
7	**Health and safety related factors**	➢ Reportable accidents rate in project ➢ Application of health and safety factors in organization ➢ Assurance rate of project ➢ Easiness to reach to the site	○ Reichelt and Lyneis (1999); Cheung et al. (2004); Takim and Akintoye (2002).
8	**Innovation and learning related factors**	➢ Learning from own experience and past history ➢ Learning from best practice and experience of others ➢ Review of failures and solving them ➢ Work group	○ Shaban (2008).

9	**Environment factor**	➢ Waste in site ➢ Climatic condition ➢ Noise ➢ Air quality	o Shaban (2008).

2.9 Summary of Literature Reviews

From the literature review, it was obtained that there were many fields and topics which are related to performance such as; construction management, factors affecting project performance, project performance measurement, and key performance indicator. The key performance indicators such as time, cost, quality, productivity, client satisfaction, regulatory & community satisfaction, health & safety are used to evaluate performance of construction projects. According to previous studies, it can be said that the performance problems occur in building construction projects due to many reasons. There are different factors affecting project performance. These factor are classified in to nine categories (cost, quality, time, productivity, client satisfaction, regulatory and community satisfaction, health and safety, environment, innovation and learning) depending on their nature of occurrence. These factors occur on many building construction project. This research attempted identifies the project performance problem in the Hawassa city and assists to overcome performance problem and to improve performance of the construction projects.

CHAPTER THREE: MATERIALS AND METHODS

3.1 Introduction

This chapter discusses the various methods used in this research. It is the procedure used in gathering data for the study to address the objectives of the research and to arrive at research findings and conclusions. Further, this chapter discusses about research design, study area, target population and sampling techniques, method of data collection. It also indicates how data was analyzed and presented.

3.2 Research Design

Methodology is a plan of action that shows how the problems are investigated, what information are collected using which methods, and how this information are analyzed in order to arrive at conclusions and develop recommendations. This research investigates the performance of public building construction projects in Hawassa city and the research questions investigate the main factors affecting the performance of building construction project and main key performance indicators of building construction projects.

According to Kothari (2004), research based on approach can be the classified in to three. These are quantitative approach, qualitative approach, and mixed methods approach. The quantitative approach involves the generation of data in quantitative form which can be subjected to rigorous quantitative analysis. The emphasis of quantitative approach is collecting and analyzing numerical data; it concentrates on measuring the scale, range, frequency etc. of phenomena. There are different types of quantitative data collection techniques, such as questionnaire, experiment, recording events, etc. On the other hand, qualitative research approach is more subjective in nature than quantitative approach and involve examining and reflecting less tangible aspect of the research subject like people's attitudes, values, opinions and behavior (Kothari, 2004). The most commonly used qualitative data collection techniques can be in depth interview, observation methods, and document review. Generally, the fundamental issues behind the selection of quantitative, qualitative or combination approaches depend on the research question and constraints. In consideration of the nature of the research, a combination of both quantitative and qualitative research design is selected to accomplish the objective of the research study.

The response from respondent was collected though a questionnaire surveys and semi-structured interview in addition to the desk study that is conducted to arrive at the research

objectives set forth in this research. After in-depth review on performance indicators and the variables or factors affecting construction performance related topics the questionnaire is structured and distributed to respondents. The desk study is analyzed in relation to theoretical propositions, and the responses obtained from the questionnaires are analyzed by descriptive statistics and relative importance index method.

3.3 Description of the Study Area

The study area Hawassa is city which located in SNNPRS, Ethiopia. Hawassa is located at 273km from the capital city of Ethiopia. The city serves as the capital of the Southern Nation, Nationalities, and People's Regional state (SNNPRS) and one of the rapidly growing cities in Ethiopia (*Web-site*).

The growth and expansion of the city is considered as high and rapid when compared to other town in the county. As result of sudden upsurge in the population of the city, relocation of civil servants and influx of the people from the rural area brought the rapid growth in construction sector to fulfill the need of residential accommodation, regional office buildings and hotels.

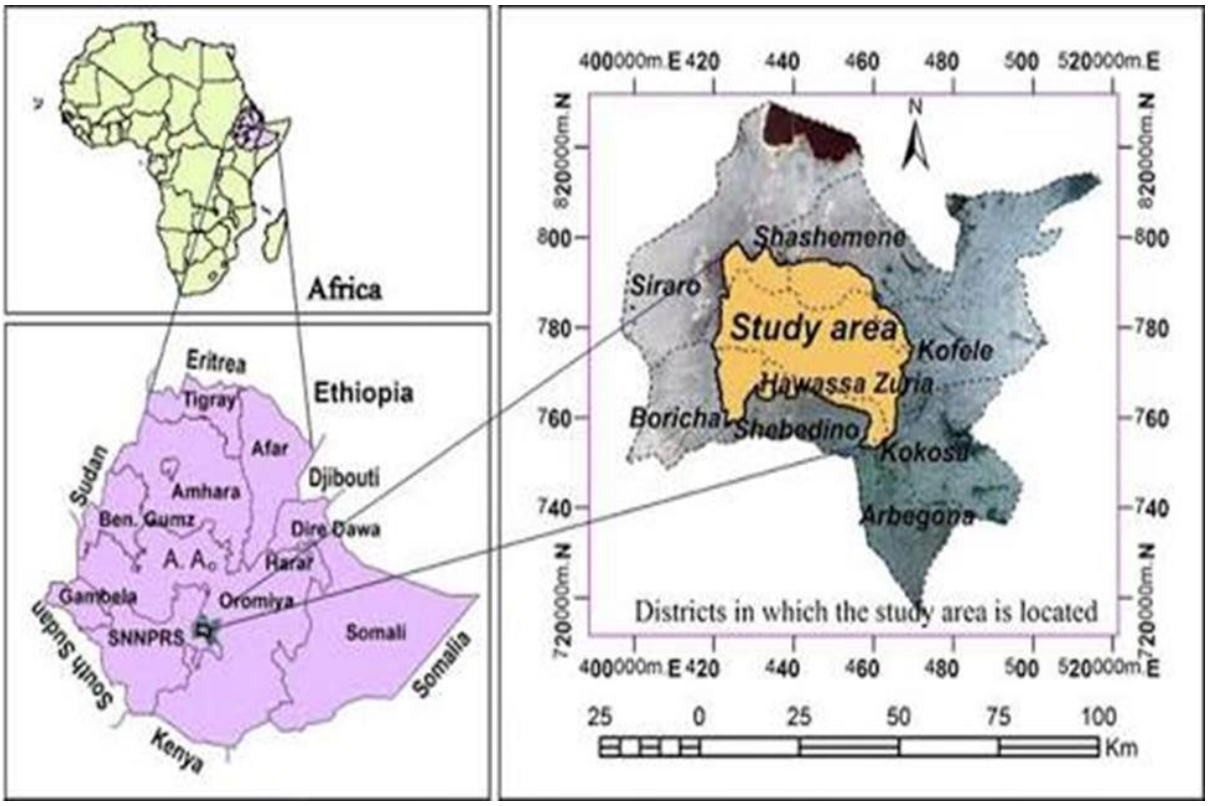

Figure 3.1: Map of Hawassa city

3.4 Study Subject

The study was intended to formulate conceptual framework to evaluate performance and identify main factors that affect performance of building construction projects and main key performance indicator on public building construction projects. The study subjects are public building construction projects in Hawassa city.

3.5 Population of the Study & Sampling Technique

The population of the study has comprised public building construction projects which are under construction in Hawassa city while this research is undertaken. Purposive sampling used to get information from the population. In this research it is decided to study the whole population of building projects which are under construction, therefore the sample size for study is equal to the population size. From each population the questionnaire are distributed to all projects selected participants. The population used in this research are G+2 and above building projects. There are three distinct government offices that are handling public building projects in Hawassa city. These are SNNPRS construction authority, Hawassa city administration construction department and Sidama zone construction department. There are three (3) active projects under Sidama zone construction department, ten (10) active projects from the Hawassa city administration construction department and eight (8) active projects under the SNNPRS construction authority. Therefore, this study is conducted on twenty one (21) active site public buildings projects in Hawassa city, which are currently under construction.

3.6 Methods of Data Collection and Research Instruments

According to Saunders et al. (2009) the type of research and data needed decide what type of data collection methods to be used. In addition to, confidentiality, sensitivity, and ease of collection, cost, time and limit choose of data collection method (Kumar, 2011). After detail review of literatures about factors affecting performance of building construction project and key performance indicators' on building construction projects, these data collection methods are selected for this research. Questionnaire and semi-structured interview are primary data collection method chosen for this purpose while the secondary data sources include internet, journals, as well as reviewing related archival documents, correspondences and other related documents. These different methods of data collection have been used in order that the collected data give multiple evidences.

1) Questionnaire

The questionnaire is used as a quantitative approach to gather information that factors affect performance of building projects and main key performance indicators' on building construction projects in Hawassa city. The questionnaire is chosen because it is a fast and relatively easy method of collecting data and is more accurate when starting processing and analysing of the data. From literature reviews fifty eight performance factors are identified and used as basis for questionnaire. These factors for performance building construction projects are classified in to nine categories: cost, time, quality, productivity, client satisfaction, regulatory and community satisfaction, health and safety, environmental and learning and innovation depending on their nature and mode of occurrence. These factors are very general and applicable to most projects.

To indicate the extent of the effect of each 58 factors on project performance, the survey respondents are asked to tick appropriate rating scale against each identified factor that reflect their opinions on the importance level. These questionnaires are filled by project managers, site and office engineers and others in different projects.

The questionnaire is designed into three main sections. The first section deals with the demographics of organization and respondents. The second section deal with factor affecting project performance and the third section deal with the main key performance indicators'. The general format of the questionnaires is found on appendix part.

2) Interview

Interview is oral interactions where oral questions are presented to the respondent to produce an oral response from the interviewee (Wilkinson and Birmingham, 2003). In this research, semi-structured interview is used to collect qualitative data. The semi-structured interview is conducted with project manager and their answer helpful to collect the all data required identifying major factor affect performance and their effect on construction project.

3) Secondary data source

Secondary data sources include internet, journals, as well as reviewing related archival documents, correspondences and other related documents has been reviewed to identify main factor affect performance and main key performance of building construction projects in the city. The secondary source provide a general understanding of the subject area by presenting a

wide range of ideas in field which help to supplement other specific information obtained from the primary source.

3.7 Data Analysis and Interpretation

3.7.1 Data Measurement

The research attempted to address most of the relevant problems under the study that enables to appreciate all concerned issues under the subject area The relative importance index method will be used to determine and rank factors that affect project performance and key performance indicators in building construction projects.

The factors that affect project performance and the responses obtained from the respondents will be analysed using SPSS-22 (Statistical Package for the Social Sciences) software and Microsoft- excel spread sheet. Ordinal scales as shown in the tables 3.6 are a ranking or a rating data that normally uses integers.

Table 3.1: Scale used for data measurement

Item	Very low	Low	Medium	High	Very high
Scale	1	2	3	4	5

$$RII = {\sum W}/{A * N} \quad \text{…….. Equation - 1 (Cheung et al, 2004).}$$

Where:

RII is relative importance index,

W is the weight given to each factor by the respondents and ranges from 1 to 5

A = the highest weight = 5 and N = the total number of respondents.

Rating scale is one of the most common formats for questioning respondents on their views or opinions of an event. In this regard, participants will be asked to indicate the level of the occurrence of factors influencing performance and key performance indicator by rating them on five point scale, (1 = very low, 2 = low, and 3 = medium, 4 = high, and 5 = very high).

For this research work Spearman Rank's Correlation Coefficient method is used to know owners, consultants and contractors perceptions on, factors that affect project performance and the key performance indicators of public building construction project. Which values varies between -1 and +1. The Spearman's Rank Correlation Coefficient is computed as (Crawshaw & Chambers, 2001).

Using equation

$$r_s = 1 - \frac{6\Sigma d^2}{n"(n"^2-1)}.. \quad \text{……..} \quad \text{Equation 2}$$

Where:

$\mathbf{r_s}$ is Spearman's Rank Correlation Coefficient,

d is the difference in the factors ranks given by the respondents, and

n" is the number of data pairs.

A correlation coefficient of **+1** means perfect positive correlation.

A correlation coefficient close to **0** means no correlation.

A correlation coefficient of **-1** means perfect negative correlation

Finally strength of correlation between the perception of the pairs of groups is evaluated based on the following guide for the absolute value of ($\mathbf{r_s}$) (Cheung et al., 2004),

- 0.19 'very weak'
- 0.20 - 0.39 'weak'
- 0.40 – 0.59 'moderate'
- 0.60 – 0.79 'strong' and 0.80 – 1.00 'very strong'

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents analysis of the research data collected from questionnaire survey responses with discussions based on the results. The results and discussion sections of the research is devised in three main parts in line with the objectives of the research. The first part presents main factors affecting project performance, main key performance indicators and conceptual framework that reveal how the factors influence the overall performance of a construction projects. The tables show participants' Relative Importance Index (RII), rank of factors affecting project performance, key performance indicators and correlations between the respondents. The figures show the combined RII and ranks.

4.2 Questionnaire Data and Analysis Results

4.2.1 Response Rate

A total of 63 questionnaires sent to the three groups of respondent's contractors, clients and consultants. 21 questionnaires sent for each group. It implies that the owner, consultant and contractor respondents are taken from each construction projects. Out of 63 questionnaires distributed; 56 completed questionnaires are received. This gives a response rate of 88%. In table 4.1 indicates as below;

Table 4.1: The number of questionnaires distributed and returned

Description	**Client**	**Contractor**	**Consultant**	Total
Questionnaires distributed	21	21	21	63
Questionnaire Returned	19	18	19	56

4.2.2 Service Year of Respondents

The distribution profile of respondent's local experience in construction field is shown in table 4.2.

Table 4.2: Construction work experience of three groups of survey respondents

Count		Type of organization			Total
		Contractor	**Client**	**Consultant**	
Work experience of the respondents	Less than 6 years	5	3	4	11
	6 to 10 years	4	6	8	18
	11to 15years	6	5	6	18
	16 to 20 years	3	4	1	8
	21 to 25 years	1	0	0	1
Total		19	18	19	56

Figure 4.1 indicates that majority of respondents that is 18 out of 56 (32%) had experience between 11-15 years, 18 out of 56 (32%) had experience between 6-10 years, 11 out of 56 (20%) had experience between less than 6 years, while 8 out of 56 (14%) had experience between 16-20 years and 1 out of 56 (2.0%) had experience between 21-25 year. Here, it means that almost above 80% of the respondents had above 6 years experienced so that they are assumed to be input this particular study.

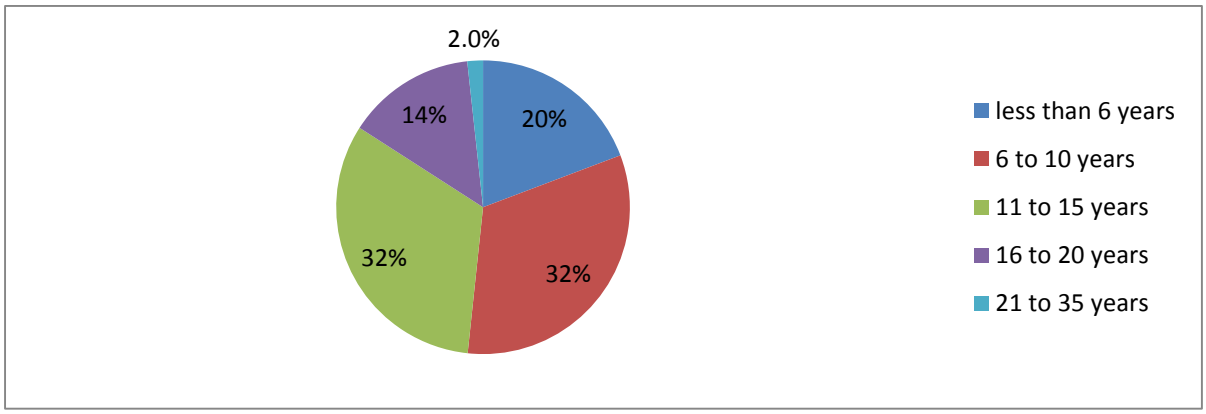

Figure 4.1: Work experience of the respondents

4.3 Factors Affecting the Performance of Building Construction Projects

The results of this part of the study intended to present results of the relative importance index (RII) and rank of factors affecting the performance of building construction projects and correlation coefficients between responses of the participants.

There are nine groups of factor identified that affect the performance of construction projects. Totally 58 factors are identified from the literatures reviews that affect the performance of construction projects and the main critical factors are discussed below.

The following tables and figures show the summary of participants' and combined relative importance index (RII) and rank of project performance factors according to each target participants and correlations between the participants.

4.3.1 Cost Related Factors

Table 4.3 shows the rank of factors influencing cost performance that have been investigated in this research from contractor, consultant and owner viewpoints. Eleven factors are identified from the literature reviews that affect the performance of cost. Based on the combined relative importance index (RII) and rank of the factor affecting cost performance in public building construction projects are discussed.

Table 4.3: Participants' RII and the rank of cost related factors

Cost related factors	Owner		Contractor		Consultant		Weighted average	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Project overtime cost	0.631	9	0.638	7	0.746	4	0.680	6
Project labour cost	0.648	8	0.786	4	0.691	5	0.726	5
Cash flow of project problem	0.705	5	0.786	4	0.688	6	0.730	4
Cost of rework	0.684	6	0.632	7	0.687	7	0.650	7

Material and equipment cost	0.842	2	0.839	2	0.747	3	0.810	2
Increase in material cost	0.853	1	0.891	1	0.774	2	0.839	1
Profit rate of project	0.742	4	0.732	5	0.681	8	0.650	7
Lack of coordination b/n designer and contractor	0.670	7	0.638	6	0.646	9	0.680	6
Cost of variation orders	0.810	3	0.824	3	0.782	1	0.800	3
Motivation cost	0.613	10	0.618	8	0.568	10	0.600	9
Market share of organization	0.600	11	0.560	9	0.580	11	0.596	11

As the combined relative important index and rank as shown above on table 4.3, ranked factors of cost performance are discussed below;

Increase in material cost (0.839) shown in first position became the main factor affect cost performance of building construction project. The cost of construction materials are increases as result of market force, increase transportation tariff of materials, shortage of materials. This result is aligning with (Iyer and Jha, 2005). Increases of material prices have been ranked by contractor respondents in first position. However, this factor ranked in second position according to client and consultant respondents. From this observed that increase in material price is more important factor for contractor because escalation of material price affects the cash flow and the profit rate of contractor.

Material and equipment costs have rank the second position with RII (0.810). As result indicates the contractors critically observed the effect of this factor in performance of building project in the city. This factor is considered as one of project cost components. Cost performance of any construction project depends mainly on liquidity of organization as result Materials and equipment's cost affects the liquidity and project cost performance.

Cost of variation order (0.800) became third critical factors next to material and equipment cost. Here variation is defined as the deviation of quantity of item of work already specified on the contract document. In actual usage of the term in construction contract it includes addition and omission of works. Variations orders from owners related to design change, increase of labour cost and material and equipment cost are leads to the increments of project cost.

Cash flow of project problem (0.730), project labour cost (0.726) and these factors affects the liquidity and project cost performance. Cash flow of project ranked in to fourth positions according to contractor respondents. It has been ranked fifth position according to consultants and six positions to client respondents. From this result cash flow of project is more important for contractor than others because this factor affects the proper execution of project with in their budget. This affects the contractor cost performance and profit rate.

Labour fourth and fifth position by consultant and contractor respectively, were as owner ranked eight positions. Labour cost more important for contactor than for consultant and owner, because labour cost is one of cost component which highly affect the profit rate of contractor.

Profit rate of project (0.650), Profit rate is considered an important indicator to evaluate cost performance of construction projects.

These are main factors that affect cost performance from the studies are, escalation of materials prices, material and equipment cost, cost of variation order.

Table 4.4: Spearman's correlation coefficient of cost related factors

	Owner	**Contractor**	**Consultant**
Owner	1	0.88	0.71
Contractor	0.88	1	0.85
Consultant	0.71	0.85	1

From table 4.4 above, the spearman correlation coefficient indicates that the contractors have very strong relation with the respondents' owners and consultants. This indicates that contractor agreed with both parties on the effects of cost performance factors.

This indicates that contractors and owners have similar awareness on the effects of the material and equipment cost, increase in material cost, cost of variation orders, motivation cost, and market share of organization on the cost performance of public building project.

There is the strong relation between the respondents' of owner and consultants and they have the same rank on motivation cost, market share of organization and have near the same relation with cash flow of project effect on the cost performance of public building project.

4.3.2 Time Related Factors

Time is one of most important factor of project success criteria for any project and also it is one of the triple constraints of projects. Any deviation from the schedule will have effect on cost and scope. Ten factors are identified from the literature reviews that affect the performance of cost. Based on the combined relative importance index (RII) and rank the factor affecting time performance in public building construction projects are discussed.

Table 4.5: Participants' RII and the rank of time related factors

Time related factor	**Client**		**Contractor**		**Consultant**		**Weighted average**	
	RII	**Rank**	**RII**	**Rank**	**RII**	**Rank**	**RII**	**Rank**
Availability of resources as planned through project duration	0.814	1	0.792	2	0.820	1	0.809	1
Poor project management assistance	0.611	7	0.596	5	0.596	7	0.600	9
Time needed to rectify defect	0.747	3	0.712	4	0.681	5	0.713	3
Site preparation time	0. 688	5	0.544	10	0.604	8	0.567	10
Project complexity	0.642	6	0.586	7	0.754	3	0.650	7
Planned time for construction	0.579	8	0.554	9	0.596	7	0.600	8
Financial constraints	0.811	2	0.804	1	0.779	2	0.780	2

Average delay in claim approval	0.547	9	0.780	3	0.720	4	0.682	4
Time needed to implement variation order	0.716	4	0.586	8	0.663	6	0.660	6
Delay in payment	0.716	4	0.600	6	0.663	6	0.680	5

As the combined relative important index and rank as shown above on table 4.4, ranked factors of time performance are discussed below;

According to respondents, the first critical time performance factors are Availability of resources as planned through project duration with RII (0.809). According to consultant and owner, availability of resources as planned through project duration is the most important performance factor. As it has the first rank among all factors with RII (0.814) and RII (0.82) respectively. As result this factor more important for consultant and owner. This factor affects directly time performance project. If resources are not available as planned through project duration, the project will suffer from problem of time and cost performance. And it also affects the whole performance of projects. This is because resource availability as planned schedule can improve time performance of projects.

Financial constraints (0.780) have been the second critical time performance factor. According to contractor respondents, it ranked in first position with RII (0.800). This result shows that financial constraint is more important factor for contractor than others because shortage of finance affects contractors. It affected by project cash flow. These problems can be considered as an obstacle for time performance of public building construction projects.

Average delay in claim approval (0.682), time need to rectify defect (0.713), project complexity (0.65), delay in payment (0.680), time to implement variation (0.660) also have been factors of project time performance. Time needed to rectify defect throughout project duration has been ranked in third position with RII (0.713).

As result shows this factor affect considered more important for contractor and consultants. Because the consultant observes the problem during their supervision work and knows its burden on contractor's cash flow and planned schedule. Most of project suffered from frequent

rework of concrete moulding work and finishing work like plastering in building project in the city.

The average delay in claim approval ranked in fourth position and which have significant impact on time performance public building projects. The average delay in claim approval directly causes delay in project time. Because if affect the proper execution of project with planned schedule time. The delay in payments from owners to contractors directly causes delay in project time. Any payment which needed by the contractor to paid on time, it assures that the contractor to execute the project within the schedule.

The main factors that affect time performance from the projects have been too much variation orders from the owner, time needed to importing materials that are not locally available, and financial constraints.

Table 4. 6: Spearman's correlation coefficient of time factors

	Owner	**Contractor**	**Consultant**
Owner	1	0.53	0.60
Contractor	0.53	1	0.85
Consultant	0.60	0.85	1

The spearman correlation coefficient as indicated in the table 4.6 above, that there is moderate correlation among contractor and owner, strong correlation among consultant and owner. They have nearly the same rank on financial constraints, planned time for construction, availability of resources as planned through project duration, and project complexity. There is very strong relation between the responses of consultant-contractor. The reason for the occurrence of very strong relation between consultant and contractor is that the rank of responses to time needed to implement variation order, financial constraints, average delay in claim approval, time needed to implement variation order and site preparation time were the same. This implies that completing the project on time is the main objective of them.

4.3.3 Quality Related Factors

Quality is one of the important key performance indicators of a construction project. Five factors are identified from literature reviews that affect the quality performance of building construction projects. The table 4.7 below show the results of participants rank and combined RII of factors affecting quality performance respectively.

Table 4.7: Participants' RII and the rank of quality related factors

Quality related factors	**Client**		**Contractor**		**Consultant**		**Weighted average**	
	RII	**Rank**	**RII**	**Rank**	**RII**	**Rank**	**RII**	**Ran**
Conformance to specification	0.716	5	0.718	3	0.723	2	0.718	3
Quality assessment system in organization	0.719	4	0.712	4	0.710	5	0.713	4
Quality of equipment or machineries and raw materials	0.758	1	0.710	5	0.745	1	0.735	2
Availability of personals with high experience and qualification	0.723	3	0.720	2	0.712	4	0.718	3
Quality training meeting	0.667	6	0.600	6	0.620	6	0.629	5
Incomplete drawing	0.750	2	0.820	1	0.720	3	0.770	1

According to respondents, the first critical quality performance factors are availability of incomplete drawing with RII (0.770). This factor is more important for contractor. The incomplete drawing often leads to design changes. Change in design is considered as one of major factor for increasing the cost of project. As result the volume of required materials and needed and labor increased. Any modification in the design will affect the budget allocated for the project.

The factor of quality of equipment and materials has been ranked in the second position with RII (0.735) by respondents. The materials, equipment's and machineries used in any project can affect the quality of the work executed. Quality of equipment and raw materials in project has been ranked by the contractor's respondents in the third position with RII (0.72). Contractors must implement their projects according to required and agreed quality because

owners and consultants usually want materials used in supervised project according to specification and agreement.

This factor is the most important one for contractors because availability of personals with high experience and qualification assist contractors to implement their projects with successful and suitable performance, this factor is very important to contractors because it affects strongly on quality performance of construction projects.

The factor of conformance to specification has been ranked in the third position with RII (0.718) by respondents. Factors incomplete technical specifications will leads challenges to project doers due to they couldn't know which type of work execute by what type materials, equipment and workmanship. This factor is significant for contractors as it is related to consultants and client satisfaction.

Quality assessment system in organization has been ranked in the fourth position with RII (0.713) by respondents. Quality assessment system in organization is rarely achieved or implemented for contractors.

The main factor affecting quality performance of building projects are incomplete drawing which often leads to design changes as result the cost and time performance are affected.

Table 4.8: Spearman's correlation coefficient of quality factors

	Owner	**Contractor**	**Consultant**
Owner	1	0.37	0.65
Contractor	0.37	1	0.25
Consultant	0.65	0.25	1

The spearman correlation coefficient as indicated in the table 4.8 above, that strong relation between the responses of owner and consultants is that they have the same rank on quality of equipment and raw materials, quality training meeting and have nearly the same rank on availability of personals with high experience and incomplete drawing.

There is weak correlation among the consultant and contractor. This week agreement among the consultant and contractors rises from their difference perception on the impact of quality of

equipment and raw material, availability of personals with high experience and incomplete drawing. This shows that the respondents do not have similar understanding on the factor under the quality group. And also the result indicates that the correlation among the respondents of contractor and owner is week. This is due to they have different understand among the impacts of conformance to specification and quality of equipment and raw materials on the quality performance public building construction project.

4.3.4 Productivity Related Factors

There are seven factors identified from the literatures reviews that affect productivity performance building construction. The table 4.9 and figure 4.2 below show the results of participants rank and combined RII of factors affecting productivity performance respectively.

Table 4.9: Participants' RII and the rank of productivity related factors

	Client		**Contractor**		**Consultant**		**Weighted average**	
	RII	**Rank**	**RII**	**Rank**	**RII**	**Rank**	**RII**	**Rank**
Project size and complexity	0.653	5	0.695	4	0.720	2	0.680	4
Management-labour relationship	0.646	6	0.640	6	0.642	6	0.642	6
Absenteeism rate through project	0.698	3	0.807	3	0.681	3	0.728	2
Number of new projects per year	0.670	4	0.600	7	0.604	5	0.624	7
Sequencing of work according to schedule	0.817	1	0.810	2	0.782	1	0.802	1
Local climate conditions	0.646	6	0.815	1	0.681	**7**	0.714	3
Wedges amount	0.712	2	0.643	5	0.634	4	0.663	5

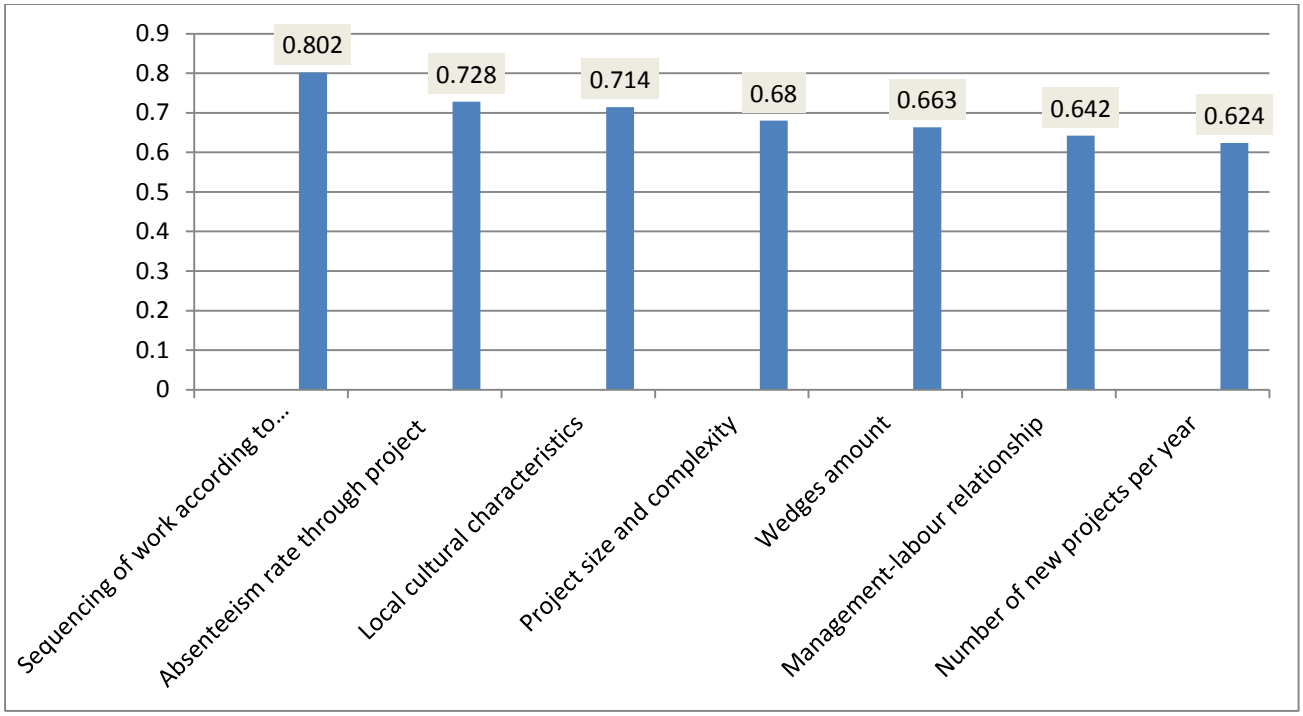

Figure 4. 2: Combined RII and rank of productivity factors

Sequencing of work has been ranked by the respondents in the first position with RII (0.802). This factor is important for these three groups because Sequencing of work assists to deliver project according to scheduled time for project completion. Therefore, the project completed with scheduled time and cost. Absenteeism rate through project has been ranked by the respondents in the second position with RII (0.728). Absenteeism through project will affect the productivity. The result indicates absenteeism through project implementation is very important for contractors. According to contractors respondents it ranked in second position and it affects the productivity performance of contractors. Therefore, the project will suffer from delay.

Local climate condition has been ranked by the respondents in the third position with RII (0.714). The changes in local climate through the year greatly affect the productivity rate of a project. High rain intensity the affect productivity of most construction projects because the rain will cause unsuitable working conditions for labour and machineries on the project site.

Project complexity has been ranked by the respondents in the fourth position with RII (0.680). Degree of project complexity is related with skills needed to construct project. This factor is important for contractors than others. This is because of different location and construction projects nature.

The above combined RII and rank on figure 4.2 productivity factors indicate sequencing of work (0.802) is main factors that affect performance productivity.

Table 4.10: Spearman's correlation coefficient of productivity factors

	Owner	**Contractor**	**Consultant**
Owner	1	0.20	0.73
Contractor	0.20	1	0.18
Consultant	0.73	0.18	1

As the spearman correlation coefficient indicates in table 4.10, that there is strong relation among the respondents of owners and consultants. They have the same rank on the impacts on the following factors; absenteeism rate through project, sequencing of work according to schedule and have nearly same rank on the effects of management-labour relationship.

The correlation table indicate that there is very weak relation between the respondents of consultants and contractors. This shows there is the difference of perception regarding the impacts of these factors, project size and complexity, local climate conditions and number of new projects per year. And also there is weak correlation among the respondents of owners and contractor. This indicates that they have different awareness on the effects of the factors.

4.3.5 Client Satisfaction Related Factors

There are five factors identified from literatures reviews that affect client satisfaction. Based on the combined relative importance index (RII) and rank the factor affecting performance public building construction projects are discussed.

The table 4.11 and figure 4.3 below show the results of participants rank and combined RII of factors affecting client satisfaction respectively.

Table 4.11: Participants' RII and the rank of client satisfaction related factors

Client satisfaction related factors	**Client**		**Contractor**		**Consultant**		**Weighted average**	
	RII	**Rank**	**RII**	**Rank**	**RII**	**Rank**	**RII**	**Rank**

Leadership skills for project manager	0.842	1	0.800	1	0.724	3	0.780	2
Number of disputes between owner and project parties	0.839	2	0.784	2	0.782	1	0.801	1
Number of rework	0.660	5	0.760	4	0.670	5	0.696	5
Information coordination b/n owner and project parties	0.702	4	0.781	3	0.688	4	0.723	3
Poor workmanship and incompetence workers	0.733	3	0.649	5	0.741	2	0.706	4

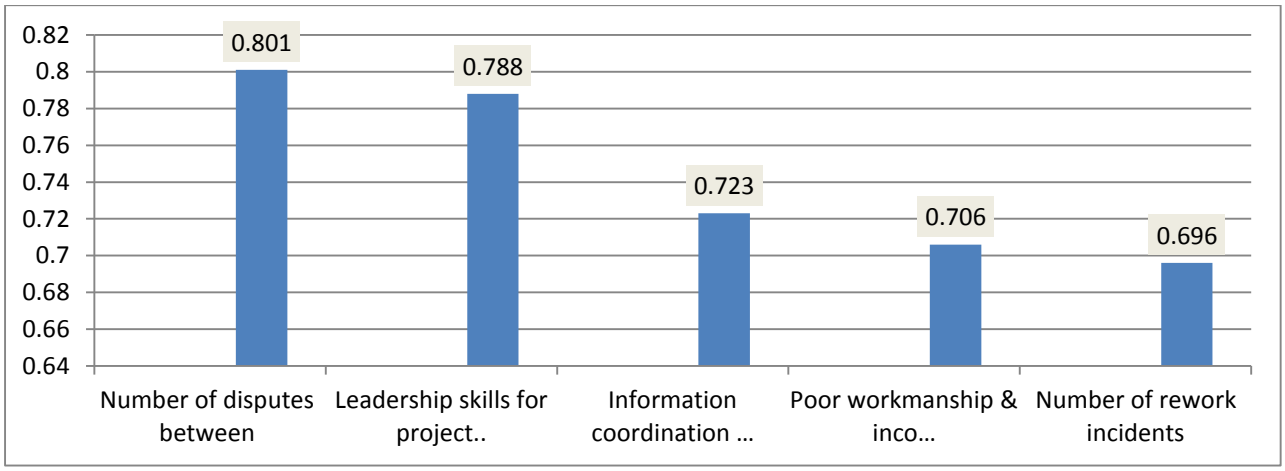

Figure 4. 3: Combined RII and rank of client satisfaction factors

Based on the combined RII and rank of client satisfaction shown on figure 4.3 above number of disputes between owner and project parties has been the first rank in first position with RII (0.801). This factor affect directly and practically on project performance. Because dispute affect all performance measuring parameter such as, time, cost, productivity, etc. on other hand, all parties agreed that, the number of rework incident does not as such affect client satisfaction parameter as it affects majorly the contractor.

Leadership skills for project manager have been ranked in the second position with (RII) (0.780). This factor is the most important one for contractors because leadership skills for project manager affect and playing a big role in the construction contractors performance, this factor is an important for contractors because it is significant for effectiveness on project performance.

Information coordination between owner and project parties RII (0.723), poor workmanship & incompetence workers RII (0.706) and number of rework RII (0.696) These factors an important factor of client satisfaction. The gap of information coordination between owner and project parties it affects the quality of the project and scheduled time of the project. Poor workmanship and incompetent staff on the project site will greatly affect the client satisfaction. This one of the reason for existence of quality defect is incompetent staff on project site.

Table 4.12: Spearman's correlation coefficient of client satisfaction related factors

	Owner	**Contractor**	**Consultant**
Owner	1	0.70	0.69
Contractor	0.70	1	0.20
Consultant	0.69	0.20	1

On table 4.12, the spearman correlation coefficient shows that the consultant responses have strong relation with the owner. This implies the owner and consultant have similar awareness on the impacts of this effect, number of rework and information coordination between owner and project parties on the client satisfaction. Similarly the owner and contractor respondents have strong correction as seen in the above table. As result these two parties have the similar understanding on the effect of the factors affecting client satisfaction in public building construction project in Hawassa city.

The correlation table 4.12 shows contractors' response has a weak relation with consultant's response. According to contractor response client satisfaction is affected by leadership skills for project manager but consultants do not give attention to same attention to effects of this factor. The consultants give attention to the effects of poor workmanship and incompetence workers on the client satisfaction but the contractor gives little attention to this effect on client satisfaction as result two parties have weak relation regarding to the impact of these factors on the client satisfaction.

4.3.6 Regulatory and Community Satisfaction Related Factors

From literatures reviews there are four factors that affect the regulatory and community satisfaction performance identified. Table 4.13, shows results the RII of participants and

combined and rank of these factors. The factors are discussed below based on the combined RII and the top rank.

Table 4.13: Participants' RII and the rank of community satisfaction related factors

Regulatory and Community satisfaction related factors	**Client**		**Contractor**		**Consultant**		**Weighted average**	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Site condition problems	0.759	1	0.780	1	0.751	2	0.763	1
Quality and availability of regulator documentation	0.740	3	0.751	2	0.765	1	0.750	2
Cost of compliance to regulators requirements	0.750	2	0.729	3	0.660	4	0.713	3
Number of non-compliance to regular document	0.605	4	0.548	4	0.700	3	0.617	3

From table 4.13 above site condition problems with RII (0.763) has been ranked critical and the first top factor which affect the performance of regulatory and community satisfaction. This factor is most important one for all parties. The problem has been related to most project sites are effects the movement of peoples' near the site. This problem affects the productivity of labours and hence affects the time performance of project.

Quality and availability of regulator documentation has been ranked the second position with RII (0.750). This factor is the most important one for all parties. Affect the project performance. Cost of compliance to regulators requirements RII (0.713) The cost which paid for compliance to regulatory bodies and the compensation cost paid for the properties of land greatly affect the of satisfaction of regulators and community and also this affects the cost performance of project. Number of non-compliance to regular document has been ranked the fourth position with RII (0.617) these factors affect the overall project performance.

Table 4.14: Spearman's correlation coefficient of regulatory and community satisfaction factors

	Owner	**Contractor**	**Consultant**
Owner	1	0.80	0
Contractor	0.80	1	0.60
Consultant	0	0.30	1

The spearman's correlation coefficient table 4.14, shows that contractor have strong relation with owner. The reason for this strong relation of contractors and owners is they have same response on ranking of the factors; site condition problems and number of non-compliance to regular document. They also have more or less the same perceptions on the causes of cost of compliance to regulators requirements and quality & availability of regulator documentation on the regulatory and community satisfaction performance.

Owners have very weak relation with consultants. The reason this weak relation of owners and consultants were they have different rank order for the factor, quality & availability of regulator documentation and cost of compliance to regulators requirements.

4.3.7 Health and Safety Related Factor

From literatures reviews there are four factors that affect the Health and Safety performance identified. Table 4.15, shows results the RII of participants and combined and rank of these factors. The factors are discussed below based on the combined RII and the top rank.

Table 4.15: Participants' RII and the rank of health & safety related factors

Health & Safety related factor	**Client**		**Contractor**		**Consultant**		**Weighted average**	
	RII	**Rank**	**RII**	**Rank**	**RII**	**Rank**	**RII**	**Rank**
Reportable accidents rate in project	0.700	2	0.691	3	0.720	1	0.703	3
Application of health & safety factors in organization	0.800	1	0.781	1	0.723	1	0.767	1

Assurance rate of project	0.690	3	0.721	2	0.691	3	0.710	2
Project location is safe to rich	0.674	4	0.654	4	0.658	4	0.660	4

The application of health and safety related factors in organizations have been ranked by the owners, consultant, and contractors respondents in the first position with RII (0.763). These factors are most important for all parties because application of health and safety factors in construction projects will the overall performance of construction project.

Assurance rate of project is the factor has been ranked in the second position with RII (0.710). Assurance is type of insurance in which money is paid out after an agreed period of time when somebody dies. Assurance rate of project affect the safety and cost performance of projects.

Reportable accident is the factor has been ranked in the third position with RII (0.703). This factor is related to the number of occurrence of injuries and illness on the employee, this factor is critical one because reportable accident rate usually affects the safety performance and the client and regulatory satisfaction.

Table 4.16: Spearman's correlation coefficient of health and safety factors

	Owner	**Contractor**	**Consultant**
Owner	1	0.80	0.90
Contractor	0.80	1	0.50
Consultant	0.90	0.50	1

The correlation coefficient shows us; there is very strong relation between consultants and owners. This very strong relation between consultants and owners are happened because they have the identical response on the factors affects health and safety category. The table again indicates that the contractor have strong relation with owner these two parties have similar awareness toward the effects of the factors on the health and safety performance parameter.

The contractors have moderate relation with consultants. The reason for this moderate relation between these two parties is they have similar response on the factors; Application of health & safety factors in organization and project location is safe to rich. They also have nearly similar

response on the effect of factors, Assurance rate of project and reportable accidents rate in project.

4.3.8 Environment Related Factors

From literatures reviews there are four factors that affect the environment related performance identified. Table 4.17, shows results the RII of participants and combined and rank of these factors. The factors are discussed below based on the combined RII and the top rank.

Table 4.17: Participants' RII and the rank of environment related factors

Environment related factors	Client		Contractor		Consultant		Weighted average	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Waste in site	0.740	1	0.716	3	0.720	2	0.720	2
Climatic condition	0.719	2	0.746	1	0.737	1	0.734	1
Noise	0.618	3	0.736	2	0.674	2	0.670	4
Air quality	0.601	4	0.700	4	0.709	3	0.695	3

The factor climate condition has been ranked by the contractors' and consultants' respondents in the first position with RII (0.734). This factor is the most important one for the three parties as owners is also ranked in second position.

Waste around the site has been ranked in the first position by owner, ranked in second position by consultant and in the third by contractor. This factor also is important factor as waste around the site which interrupt the movements of peoples and as result decrease productivity of worker.

The air quality has been ranked in the third position with RII (0.694).The air quality with in and around the site will greatly affect environment as result it affect productivity of the labours. The performance of project will be affected.

The level of noise which comes from equipment's and machineries will affect the working environment of the construction site and hence affects the health and safety of workers and community around the site. Noise level has been ranked by owners', consultants' and

contractor respondents in the fourth position with RII (0.694). However, for all parties a noise level is less important than other environment related factors because it rarely an issue in the Hawassa city public building construction.

Table 4.18: Spearman's correlation coefficient of environment related factors

	Owner	**Contractor**	**Consultant**
Owner	1	0.40	0.60
Contractor	0.40	1	0.80
Consultant	0.60	0.80	1

The spearman's rank correction table 4.18 above shows that there is very strong relationship between contractors' and consultants' responses. This is due to their similar response understanding in ranking the factors, climatic condition and level. They have also nearly same ranking on, waste in site and air quality.

The correlation coefficient in above table indicates that owner have strong relation with the response of contractor. The reason for this is they have nearly similar awareness on the effects of factor on environment.

However, the correlation coefficient between owner and contractor is week. This indicates that they have different perceptions on most of environment related factors in relation to their impact on performance. This is because of their response in all factors except on Air quality.

4.3.9 Innovation & Learning Related Factors

From literatures reviews there are four factors that affect the Innovation & learning performance identified. Table 4.19 and figure 4.4, shows results the RII of participants and combined and rank of these factors. The factors are discussed below based on the combined RII and the rank.

Table 4.19: Participants' RII and the rank of innovation & learning related factors

	Client	**Contractor**	**Consultant**	**Weighted average**

Innovation & learning related factors	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Learning from own experience	0.712	2	0.694	3	0.743	2	0.716	2
Review of failures and solve them	0.780	1	0.786	1	0.761	1	0.775	1
Learning from other experience	0.695	4	0.723	2	0.705	3	0.707	3
Work in team	0.700	3	0.680	4	0.690	4	0.690	4

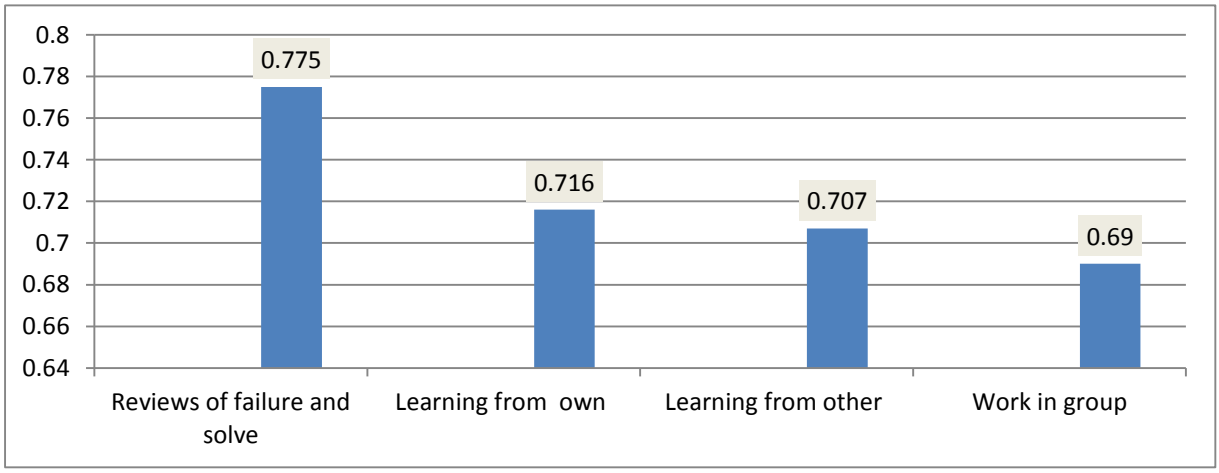

Figure 4.4: Combined RII and rank of Innovation & learning related factors.

Review of failures and solve them has been ranked in the first position with RII (0.775). This factor will enhance contractors' performance and will satisfy the owner, and also this factor will improve the project performance.

Learning from best practice and experience of others has been ranked in the second position with RII (0.716). This is factor important for all parties because it can improve and develop construction performance of current and future projects. This factor will improve the performance of projects. Learning from best practice and experience of others affects the project performance because it affects the innovation and learning required for construction. Learning from other has been ranked in third position with RII (0.707).

Table 4.20: Spearman's correlation coefficient of learning and innovation related factors

	Owner	**Contractor**	**Consultant**
Owner	1	0.40	0.80
Contractor	0.40	1	0.80
Consultant	0.80	0.80	1

The spearman's rank correction table 4.20 above shows that there is very strong relationship between owners' and consultants' responses. This is due to their similar response understanding in ranking the factors, learning from own experience and learning from own experience and work in group. They have also nearly same ranking on, learning from other experience. Similarly there is also strong correlation coefficient between consultants and contractor responses. As they have similar rank on the effects of factors such as review of failures and solve them and work in group.

However, the correlation coefficient between consultants and owners is week. This indicates that they have different perceptions on most of innovation and learning related factors in relation to their impact on performance. This is because of their response in all factors except on review of failures and solving them.

4.4 Main Factors Affecting Performance of Public Building Construction Projects

Based on the literatures reviews there are fifty eight factors identified that affect the performance public building construction projects and sub-grouped in to nine group factors. From the analysis and discussions made above top ten preferred factors based on their RII and above are established as follows in table 4.21.

Table 4.21: Main factors affect performance of public building construction projects

Factors affecting performance	**RII**	**Overall rank**	**Group factor**
Increase in material cost	0.839	1	Cost related factor
Material and equipment cost	0.810	2	Cost related factor
Availability of resources as planned through project duration	0.809	3	Time related factor

Sequencing of work according to schedule	0.802	4	Productivity related factor
Number of disputes between owner & project parties	0.801	5	Client satisfaction related factor
Cost of variation orders	0.800	6	Cost related factor
Leadership skills for project manager	0.788	7	Client satisfaction related factors
Financial constraints	0.780	8	Time related factor
Incomplete drawing	0.775	9	Quality related factor
Application of health & safety factors in organization	0.767	10	Health and safety related factor

From table 4.21 above summarized that main factors that affecting performance of public building construction project in Hawassa city related to respondents as sorted by overall ranking were; increase in material cost, material and equipment cost, availability of resources as planned through project duration, sequencing of work according to schedule, number of disputes between owner & project parties, cost of variation orders, leadership skills for project manager, financial constraints, incomplete drawing and site condition problem are the main significant factor affecting the performance of public building construction projects in Hawassa city. Generally, from top ten determined main factors 3 of the are cost related factors, 2 of them are time related factors, were 1 of them are productivity related factors and 2 of them client satisfaction related factors, 1 factor from health and safety related factor and 1 from quality related factors. Therefore cost related factors, time related factors, quality related factors, productivity related factors, and client satisfaction related factors and health and safety related factors are major group of factors affect the performance of public building construction project in Hawassa city. This shows project time and cost factors was most affecting performance of public building project according to questionnaire responds, also coincides the result from desk study obtained.

4.5 The Key Performance Indicators in Building Construction Projects

This part consists of results and discussion of combined relative importance index (RII) and rank of the key performance indicators of public building construction projects in Hawassa city. With respect to their correlation coefficient responses of participants, there are seven key

performance indicators in construction projects that are identified from the literatures reviews. Table 4.22 and figure 4.11, shows the RII of participants' and rank of key performance indicators.

Table 4.22: Participants' RII and ranks of key performance indicators

No	Key Performance Indicators	Owner		Contractor		Consultant		Average	
		RII	Rank	RII	Rank	RII	Rank	RII	Rank
1	Time	0.818	1	0.828	1	0.842	1	0.829	1
2	Cost	0.800	2	0.814	2	0.782	2	0.798	2
3	Quality	0.740	3	0.705	4	0.712	3	0.719	3
4	Productivity	0.737	4	0.684	5	0.664	5	0.700	4
5	Client Satisfaction	0.698	5	0.712	3	0.618	7	0.670	5
6	Regulatory & community	0.680	6	0.656	6	0.674	4	0.670	5
7	Health and safety	0.680	6	0.632	7	0.621	6	0.644	6

From the combined RII and ranks result shown on table 4.22, cost has been ranked the first main key performance indicator with RII (0.829). This is because the effect of cost on the project performance is very important.

Time has been the second key performance indicator with RII (0.798) shown on the above table 4.22. Time has a great effect on the overall performance of construction projects.

Quality has been third key performance indicator is with RII (0.719). It has high effects on the overall project performance.

Productivity has been ranked the fourth key performance indicator with RII (0.692). As results shows the productivity has effect on the overall performance of construction projects.

Regulatory and community satisfaction has been ranked on the fifth key performance indicator with RII of 0.670. Similarly Client satisfaction ranked as fifth main key performance indicator. They have moderate impact on the overall project performance.

Health and safety has been the six ranked key performance indicator with RII (0.644). This factor also has effect on the overall project performance. They have low effects on the overall performance of projects compared to other group of factor

Table 4.23: Spearman's correlation coefficient key performance indicators

	Owner	**Contractor**	**Consultant**
Owner	1	0.87	0.83
Contractor	0.87	1	0.60
Consultant	0.83	0.60	1

The results on above table 4.23, spearman correlation coefficient indicates that there is very strong relation between the responses of owners and contractors, and owners and consultants. This very strong relation between owners and contractors, and owners and consultants is due to they have similar rank on, time, cost and regulatory and community satisfaction. And also they have nearly similar rank on the other parameters.

There is moderate strong relation between consultants and contractor as indicated in the above table 29. This shows there nearly similar understanding on performance parameter and similar rank on, time, cost and productivity. From the analysis and discussions made above the main key performance indicator top four ranked factors based on their RII (0.700) and above are time, cost, quality and productivity.

4.6 Results of the Case Studies

Case studies are collected from three public building construction projects from Hawassa city. The data were collected from, questionnaires, archival documents and discussion with participants on the project site. The general profiles of the projects such as project location, commencement date, contract period, contract amount, contractor, consultant, building purpose, building height and project status are included in the case studies. This case study indicates the main factors that affecting the performance of the projects in the selected case studies. Table 4.24 shows the results of the selected case studies.

Project A

Location…… Hawassa

Commencement date……December 14, 2017

Contract period……949 calendar days

Contract amount……..190,689,770.49

Contractor…… X

Consultant…… X

Building purpose…….. Hospital

Building height……. B+G+8

Project status…….80%

Project B

Location…….. Hawassa

Commencement date……..June, 2018

Contract period…… 1098 calendar days

Contract amount…….. 442,000,000

Consultant…… X

Building purpose…….. Office

Building height…….B+ G+10

Project status…… 20%

Project C

Location…….. Hawassa

Commencement date……... July, 18, 2017

Contract period…… 750 calendar days

Contract amount…….. 109,721,713.42

Contractor…… X

Consultant…… X

Building purpose…….. Office

Building height……. G+ 6

Project status…….30%

Table 4.24: Selected project for case studies

Factors	**Factor affecting project performance**		
	Project A	**Project B**	**Project C**
Cost related	• Increase in material cost • Cash flow of project	• Increase in material cost • Lack of coordination between designer and contractor	• Cash flow of the project • Cost of variation order • Increase in material and equipment cost
Time related	• Delay due to material shortage • Financial constraint	• Delay in payment • Time needed to implement variation order • Site preparation time	• Average delay in claim approval • Financial constraints • Low speed decision making

Quality related	• Unavailability of personals with high experience	• Unavailability of quality materials • Unavailability of competent workers	• Quality assessment system in organization • Unavailability of Competent staff
Productivity related	• Project size and complexity • Absenteeism rate through project	• Sequencing of work according to schedule • Absenteeism rate through project • Project size and complexity	• Absenteeism rate through project
Client satisfaction related		• Number of disputes between owner and project parties • Poor workmanship and incompetence	• Number of rework incidents • Information coordination between owner and project parties
Health and safety related	• Application of health and safety factors in organization	• Application of health and safety factors in organization	• Application of health and safety factors in organization

4.6.1 Finding of the Case Study

A case study conducted on three public building projects in the city in order to check the identified factors on each specific project. These are very Similar to factor ranked from questionnaire survey. These three projects which are designed and constructed by different consultants and contractors are studied for identification of the main factors that affect project performance and the projects faced performance problem.

Generally, the following are drawn by case study from these sampled projects as the main factors that affect performance of the project in the city;

- ✓ Escalation of material prices
- ✓ Cost of variation order
- ✓ Financial constraints
- ✓ Quality assessment system in organization
- ✓ Time needed to implement variation order
- ✓ Cash flow of the project
- ✓ Unavailability of quality materials
- ✓ Sequencing of work according to schedule
- ✓ Absenteeism rate through project
- ✓ Application of health & safety factors in organization
- ✓ Unavailability of quality materials

In general, the above factors have negative effect on the overall performance of a project in the selected public building projects in the city. The owner, contractor and consultant shall take responsibility to overcome the influence of factor on the overall performance of construction.

CHAPTER FIVE: SUMMARY AND CONCLUSION

Based on the results and discussion from the previous chapter, the following major conclusions are derived and summarized:

5.1 Conclusions

1. A Survey finding confirmed that escalation of material price has been main factor that leads to project cost overrun and affect the cost performance of project. Cost of variation order also major identified factors affects the cost performance of public building construction projects in the city.

2. Availability of resources as planned through project duration in project site to accomplish the project on schedule time and financial constraints has been identified as the main factor which affect the time performance of the project.

3. Incomplete drawing has been factor main which affect the quality performance of the project and most project have not competent staff with quality to achieve the quality projects and also contractor have the problem of conformance with speciation of quality.

4. Sequencing of work according has been to schedule and absenteeism rate though projects are main factors which lead the projects to failure in productivity performance criteria. There has been great Absenteeism rate though project through the projects due to this there is productivity problem in the project site.

5. The main factors which affect client satisfaction performance measuring criteria have been number of dispute between owners and the project parties and leadership skill of project manager.

6. Site condition problem has been the critical for regulatory and community satisfaction performance measuring criteria. This problem affects the productivity of labors by creating the congested site area and hence affects the time performance of the project.

7. There has not been any health and safety application in the most of the site.

8. The main key performance indicators identified from this study were: - cost, time, quality, productivity,

5.2 Recommendations

The following recommendations were made based on the findings;

- ✓ Owners should facilitate payment to contractors in order to overcome the financial constraints of contractor.
- ✓ Owners should create good coordination and relationship among project participants through Project life in order to improve project performance.
- ✓ Disputes between owner and project parties should be minimized.
- ✓ Contractor should consider business environments risk in their cost estimation in order to overcome delay because of material shortage.
- ✓ Contractor should consider cash flow of project for improvement of proper execution of project with in their budge as result cost performance and time performance is maintained.
- ✓ The contractor should ensure that he selects qualified and experienced personnel. Use material and equipment of good quality; ensure that his personnel always conform to specification.
- ✓ Contractors should training the personnel on new skill is important, conduct quality training and follow up. Contractors are also recommended to give more attention with sequencing of work according to schedule in order to improve productivity performance.
- ✓ Consultants should provide complete drawing for better time performance and to minimize claim and disputes.
- ✓ Consultants should properly supervise the work activities in the site in order to execute the project with scheduled time, cost and quality for improvement of project performance.

5.2.1 Suggestions for Future Work

- ✓ It is suggested that find out the level of performance problem between public and private construction project, which one has got higher performance level.
- ✓ It is suggested to develop performance measurement framework for other type of construction projects like road and building construction projects which differs from the population used in this research.

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APPENDICES: QUESTIONNAIRE

SECTION ONE: GENERAL INFORMATION

Please answer the following general question by filling the blank or circle only one that represents you most appropriately.

1. Type of organization you are working for?

   A. Owner B. Contractor C. Consultant

2. Job title of the respondent?

   A. Project Manager B. Site Engineer C. Office engineer

   Others (specify) _____

3. What is the highest level of education you have received?

   A. Master Degree B. Bachelor Degree C. Certificate/Diploma

4. Level of experience in the construction industry?

   A. Less than 5 years B. 5-10 years C. More than 10 years

SECTION TWO: FACTORS AFFECTING THE PERFORMANCE OF THE CONSTRUCTION BUILDING PROJECTS

Below are numbers of factors affecting the performance of the construction building projects, related to your experience, please express your opinion on the importance of the following factors as key performance indicators of construction building projects. ***(Please tick the appropriate box)***

Where: 1 = Very Low Important (VLI),

2 = Low Important (LI),

3 = Medium Important (MI),

4 = High Important (HI), & 5 = Very High Important (VHI).

1. Cost group	***1***	***2***	***3***	***4***	***5***
1.1 Cash flow of project					
1.2project labour cost					
1.3 Project overtime cost					
1.4 Cost of rework					
1.5 Material & equipment cost					
1.6 Increase in material cost					
1.7 motivation cost					
1.8 Lack of coordination b/n designer and contractor					
1.9 Cost of variation orders					
1.10 Market share of organization					
1.11Profit rate of project					
Market share of organization					
2. Time group	1	2	3	4	5
2.1Time needed to rectify defect					
2.2 Poor project management assistance					
2.3 Delay in payment					
2.4 Site preparation time					
2.4 Project complexity					

b) *If any other, please specify;*

2.5 Financial constraints					
2.6 Average delay in claim approval					
2.7 Average delay in payments from owners to contractors					
2.8 Planned time for construction					
2.9 Time to implement variation					
2.10 Availability of resources as planned through project duration					
a) *If any other, please specify*					
3. **Quality group**	1	2	3	4	5
3.1 Conformance to specification					
3.2 Quality assessment system in organization					
3.3 Quality of equipment or machineries and raw materials					
3.4 Unavailability personals with high experience and qualification					
3.5 Quality training					
A. If any other, please specify;					

4. **Productivity group**	1	2	3	4	5
4.1 Project size and complexity					
4.2 Management-labour relationship					
4.3 Absenteeism rate through project (late start and early exists)					
4.4 Number of new projects per year					
4.5 Sequencing of work according to schedule					
4.6 Local climate conditions					
4.7Wedges amount					
A. *If any other, please*					
5. **Client Satisfaction group**	1	2	3	4	5
5.1 Leadership skills for project manager					
5.2 Number of disputes between owner & project parties					
5.3 Number of rework incidents					
5.4 Information coordination between owner & project parties					

5.5 Poor workmanship & incompetence workers					
B. *If any other, please specify;*					
6. **Community Satisfaction group**	1	2	3	4	5
6.1 Site condition problems					
6.2 Quality & availability of regulator documentation					
6.3 Cost of compliance to regulators requirements					
6.4 Number of non-compliance to regular document					
C. *If any other, please specify;*					
7. **Health & Safety group**	1	2	3	4	5
7.1 Reportable accidents rate in project					
7.2 Application of health & safety factors in organization					
7.3 Assurance rate of project					
7.4 Easiness to reach to the site.					
7.5 Accident rates					

D. *If any other, please specify;*					
8. Environment group	1	2	3	4	5
8.1 Waste in site					
8.2 Climatic condition					
8.3 Noise					
8.4 Air quality					
E. *If any other, please specify;*					
9. Innovation & learning group	**1**	**2**	**3**	**4**	**5**
9.1 Coordination					
9.2 Learning from own experience					
9.3 Learning from other experience					
9.4 Reviews of failure & solve					
F. *If any other, please specify;*					

SECTION THREE: Key Performance Indicators' Building Construction Projects

Below are numbers of key performance indicators' of building construction projects. From your experience, please fill the effect of these occurrences on project performance to determine the key performance indicators of public building construction projects in Hawassa city. ***(Please tick the appropriate box).***

Where; 1 = Very Low,

2 = Low,

3 = Medium,

4 = High, and 5 = Very High

S.No.	KEY PERFORMANCE INDICATORS'	1	2	3	4	5
1	Cost					
2	Time					
3	Quality					
4	Productivity					
5	Client satisfaction					
6	Regulatory & community satisfaction					
7	Health & safety					

Thank You for your collaboration!!!