

ADDIS ABABA UNIVERSITY
SCHOOL OF COMMERCE
MA PROGRAM IN PROJECT MANAGEMENT

**FACTORS AFFECTING SCHEDULE AND COST PERFORMANCE IN
ETHIOPIAN CONSTRUCTION PROJECTS: IN CASE OF TNT
CONSTRUCTION AND TRADING**

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DECLARATION

I declare that this thesis entitled“FACTORS AFFECTING COST AND SCHEDULE PERFORMANCE OF CONSTRUCTION PROJECT IN ETHIOPIA (CASE OF: TNT CONSTRUCTION AND TRADNG)” is my original work. In addition, this thesis was not, copied, and presented for a degree in any other university and that all the source of material used in this thesis has been, duly acknowledged.

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Abstract

For a project to be successful the project have to be completed within a contract time with the allocated budget by qualifying the expected quality that is required by the clients or end users. The goal of this research was to determine factors affecting cost and schedule performance of a building construction in TNT construction and trading. The study used descriptive and explanatory research design to accomplish this purpose. From the literature review 22 factors affecting cost performance and 27 factors affecting time performance were identified and included in the survey questionnaire. The survey was performed using the census process, with 48 workers from TNT construction and trading filling out questionnaires. 45 questionnaires were correctly filled and returned. Relative importance index was used for data analysis. The finding revealed the first top ten factors affecting cost performance as fluctuation in building materials, cash flow and financial difficulty face by contractor, lack of cost planning/monitoring during pre and post contract stage, wrong estimation, change in the scope of the project, political interference, lack of cost report during construction stage, repeated design change, lack of updated cost data, risk and uncertainty associated with project. In addition the first top ten factors affecting time performance were financial incapability, fluctuation in material price, inexperienced consultant, late procurement and delivery of materials, difficult in financing project by contractor, ineffective planning and scheduling of project by contractor, delay in approving major change in the scope of work by consultant, incomplete design, poor site management and supervision by contractor, late payment by main contractor to subcontractors. Based on the group of factors affecting time performance rank from one to four was: Contractor Related Factors, Consultant Related Factors, Client Related Factors, External related Factors. As a result, the recommendation was provided so that the company could manage factors affecting cost and time performance.

Key words. Project Cost performance, time performance, delay, cost overrun,

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CHAPTER ONE

1. Introduction

1.1 Background of the study

In the construction industry, making sure a project is completed on time, within budget and by achieve other project objectives is the aim of project control. It is a task which is complex undertaken by project managers in practice, which involves constantly measuring progress, evaluating plans and taking corrective actions when required (kerzner, 2003). During the previous couple of decades, numerous project control methods, such as Program Evaluation and Review Technique (PERT), Gantt Bar Chart and Critical Path Method (CPM) have been developed ((Lester, 2000). A spread of software packages have become available to support the appliance of these project control methods, for example Microsoft Project, Asta Power Project, Primavera, etc. Despite the wide use of these methods and software packages in practice, many constructions' schedule and cost performance isn't satisfactory.

A construction schedule shows how a project is to be completed or constructed in either a written or graphical representation. Using a construction project schedule as project management tool one can forecast when the project will finish(Mark Nagata, 2017).

According to (Chitkara, 2011) cost is defined as the accounted expenditure, which the owner has agreed to commit for creating/acquiring the desired facility. Within the development industry there's a real taken a toll that's decided at the time of completion of the extend whereas at the begin of the project there will be an evaluated taken a toll which could be a budget or forecasted taken a toll of the venture. The contrast between the two costs will tell us in case there's a cost overrun or not.

Completing ventures on time is a pointer of productivity, but the development handle is subject to numerous factors and eccentric variables, which result from numerous sources. These sources incorporate the execution of parties, assets accessibility, natural conditions, association of other parties, and legally binding relations. However, it is not usual that a project can be completed within the specified time.

For a productive construction the project is needed to be completed on time with in the budget. But most of the time this is only ideal in the construction industry. There are many factors that affects the cost and schedule performance in the construction industry.

The contractor will be entitled to extension of time if a construction project is delayed due to the client's reason. This in turn comes with additional payment for time related cost like profit and overhead cost said (Tuyishime, 2016). Due to delays there will be increase in interest rate and escalation of construction cost and this in turn will increase the construction project cost. Delay causes cost overrun for both the owner and contractor. Delay causes loss of expected profit from the owner's point of view and it means an increased overhead from the contractor's point of view. The cost performance and schedule performance are the main measures of performance of a construction project. A successful building project is the one which is completed with the planned timeline and allocated budget as developing countries like Ethiopia are a facing problems of scarce project financial resources. (Shen, 1997).

1.2 Statement of the problem

Construction delays are a around the world wonder that happens in most development ventures and the greatness of these delays shifts impressively from extend to extend. Agreeing to Aibinu, A. and Jagboro, G. (2002;), concluded that development ventures in Nigeria taken a toll overwhelms were experienced due to development delays. Besides, Mohammed and issah (2012) conducted a survey on ventures in creating nations and found that they were encountering development delays and were being deserted.

Delay in a construction project could be a widespread issue and has gotten to be a major endemic confronting the Ethiopian Construction Industry. Delay in this sense could be a circumstance when the temporary worker, the project proprietor or several other variables together or severally contribute to the non-completion of the project inside the initial or the stipulated or concurred contract whole and concurred contract period.

Among the construction projects executed cost overrun is one of the major issues in Ethiopia (Ashebir ShiferawBelachew, WubishetJekaleMengesha, Murad Mohammed, 2017): (Abubekir, 2015): (ZinabuTebeje, GetachewTeka, 2015): (Fetene, 2008). And

concurring to Tadele(2018): plan and taken a cost of a project construction is influenced in numerous ways. This issue in turn is causing challenges in financing of up and coming ventures, convenient utilization of the office by the open and the relationship among partners (Client, contractor, and consultant) included within the construction process.

Subsequently, distinguishing proof of the root causes of the challenges and indicating the conceivable way out in interview with partners are basic calculate. In doing so, this inquire about serious to recognize basic causes for cost overrun and time varieties of Ethiopian construction project.

Moreover, this study addresses the factors that affect cost and time performance in the case of TNT construction and trading projects. And what initiated me for the study of this research is largely due to individual perception and low Performance of the building construction projects in terms of cost and time. The practical problem in the construction industry is not managing these cost and time performances clearly. As there is delay in the project so would the cost be altered. And also the purpose of this study is to find answers that contribute to the body of knowledge as well as discovering the reasons behind the poor performance in terms of time and cost of construction projects generally in Ethiopia and particularly within TNT construction and trading.

1.3 Research Question

1. What are the factors affecting schedule performance of building constructions in TNT construction and Trading?
2. What are the factors affecting cost performance of building constructions in TNT construction and Trading?

1.4 Objectives

1.4.1 General Objectives

The objective of this research is to assess the factors that affect project schedule and cost performance in the case of TNT construction and Trading.

1.4.2 Specific objectives

The specific objectives of this research are;

1. To identify factors affecting schedule performance of building constructions in TNT construction and Trading.
2. To identify factors affecting cost performance of building constructions in TNT construction and Trading.

1.5 Significance of the study

Overall, this research is performed either for the addition of new knowledge or to solve problems. This research tends to provide information for TNT construction and Trading key challenges that exist in the construction industry specifically in building projects. In order to improve efficiency in the construction sector one has to understand the factors behind the delay and cost overrun of a construction project. In addition to this some researchers could use this study as a resource to make further research on similar subject matter as it will be published in international scientific journal.

1.6 Organization of the study

This study is organized in to five chapters. The introduction part which is the first chapter includes background of the study, statement of the problem, research questions, objectives of the study, significance of the study and organization of the study. The second Chapter, deals on reviews of related literature. The research methodology; data Presentation; analysis and discussion of the research will be presented in Chapter three and four respectively. The last chapter will provide discussion, conclusion, implication for further research and related recommendations based on the findings of the study.

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Overview of Ethiopian Construction Industry

According to (Fetene.nega, 2008) Ethiopia has a rich history of construction industry. The ruined palace of Queen Sheba at Yeha, the Obelisks of Axum the rock-hewn churches of Lalibela, and the Castles of Gondar are good examples of modern Civilization that existed in Ethiopia. Especially during the late 19th and early 20th century significant developments were seen in this regard. Although the development of the construction in the Ethiopia is slow, it plays a key role in the development of the national economy. The socio-economic development of the country is significantly dependent on the construction industry

In Ethiopia, construction is an important sector for its economical development. Due to many reasons the country is not working in its fullest potential but construction is still the prime factor for development of the country. Growth in this sector is critical for growth in national income As construction is among the largest sectors that generates employment within the country as well as a key indicator of the economy of Ethiopia growth in this sector is critical for the growth in national income. Many developing countries are facing also cost and time related issues among which cost overruns quite prominent. (Medhanit, 2019)

2.2 Background of the organization

TNT Construction and Trading is a construction and general trading company established in accordance with the commercial code of the Federal Democratic Republic of Ethiopia (FDRE) in year 2005 (1997 E.C). Currently its office is located in Yeka sub city Kebele 17. The company is established with the purpose of providing various construction services, import and export and other general trading activities and in so doing contributing specifically to the development of the construction industry in the country and generally to the economic growth of the country. The firm is currently registered as a General Contractor Grade-I meeting all the criteria set by government laws. The firm is also registered for V.A.T by Federal Inland Revenue Au. Four projects were selected namely, Prosperity party Headquarter building, Teachers residential Apartment, 2B+G+

13 bole Ayat 40/60 condominium building and 40/60 saving house constructions to collect data for the project paper.

2.2 Performance problem in building industry

For most construction projects the two parameters i.e. time and cost are the basis for procurement (Bowen, et al (2007)). The majority of the project management control systems highlight time and cost, and overlook the relative importance of quality (Hughes,Hillebradt and Murdock, 2000). Similarly, Herbsman and Ellis (1991) argued that the main problems in traditional approaches to project delivery have been delays in the planned schedule, cost overruns, serious problems in quality, and an increased number of claims and litigation associated with construction projects.

According to Marion (1996)in order to plan and manage a successful project, the three project parameters of time, cost and quality have to be clearly understood.Bowen, et al (2007) argued that for the consideration of the three project parameters in attaining client's basic objective, from the three points of a triangle neglecting one factor will have a corresponding detrimental effect upon the opposite two. In addition a study conducted by Lansley(1994) argued strongly the big importance of studying the behavioral aspect of management in attempting to address problems facing the construction industry. Bowen, et al (2007) asserted that for a successful project the three project parameters have been balanced and there is a need to embrace time, cost and quality management as a human activity system.

2.3Construction projects and performance

The ultimate goal for every project is Project success. Success of construction projects depends mainly on performance of the project. Many researchers have studied building projects performance. When a project is completed within the stated budget, on Schedule, conform to user expectations, meet specifications, and achieve quality of workmanship and with minimized construction aggravation the project is considered to be successful(Songer, A.andMolenalar,K, 1997). According to Dissanayaka, S,and Kumararwamy,M, (1991),the major cause of bad performance in construction projects is inappropriate selection of procurement method. Thomas (2002) recognized relationship with clients, relationship with consultants, financial stability, progress of work,

management capabilities, standard of quality, health and safety, resources, claim and contractual disputes, relationship with subcontractors, reputation and amount of subcontracting as the main performance criteria of construction projects.

2.5 Factors affecting budget and schedule performance

Many researches in developing countries especially in Africa have made progress in determining the factors affecting schedule performance in a construction project. (ABJ Journal of advanced research, kaliba C, Muya M and Mumba K, (2009) explained in their study that, the major factors that affects schedule performance in construction projects in Zambia were financial deficiencies on the part of the client or contractor, delayed payments, economic problems, contract modification, material procurement, staffing problems, changes in design drawings, poor supervision, equipment unavailability, construction mistakes, changes in specifications, labor disputes, and strikes, poor coordination on site,. In Uganda, Agaba, (2009) attributes delays in construction projects to problems associated with management and supervision and poor designs and specifications,. In their study, El-Razek, Bassioni, Mobarak, (2008) found that coordination difficulty, delayed payments, and poor communication were important factors that affects delay in Egypt. Kouskili and Kartan (2004) identified the main factors affecting cost and time overrun as unreliable sources of materials on the local market, inadequate/inefficient equipment, tools and plant, and site accidents.

According to Iyer and Jha (2005) the budget performance of a building project may be affected by different factors like project managers competitiveness, participant monitoring and feedback, competence of owners, coordination of project managers and other participants, support from senior managers, leadership skills, decision making. Project budget is considered as common measures used to measure performance of the project budget.

2.6 Project schedule.

Stallsworth (2009) defines project schedule as a tool used to help manage resources and tasks, and it will help to guide a project to a successful completion. Individual tasks identified in the schedule are given a duration consisting of a start and end time. For milestones to be set at significant points within the project schedule resources will be

assigned to the tasks,. He stated that milestones are very useful features of a schedule. They are significant events that helps a project to have a progress and which can be helpful for senior management. To achieve project period deadlines it is crucial to use creative method of scheduling as there are project management software like (Primavera , MS project) schedule performance measurements like (SV, SPI) and Project scheduling methods like (CM, PERT).

2.7 Estimation of project time

When estimating a project time the main challenge is the assumptions it is based on. There are difficulties encountered during time estimation of the project the first is that the predictions made about the risks that are likely to influence project time might be wrong. It means the risks that are most likely to cause project delays are not quantified due to inaccurate assumptions. Secondly the technique used to estimate project may not be accurate such that it doesn't consider the parameters that influence time such as method of construction, project breakdown structure workers' productivity and style of management (Talukaba, 1999).

The client estimates the contract time depending on his terms of condition. But while doing that the client needs to be advised by a consultant. This is when inaccurate time estimation is caused by the consultant due to lack of applying modernized techniques of time estimation, time risk identification and analysis.

2.8 Project delays in construction projects

In construction, delay could be defined as the time overrun either beyond the date that the parties agreed upon for delivery of a project or beyond completion date specified in a contract. (Sadi.A.etal2006). It is a projects leaping over its planned schedule and it is considered as common problem in construction projects.

2.9 Classification of delays in construction projects

Construction project delays can be caused by many factors. According to Scott (1993) delays are classified in to three categories contractor related delays, consultant related delays and external factors related delays. Ochoa (2013) on the other hand categorized delay as concurrent, excusable, or non-excusable. Theodore (2009), has also classified delay in four parts Excusable or non-excusable and Critical or noncritical

2.10 Factors Affecting Time Performance

The consequences of construction time overrun when undertaking a building construction project affects all project parties, with issues like extra cost. The massive issue of the development sector in developing countries are categorized in three groups. Shortage of infrastructure, problems brought by clients and consultant and eventually incompetent contractors (Ogulana and Promkuntong, 1996).

2.11 Factors Affecting Cost Performance

Completion of construction project with intended budget is, frequently seen as major criteria of project success by clients, contractors, and consultants and related stakeholders (ZinabuTebeje, GetachewTeka, 2015). Construction industry now –a-days is facing severe problem of poor cost management leading in huge amount of cost overrun. The matter of poor cost management and overrun in project cost is serious issue in both developed and developing countries (Hameed, 2013). Cost is situation where by a project incurs expenses in far more than its expected costs outlined within the take into account the project (Reuben & Olusegun, 2014). as cited on Aftab, et al (2012) cost overrun considered because the difference between actual cost of project and its cost limit, occurs when the resultant cost target of project exceed its cost limits where cost limit of a project refers to the most expenditures that the client is ready to incur on a completed building project. Mukuka et al, (2014) study identified a number of important factors, which cause projects cost overruns. Such as cash flow and financial difficulties faced by the contractor, fluctuation of prices of material, lack of experience, poor site management and supervision. And schedule delay also extension of project, additional cost, budget shortfall, adversarial relationship between participants of the project, delayed payments to contractors, poor quality workmanship and dissatisfaction by project owners and consequently by end user as the major effect of cost overruns.

Gomez (2012) Suggested list of critical success factors that influence cost performance in construction projects in the UK as the factor identified are, Project manager competency, contractor's competence, client commitment to getting the job done, good relationship between project parties, accuracy of plans and initial information, adequate specifications, early involvement of the contractor, accurate selection of form of contract,

client's involvement and feedback, availability of funding, initial identification of all the risks, and architect's competency.

Also other research conducted by Olawale (2010) on Main reason for cost within the UK construction project as the identified cause are, design changes, risk and uncertainty related to projects, inaccurate evaluation of project's time, nonperformance of subcontractor and nominated suppliers, complexity of works, conflict between project parties, discrepancies in contract documentation, contract and specification interpretation, Inflation of costs, financing and payment for completed works, lack of proper training and skill of project management. additionally low skilled manpower, unpredictable climate, dependency on imported materials, lack of appropriate planning, unstable rate of interest ,fluctuation of currency/exchange rate, weak regulation and control, project fraud and corruption ,unstable and government police . Jha&Iyer(2005) administered research to seek out the factors affecting the price performance in Indian construction project, thorough questionnaire survey on the important success and failure attributes. according to the study the important success attribute factor are, Effective monitoring and feedback by project manager and project team members coordinating ability and report of project manager with top management, positive attitude of project manager, and project participants, and project manager's technical capability. Material market rate, contract modification, high level of quality requirement, project location, depends on the fresher has got to bear the entire responsibility. and rework of bad quality performance, often changing sub-contractor's company, lack of technical skill, lack of experience in similar projects, shortage of experienced staff and labor, prime quality of work required , labor strike ,lack of sub-contractors skill, unclear specification, owners delay in freeing the contractor financial payment, and incomplete drawing Equipment shortage, poor productivity of material and labor, poor scheduling of labor and material for work, and poor documentation and no detailed written procedure.

2.12 Strategies for minimizing delay

Under their study entitled 'Major Mitigation Measures for Delays in Construction Projects', MohamadSyazliFathi and Mohammad Abedi have identified 30 Methods of avoiding or minimizing delays in construction projects. The basic methods identified are presented in this section. These are Accurate initial cost estimates and initial time

estimates, Performing a preconstruction planning of project tasks and resource needs, Adopting a new approach to contract award procedure by Selection of a competent consultant and a reliable contractor to carry out the work, giving less weight to prices and more weight to the capabilities and past performance of contractors, availability of resources, allocation of sufficient time and money at the design phase, competent project manager, commitment to projects, ensure adequate and available source of finance until project completion, comprehensive contract documentation, Frequent progress meeting, Enforcing liquidated damage clauses, Systematic control mechanism, Contingency allowance, Use up to date technology utilization, Effective strategic planning, Multidisciplinary/competent project team. (Mohamad S. and Mohammad A., 2011)

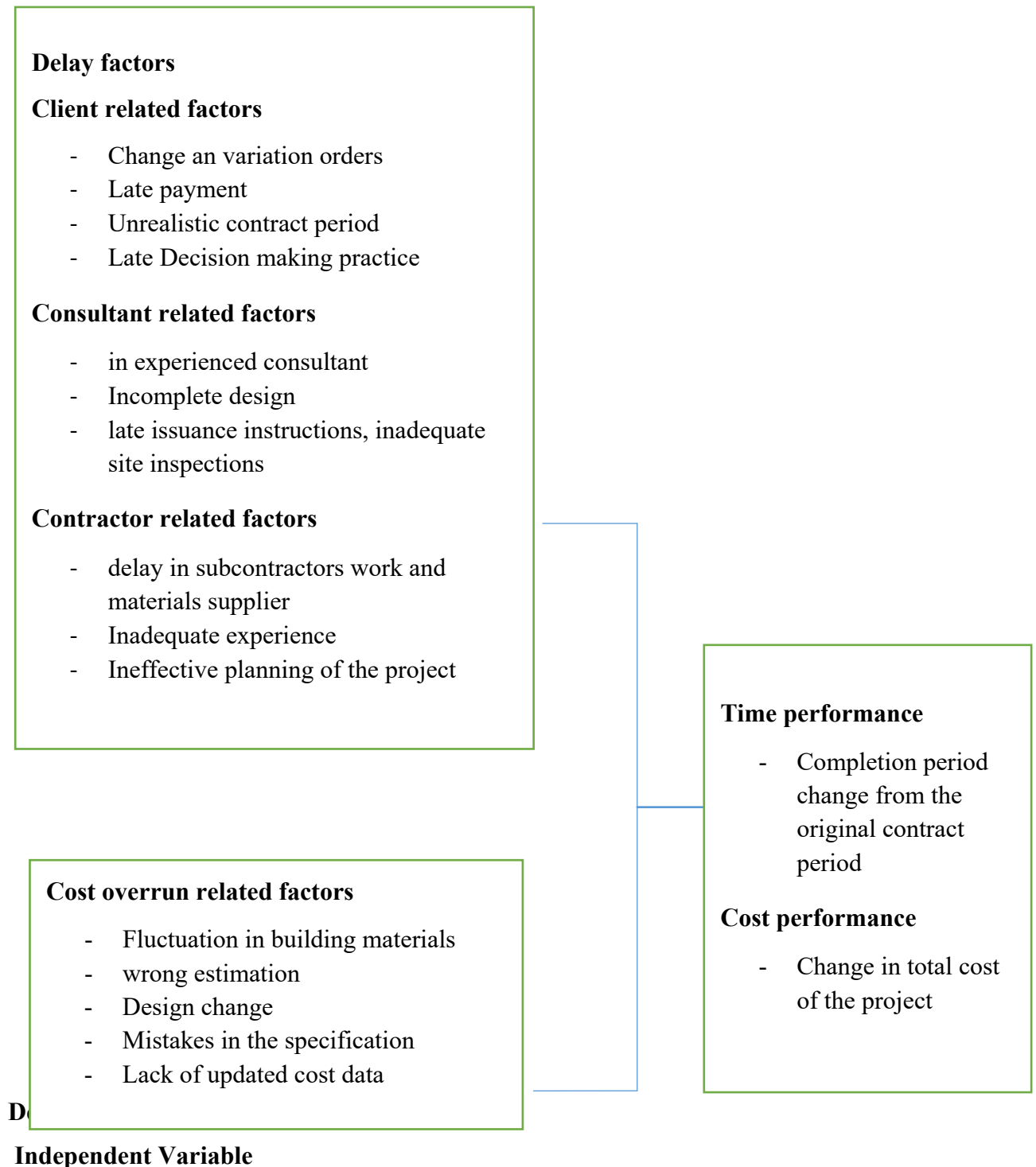
2.13 Strategies for minimizing cost overrun

In construction projects in India, under his study of minimizing Cost Overruns, Abdussalam (2015) has categorized the mitigation methods against cost overrun into proactive, reactive measures and organizational strategies by consulting literatures; the proactive strategies are those which should be adopted in the planning stage of projects which include efficient planning of strategies, and management of site and supervision of the project; appropriate planning and arrangement of project; organized regulatory mechanism; and using proper methods for construction (Azis et al., 2012). The organizational strategies include: appropriate prominence on previous experience; regular coordination between the associated parties; increasing human resources in the industry; and complete administration of contracts (Ahsan, K., & Gunawan, I., 2012). Undertaking a preconstruction planning regarding the procedures and resources of project could be a proactive, reactive, and organizational strategy (Azis et al., 2012).

On the other hand, Nadzirah (2015) has identified numerous mitigation measures associated with time control and value overrun issues by consulting a Comprehensive literature consisting of 21 published articles. Consistent with him keeping construction projects within estimated costs and schedules requires sound strategies, good practices, and careful judgment. There are, however, steps that which will be taken to attenuate their causes and effects of time and value overrun, the key one is using efficient project management tools and practices. (Nadzirah B. 2015)

Conceptual framework

Fig 2.1 conceptual framework



Source: Own interpretation

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1 Research Design

Research design refers to the plan or organization of scientific investigation, designing of a research study that involves the development of a plan or strategy that will guide the collection and analyses of data (Poilt, D., and Hungler, B, 1985). This Research design's target is to address research problems by integrating different components of the study in coherent and logical manner.

In this study both quantitative and qualitative research methods (mixed approach) were employed. Mixed research is a method of integrating both qualitative and quantitative data by collecting the two forms of data. This research has a descriptive nature describing the existing phenomenon as it exists.

In this study primary data was collected through survey to get perception on factors affecting schedule and cost performance and secondary data were collected from reviewing books, journals and previous study.

3.3 Target Population

The target population is members of TNT construction project teams, the client and consultant involved managing the construction project. To select target population four building construction projects were selected namely, Prosperity party Headquarter building, Teachers residential Apartment, 2B+G+ 13 bole Ayat 40/60 condominium building and 40/60 saving house constructions. The assigned numbers of team members in each of these projects were 1 project manager, 1 construction engineer, 2 project supervisor, 5 Office engineers and 4 site engineers. Thus the total targeted population is the total number of team members which is 48. The researcher designed a questionnaire to all to get the required information. The sampling method the researcher chose for the study is purposive or judgmental sampling. The respondents of the questionnaires have been selected based on purposive sampling of the researcher's subjective judgment which considers that the selectee will give required level of information. Purposive sampling was chosen as it will be possible to deliberately determine who to include in the study based on their ability to provide necessary and reliable data.

3.4 Source of Data

For the study both primary and secondary data were used. In keeping with Currie (2005), combining several methods within the same single study is vital to triangulate the results of each method involved. Cutting on one method can adversely affect the reliability and validity of the results and ultimately affecting the conclusions drawn and therefore the recommendations made. Most of the data was obtained through questionnaires document and referring company's official document.

3.4.1 Primary Data

Primary data is data that's collected for specific research problem at hand using procedures that fit the research problem best. The primary data will be obtained from TNT construction and trading employees using questioner. The primary data was new and related to the topic of the research study so the degree of precision is very high, it is current and it gave a better realistic view to the researcher about the topic under consideration (Tadele, 2018).

3.4.2 Secondary Data

Secondary data is the data that have been collected before and readily available from other sources. i.e. they refer to the data which have already been collected and analyzed by some one else. The researcher used company's official document as source of data. These sources were used as a supplement to the primary data collected by the researcher as making conclusion and recommendation.

3.5 Data Collection Techniques

As a primary data source the researcher used both questionnaire and related report of the company and company profile as secondary data source.

3.6 Data Analysis Techniques

Data was collected, analyzed and presented in such a way that helps the researcher answer the research questions and meet the objective of the study from which conclusions and recommendations can be drawn.

The analysis is based on research objective, the statement of the problem and research questions. This study is quantitative in nature; therefore the collected quantitative data

will be coded, analyzed and interpreted. The data from the closed ended questions will be coded and entered to SPSS version 25. So as to analyze and summarize the data descriptively using tables, percentages and frequency.

The data collected from the survey was analyzed using, the Relative Importance Index method (RII). Used to, determine relative significance and ranking of factors affecting schedule and cost performance. Shaban.S.S(2008) use, relative importance index computed as

$$RII = \sum_{i=1}^5 W_i X_i / A * N$$

Where; RII=relative importance index

W=Weighting given to each factor by respondent and its range from 1 to 5

X=frequency of it's response given for each cause

A=highest weight

N=total number of participant

The open ended questions from the questionnaire will be categorized manually by the researcher in a generalizable format. Finally, all the data will be presented to the reader in a readable format by further explaining the case using discussions. After which conclusion will be made about the particular case and recommendation will be delivered by the researcher. As a whole Statistical package for social sciences (SPSS) and Microsoft excel, analytical tool used for data analysis

3.7 Ethical Considerations

The ethical obligations to any or all involved with in the study has been taken into consideration by the researcher. The researcher first has gain consent of all respondents before to administering the questionnaire and maintains their anonymity. Additionally, the researcher ensures that findings of the study was only to be used for tutorial purposes and also findings of the research were presented with no deviation from the end result of the research. Furthermore, the analyst gave full affirmations to all or any of the reference materials utilized in the study.

3.8 Reliability

Reliability is a consistency measure. When a measure produces similar results under consistent conditions it is said to have reliability. For this study the widely used Cronbach Alpha were used

to measure internal reliability for tests with multiple possible answers. A measure of how well the test is actually measuring what it wants to measure is called internal consistency. it is said to have very good reliability for preferred levels of the coefficient is greater 80. if it is below 50, it would not be considered a very reliable test. Table 3.1 below, depicts that the values of Cronbach's Alpha for each field of the questionnaire. As it is shown in the Table, for each field Cronbach's Alpha value is in the range between 0.752-0.826. This range is regarded as high; the outcome confirms the reliability of each field of the questionnaire

Items	cronbach alpha	number of item
Client related factors	0.826	9
Consultant related factors	0.812	8
Contractor related factors	0.921	14
Environment related factors	0.752	5

CHAPTER FOUR

4. Results and Discussion

4.1 introduction

This chapter presents the result of the information that is obtained from the respondents using questionnaire. In line with to 48 distributed questionnaire, out of which 40 were returned completed. Statistical data were entered into SPSS (Statistical Packages for Social Science) and analyzed by using descriptive statistical techniques. This chapter begun by presenting the final background of the respondent so it shows the findings of the key factors identified which are the causes for the construction project cost to overrun in TNT Construction and trading PLC from the closed ended and open ended questionnaire.

The questionnaire was developed using Linkert scale; where 1. represents not significant (NS), 2 represents slightly significant (ss), 3 represents moderately significant (ms), 4 represents very significant (vs) And 5 represents Extremely significant. (ES)

The collected Questionnaires were put in to SPSS version 25 in order to make an analysis, which enabled to present using frequency and percentage.

4.2 Response rate

As written in the previous chapter the study used a sample size of 48 TNT construction and trading PLC employees. Thus out of the 48 questionnaires distributed to employees of TNT construction and trading PLC 45 were correctly filled out and returned resulting in response rate of 93.75%. This response rate was high enough for the study's conclusions to be drawn.

Table 4.1. Response rate

Description	Response rate	Percentile
Questionnaire prepared	48	100%
Questionnaire filled	45	93.75%
Questionnaire not complete	3	6.25%

4.3 General background of respondents

This part mainly shows general information about the respondents in terms of age, gender, educational qualification and work experience. Respondents were asked questions about their general background in order to collect information on these topics, and their answers are presented below.

Table 4.2 below shows the general background of the respondents. Accordingly from the total respondents 77.8% were male and the rest 22.2% were female. The respondents were also asked to specify their age in an interval so 37.8% of the respondents were 20-29 years, 57.8% of the respondents were 30-39 years, 4.4% of the respondents were 40-49 years. According to the results 80% of the respondents stated their highest level of education as degree, and the rest 20% of the respondents stated their highest level of education as masters degree. According to the finding the majority of respondents in the sample had a bachelor's degree. This finding indicates that 100% of the respondents have an education level above bachelor's degree. Thus the result shows that the respondents are academically qualified to comprehend and react to the survey item.

In addition as shown in table below respondents were asked to state the number of years they have worked in TNT construction and trading. According to their responses 11.1 percent of respondents had work experience below 2 years, 37.8 percent of respondents had worked for a period ranging from 2 to 5 years, 51.1 percent of respondents had worked for a period ranging from 6 to 10 years. This implies that most of the employees (88.9%) have above 2 years of experiences accumulated in the organization. Moreover, as shown the table below, all respondents have an experience working in projects in TNT construction and trading. This in turn can add recognized value for this study, as the respondents have the experience to give their perspective on project related area.

Table 4.2 Respondent's general information

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	35	77.8	77.8	77.8
	Female	10	22.2	22.2	100.0
	Total	45	100.0	100.0	
Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Age	20-29 years	17	37.8	37.8	37.8
	30-39 years	26	57.8	57.8	95.6
	40-49 years	2	4.4	4.4	100.0
	Total	45	100.0	100.0	
Education					
		Frequency	Percent	Valid Percent	Cumulative Percent
Education	Degree	36	80.0	80.0	80.0
	Postgraduate	9	20.0	20.0	100.0
	Total	45	100.0	100.0	
Experience					
		Frequency	Percent	Valid Percent	Cumulative Percent
Experience	below 2 years	5	11.1	11.1	11.1
	2-5 years	17	37.8	37.8	48.9
	6-10 years	23	51.1	51.1	100
	Total	45	100.0	100.0	
Profession					
		Frequency	Percent	Valid Percent	Cumulative Percent
Profession	project engineer	6	13.3	13.3	13.3
	Engineer	39	86.7	86.7	100.0
	Total	45	100.0	100.0	

4.4 Factors affecting cost performance

This part comprises of results and discussion of factors that affect cost performance of TNT construction and trading buy using Relative importance index and ranking of factors affecting the performance. The following table summarizes RII value of factors affecting cost performance according to each type of target group.

Table 4.3 RII value of factors affecting cost performance of respondents view

Factors affecting cost performance	RII
Fluctuation in building materials	0.9511
wrong estimation	0.7067
repeated design change	0.6667
mistakes in the specification	0.6133
lack of updated cost data	0.6622
discrepancies in contract document	0.6400
high transportation cost	0.6267
political interference	0.6978
lack of local skilled labor	0.5422
unpredictable weather condition	0.5111
rework of bad quality performance	0.6489
poor performance of subcontractor	0.4578
additional cost due to variation work	0.5956
risk and uncertainty associated with project	0.6533
poor scheduling of labor	0.6444
material wastage on site	0.6356
unclear specification or change in specification	0.6089
contractor poor site management and supervision	0.5422
change in the scope of the project	0.7067
cash flow and financial difficulty face by contractor	0.8756
lack of cost report during construction stage	0.6933
lack of cost planning/monitoring during pre and post contract stage	0.7733

According to the respondents view, the value of RII and rank of factors affecting cost performance presented in the following Table 4.4.

Table 4.4. Summary of RII and Rank of Factors Affecting Cost Performance

Factors affecting cost performance	RII	Rank
Fluctuation in building materials	0.9511	1
cash flow and financial difficulty face by contractor	0.8756	2
lack of cost planning/monitoring during pre and post contract stage	0.7733	3
wrong estimation	0.7067	4
change in the scope of the project	0.7067	5
political interference	0.6978	6
lack of cost report during construction stage	0.6933	7
repeated design change	0.6667	8
lack of updated cost data	0.6622	9
risk and uncertainty associated with project	0.6533	10
rework of bad quality performance	0.6489	11
poor scheduling of labor	0.6444	12
discrepancies in contract document	0.6400	13
material wastage on site	0.6356	14
high transportation cost	0.6267	15
mistakes in the specification	0.6133	16
unclear specification or change in specification	0.6089	17
additional cost due to variation work	0.5956	18
lack of local skilled labor	0.5422	19
contractor poor site management and supervision	0.5422	20
unpredictable weather condition	0.5111	21
poor performance of subcontractor	0.4578	22

From Table 4.4: according to the respondents the extremely significant factors affecting cost performance ranked in first position from total of 22 factors was, fluctuation in building materials (RII =0.9511) fluctuation is a change in cost of construction material from original value of cost. cash flow and financial difficulty face by contractor was the second significant factors affecting cost performance with (RII= 0.8756). cash flow and financial difficulty is a major problem in developing a construction industry.. In the third position lack of cost planning/monitoring during pre and post contract stage with (RII=0.7733). In fourth position wrong estimation with (RII=0.7067). Moreover, in fifth position change in the scope of the project with RII=0.7067 was the significant factors affecting cost performance. And political interference, lack of cost report during construction stage, repeated design change, lack of updated cost data, risk and uncertainty associated with project are ranked from six to ten respectively.

Overall Response of Factors Affecting Cost Performance

The general summery and discussion of the first top ten actors affecting cost performance. Based on the overall RII value, the factors are presented in Table 4.4

Fluctuation in building materials ranked in first position with (RII=0.9511) the most significant factors affecting cost performance. Fluctuation is variation in cost of construction material from original value of cost.

Cash flow and financial difficulty face by contractor ranked in second position with (RII=0.8756). during execution of a project the contractor may face financial difficulty. This difficulty may result termination of project. For this reason the client may hire new contractor.

lack of cost planning/monitoring during pre and post contract stage the client and consultant may cause the problem during pre contract stage of a project. In this stage lack of cost planning and budgeting, lack of checking the financial capacity of the client before starting the project could be a problem. In contractors side tracking the progress of the project if it is on budget, poor estimation of the project are the main problems encountered.

Wrong estimation of projects affects cost performance. That means when there is quantity change in the project work the initial cost assumed will also vary.

Change in the scope of the project is the factor ranking fifth is change in scope of the project which means when the planned work is not the same as the executed work. Thus the cost incurred for the planned project will not be the same as the cost incurred for the executed project.

Political interference is when the contractor is expected to be part of the country's political endeavor. This might affect the cost performance in such a way that when the contractor involves in political matter and supports the clients political preference he is likely to get the job done with minimum cost expected.

Lack of cost report during construction stage if there is cost report it will be easy to know the revenue and expenses clearly. thus it will be easy to know the profit loss of the project.

Repeated design change omission of major part of design, design incompleteness and client requirement change are the main reasons for repeated design changes in a project.

Frequency distribution on factors affecting cost performance

The study findings in table 4.5 indicate that fluctuation in building materials cost is the most significant factor affecting cost performance in building construction as indicated by highest respondents rate of 82.2% (n=37) who said it is extremely significant followed by those who said it is very significant factor 11.1% (n=5). cash flow and financial difficulty face by contractor is the second leading factor as indicted by highest response of 49% (n=22) who said it is extremely significant followed by respondents who said it is very significant 40% (n=18). The study also figured out that lack of cost planning/monitoring during pre and post contract stage is the third significant factor that affects cost performance with a high response rate of 51.1% (n=23) who said it is very significant followed by those who said it is moderately significant 31.1% (n=14). Wrong estimation came fourth significant factor affecting cost performance with highest response rate of 51.1% (23) and 24.4% (n=11) for moderately significant and very significant respectively.

Table 4.5.Frequency distribution on factors affecting cost performance

Statement (where 1=not significant, 2=slightly significant, 3=moderately significant, 4=very significant, 5=extremely significant)		1	2	3	4	5	Totals
Fluctuation in building materials	N	0	0	3	5	37	45
	%	0	0	6.7	11.1	82.2	100
cash flow and financial difficulty face by contractor	N	0	0	5	18	22	45
	%	0	0	11.1	40	48.9	100
lack of cost planning/monitoring during pre and post contract stage	N	0	0	14	23	8	45
	%	0	0	31.1	51.1	17.8	100
wrong estimation	N	0	3	23	11	8	45
	%	0	6.7	51.1	24.4	17.8	100
change in the scope of the project	N	0	2	17	26	0	45
	%	0	4.4	37.8	57.8	0	100
political interference	N	3	9	9	11	13	45
	%	6.7	20	20	24.4	28.9	100
lack of cost report during construction stage	N	0	6	15	21	3	45
	%	0	13.3	33.3	46.7	6.7	100
repeated design change	N	0	6	23	11	5	45
	%	0	13.3	51.1	24.4	11.1	100
lack of updated cost data	N	0	15	11	9	10	45
	%	0	33.3	24.4	20	22.2	100
risk and uncertainty associated with project	N	0	9	20	11	5	45
	%	0	20	44.4	24.4	11.1	100

4.5 Factors affecting schedule performance

Results and analysis on factors affecting schedule performance in TNT construction and trading is discussed below using relative importance index and ranking top ten factors affecting time performance according to respondents view.

Below the table shows summary of the 27 factors with calculated RII value according to respondents of TNT construction and trading

Table 4.6.RII value of factors affecting time performance of respondents view

Factors affecting time performance	RII	Rank
financial incapability	0.8844	1
fluctuation in material price	0.8756	2
inexperienced consultant	0.8533	3
late procurement and delivery of materials	0.8356	4
difficult in financing project by contractor	0.8278	5
ineffective planning and scheduling of project by contractor	0.8178	6
delay in approving major change in the scope of work by consultant	0.8044	7
incomplete design	0.8000	8
poor site management and supervision by contractor	0.7733	9
late payment by main contractor to subcontractors	0.7644	10
inadequate technical study during bidding	0.7556	11
inadequate experienced contractor	0.7541	12
late approval of shop drawings	0.7451	13
improper construction methods	0.7422	14
late issuance instructions	0.7378	15
Late inspection of imported material at ports	0.7244	16
waiting time for approval of tests and inspection	0.7200	17
lack of coordination with project participants	0.7200	17
delay in site mobilization	0.7200	17
reworks due to mistakes and errors	0.7200	17
delays in subcontractor works	0.7111	18
unexpected government regulations	0.7111	18
rework due to errors during construction	0.7022	19

inadequate site inspection	0.6978	20
unavailability of utilities in site (such as water, electricity etc.)	0.6800	21
poor communication with project parties	0.6444	22
weather condition	0.5911	23

The following Table is adopted from Table 4.6 present List of top ten factors affecting time performance.

Table 4.7 Summary of List of Top Ten Factors Affecting Time Performance

Factors affecting time performance	RII	Rank
financial incapability	0.8844	1
fluctuation in material price	0.8756	2
inexperienced consultant	0.8533	3
late procurement and delivery of materials	0.8356	4
difficult in financing project by contractor	0.8278	5
ineffective planning and scheduling of project by contractor	0.8178	6
delay in approving major change in the scope of work by consultant	0.8044	7
incomplete design	0.8000	8
poor site management and supervision by contractor	0.7733	9
late payment by main contractor to subcontractors	0.7644	10

Based on the research finding the first top ten factors affecting time performance of TNT construction and trading according to respondents view was, financial incapability, fluctuation in material price, inexperienced consultant, late procurement and delivery of

materials, difficulty financing project by contractor, ineffective planning and scheduling of project by contractor. In addition delay in approving major change in the scope of work by consultant, incomplete design, poor site management and supervision by contractor, late payment by main contractor to subcontractors.

Financial incapability–the contractor should be financially capable of constructing the project and the client should be ready for any payments.

Fluctuation in material price – material price is always changeable this may affect the schedule of the project.

Inexperienced consultant- when the consultant is experienced quantity, design, drawings will be more or less accurate thus this will help in completing the project on time.

Ineffective planning and scheduling of project by contractor – planning is a major task in executing a construction project. If a project is planned in an effective way the possibility of schedule delay will be less likely.

Frequency distribution on factors affecting time performance

The study findings in table 4.5 indicate that financial incapability is the most significant factor affecting time performance in building construction as indicated by highest respondents rate of 55.6% (n=25) who said it is extremely significant followed by those who said it is very significant factor 31.1% (n=14). Fluctuation in material price is the second leading factor as indicted by highest response of 48.9% (n=22)who said it is extremely significant followed by respondents who said it is very significant 44.4% (n=20). The study also figured out that inexperienced consultant is the third significant factor that affects time performance with a high response rate of 53.3% (n=24) who said it is very significant followed by those who said it is moderately significant 24.4% (n=11). Late procurement and material delivery came fourth significant factor affecting cost performance with highest response rate of 42.2% (n=19) and 33.3% (n=15) for moderately significant and very significant respectively.

Table 4.8.frequency distribution on factors affecting time performance in building construction

Statement (where 1=not significant, 2=slightly significant, 3=moderately significant, 4=very significant, 5=extremely significant)		1	2	3	4	5	Totals
Financial incapability	N	0	0	6	14	25	45
	%	0	0	13.3	31.1	55.6	100
fluctuation in material price	N	0	0	3	20	22	45
	%	0	0	6.7	44.4	48.9	100
inexperienced consultant	N	0	2	8	11	24	45
	%	0	4.4	17.8	24.4	53.3	100
late procurement and delivery of materials	N	0	0	11	15	19	45
	%	0	0	24.4	33.3	42.2	100
difficult in financing project by contractor	N	0	3	6	20	16	45
	%	0	6.7	13.3	44.4	35.6	100
ineffective planning and scheduling of project by contractor	N	0	0	12	17	16	45
	%	0	0	26.7	37.8	35.6	100
delay in approving major change in the scope of work by consultant	N	0	0	9	26	10	45
	%	0	0	20	57.8	22.3	100
incomplete design	N	0	6	5	17	17	45
	%	0	13.3	11.1	37.8	37.8	100
poor site management and supervision by contractor	N	0	3	11	20	11	45
	%	0	6.7	24.4	44.4	24.4	100
late payment by main contractor to subcontractors	N	0	6	6	23	10	45
	%	0	13.3	13.3	51.1	22.2	100

4.5.2 Result analysis of factors affecting time performance by group

This part comprises of results and discussion of factors that influence time performance of TNT construction and trading using relative importance index and ranking of factors affecting the time performance. Ranking factors according to each type of target group is discussed as follows

4.5.2.1 Client related factors

The relative importance index (RII) and rank of time factor are summarized in Table 4.9

Table 4.9. RII and Rank of Client Related Factors Affecting Time Performance

Factors affecting time performance	RII	Rank
Client related factors		
late decision making process	0.8578	1
late interim payments by owner to contractor	0.8533	2
financial inability	0.8400	3
unrealistic contract period	0.8222	4
late instruction by client	0.7556	5
suspension of works by client	0.7156	6
change order by owner during construction	0.7111	7
suspension of works by client	0.7111	7
delay to furnish and deliver the site to the contractor	0.6844	8

Respondent's views

According to table 4.9 late decision making process by client is the most significant factor affecting time performance which is ranked in the first position by the respondents with RII value of 0.8578.

Late interim payments by owner to contractor with RII factor of 0.833 is ranked in second place.

Financial inability of the client as factor affecting time performance is ranked in third place by respondents view with a RII factor is 0.8400.

Unrealistic contract period, late instruction by client, suspension of works by client, change order by owner during construction, suspension of works by client and delay to furnish and deliver the site to the contractor are factors affecting time performance in order of descending from this group of factor.

4.5.2.2 Contractor related factors

The relative importance index (RII) and rank of time factor are summarized in Table 4.10.

Table 4.10 RII and Rank of Contractor Related Factors Affecting Time Performance

Factors affecting time performance	RII	Rank
Contractors related factors		
financial incapability	0.8844	1
late procurement and delivery of materials	0.8356	2
difficult in financing project by contractor	0.8178	3
ineffective planning and scheduling of project by contractor	0.8178	4

poor site management and supervision by contractor	0.7733	5
late payment by main contractor to subcontractors	0.7644	6
inadequate technical study during bidding	0.7556	7
inadequate experienced contractor	0.7511	8
improper construction methods	0.7422	9
delay in site mobilization	0.7200	10
reworks due to mistakes and errors	0.7200	11
delays in subcontractor works	0.7111	12
rework due to errors during construction	0.7022	13
poor communication with project parties	0.6444	14

According to respondents view major factors affecting time performance, which is related to contractor is as shown in the above table 4.8 Financial incapability is the major factor affecting time performance as the respondents view with RII factor of 0.8844. According to respondents view late procurement and delivery of materials has been ranked in second position with RII of 0.8356. this factor decides when to complete the project. Difficult in financing project by contractor is ranked third position with relative importance index of 0.8178 by respondents.

In overall responses, poor site management and supervision by contractor, late payment by main contractor to subcontractors, inadequate technical study during bidding, inadequate experienced contractor, improper construction methods, delay in site mobilization, reworks due to mistakes and errors, delays in subcontractor works, rework due to errors during construction and poor communication with project parties are factors affecting time performance in descending order.

4.5.2.3 Consultant related factor

The relative importance index (RII) and rank of time factor are summarized in Table 4.11

Table 4.11 RII and Rank of Consultant Related Factors Affecting Time Performance

Factors affecting time performance	RII	Rank
Consultant related factors		
inexperienced consultant	0.8533	1
delay in approving major change in the scope of work by consultant	0.8044	2
incomplete design	0.8000	3
late approval of shop drawings	0.7511	4
late issuance instructions	0.7378	5
lack of coordination with project participants	0.7200	6
waiting time for approval of tests and inspection	0.7200	7
inadequate site inspection	0.6978	8

According to respondents view major factors affecting time performance, which is related to consultant is as shown in the above table 4.11 Inexperienced consultant is the major factor affecting time performance as the respondents view with RII factor of 0.8533.

According to respondents view delay in approving major change in the scope of work by consultant has been ranked in second position with RII of 0.8044.

Incomplete design is ranked third position with relative importance index of 0.8000 by respondents.

In overall responses, late approval of shop drawing, late issuance instructions, lack of coordination with project participants, waiting time for approval of tests and inspection and inadequate site inspection are factors affecting time performance in descending order.

4.5.2.4 External factors

The relative importance index (RII) and rank of time factor are summarized in Table 4.12

Table 4.12 RII and Rank of External Factors Affecting Time Performance

Factors affecting time performance	RII	Rank
External factors		
weather condition	0.5911	5
unexpected government regulations	0.7111	3
fluctuation in material price	0.8756	1
Late inspection of imported material at ports	0.7244	2
unavailability of utilities in site (such as water, electricity etc.)	0.6800	4

From the respondents view fluctuation in material price is a major factor affecting time performance in a project with a relative importance index of 0.8756. late inspection of imported material at ports, unexpected government regulations, unavailability of utilities in site and weather condition comes from second to fifth position as a factor affecting time performance in a project with relative importance index of 0.7244,0.711,0.6800 and 0.5911 respectively.

Summary of factors affecting time performance in a project by group

By using mean RII value of each group rank based on respondents view is shown in table 4.13 by rating the weight.

Table 4.13 summary of RII factor and rank of factors affecting time performance by group.

Factors affecting time performance	RII	Rank
Contractors related factors	0.7606	1
Client related factors	0.7435	3
Consultant related factors	0.7600	2
External factors	0.7164	4

From table 4.13 Contractor related factors are ranked first by group according to the respondents view. Consultant related factors, client related factors and external factors comes second to fourth place in order.

4.6 Strategies for minimizing delay and cost overrun

4.6.1 Strategies for minimizing cost overrun

Inorder to minimize delay in construction projects in TNT construction and trading, the respondents recommended that the contractor must plan the budget properly (13%), for estimating cost the contractor must use updated costs (11%), time management must be practical in all construction phases (9%), the contractor should be careful in scheduling and tracking the progress of the project (11%), the government should interfere in the price fluctuation of construction materials in the country (7%), the contractor must work by minimizing material wastage (9%), the contractor have to use quality workmanship and develop good site management and supervision (9%), there should be a construction association to challenge policy makers in the country (11%).

Table 4.14 strategies on how to minimize construction cost overrun

Recommendations	Frequency	Percentage (respondents)
The contractor must plan the budget properly	6	13%
For estimating cost the contractor should use updated costs	5	11%
Time management must be practical in all the construction phases	4	9%
The contractor should be careful in scheduling and tracking the progress of the project	5	11%
The government should interfere in the price fluctuation of material price in the country	3	7%
The contractor must work by minimizing material wastage	4	9%
The contractor have to use quality workmanship and develop good site management and supervision	4	9%
There needs to be a construction association to challenge policy makers in the country	5	11%
In every contract, price adjustment must be included because of continuous price inflation problem	9	20%
	45	100

4.6.2 Strategies for minimizing delay

In order to minimize delay in construction projects in TNT construction and trading, the respondents recommended that proper work schedule must be prepared by the contractor before starting the work and during execution (11%), communication between parties should be facilitated (16%), the consultant should execute inspection and approval process carefully (9%), the client must pay the contractor on time (18%), the client must

allocate adequate budget before starting the project(16%), the consultant must design a complete drawing and provide continuous supervision (18%), the contractor should use good construction methodology to minimize reworks due to errors (13%).

Table 4.15 strategies on how to minimize construction time delay

Recommendations	Frequency	Percentage (respondents)
Proper work schedule must be prepared by the contractor before starting the work and during execution	5	11%
Communication between parties should be facilitated	7	16%
The consultant should execute inspection and approval process carefully	4	9%
The client must pay the contractor on time	8	18%
The client must allocate adequate budget before starting the project	7	16%
Consultant must design a complete drawing and provide continuous supervision	8	18%
Contractor have to use good construction methodology and to minimize reworks due to errors	6	13%
	45	100

CHAPTER FIVE

5.Conclusion and recommendation:

5.1 Introduction

The specific objectives of this research is to identify the factors which are responsible for time and cost overrun in projects found in TNT construction and trading.And also to provide strategy to minimize these factors.Thus in this chapter summary and discussion of major findings and as well as recommendation of the study is represented. The study conducted the analysis using SPSS and relative importance index by gathering data using questionnaire. Conclusion of research finding, and recommendation, presented in this chapter. In addition, suggestion of research area for future study also encompassed.

5.2 conclusion

The following conclusion are drawn from the research finding

- The first objective of the research was to identify factors affecting cost performance in TNT construction and trading. In this thesis 32 factors affecting cost performance were identified using different literature reviews and these factors were ranked according to the respondents view.fluctuation in building materials, cash flow and financial difficulty face by contractor, lack of cost planning/monitoring during pre and post contract stage, wrong estimation, change in the scope of the project, political interference, lack of cost report during construction stage, repeated design change, lack of updated cost data, risk and uncertainty associated with project were ranked from first to ten respectively.
- Identifying factors affecting schedule performance in TNT construction and trading was the second objective of the research. Like the cost factors 27 factors affecting time performance were identified using different literature reviews. The respondents ranked these factors from these the top ten are financial incapability, fluctuation in material price, inexperienced consultant, late procurement and delivery of materials, difficulty financing project by contractor, ineffective planning and scheduling of project by contractor, delay in approving major change in the scope of work by consultant, incomplete design, poor site

management and supervision by contractor, late payment by main contractor to subcontractors.

- The factors affecting time performance in TNT construction and trading were also analyzed by targeted group of four (contractor related, consultant related, client related and external factors) which were identified by literature review. And in the result contractor related factors came first for affecting the completion time of a project. Consultant related factor, client related factor and external factor comes second to fourth respectively.
- Proposing strategy to minimize factors affecting cost performance of building construction in TNT construction and Trading was the third objective of this thesis. The respondents gave their view in an open ended questionnaire. From the given strategies for minimizing these factors the main ones which were identified by most respondents were the contractor must plan the budget properly, for estimating cost the contractor must use updated costs, the contractor should be careful in scheduling and tracking the progress of the project, there should be a construction association to challenge policy makers in the country.
- The last objective was proposing strategy to minimize factors affecting schedule performance of building construction in TNT construction and trading. From the respondent view they listed the main ones as proper work schedule must be prepared by the contractor before starting the work and during execution, communication between parties should be facilitated, the client must pay the contractor on time, the client must allocate adequate budget before starting the project, the consultant must design a complete drawing and provide continuous supervision, the contractor should use good construction methodology to minimize reworks due to errors.

5.3 Recommendation

The issues of cost overrun and time delay in building construction are extremely affecting construction in TNT construction and trading. For a successful project for a project all stakeholders must work side by side. The schedule and budget are the key and critical factors that mostly affect building projects.

Recommendations on how to minimize cost performance

- The contractor must allocate budget for the project prior to starting. Since budget is the major tool for executing the project
- During preparation of the bill of quantity proper care should be taken in the client's side before tendering by using qualified, experienced professional team. This will help avoid excess quantity during construction.
- Inflation of construction material has become a big problem in the construction industry. In order to avoid this problem the government should apply a method to control the cost of material and if there will be an inflation information should be provided about updated price cost of data of construction material. This will enable to estimate cost, forecast the cost of construction material price in future and make contingencies for an unexpected inflation based on previous data,
- Using local construction material by minimizing using imported construction material.
- To monitor and control construction project and also the major input for development of cash flow program to track cost performance, appropriate planning and scheduling of work should be implemented.
- During preparation of standard drawing before construction starts errors should be avoided.
- When the contractor selects sub-contractors financial status, technical capability and past performance assessment to related projects should be considered.
- Proper site management, supervision, and better communication between all parties involved in construction project.
- Avoiding error while preparation of bill of quantity

Recommendations on how to minimize time performance

- Effective, economical and time saving method for construction should be selected by the contractor.
- The Contractor should be responsible for scheduling and planning the project in a proper and right way,

- While construction is taking place the contractor must avoid defects or errors in order to minimize time delays to rectify defect.
- The contract administration department of the contractor's staff should be good and strong.
- The contract document should be free from contradiction and discrepancies and also government condition of contract should be referenced by a professional in order to avoid dispute and conflict.
- The contractor should effect proper management of material usage. The requisition of material, time delivery of the requested material, procurement and usage of the quality material according to the specification of the contract, proper material usage by optimization system should be properly implemented.
- Providing trainings and providing suitable working environment will increase labor productivity. This will help in timely completion of the project.
- The consultant should carefully see design changes and give accurate, quick review and decision should be given in a timely manner.
- The client should effect interim payments to the contractor according to the contract document so that the contractor could execute the project with in the time limit.
- Before starting any project the client must fix financial management system because financial inability by the owner could affect time performance of the project.

5.4 Recommendation for future studies

The finding of this study were limited to factors affecting time and cost performance in TNT construction and trading and how to mitigate these factors. Thus for future study one can go through impact of low performance in cost and time performance in TNT construction and trading.

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Appendix A

QUESTIONNAIR

Thank you in advance for taking time to fill this questionnaire. The aim of this questionnaire is to study the “**Factors affecting schedule and cost performance in TNT construction and trading**” I sincerely request you to respond to the questions as honestly as possible with exact relevant fact and return the completed questionnaires. All data included in this questionnaire will be used only for academic research and will be strictly confidential.

Detail of the researcher

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Thanks in advance for your cooperation and help

BersabelAlemu

July 2022

Section A: General Information

1. Gender: Male ☐
- Female ☐
2. Age (in year): 20-29 years ☐
- 30-39 years ☐
- 40-49 years ☐
- 50-59 years ☐
3. Profession: Architect ☐
- Project Engineer ☐
- Engineer ☐
- Quantity surveyor ☐
4. Level of education: Diploma ☐
- Degree ☐
- Postgraduate ☐
- Others, please specify: _____
5. Years of work experience (in years): Below 2years ☐
- 2-5 years ☐
- 6-10 years ☐
- Above 15 years ☐
6. For how many years have you worked on the project?
- Below 1 ☐
- 1-2 years ☐
- Above 3 years ☐

Section B

Below are numbers of theorized factors affecting the cost performance of construction projects. From your experience please express your opinion on the importance of the following factors as affecting the cost performance of building project in Ethiopian construction Industry. (Please tick the appropriate box ✓) with the following ordinal scale 1-5.

- Extremely significant = 5
- Very significant = 4
- Moderately significant= 3
- Slightly significant = 2
- Not significant = 1

	Factors affecting cost performance	1	2	3	4	5
1	Fluctuation in building materials					
2	Wrong estimation					
3	Repeated Design change					
4	Mistakes in the specification					
5	Lack of updated cost data					
6	Discrepancies in contract document					
7	High transportation cost					
8	Political interference					
9	Lack of local skilled labor					
10	Unpredictable weather conditions					
11	Rework of bad quality performance					
12	Poor performance of sub-contractor					
13	Additional cost due to variation work					

14	Risk and uncertainty associated with project					
15	Poor scheduling of labor					
16	Material wastage on site					
17	Unclear specification or change in specification					
18	Contractor poor site management and supervision					
19	Change in the scope of the project					
20	Cash flow and financial difficulty faced by contractor					
21	Lack of cost report during construction stage					
22	Lack of cost planning/monitoring during pre-and post-contract stage					

Section C

Below are numbers of theorized factors affecting the schedule performance of construction projects. From your experience please express your opinion on the importance of the following factors as affecting the cost performance of building project in Ethiopian construction industry. (Please tick the appropriate box ✓) with the following ordinal scale 1-5.

- Extremely significant = 5
- Very significant = 4
- Moderately significant= 3
- Slightly significant = 2 -Not significant = 1

	Factors affecting time performance	1	2	3	4	5
	Client Related Factors					
1	Late interim payments by owner to contractor					
2	Unrealistic Contract period					
3	Financial inability					
4	Late decision making process					
5	Delay to furnish and deliver the site to the contractor					
6	Change order by owner during construction					
7	Suspension of works by client					
8	Late instruction by client					
9	Suspension of works by client					

	Continued	1	2	3	4	5
	Consultant Related Factors					
1	Delay in approving major change in the scope of work by consultant					
2	Waiting time for approval of tests and inspection					
3	Inexperienced consultant					
4	Incomplete design					
5	Late issuance instructions					
6	Inadequate site inspections					
7	Lack of coordination with project participants					
8	Late approval of shop drawings					
	Contractors Related Factors					
1	Delay in site mobilization					
2	Ineffective planning and scheduling of project by contractor					
3	Difficult in financing project by contractor					
4	Poor site management and supervision by contractor					
5	Delays in sub-contractors works					
6	Rework due to errors during construction					
7	Financial incapability					
8	Inadequately experienced contractor					
9	Reworks due to mistakes and errors					
10	Inadequate technical study during bidding					

11	Poor communication with project parties					
12	Late payment by main contractor to subcontractors					
13	Improper construction methods					
14	Late procurement and delivery of materials					
	Continued	1	2	3	4	5
	External Related Factors					
1	Weather condition					
2	Unexpected government regulations					
3	Fluctuation in material price					
4	Late inspection of imported material at ports					
5	Unavailability of utilities in site (such as water, electricity ...etc.					

Section D

Mitigation Strategies

Please state your possible mitigation strategies to minimize cost overrun problem of building construction in TNT construction and trading.

Please state your possible mitigation strategies to minimize delay problem encountered in TNT construction and trading.
