

**Factors Influencing Quality of Construction Projects: in
cases of Ethiopian Airports Enterprise**



COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF ACCOUNTING AND FINANCE
JIMMA UNIVERSITY
MPMF PROGRAM

*A Thesis Submitted to the School of Graduate Studies of Jimma University in
Partial Fulfillment of the Requirements for the Award of the Degree of Master of
Arts in Project Management and Finance.*

By:

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JUNE, 2019

JIMMA ETHIOPIA

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*A Thesis Submitted to the School of Graduate Studies of Jimma University in
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Under the Supervision of

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DECLARATION

I Here By Declare That This Thesis Entitled “A Study on Factors Influencing Quality of Construction Projects: in cases of Ethiopian Airports Enterprise“out by me under the guidance and supervision of Dr. **Deresse Mersha** and **Mr. Ganfure Tarekegn**.

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

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ABSTRACT

The main objective of this study was to assess factors influencing quality of construction projects under Ethiopian Airports Enterprise. The descriptive survey method was used with Quantitative and qualitative approaches. Quantitative approach was used in this study for collecting the quantitative data from 125 respondents of two Ethiopian Airports Enterprise Addis Ababa Bole International Airport and Jimma Aba Jifar Airport through questionnaire. Qualitative approach was used to collect qualitative data through document review. Census was used to select the respondents since the total populations were selected as the respondents of this study. Data were collected from respondents through five scale Likerted close-ended questionnaire. The qualitative data were collected from the document review. The collected quantitative data were analyzed in percentages, mean, standard deviation to give the meaningful conclusion for the data that analyzed in descriptive statistic. The qualitative data that were collected through document review were discussed in text explanations. On the basis of the analysis made of this study, the conclusions were made and the findings of this study were identified. The findings of this study were: the absence of the availability of labor influence quality of construction projects in Ethiopian Airports Enterprise had high, construction materials had influenced the quality of construction projects in Ethiopian Airports Enterprise, absence of adequate construction equipment had highly influenced the quality of construction projects in Ethiopian Airports Enterprise, the extent at which availability of funds influence quality of construction projects in Ethiopian Airports Enterprise and project management practices had influenced the quality of construction projects in Ethiopian Airports Enterprise. The Ethiopian Airports Enterprise should give due attention to the problems identified.

Keywords: *Airport construction project, project quality, corruption effects, poor management.*

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ACRONYMS/ ABBREVIATIONS

EAE - Ethiopian Airports Enterprise

ECI – Early Contractor Involvement

ESI – Early Supplier Involvement

GDP – Gross Domestic product

LCC – Low Cost Carrier

PMBOK – Project Management Body of Knowledge

PMI – Project Management Institution

PPI – Project Performance Indicator

QP – Quality Performance

QPMS – Quality Performance Management System

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Quality of projects is one of the traditional and global measure of project performance. For construction projects, the goal and desire of clients, contractors and consultants is to ensure that projects are delivered according to acceptable and agreed standards. According to the project management institute's (PMI, 2008) Body of knowledge (PMBOK) projects, which are temporary endeavors undertaken to meet unique goals and objectives within a defined scope, budget and time frame, typically go through a life cycle. The project life cycle, which is a logical sequence of activities to accomplish the projects goals, is made up five stages namely; the project initiation stage, the project planning stage, the project execution stage, the monitoring and controlling stage and the project closure stage. Attention to detail, along with the involvement of key stakeholders and proper documentation at each stage ensures the success and quality of the project. The sequential phases are generally differentiated by the set of activities that are carried out within the phase, the key actors involved, the expected deliverables, and control measures put in place. In executing Airport construction projects, achieving quality is one of the ultimate objectives of all stakeholders (Ofori, 2006). Quality can be described as meeting specifications and approved standard agreed by stakeholders. It was also described as the totality of features and characteristics of production process that bear on its ability and capacity to satisfy the stated need or fitness (S.M., 2002). Another definition of quality is "uniformity of the product characteristics or delivery of a service around a nominal or target value". This definition of quality concerned about locating the product characteristics and process parameters within the design specifications or tolerance limits (S.M., 2002).

The Airport industry throughout the world is becoming an increasingly important factor in development. The role of Airport is particularly important in the countries that rely on tourism. As a capital-intensive industry Airport endeavors to attract as many airlines as possible, often cooperating with local authorities.

This is the rule in Ethiopian Airports that have seasonal traffic pattern. There are four international and seventeen domestic Airports in Ethiopia. The aviation industry has been growing steadily for the last decades. However, due to competition, finance crisis and soaring oil prices followed by the diffusion of deregulation and liberalization on international level, adaptation to an ever-changing environment has been quite challenging, resulting in restructuring and cost reductions in most of the air companies (Park, Pheng and ChuanQuek 2013).

Parallel to this, due to changes in the air transport market, the competitiveness of the low-cost carriers (LCCs) has greatly expanded and many LCCs have been established around the world. In the same time strong expansion of tourism industry worldwide has helped LCCs further expansion bringing up at the same time quite a few new development dilemmas (Park, Pheng and ChuanQuek 2013).

The construction industry plays a vital role in the economy. The construction industry is complex in its nature because it comprises large numbers of parties as owners (clients), contractors, consultants, stakeholders, and regulators. Despite this complexity, the industry plays a major role in the development and achievement of organization's goals. Development is the amount of value-added goods and services that are generated from all regional activities in certain area. That is generated from Airport areas included construction and infrastructure development(Park, Pheng and ChuanQuek 2013).

Construction project is the activity that consists of series of works that is interdependent with each other. The construction project activity starts from the planning stage to project implementation is really influenced by the ability to set or manage project resources. There are several resources that are necessary in the construction project, such as material, workforce, cost or even equipment. The incapability to manage resources that is required in the project can cause various problems, such as inflated cost, project time finishing that is not according to plan, inaccuracy of work quality that is generated and others, which eventually can harm the project implementation as a whole.

Material is one of the important components that influence the sustainable of the construction project without any material management that can cause problem towards on-going construction project. Materials (including raw materials, finished products, semi-finished products,

components and parts) are material conditions of construction, and material quality is one of necessary conditions to ensure construction quality (Park, Pheng and ChuanQuek 2013).

In developing country like Ethiopia, corruption and poor management were a major concern in the construction industry. Especially, corruption in the construction of public infrastructure has particularly serious implications for developing countries. In appropriate project choice, high prices, poor quality, excessive time and cost overruns, among other challenges, impact negatively on economic growth and poverty alleviation.

Corruption during the early stages of the project cycle, when projects are appraised, designed, and budgeted, may open doors for additional corruption later. Examples are presented to demonstrate how skewed incentives during project preparation can facilitate corruption during implementation (and create further negative impacts on project value) (Park, Pheng and ChuanQuek 2013).

Efforts to improve transparency should more focus on the procedures surrounding decision-making project preparation. However, where corruption is deeply embedded, breaking the links among participants in the various stages of project delivery may be the only way to improve the governance of project preparation. In addition, quality performance (QP) is a management tool that is aimed at giving necessary information to identify quality improvement opportunities for better performance and productivity (Abdul., 2011).

On the other hand, poor management can endanger both the success and completion of a project as well as the safety of the workers. This can result in a lost reputation and millions of lost dollars. Future work depends on the perception of current and past work. Learn to identify ineffective construction management practices early before you wind up paying for it through the nose. When there is uncertainty, variability in objectives there is an increase in risk. The result is an increase in safety and material incidents, injuries, and losses (Abdul., 2011).

Bad construction management plays a role in everything from ineffective bidding and preconstruction assessment to hiring the wrong crew and the inability to complete the project on time and on budget. Bidding before obtaining and analyzing all needed information can begin a very slippery slope.

Recovery is nearly impossible if your organization also suffers from misaligned processes, measurement of the wrong metrics, and ineffective hiring practices. For a user, quality is nothing but satisfaction with the appearance, performances, and reliability of the project for given price range. In the realm of project management, the schedule, cost, and quality achievement are also referred to as the iron triangle. Quality management is focused not only on product/service quality, but also the means to achieve it. Quality management therefore uses quality assurance and control of processes as well as products to achieve more consistent quality. Focus on quality is central to any successful product. Quality once defined during planning, must be not negotiated. Time, scope and cost can be negotiated (Abdul., 2011).

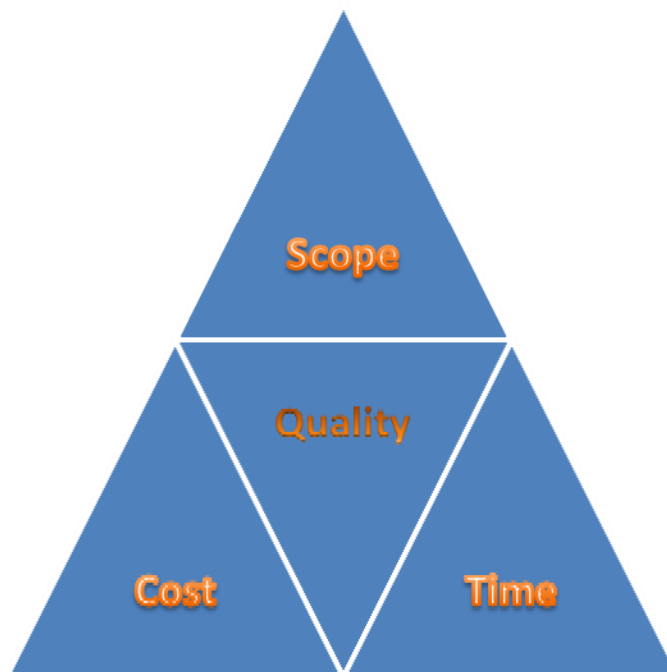


Figure 1. Quality management process (Kerzen 2009), Project Management

In many developing countries, major construction projects account for 10% of their Gross Domestic Product (GDP) and approximately 50% of the wealth invested in fixed assets (Abdul R.R., 2011) (Abdul Karim et al, 2005). Moreover, the development of the construction industry in developing countries lags far behind other industries in those countries compared to developed countries (Yimam, 2011). The nature of the industry is considered very complex since it involves many stakeholders such as owners, contractors, consultants, regulators, and suppliers (Ghoddousi et al, 2012). Each construction project is unique and that is due to its nature based on size,

budget, material, location, weather conditions, and manpower (Budawara, 2009). However, the goal of all construction projects is to build projects on time, within budget, with stated quality standards, and a healthy and safety environment. Research has shown that 20% of these construction projects fail to achieve their goal as a result of over scheduling, delays, or cost overruns that can put any construction project at risk (Archibald, 2012; Thomas, 1997).

Construction projects risks are generally perceived as events that affect the project's cost, time, and quality. The extent to which risks exist in a project is linked negatively to the likelihood of a successful outcome to any projects (Hughes, 2006). Some of these risks included labor productivity factors that lead to low productivity, which ultimately leads to project failure. That agrees with (Ugwoeri, 2012) "that low labor productivity can result in project delays and increases costs". (Hughes, 2006) states that "failure to properly manage risks often leads to increased cost, schedule, delays, disputes, claims and litigation". Since productivity has an inverse relation to cost, improving low labor productivity will not just reduce cost, but will also benefit the contractor by increasing profit margins (Ghosh, David and Murat, 2004).

In this study, various factors affecting performance quality of Airport construction projects will be examined with a view to suggesting improvement measures. This will be carried out to identify the specific actions that firms take to ensure quality in their organizations.

Therefore, the main objective of this study is to identify the factors affecting influencing quality of construction projects in Ethiopian Airports Enterprise and to determine the relative importance of these factors.

1.2. Statement of the problem

The construction industry like any other production industry is facing with challenges that affect the performance and output of the endeavor. Identifying potential critical factors that affect the quality performance of median or big scale contractors before the commencement of projects will ensure client satisfaction at the completion of project. Establishment and achievement of acceptable levels of quality in construction projects has long been a problem, 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. In developed countries,

(Long, Jha, and Iyer ,2004) remarked that quality problems arise in large construction projects due to incompetent designers/contractors, poor estimation and change management, social and technological issues, site related issues and improper techniques and tools. Identified project performance categories such as people, cost, time, quality, safety and health, environment, client satisfaction, and communication (Cheung,2004).

It is noticed that there are several problems in the construction industry caused by bad quality control, and the situation seems to get worse. Projects are frequently late, over budget and suffer from poor workmanship and materials.

Conflict is increasing, resulting in litigation and arbitration with depressing regularity. Quality performance (QP) is a management tool that is aimed at giving necessary information to identify quality improvement opportunities for better performance and productivity (Abdul ., 2011).

In the project management, the schedule, cost and quality achievement are also referred to as the iron triangle. Out of these three aspects, the achievement of schedule and cost compliances of the project management is attending most of the time.

This results in a halfhearted attempt to achieve quality at project sites. For project owners, there are many benefits to working only with contractors having formal quality management protocols. For one, working with such a contractor will reduce project costs and completion time, while enhancing safety. Moreover, there are many reasons and factors which attribute to such this problem. In the Ethiopian Airports Enterprise, there are many construction projects which are failing in quality. In addition, performance measurement systems are not effective or efficient to overcome such this problem.

Despite the construction industry's significant contribution to the economy of developing countries and the critical role it plays in those countries' development, the performance of the industry remains generally low. As Idoko, (2008) noted, many projects in developing countries encounter considerable time and cost overruns, fail realize their intended benefit or even totally terminated and abandoned before or after their completion. Moreover, the development of the construction industry in developing countries generally lags far behind from other industries in those countries and their counter parts in developed nations. Generally, as (Ofori, 2006 and Jekale, 2004)] concluded, the construction industry in developing countries failed to meet

expectations of governments, clients and society. In addition, there are other indicators of quality construction projects in the Ethiopian Airports Enterprise such as project managers, coordination between participants, monitoring, and feedback and leadership skills. However, there are important issues related to failures and problems of quality construction projects in the Ethiopian Airports Enterprise which are poor management system, social and technological issues, corruption and contractor incompetence. Generally, the key problem of Ethiopian Airports Enterprise is ownership problem. Clearly there is need for growth of the construction industry in Ethiopia to match the developed economic. Despite a significant amount of investigation already being undertaken to examine quality failures and their causes in construction projects. Previous studies have addressed factors influencing performance of building construction project, however those studies have given little attention to quality of construction projects in Ethiopian Airports Enterprise giving a dearth gap in the existing literature, this study will address the above gap by addressing quality of building construction projects and evaluate the factors affecting the performance of construction projects in the Ethiopian Airports Enterprise in order to assist owners, consultants and contractors to overcome performance problem and to improve performance of their construction projects. Hence, performance of any construction projects can be evaluated according to key performance indicators. The previous recent study had not been conducted on the quality of construction of airport in the setting area on which current study was conducted. This condition motivated the researcher to conduct this study on these setting areas.

1.3. Objectives of the study

1.3.1. General Objective

The general objective of the study was to examine the factors influencing quality of construction projects in Ethiopian Airports Construction Projects.

1.3.2 Specific Objectives

- To determine how quality of labor influence on quality of construction projects in Ethiopian Airports Enterprise.
- To explore the influence of contract administration on quality of construction project in Ethiopian Airports Enterprise.

- To examine influence of construction materials on the quality of construction projects in Ethiopian Airports Enterprise.
- To establish influence of construction equipment on quality of construction projects in Ethiopian Airports Enterprise
- To determine influence of funds on the quality of construction projects in Ethiopian Airports Enterprise
- To evaluate the project management actions of Ethiopian Airports Enterprise that affect project quality of construction projects in Ethiopian Airports Enterprise.

1.4. Research Questions

These were different important questions to be answered in the major problem addressed in the research.

- ☞ To what extent does availability of labor influence quality of construction projects in Ethiopian Airports Enterprise?
- ☞ Do construction materials influence quality of construction projects in Ethiopian Airports Enterprise?
- ☞ To what extent does construction equipment influence quality of construction projects in Ethiopian Airports Enterprise?
- ☞ To what extent do funds influence quality of construction projects in Ethiopian Airports Enterprise?
- ☞ How can contract administration influence the quality of construction projects in Ethiopian Airports Enterprise?
- ☞ Does project management actions that influence the quality of construction projects in Ethiopian Airports Enterprise?

1.5. Significance of the study

The significance of this study will be identifying the factors affecting the quality performance of Airport construction projects. This finding can be useful to Ethiopian Airports enterprise and the relative importance of each factor, is an essential first step towards establishing methods for a real improvement of building construction projects in Ethiopia. Again, the finding of this study will help inform policy makers on factors that have implications on quality of construction projects. Policy makers will further be in a better position to formulate, design and implement policies that would ensure quality of construction projects all over the country. It also assists in highlighting pitfalls that contractors can avoid not to be blacklisted as defaulters by the relevant government authority. This study may also assist contractors to understand the behavior of the materials market to bid accurately for tenders. This is paramount for contractors since they may cushion themselves appropriately and thus avoid the effects that may affect them.

1.6. Scope of the study

The scope covers factors affecting quality performance of Ethiopian Airports Construction projects at all particularly Addis Ababa Bole International Airport and Jimma Aba Jifar Airport. These included the client, consultants, contractors, sub-contractors and end users whose individual and collective level of compliance to quality standards contribute to Airport construction project delivery. This study had focused on labor influence construction materials influence, construction equipment influence, funds influence, contract administration influence and management actions.

1.7. Limitation of the Study

The main objective of this study was to assess the factors influencing quality of construction projects in Ethiopian Airports Enterprise so that the limitation of the study was the absence of other setting areas in addition to Ethiopian Airports Enterprise. There was challenges to collect data from top management of the organization, construction companies, contractors, national government officials and other stakeholders who are generally busy due to the nature of their work. This would affect the response rate. To overcome this challenge the researcher delivered

and picked the questionnaire was delivered at their convenience. Anyway, issues of contract administration and contractors cash flow problems in relation to projects being a highly sensitive issue will pose a challenge with many players in the construction industry being skeptical and unwilling to provide information for this study. These challenges were dealt with amicably by allowing only those willing to participate in the study. The questionnaires might not be submitted back to the researcher on time. Furthermore, the respondents might not be highly enlightened on issues relating to the study.

1.8. Definition of significant terms

Buildings - a structure with a roof and walls standing permanently in one place, such as a house or a factory.

Construction _ is the clearing, dredging, excavating, and grading of land and all other activities associated with putting up of buildings, structures or other types of real property such as bridges and dams or roads.

Construction material _ items or supply consumed or used in a construction project.

Construction equipment _ equipment used in construction project which may be mobile, semi-permanent, or permanent, intended for heavy works such as lifting containers, drilling holes.

Contractor _ assembles and allocates the resources of labor, equipment and materials to the project in order to achieve completion at maximum efficiency in terms of time, quality and cost.

Competent personnel _ are the ability of an individual to do a job.

Costs overrun _ the amount by which actual costs exceed the baseline or approved costs.

Consultant _ in this study the consultants are quantity surveyors, Architects, Engineers and technicians who are involved professionally in construction of projects.

Construction project _ this are projects involves building or constructing of infrastructures.

Factors are a condition that causes a result or the one of element.

Funds are financial resources or amount of money that is used for special purpose.

Influence is the gradual or unseen operation of some cause.

Infrastructure is the basic physical and organizational structures and facilities such as buildings and roads needed for the operation of a society or an enterprise.

Labor is the aggregate of all human physical and mental effort used in creation of goods and services.

Quality is fitness for use or a degree of excellence.

1.9. Organization of the Study

The study was organized in to five chapters. Chapter one contains the background of the study, statement of the problem and purpose of the study. This was followed by the research objectives, research questions, relevance of study, scope of study, limitation of study, and definition of significant terms and concludes with the organization of the study.

Chapter two covered the literature review from various sources to establish work done by other researchers, their findings, conclusions and identification of knowledge gaps which forms the basis of setting objectives and research questions of the study. The theoretical and conceptual frameworks were also explained.

Chapter three covered the research design, target population of the study, sample size and sampling procedures. This was followed by data collection procedures, data collection instruments, validity of the instruments, reliability of instruments, data analysis techniques, ethical considerations and concludes with operational definition of variables.

Chapter four covered the findings form data analysis, presentation of findings and interpretation of findings. It concluded with the summery of the chapter.

Chapter five covered the summary of findings, discussions, conclusions and recommendations of the study. It was concluded with suggested areas for further research and contribution to the body of knowledge.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter contains relevant literature on the incidence of quality of construction projects in Ethiopian Airports Enterprise from global, national and local perspectives. The chapter also offers theoretical, empirical and conceptual frameworks on which the study is based.

2.2. Global review of quality in construction project

Quality is one of the important key performance indicators of a construction project which may cause cost overrun and time delays. According to Kerzner (2006) quality is those products and services that are perceived to meet the needs and expectations of the customer at a cost that represents outstanding value. However, the perception of poor quality of contractors has turned out to be of great concern to stakeholders. Poor quality has potentially reduced the level of employment rate, influenced the completion time of projects due to re-work and ultimately pushing client's budget beyond reach.

Contractor quality is critical to the success of any construction project since improved contractor quality performance leads to increase client satisfaction, an improvement in the reputation of contractor and hence completeness in the market (Xiao and Proverbs, 2003). Success of building construction projects depends mainly on success of performance. Many previous researches had been studied performance of construction projects. Dissanayaka and Kumaraswamy (1999) remarked that one the principle reasons for the construction industry's poor performance has been attributed to the inappropriateness of the chosen procurement system. 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. Thomas (2002) identified 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.

Chan and Kumaraswamy (2002) stated that construction time is increasingly important because it often serves as a crucial benchmarking for assessing the performance of a project and the efficiency of the project organization. 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 (PPI) is needed. Pheng and Chuan (2006) obtained that human factors played an important role in determining the performance of a project, Ugwu and Haupt (2007) remarked that both early contractor involvement (ECI) and early supplier involvement (ESI) would minimize constructability-related performance problems including costs associated with delays, claims, wastages and rework, etc. (Ling, Jha and Iyer.2007) obtained that the most important of practices relating to scope management are controlling the quality of the contract. It was recommended for foreign firms to adopt some of the project management practices highlighted to help them to achieve better project performance in China.

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. Ogunlana et al (1996) stated that the construction industry performance problems in developing economies can be classified in three layers: problems of shortages or inadequacies in industry infrastructure (mainly supply of resources), problems caused by clients and consultants and problems caused by contractor incompetence/inadequacies. Okuwoga (1998) identified that the performance problem is related to poor budgetary and time control(Ling, Jha and Iyer 2004) remarked that performance problems arise in large construction projects due to many reasons such as: incompetent designers/contractors, poor estimation and change management, social and technological issues, site related issues and improper techniques and tools. Navon (2005) stated that the main performance problem can be divided into two groups: (a) unrealistic target setting

(i.e., planning) or (b) causes originating from the actual construction (in many cases the causes for deviation originate from both sources).

Samson and Lema (2002) found that the traditional performance measurement systems have problems because of large and complex amount of information with absence of approaches to assist decision maker understand, organize and use such information to manage organizational performance. Navon (2005) remarked that traditional project performance control is usually generic (e.g., cost control techniques). It relies on manual data collection, which means that it is done at low frequency (normally once a month) and quite some time after the controlled event occurred (i.e., not in real-time).

Moreover, manual data collection normally gives low quality data. Ling et al (2007) remarked that architectural, engineering and construction (AEC) firms may face difficulties managing construction projects performance in China because they are unfamiliar with this new operating environment. Kim et al (2008) stated that international construction projects performance is affected by more complex and dynamic factors than domestic projects; frequently being exposed to serious external uncertainties such as political, economic, social, and cultural risks, as well as internal risks from within the project.

In order to address quality related issues, several studies have been conducted indifferent countries. Chua et al (1999) have developed a hierarchical model for construction project success for different project objectives. For quality objectives they find that it influenced by four main project aspects, namely; project characteristics, contractual arrangements, project participants, and interactive processes. Arditi and Gunaydin (1998) find 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. Pheng (2004), through case studies, and better employee job satisfaction. Bubshait and Al-Atiq (1999) observe that a contractor's quality assurance system, which ensures consistent quality, is essential in preventing problems and the reoccurrence of problems.

His survey also points to the lack of documentation of a quality system for most of the contractors. Abdel-Razek (1998) has studied the quality improvement methodology and finds

that 'improvement of employee satisfaction' is the most important area in contributing quality improvement in Egypt. Ledbetter (1994) has developed a quality performance management system (QPMS) that tracks labor costs in three main categories: normal work, quality management work (prevention and appraisal), and rework (deviation correction). He has assumed the cost of quality to be the sum of quality management and rework. He finds QPMS to be useful in promoting awareness and improving the understanding of the quality process in addition to facilitating communication, reducing the overall cost of quality, and human resources; who end up failing; the regulation of building contractors cannot be overemphasized given that they are responsible for construction of the structures occupied by the government agency.

Generally in every country, construction regulation authorities are established to harmonize construction laws found in statutes which may contradict each other, curb uncontrolled and unchecked physical planning of building and construction, control and enforce the mechanisms on the application of the building code in the construction industry, prevent easy entry and penetration of unqualified contractors, and improve on the bureaucratic requirements and procedures in approval of construction plans. Further, construction regulation authorities eliminate corruption cases in the building industry, emphasize on both material quality and contractor performance, and revise the building codes to ensure relevance (Nahinja, 2004).

2.3. Factors that influence quality of construction projects

The quality problems in construction are different and varied. The construction quality is based on the organization's characteristics, procedure of working, and contractor follows the drawings and specifications under defined budgets, skill of labor, quality of materials and applied equipment. Several studies have been conducted on factors affecting the quality of any kinds of construction project. The management issues were the most important factors that affected construction quality for developed economic of countries. (Chua, D.K.H. et al. 1999). The most important factors affecting quality of building construction project during the construction in developing countries are the characteristics of site layout, skill and experience of site staff, characteristics of design documents and using equipment, materials, quality and labor management systems and the owner quick response in making decisions.

According to Adenuga and Afolarin (2013) found that five most important factors affecting quality of public housing projects comprising of poor communication of design of requirements by owners, poor labor skills and supervision, lack of clarity in project design and build ability problems, availability of skilled labor and availability of materials. Another study Ali and Wen (2011) finds out the factors that contribute to poor workmanship and possible measures to minimize the problem. The factors contribute to poor workmanship in construction through literatures, they are poor project management, complicated role of subcontractor, lack of experience and competency of labors, language barrier to communication and lack of communication, unsuitable construction equipment, bad weather condition, limited time and limited cost. Nevertheless, they suggested six possible ways to minimize the workmanship quality problem; strict supervision, training and education, proper communication among parties involved, proper construction management, proper manpower management, and proper design.

According to Janipha and Ismail (2013) developed the conceptualization of quality issues in Malaysian construction environment. The research emphasized to investigate the quality issues in current situation. The list of quality issues was obtained from literature review and preliminary interviews. The result arranged from the most affect to the lowest one in the construction environment, it shows that the material supply by supplier, supplier relationship and communication, and project supervision, project information and documentation, quality culture and attitude, competitive bidding, nature of construction environment and management commitment, respectively.

According to Cao (2010) mentioned that causing of quality problems consists of problems concerning the construction procedures and regulations; problems of design and calculation; substandard materials and products; out of control of construction and management; the influence of natural conditions; improper use of facilities. Another study (Abdul , 2011,Abdul,2012) investigated the causes of quality failures in the building construction projects. The results discovered top five causes of quality failure that insufficient skill levels among workers, inadequate reviews of the design and engineering drawings, lack of site layout studies, poor quality improvement programs, and lack of training personnel. The top three factors as barrier to improve quality in construction industry are: lack of skilled labors, awarding of

contracts to the lowest bidder, and lack of effective teams and/or team building skills, respectively.

2.4. Availability of labor and quality of construction projects

According to Chan (2010) labors have an important role toward improving quality of the project. Highly experienced labor is among the main sub-factors influencing quality. Low wages and very few job opportunities in developing countries adversely impacted the labor force where highly qualified labors are avoided to minimize the contract prices. Competence of the workers is the ability of an individual to do a job (Chan A.P and Tam C.M., 2000). Competencies included all the related knowledge, skills, abilities, and attributes that from a person's job. This set of context-specific qualities is correlated with superior job performance and can be used as a standard against which to measure job performance as well as to develop, recruit, and hire employee. Motivation of labor, skill of labor, physical fatigue, a shortage of experienced labor, and level of education, labor age, and lack of competition, labors is loyalty, and labor personal problems influence performance of a projects (Cooke, B. and Williams P. 2003).

The contractor's involvement in supervision is important especially if work is subcontracted. Lack of information and overlapping activities, which are common on construction sites, may result in rework, high costs, and low-quality performance. Effective coordination by the different teams of site staff may increase the effectiveness of the work and project completion (Fisk, 1997). According to Pheng and Chuan (2006) obtained that human factors played an important role in determining the performance of a project if 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 must 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. For example, the contractor cannot cast concrete before an inspection of the formwork and steelwork, thus influencing labor productivity (Zakeri et al ,1996). With non-completion of the required work according to the specifications and drawings, supervisors may ask for the rework of a specific task. Supervisors' absenteeism stops the work totally for activities that require their

attendance, such as casting concrete and backfilling, further delaying inspection of the completed work which in turn, leads to delays in starting new work.

2.5. Construction materials and quality of construction projects

Materials (including raw materials, finished products, semi-finished products, components and parts) are material conditions of construction, and material quality is one of necessary conditions to ensure construction quality. (Cheng Hu, 2010) main contents of quality control of materials: material procurement. According to (Brown Andrew and Adams John, 2000), the adaptation of a good material management system helps in improving quality of the project. Controlling the delivery time of construction material to the site leads easement of implementation of different construction activities and decreases interruptions. One of the major sub-factors highlighted by the respondents that affect quality is the availability of good quality construction materials. Most countries in Africa, the resources of the construction materials have been monopolized. Therefore, the availability good material with reasonable market prices is not guaranteed at most times. (Chua et al. 1999)

2.6. Construction Equipment and quality of building construction projects

According Liang Shilian (2010) construction machinery and equipment are essential facilities for the modern construction, reflecting the construction power of the enterprise, and having a direct impact on the project progress and quality. The quality control is to make the type and performance parameters of construction machinery and equipment match the conditions, technology and other factors of the construction site. The contractor should select construction machinery and equipment in accordance with advanced technology, economic rationality, production application, reliable performance and safety, with the applicability and reliability to a specific project then the performance parameters should be made sure correctly in accordance with the requirements of construction and quality assurance. For example, the strength of tensile force of lifting jack must be larger than the maximum tension required in the procedure construction machinery and equipment should be regularly calibrated, so as not to mislead the operator.

2.7. Availability of funds and quality of construction projects

The financial power of the contractor has a pivot role in completing the project on time and with the stated performance requirements. Financial problems and lack of cash flow will adversely affect the progress of projects. Most ongoing projects in developing countries are donor funded projects. In most cases, the donors stipulate their own payment conditions. The prolonged procedure and payments duration as well as the different systems followed by these donors confuse the contractors and result in financial problems this affect the performance of the project (Elchaig, Boussabinain and Ballal T. 2005). According to Chen (2007) mentions that for a project to be successful there should be adequate fund allocated to finance its completion. Jackson, (2010) added that project funds availability is an important factor that influences delivery a project. Sambasivan and Soon, (2007) stated that reports are an essential way of keeping everyone informed and therefore managers should manage the project, plan for the project and monitor. Also, the structure of the industry is fragment with increasing number of small companies and consolidation of large companies.

2.8. Project Management Actions and Quality of Construction Projects

Project management action is a key for project success (Hubbard, 1990). Jaselkis and Ashley (1991) suggested that by using the management tools, the project managers would be able to plan and execute their construction projects to maximize the project's chances of success. Then, the variables in project management included adequate communication, corruption, control mechanisms, feedback capabilities, troubleshooting, coordination effectiveness, decision making effectiveness, monitoring, project organization structure, plan and schedule followed, and related previous management experience (Walker and Vines, 2000).

Infrastructure service provision is a sector known for its association with corruption. Corruption in the construction industry often results from a combination of the highly competitive nature of the construction tendering process, a lack of transparent selection criteria for many projects, tight margins, close relationships between contractors, subcontractors and (sometimes) project owners, and cronyism in the industry, poorly trained, under supervised and unregulated work as well as the inadequate training of engineers and builders. Corruption in construction projects can reduce the efficiency, effectiveness and equity of infrastructure services. Corrupt practices can

occur at every phase of a construction project: during planning, inspection, design, bid and contract signing, construction, service delivery and operation and maintenance.

A project can be characterized by a few elements such as objectivity as it is definable with result, output or product, complexity with normally interrelated activities and large number of different tasks, unique where it is usually a “one-off” assignment, uncertainty as it has element of risk, temporary with its well defined beginning and end and lastly operate in a life cycle as emphasis and resource needs change during the life of the project. In contrary, project management is defined as the process of controlling the achievement of the project objectives, using the existing organizational structures and resources and manage the project by applying a collection of tools and techniques without interrupting the routine operation of a company (Munns & Bjeirmi, 1996). Some of the functions of project management are defining the work requirement, allocating resource needs, planning the execution of work required, monitoring the progress of the work and acting to unexpected events that took place (Munns & Bjerimi, 1996). According to Kerzner (2009), most individuals recognize the quantitative tools for planning, scheduling, and controlling work. It is essential that project managers comprehend completely the operations of each department. The only way to minimize risk is for organizations to plan better. Since organizations now exist in turbulent environment where competition, uncertainty and unprecedented complexity of new task has become the order of the day, one will unarguable recommend project management as one of the methodologies to foster better planning. These have become one of the reasons why more organizations are integrating project management as a way of life in their endeavor.

2.9. Theoretical Framework

Six Sigma is a business improvement approach that seeks to find and eliminate causes of defects and errors in manufacturing and service processes. Six Sigma was developed in 1980s in manufacturing industry and became popular as a process improvement method. Total quality management which is a management philosophy focuses on continually work processes (Body, 2009). Particularly, Six Sigma became a useful method as a performance indicator and process improve for the companies from different industry. Increasing numbers of companies start to integrate the full implications of Six Sigma (Llorens-Montes and Molina, 2006). Six Sigma is a

quality improvement technique based on statistics, was used firstly by Motorola in the 1980s. It helps to decrease costs, increase quality by improving process and reduce the production time (Llorens-Montes and Molina, 2006). Six Sigma has statistical and business perspectives and its applications are improved by Six Sigma Academy (Llorens-Montes and Molina, 2006).

A process improvement method under Total Quality Management included process Cost Model. Quality costs are one of the most important success factors of a quality management system. So, poor quality impact on cost and performance should be measured in order to warn company management who can realize preventive actions and beneficial activities (Aoieonget al., 2002). For that, measurements of quality costs by process Cost Model have been introduced by (Aoieong et al., 2002) for construction industry.

The main purpose of this model is to measure quality costs of specific processes rather than the quality costs of total project (Tang et al., 20004). Process Cost Model which uses financial theory is a process-oriented perspective for customer satisfaction and continuous process improvement (Stewart and Spencer, 2006). Kaizen Model is another process improvement perspective which was developed by Japanese and has contributed their economic growth considerably (Stewart and Spencer, 2006). Eliminating wastes, managing time and cost and reduction of services values are the main aim of Kaizen (Atta, 1999). However, the integration of total quality management and Kaizen might be difficult since the aims and ideas of them are like each other (Stewart and Spencer, 2006).

Six Sigma is a continuous cycle for quality improvement.

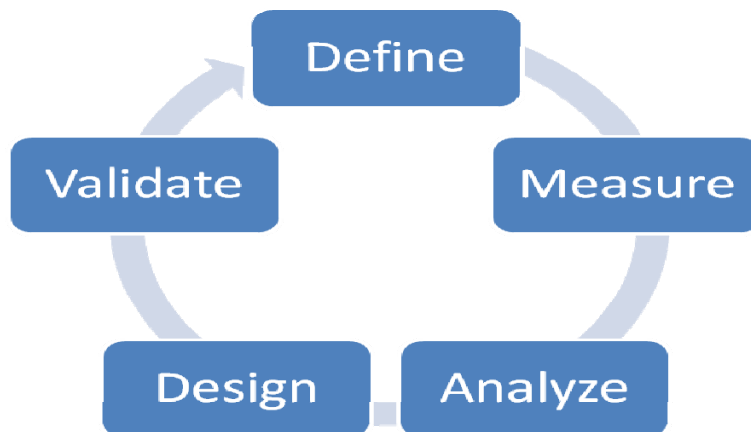


Figure 2. A continuous cycle for quality improvement (Brown Andrew and Adams John. 2000)

2.10. Conceptual Framework

A conceptual framework is a brief explanation of the relationships between the variables identified for study in the statement of the problem, objectives and research questions. In this research, the conceptual framework will be the concise description of the phenomenon under study accompanied by visual depiction of the variables under study (Mugenda and Megenda, 2008). In figure 1 below shows the relationship between the independent variable and the dependent variables, intervening variables and the moderate variables. The independent variables included availability of labor, construction materials, construction equipment and availability of funds, the intervening variables included; owner specifications and climate condition during construction. Moderate variable included government policies and project characteristics, and the dependent variable is quality of construction project.

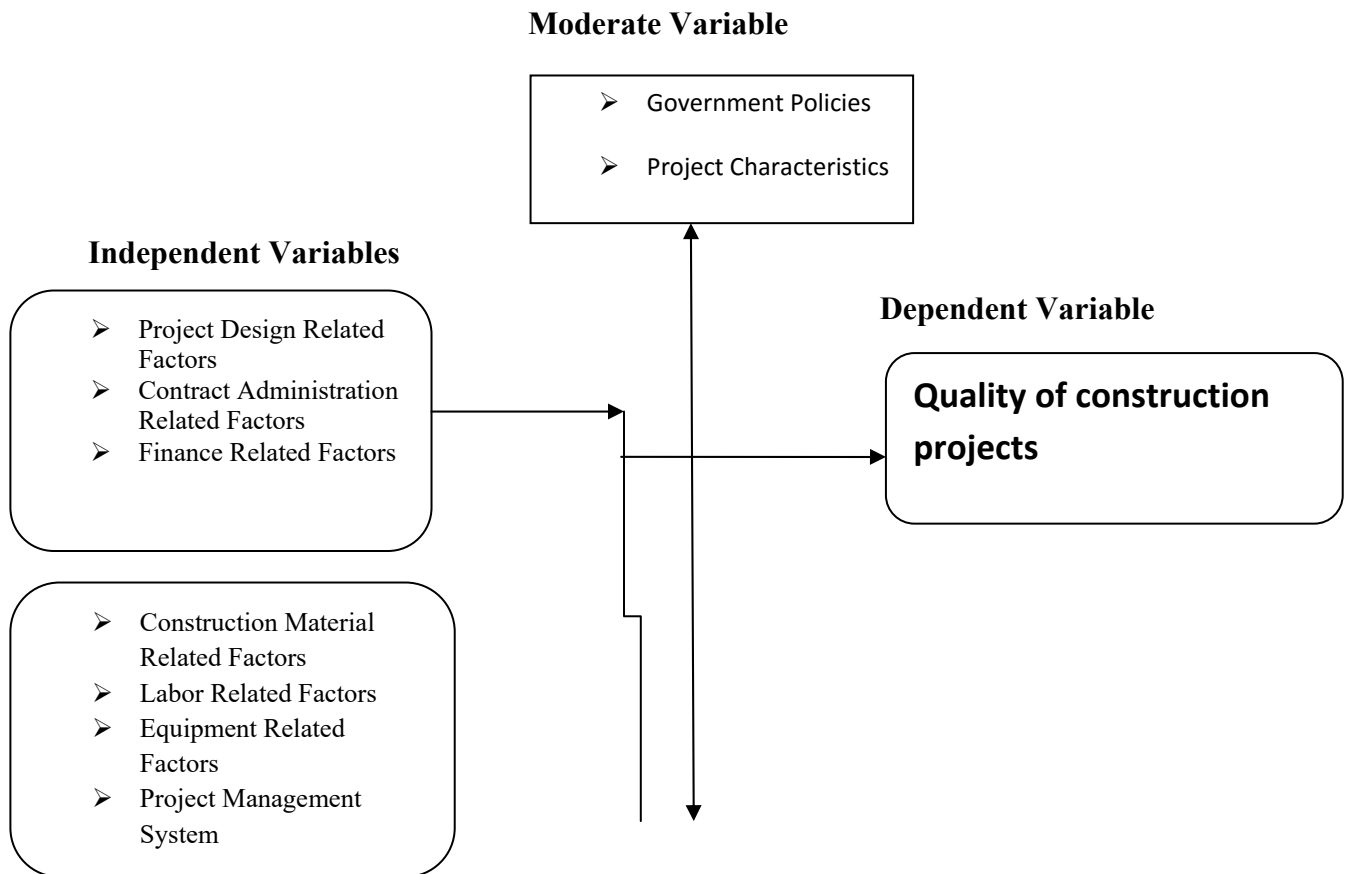


Figure 3: Conceptual framework (sources: Mugenda and Megenda, 2008)

Variables are measurable characteristic that assumes different values among the subjects. It is a variable that a researcher manipulates in order to determine its effect or influence on another variable while independent variables also called predictor variable in this case the independent variables are; availability of labor, construction material, construction equipment, availability of funds, contract administration, and project management actions all predict the amount of variation that occurs in the dependent variable which is quality of construction projects. The intervening variables and moderate variable also contribute in predicating the amount of variation that occurs in the dependent variable. In this case the intervening variable included; owner specifications and climate condition during construction, while moderate variable included government policies and project characteristics.

2.11. Research gaps

Many construction project proposals have been crafted but only to be left to gather dust on shelves merely because the cost is enormous and cannot be sustained. Overtime, the costs of putting up a viable investment in Ethiopia has been of great concern. Many investment proposals fail to materialize, or some stagnate as a result of lack of finances. This is mainly attributed to the rapid increase in the cost of construction. The difference between ex-ante and ex-post contract prices is significant. According to Kariuki (2010), contractors worldwide as well as Ethiopia have experienced cost overruns in projects leading to low profits, zero profits or even losses in some instances and some of the causes of cost overrun included sudden increase in materials prices and poor timing of resource procurement. The resulting effects are many which may include lack of enough and sustainable development, compromise on the quality of construction products and timely delivery of projects which indeed has a cost factor attached due to extended preliminaries.

Wachira (1996) reveals factors such as national and local shortages of labor and construction materials, a credit squeeze and sudden increase in the price of construction materials or components or fuel influence construction projects. The problem of increase in fuel and construction materials prices impacts severely both developers and contractors. The government has made various efforts to improve the management of the construction industry under the Ministry of Urban Development and Construction. These efforts have been carried out in the

various Ministries, Departments and Agencies that have a stake in the Ministry of Urban Development and Construction. However, despite of all these building construction materials have gone up and quality of construction projects has been influenced. Previous local study had not been conducted on this topic in the current setting area of this study. Therefore, this study attempts to investigate the causes and factors influencing quality of Airport construction projects at Ethiopian Airports Enterprise.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

This chapter focused on the research methods used to find answers to the research objectives. The research design, target population, sampling procedures and sample size, data collection methods, reliability and validity of the data collection instruments and procedures, and finally, the data analysis and ethical considerations is presented in the chapter.

3.2. Research Design

This research followed descriptive survey research method with quantitative and qualitative research approaches. In quantitative and qualitative, we combine two data collecting approaches, which were qualitative and quantitative approaches. It was used descriptive survey design with a mixed approach, more of quantitative was employed. The descriptive research type of research design helps to identify and evaluate the causal relationships between the different variables under consideration. Mixed methods provides better (stronger) inferences. Therefore, by using a mixed approach it can capitalize the strength of quantitative and qualitative approach and remove any biases that exist in any single research method (Creswell, 2003). This study used stratified simple random sample technique since the respondents were taken from four groups.

3.3. Source of Data

Both primary and secondary source were used to capture the data. Primary data were collected through structured questioners which were filled by project managers while secondary data, which obtained from different reports and journals.

3.4. Target population of the Study

Target population is the total number of the subjects of interest to the researcher. The study targeted all the 125-top management of construction companies, contractors, consultants, sub-contractors, national government officials and project owners or clients in Ethiopia as shown in

table 3.1 below. The researcher used respondents involved in Addis Ababa Bole International Airport and Jimma Aba Jifar Airport construction projects at International level and Domestic level, respectively as a shown in the table below.

Table 3.1: Target Population

Categories	Total no.	Respondents
Contractors	30	30
Sub-contractors	25	25
Consultants	30	30
Project owners	20	20
National government officials	20	20
Total	125	125

3.5. Sampling and sampling techniques

Sampling is a procedure, process or technique of choosing a sub- group from a population to participate in the study Kothari (2004). The sample is a smaller group or sub-group obtained from the accessible population such as owners, consultants and contractors. The population was select in such a way as to ensure that certain sub-groups in the population were not rejected. Since the total population are small the researcher does not sample hence used census that is capturing the entire population of the clients, contractors, sub-contractors, consultant, and national government officials. Since the numbers of the total population was manageable, all the total population of the two Airports was taken as respondents through census.

3.6. Methods of Data Collection

Two sets of data which relevant to the effective conduct of this research namely; primary and secondary. The primary data which refers to field data is obtained using well-structured questionnaire and interviews developed from the initial identification of likely factors influencing quality of Airport construction projects in a case study of Ethiopian Airports Enterprise (EAE). The questionnaires was designed to elicit information on the following: the respondent's role in construction, how long the respondent has been in construction, influence of construction materials on quality of building construction projects, extent which availability of funds and lab our influence of construction materials on quality of building construction projects. The questionnaires and interviews were administering to contractors, clients/owners and

consultant to gather information on factors influencing quality of construction projects in Ethiopian Airports Enterprise. Secondary data through the review of various relevant literatures was used in the course of carrying out the research. Generally, the scales of the variables were ordinal scales. The questionnaire and interviews was validated by my supervisor before administration.

3.7. Validity of the instrument

The instrument used to collect quantitative data and qualitative data were used to triangulate the results that had obtained through quantitative approach and qualitative approach. It is the degree to which the test items measure a quality for which the test was designed (Kothari, 2004). Validity is the accuracy, soundness or effectiveness with which an instrument measures what it is intended to measure (Kumar, 2005). The questionnaires and interviews were reviewed by a experts in the field of the study. They were request to identify the content validity and to what extent it is suitable to be used as an instrument to realize the goals and aims of this research. The panel ensures that the items adequately represented concepts that cover all relevant issues under investigation.

3.8. The Research Process

The study had followed different steps like designing the gap of study that followed with basic questions and general and specific objectives design , selecting the closely related review literatures to the topic of this study, adopting appropriate methodology in this study, collection of data by the method of through survey question, analyzing the collected data and identifying the findings under the conclusion part of the study based on the analysis made of this study and presenting recommendations based on the identified findings of this study were the processes that had followed in this study.

CHAPTER FOUR

4. DATA ANALYSIS, PRESENTATION AND INTERPRETATION

In this part of the study, different phases and steps were followed in the analysis and interpretations of the data that were collected for this study. In the first part of the analysis the data that were collected on the demographic information of sample respondents of this study were analyzed and followed with discussions. In the second part of the analysis, the data that were collected from the sample respondents through questionnaire were analyzed and followed with text explanations. In the last part of the study the data that were reviewed from reports were analyzed qualitatively with text explanation.

4.1. Analysis and Discussions on the Demographic information of respondents

The personal information of sample respondents like,sex,age,educational qualifications and working experinces were analyzed and prsented in table 4.1.1 as follows.

Table 4.1.1. Analysis and disscussions on the demographic informations of respondents

No	Variables	Alternatve Items	Frequency	Percent
1	Sex:	Male	107	85.60
		Female	18	14.40
2	Age in years	21-30	15	12.00
		31-40	25	20.00
		41-50	65	52.00
		51 and above	20	16.00
3	Educational qualification	Diploma	12	9.60
		First degree	93	74.40
		Second degree and above	20	16.00
4	Work experience in years	5years and below	18	14.40
		6 – 10	32	25.60
		11 – 15	35	28.00
		Above 15years	40	32.00
5	Marital Status	Single	34	27.20
		Married	91	72.80

Source: own survey 2019

As indicated in the above table 4.1.1. 107(85.60%) of the respondents of this study were male respondents and 18(14.40%) of the respondents were female respondents. This indicated that most of the respondents of this study were male respondents.

As it was shown in the above table 4.1.1 the ages of the respondents of this study were ranged between below 21 and 51 and above years. The highest percent of ages of the respondents was ranged between 41 and 50 years and the second highest percent of ages of the respondents was ranged between 31 and 40 years. The last percentages of the ages of the respondents was ranged between 21 and 30 years; 12(9.60%) of the educational qualifications of the respondents was diploma, 93(74.40%) of the educational qualifications of the respondents was first degree and 20(16%) of the educational qualifications of the respondents was second degree and above.

As it was indicated in the above table 4.1.1 the working experiences of the respondents were ranged between 5 years and below 18(14.40%) and above 15 years 40(32%) of the working experiences of the respondents was above 15 years that encompassed the highest percent of the respondents. 18(14.40%) of working experiences of the respondents was that encompassed the least percent of the respondents.

4.2. Analysis of Data that Collected through Questionnaire

43 closed-ended questions and 2 open ended were designed to collect the quantitative and the qualitative data from 125 sample respondents of two Airports. Close-ended 5 Scale Likerted questions were designed on the factors influencing the construction quality in the Airport construction projects. The collected data were analyzed and presented in the following tables and followed with discussions.

Table 4.2.1. Components of Work experiences and sources of problems on the quality construction

Components of Work experiences		Frequency	Percent	valid Percent
Items included	Airport Road Construction	56	44.80	44.80
	Airport Building Project	34	27.20	27.20
	Hotel projects	10	8.00	8.00
	Residential building	25	20.00	20.00
Total		125	100	100

Source: own survey 2019

As it was shown the types of the project in which respondents were involved include: 56(44.80%), 34(27.20%), 10(8%) and 25(20%) Airport Road Construction, Airport Building Projects, Hotel projects and Residential building, respectively.

Table 4.2.2. Components of Work experiences

Components of Work Experiences		frequency	percent	valid percent
Items included	Less than 2 years	12	9.60	9.60
	3-5 years	25	20.00	20.00
	6-10 years	40	32.00	32.00
	More than 10 years	48	38.40	38.40
Total		125	100	100

Source: own survey 2019

In the above table 4.2.2, items related to the involvements years of the participants in the construction projects of the airport Work experiences and sources of problems on the quality construction were designed, responses were collected, analyzed in the above table and discussed. 9.60%, 20.00%, 32% and 38.40% of the responses of respondents had indicated as the work experiences of the respondents had been ranged between less than two years and more than 10 years. The highest percentage of the respondents working experiences was more than 10 years and the second highest range of working experiences was between 6 and 10 years and the least range of working experiences of the respondents were ranged less than two years. This implies that respondents' different working experiences had provided their responses for this study.

Table 4.2.3 The quality of construction

The Construction Projects		Frequency	Percent	Valid percent
Items included	High Quality	7	5.60	5.60
	Medium Quality	20	16.00	16.00
	Low Quality	98	78.40	78.40
	Total	125	100	100

Source: own survey 2019

As it was shown in the above table on the evaluation of the quality of projects at Ethiopian Air ports Enterprise, the responses of the respondents had shown that 7(5.60%), 20(16%) and 98(78.40%) responses had indicated that the quality of projects at Ethiopian Air ports Enterprise are high, medium and low respectively. This implies that the quality of the majority of construction at Ethiopian Air ports Enterprise was low and Per the standard.

Table 4.2.4. Components of sources of problems on the quality construction

Sources of problems		Frequency	Percent	Valid percent
Items included	Problem in project design	21	16.80	16.8
	Problems related to Finance	23	18.40	18.40
	Problem related to labor	19	15.20	15.20
	problems related to technology	13	10.40	10.40
	Contract administration	15	12.00	12.00
	Management problems	16	12.80	12.80
	Problem related to material	18	14.40	14.40
Total		125	100	100

Source: own survey 2019

In the above table 4.2.4, seven items related to sources of problems on the quality construction were identified; responses were collected, analyzed in the above table and followed with discussions as follows. As it was indicated and presented in the above table the factors that contributed for the low quality of construction Ethiopian Air ports Enterprise were Problem in project design 21(16.80%), Problems related to Finance 23(18.40%), Problem related to labor 19(15.20%), problem related to technology 13(10.40%), Contract administration 15(12%), Problem related to project Management problems 16(12.80%) and Problem related to construction material 18(14.40%).

Table 4.2.5. Who is affected by the quality problem

Sources of problems		Frequency	Percent	Valid percent
Items included	Contractor	30	24.00	24.00
	Client employee	20	16.00	16.00
	Sub-contractors	9	7.20	7.20
	Consultant	20	16.00	16.00
	Engineer	46	36.80	36.80
Total		125	100	100

Source: own survey 2019

As it was indicated groups that suffer most in the event of poor quality of construction projects at Ethiopian Airport enterprise were Contractor 30(24%), Client employee 20(16%), Sub-contractors 9(7.20%), Consultant 20(16%) and Engineer 46(36.80%).

Table 4.2.6. Effect of poor quality projects

Sources of problems		Frequency	Percent	Valid percent
Items included	Cost for Maintenance	30	24.00	24.00
	Impact on Profitability	10	8.00	8.00
	Low quality service	15	12.00	12.00
	Impact on competitiveness	24	19.20	19.20
	Inefficient use of resources	46	36.80	36.80
Total		125	100	100

Source: own survey 2019

As it was indicated in the above table the poor quality of projects Ethiopian Airport enterprise had affected by Incurring additional cost for Maintenance 30(24%), Impact on Profitability 10(8%), Low quality service to clients 15(9.20%), Impact on competitiveness 24(19.20%) and Inefficient use of resources 46(36.80%).

4.3. Factors affecting Quality of construction projects

Indicate the extent to which each of the following factors affecting quality of construction projects at Ethiopian Airports Enterprise by circling the appropriate number assuming the following keys; such are 4 – very high effect, 3 – high effect, 2 – medium effect, 1 – low effect, and 0 – no effect at all.

4.3.1. Project Design Related Factors

Table 4.3.1.1. The extent in which project drawings are prepared in full details

The extent in which project drawings are prepared in full details		Frequency	Percent	Valid percent
Items included	No effect at all	10	8.33	8.33
	Low effect	20	16.00	16.00
	Medium effect	65	50.00	50.00
	High effect	18	14.40	14.40
	Very high effect	12	9.60	9.60
Total		125	100	100

Source: own survey 2019

The first item was designed to assess the extent in which project drawings are prepared in full details. The responses of 10(8.33%) and 20(16.00%) were shown as the extent in which project drawings are prepared in full details had been no influence and had low influence on the quality of the construction projects. However, the significance of percent 65(50%),18(14.40%) and 12(10%) had indicated that the extent in which project drawings are prepared in full details had influenced at medium level, high level and at very high level respectively.

Table 4.3.1.2. The extent in which frequent Change of Specifications

The extent in which frequent Change of specifications		Frequency	Percent	Valid percent
Items included	No effect at all	9	7.20	7.20
	Low effect	20	16.00	16.00
	Medium effect	66	52.80	52.80
	High effect	18	14.40	14.40
	Very high effect	12	9.60	9.60
Total		125	100	100

Source: own survey 2019

The second item was designed to assess the extent in which frequent Change of specifications .The responses of 9(7.20%) and 20(16.66%) indicated as the extent in which frequent Change of specifications had been no influence and had low influence on the quality of construction projects. However, the significance of percent 66(52.80%), 18(14.40%) and 12(9.60%) had indicated that the extent in which project frequent change of specifications had influenced at medium level, high level and at very high level respectively.

Table 4.3.1.3. The extent in which the design Conformance to codes

The extent in which the design Conformance to codes		Frequency	Percent	Valid percent
Items included	No effect at all	10	8.00	8.00
	Low effect	18	14.40	14.40
	Medium effect	67	53.60	53.60
	High effect	17	13.60	16.60
	Very high effect	13	10.40	10.40
Total		125	100	100

Source: own survey 2019

The third item was designed to assess the extent in which the design Conformance to codes and standards. The responses of 10(8%) and 18(14.40%) were shown as the extent in which the design Conformance to codes and standards no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 67(53.60%), 17(13.60%) and 13(10.40%) had indicated that the design Conformance to

codes and standards had influenced at medium, high and very high respectively.

Table 4.3.1.4. The extent in which Adherence to Specifications

The extent in which Adherence to Specifications		Frequency	Percent	Valid percent
Items included	No effect at all	10	8.00	8.00
	Low effect	15	12.00	12.00
	Medium effect	73	58.40	58.40
	High effect	19	15.20	15.20
	Very high effect	10	8.00	8.00
Total		125	100	100

Source: own survey 2019

The fourth item was designed to assess the extent in which adherence to specifications. The responses of 10(8%) and 15(12%) were shown as the extent in which adherence to specifications had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses; 73(58.40%), 19(15.20%) and 10(8%) had indicated that the extent in which adherence to specifications. Had influenced at medium, high and very high respectively.

Table 4.3.1.5. The extent in which Bill of quantity is detailed and accurate

The extent in which Bill of quantity is detailed and accurate		Frequency	Percent	Valid percent
Items included	No effect at all	9	7.20	7.20
	Low effect	16	12.80	12.80
	Medium effect	71	56.80	56.80
	High effect	19	15.20	15.20
	Very high effect	10	8.00	8.00
Total		125	100	100

Source: own survey 2019

The item was designed to identify the extent in which Bill of quantity is detailed and accurate. The responses of 9(7.2%) and 10(8.00%) were shown as Bill of quantity is detailed and accurate had no influence and had very high influence on the quality of construction of Airport. However, the significant percent of responses; 71(56.8%),

19(15.20%) and 16(12.80%) had indicated that the Bill of quantity is detailed and accurate had influenced at medium, high and low respectively.

4.3.2. Contract Administration Related Factors

Table 4.3.2.1. Transparent project Awarding System

Transparent project Awarding System		Frequency	Percent	Valid percent
Items included	No effect at all	5	4.00	4.00
	Low effect	8	6.40	6.40
	Medium effect	75	60.00	60.00
	High effect	24	19.20	19.20
	Very high effect	13	10.40	10.40
Total		125	100	100

Source: own survey 2019

The first item was designed to identify transparent project awarding system. The responses of 5(4%) and 8(6.40%) were shown as transparent project awarding system had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses; 75(60%), 24(19.20%) and 13(10.40%) had indicated that the transparent project awarding system had influenced at medium, high and very high respectively.

Table 4.3.2.2. A written contract with clear conditions

A written contract with clear conditions		Frequency	Percent	Valid percent
Items included	No effect at all	5	4.00	4.00
	Low effect	7	5.60	5.60
	Medium effect	76	60.80	60.80
	High effect	24	19.20	19.20
	Very high effect	13	10.40	10.40
Total		125	100	100

Source: own survey 2019

The second item was designed to assess a written contract with clear conditions. The responses of 5(4%) and 7(5.60%) were shown as absence of a written contract with clear conditions had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 76(60.80%), 24(19.20%) and 13(10.40%) had indicated that the transparent project awarding system had influenced at medium, high and very high respectively.

Table 4.3.2.3. Pervious successful relations between Parties

Pervious successful relations between parties		Frequency	Percent	Valid percent
Items included	No effect at all	5	4.00	4.00
	Low effect	7	5.60	5.60
	Medium effect	80	64.00	64.00
	High effect	20	16.00	16.00
	Very high effect	13	10.40	10.40
	Total	125	100	100

Source: own survey 2019

The third item was designed to examine pervious successful relations between parties. The responses of 5(4%) and 7(5.60%) were shown as absence of pervious successful relations between parties had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 80(64%), 20(16.00%) and 13(10.40%) had indicated that the successful relations between parties had influenced at medium, high and very high respectively.

Table 4.3.2.4. Good and fair subcontracting conditions

Good and fair subcontracting conditions		Frequency	Percent	Valid percent
Items included	No effect at all	6	4.80	4.80
	Low effect	7	5.60	5.60
	Medium effect	82	65.60	65.60
	High effect	18	14.40	14.40
	Very high effect	12	9.60	9.60
	Total	125	100	100

Source: own survey 2019

The fourth item was designed to identify good and fair sub-contracting conditions. The responses of 6(4.80%) and 7(5.60%) were shown as absence of good and fair sub-contracting conditions had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 82(65.60%), 18(14.40%) and 12(9.60%) had indicated that the successful relations between parties had influenced at medium, high and very high respectively.

Table 4.3.2.5. Using a system to evaluate Contractor/Sub-contractors' performance

Using a system to evaluate contractor/ sub-contractors' performance		Frequency	Percent	Valid percent
Items included	No effect at all	4	3.20	3.20
	Low effect	9	7.20	7.20
	Medium effect	82	65.60	65.60
	High effect	18	14.40	14.40
	Very high effect	12	9.60	9.60
Total		125	100	100

The fifth item was designed to assess using a system to evaluate contractor/ subcontractors' performance; 3.2%, 7.20%, 65.60%, 14.40 and 9.60 of the responses as absence of using a system to evaluate contractor/ sub-contractor's performance had no effect, low effect, medium effect, high effect and very high on the quality of the construction respectively.

4.3.3. Construction Material Related Factors

Table 4.3.3.1. Using a comprehensive material management system

Using a comprehensive material management system		Frequency	Percent	Valid percent
Items included	No effect at all	5	4.00	4.00
	Low effect	11	8.80	8.80
	Medium effect	79	63.20	63.20
	High effect	17	13.60	13.60
	Very high effect	13	10.40	10.40
Total		125	100	100

Source: own survey 2019

The first item was designed to identify using a comprehensive material management system. The responses of 5(4. %) and 11(8.80%) were shown as absence of using a comprehensive material management system had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 79(63,20%), 17(13.60%) and 12(9.60%) had indicated that using a comprehensive material management system had influenced at medium, high and very high respectively.

Table 4.3.3.2. Cooperation between contractor and material suppliers

Cooperation between contractor and material suppliers		Frequency	Percent	Valid percent
Items included	No effect at all	4	3.20	3.20
	Low effect	12	9.60	9.60
	Medium effect	79	63.20	63.20
	High effect	18	14.40	14.40
	Very high effect	12	9.60	9.60
Total		125	100	100

Source: own survey 2019

The second item was designed to assess cooperation between contractor and material suppliers. The responses of 5(4. %) and 11(8.80%) were shown as cooperation between contractor and material suppliers had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 79(63,20%), 17(13.60%) and 12(9.60%) had indicated that the using a cooperation between contractor and suppliers had influenced at medium, high and very high respectively.

Table 4.3.3.3. Availability of good quality construction materials

Availability of good quality construction materials		Frequency	Percent	Valid percent
Items included	No effect at all	5	4.00	4.00
	Low effect	11	8.80	8.80
	Medium effect	80	64.00	64.00
	High effect	19	15.20	15.20
	Very high effect	10	8.00	8.00
Total		125	100	100

Source: own survey 2019

The third item was designed to examine availability of good quality construction materials. The responses of 5(4. %) and 11(8.80%) were shown as availability of good quality construction

materials had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 80(64%), 19(15.20%) and 10(8%) had indicated that the using an availability of good quality construction materials had influenced at medium, high and very high respectively

Table 4.3.3.4. Using material storage and handling system

Using material storage and handling system	Frequency	Percent	Valid percent
Items included	No effect at all	4	3.20
	Low effect	12	9.60
	Medium effect	80	64.00
	High effect	18	14.40
	Very high effect	11	8.80
	Total	125	100

Source: own survey 2019

The fourth item was designed to identify using material storage and handling system. The responses of 4(3.20 %) and 12(9.60%) were shown as using material storage and handling system had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 80(64%), 19(15.20%) and 10(8%) had indicated that the using material storage and handling system had influenced at medium, high and very high respectively.

Table 4.3.3.5. Construction materials supplier's monopoly

Construction materials supplier's monopoly	Frequency	Percent	Valid percent
Items included	No effect at all	3	2.40
	Low effect	13	10.40
	Medium effect	80	64.00
	High effect	19	15.20
	Very high effect	10	8.00
	Total	125	100

Source: own survey 2019

The fifth item was designed to assess construction materials suppliers' monopoly. The responses of 3(2.40 %) and 13(10.40%) were shown as construction materials suppliers' monopoly had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 80(64%), 19(15.20%) and 10(8%) had indicated that the using construction materials supplier's monopoly had influenced at medium, high and very high respectively.

4.3.4. Labour Related Factors

Table 4.3.4.1. Experience and competency of supervisor

Experience and competency of supervisor		Frequency	Percent	Valid percent
Items included	no effect at all	4	3.20	3.20
	low effect	12	9.60	9.60
	medium effect	65	52.00	52.00
	high effect	34	27.20	27.20
	Very high effect	10	8.00	8.00
	Total	125	100	100

Source: own survey 2019

The first item was designed to identify experience and competency of supervisor. The responses of 4 (3.20 %) and 12(9.60%) were shown as absence of experience and competency of supervisor had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 65(52%), 34(27.20%) and 10(8%) had indicated that the absence of experience and competency of supervisor had influenced at medium, high and very high respectively

Table 4.3.4.2. Lack of timely supervision and inspection

Lack of timely supervision and inspection		Frequency	Percent	Valid percent
Items included	no effect at all	3	2.40	2.40
	low effect	12	9.60	9.60
	medium effect	66	52.80	52.80
	high effect	33	26.40	26.40
	Very high effect	11	8.80	8.80
	Total	125	100	100

Source: own survey 2019

The second item was designed to assess lack of timely supervision and inspection. The responses of 3 (2.40 %) and 12(9.60%) were shown as lack of timely supervision and inspection had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 66(52.80%), 33(26.40%) and 11(8.80%) had indicated that the lack of timely supervision and inspection had influenced at medium, high and very high respectively.

Table 4.3.4.3. Skills and experience of workers

Skills and experience of workers		frequency	percent	valid percent
Items included	no effect at all	3	2.40	2.40
	low effect	11	8.80	8.80
	medium effect	68	54.40	54.40
	high effect	32	25.60	25.60
	Very high effect	11	8.80	8.80
Total		125	100	100

Source: own survey 2019

The third item was designed to examine skills and experience of workers. The responses of 3 (2.40 %) and 11(8.80%) were shown as absence of skills and experience of workers had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 68(54.40%), 32(25.60%) and 11(8.80%) had indicated that the absence of skills and experience of workers had influenced at medium, high and very high respectively.

Table 4.3.4.4. Training opportunities

Training opportunities		Frequency	Percent	Valid percent
Items included	no effect at all	4	3.20	3.20
	low effect	10	8.00	8.00
	medium effect	68	54.40	54.40
	high effect	33	26.40	26.40
	Very high effect	10	8.00	8.00
Total		125	100	100

Source: own survey 2019

The fourth item was designed to identify training opportunities. The responses of 4 (3.20 %) and 10(8. %) were shown as absence of training opportunities had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 68(54.40%), 33(26.40%) and 10(8%) had indicated that the absence of absence of training opportunities had influenced at medium, high and very high respectively.

Table 4.3.4.5. Income level and wages of labor

Income level and wages of labor		Frequency	Percent	Valid percent
Items included	no effect at all	3	2.40	2.40
	low effect	10	8.00	8.00
	medium effect	69	55.20	55.20
	high effect	34	27.20	27.20
	Very high effect	9	7.20	7.20
Total		125	100	100

Source: own survey 2019

The fifth item was designed to assess income level and wages of labor. The responses of absence of income level and wages of labor had highly influence 3(2.40 %) and 10(8%) were shown as income level and wages of labor had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 69(55.20%), 34(27.20%) and 9(7.20%) had indicated that the income level and wages of labor had influenced at medium, high and very high respectively.

4.3.5. Equipment Related Factors

Table 4.3.5.1. Availability of equipment

Availability of equipment		Frequency	Percent	Valid percent
Items included	no effect at all	3	2.40	2.40
	low effect	9	7.20	7.20
	medium effect	70	56.00	56.00
	high effect	33	26.40	26.40
	Very high effect	10	8.00	8.00
Total		125	100	100

Source: own survey 2019

The first item was designed to identify availability of equipment. The responses of 3(2.40 %) and 9(7.20%) were shown as absence of availability of equipment had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 70(56%), 33(26.40%) and 9(7.20%) had indicated that the availability of equipment had influenced at medium, high and very high respectively.

Table 4.3.5.2. Equipment management system

Equipment management system		frequency	percent	valid percent
Items included	no effect at all	4	3.20	3.20
	low effect	8	6.40	6.40
	medium effect	67	53.60	53.60
	high effect	36	28.80	28.80
	Very high effect	10	8.00	8.00
Total		125	100	100

Source: own survey 2019

The second item was designed to assess equipment management system. The responses of absence of equipment management system had highly influenced the 4 (3.20 %) and 8(6.40%) were shown as. equipment management system had no influence and had low influence on the quality of construction of Airport. However, the percent of responses, 67(53.60%), 36(28.80%) and 10(8%) had indicated that the equipment management system had influenced at medium, high and very high respectively.

Table 4.3.5.3. Technology of mechanical equipment

Technology of mechanical equipment		Frequency	Percent	Valid percent
Items included	no effect at all	2	1.60	1.60
	low effect	5	4.00	4.00
	medium effect	70	56.00	56.00
	high effect	36	28.80	28.80
	Very high effect	12	9.60	9.60
Total		125	100	100

Source: own survey 2019

The third item was designed to examine technology of mechanical equipment. The responses of 2 (1.60 %) and 5(4%) were shown as absence of technology of mechanical equipment had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 70(56%), 36(28.80%) and 12(9.60%) had indicated that the technology of mechanical equipment had influenced at medium, high and very high respectively.

Table 4.3.5.4. Good utilization of equipment

Good utilization of equipment		Frequency	Percent	Valid percent
Items included	no effect at all	3	2.40	2.40
	low effect	7	5.60	5.60
	medium effect	60	48.00	48.00
	high effect	40	32.00	32.00
	Very high effect	15	12.00	12.00
	Total	125	100	100

Source: own survey 2019

The fourth item was designed to identify good utilization of equipment. The responses of 3(2.40 %) and 7(5.60%) were shown as absence of good utilization of equipment had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 60(48%), 40(32%) and (12%) had indicated that the good utilization of equipment had influenced at medium, high and very high respectively.

Table 4.3.5.5. Components of Equipment Related Factors

Regular Equipment maintenance		Frequency	Percent	Valid percent
Items included	no effect at all	2	1.60	1.60
	low effect	8	6.40	6.40
	medium effect	60	48.00	48.00
	high effect	40	32.00	32.00
	Very high effect	15	12.00	12.00
	Total	125	100	100

Source: own survey 2019

4.3.6. Project Management Related Factors

Table 4.3.6.1. Project Planning and Scheduling

Project Planning and Scheduling		Frequency	Percent	Valid percent
Items included	no effect at all	4	3.20	3.20
	low effect	6	4.80	4.80
	medium effect	15	12.00	12.00
	high effect	71	56.80	56.80
	Very high effect	39	31.20	31.20
	Total	125	100	100

Source: own survey 2019

The first item was designed to identify Project Planning and Scheduling. The responses of 4(3.20 %) and 6(4.80%) were shown as Project Planning and Scheduling had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 71(56.80%), 39(31.20%) and 15(12%) had indicated that project Planning and Scheduling had influenced at high, very high and medium respectively.

Table 4.3.6.2. Using integrated project execution System

Using integrated project execution System		Frequency	Percent	Valid percent
Items included	no effect at all	3	2.40	2.40
	low effect	8	6.40	6.40
	medium effect	70	56.00	56.00
	high effect	39	31.20	31.20
	Very high effect	15	12.00	12.00
	Total	125	100	100

Source: own survey 2019

The second item was designed to assess Using integrated project execution System. The responses of 3(2.40 %) and 8(6.400%) were shown as Using integrated project execution System had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses; 70(56%), 39(31.20%) and 15(12%) had indicated that Using integrated project execution System had influenced at medium, high and very high respectively highly influenced the quality of the construction.

Table 4.3.6.3. Implementing a safety program

Implementing a safety program		frequency	Percent	Valid percent
Items included	no effect at all	4	3.20	3.20
	low effect	9	7.20	7.20
	medium effect	72	57.60	57.60
	high effect	30	24.00	24.00
	Very high effect	10	8.00	8.00
	Total	125	100	100

Source: own survey 2019

The third item was designed to examine implementing a safety program. The responses of absence of adequate communication systems had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 70(56%), 39(31.20%) and 15 (12%) had indicated that implementing a safety program had influenced at medium, high and very high respectively highly influenced the quality of the construction.

Table 4.3.6.4. Implement quality control and assurance system

Implement quality control and assurance system		Frequency	Percent	Valid percent
Items included	no effect at all	4	3.20	3.20
	low effect	6	4.80	4.80
	medium effect	71	56.80	56.80
	high effect	39	31.20	31.20
	Very high effect	15	12.00	12.00
	Total	125	100	100

Source: own survey 2019

The fourth item was designed to identify implementing quality control and assurance system. The responses of 4(3.20 %) and 6(4.80%) were shown as absence of adequate implementing quality control and assurance system had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 71(56.80%), 39(31.20%) and 15(12%) had indicated implement quality control and assurance system had influenced at medium, high and very high respectively highly influenced the quality of the construction.

Table 4.3.6.5. Controlling and monitoring mechanism

Controlling and monitoring mechanism		Frequency	Percent	Valid percent
Items included	no effect at all	3	2.40	2.40
	low effect	8	6.40	6.40
	medium effect	15	12.00	12.00
	high effect	70	56.00	56.00
	Very high effect	39	31.20	31.20
	Total	125	100	100

Source: own survey 2019

The fifth item was designed to assess controlling and monitoring mechanism. The responses of 3(2.40 %) and 8(6.40%) were shown as absence of adequate controlling and monitoring mechanism had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 70(56%), 39(31.20%) and 15(12%) had indicated that controlling and monitoring had influenced at high, very high and medium respectively highly influenced the quality of the construction

4.3.7. Finance Related Factors

Table 4.3.7.1. Contractors cash flow problem

Contractors cash flow problem		Frequency	Percent	Valid percent
Items included	no effect at all	2	1.60	1.60
	low effect	7	5.60	5.60
	medium effect	70	56.00	56.00
	high effect	40	32.00	32.00
	Very high effect	6	4.80	4.80
	Total	125	100	100

Source: own survey 2019

The first item was designed to identify influence of contractor's cash flow problem the responses of 2(1.60 %) and 7(5.600%) were shown as presence of contractor's cash flow problem had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 70(56%), 40(32%) and 6(4.80%) had indicated that contractors cash flow problem had

influenced at medium, high and very high respectively highly influenced the quality of the construction.

Table 4.3.7.2. Payment by the Clients

Payment by the Clients		Frequency	Percent	Valid percent
Items included	no effect at all	3	2.40	2.40
	low effect	7	5.60	5.60
	medium effect	65	52.00	52.00
	high effect	40	32.00	32.00
	Very high effect	10	8.00	8.00
	Total	125	100	100

Source: own survey 2019

The second item was designed to assess the honoring payment by the clients. The responses of 3(2.40 %) and 7(5.60%) were shown as absence of adequate the honoring payment by the clients had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 65(52%), 40(32%) and 10(8%) had indicated that honoring payment by the clients had influenced at medium, high and very high respectively highly influenced the quality of the construction.

Table 4.3.7.3. Increase in price of Material and Labor

Increase in price of Material and Labor		Frequency	Percent	Valid percent
Items included	no effect at all	4	3.20	3.20
	low effect	6	4.80	4.80
	medium effect	63	50.40	50.40
	high effect	42	33.60	33.60
	Very high effect	10	8.00	8.00
	Total	125	100	100

Source: own survey 2019

The third item was designed to examine increase in price of material and labor. The responses of 4(3.20 %) and 6(4.80%) were shown as presence of increase in price of material and labor had no influence and had low influence on the quality of

construction of Airport. However, the significant percent of responses, 63(50.40%), 42(33.60%) and 10(8%) had indicated that increase in price of material and labor had influenced at medium, high and very high respectively highly influenced the quality of the construction.

Table 4.3.7.4. Foreign exchange for purchasing machineries frequency

Foreign exchange for purchasing machineries frequency		Frequency	Percent	Valid percent
Items included	no effect at all	3	2.40	2.40
	low effect	7	5.60	5.60
	medium effect	65	52.00	52.00
	high effect	40	32.00	32.00
	Very high effect	10	8.00	8.00
	Total	125	100	100

Source: own survey 2019

The fourth item was designed to identify foreign exchange for purchasing machineries. The responses of 3(2.40 %) and 7(5.60%) were shown as absence of adequate foreign exchange for purchasing machineries had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 65(52%), 40(32%) and 10(8%) had indicated that foreign exchange for purchasing machineries had influenced at medium, high and very high respectively highly influenced the quality of the construction.

Table 4.3.7.5. Source of Finance for the Project

Source of finance for the project		frequency	Percent	Valid percent
Items included	no effect at all	4	3.20	3.20
	low effect	8	6.40	6.40
	medium effect	63	50.40	50.40
	high effect	40	32.00	32.00
	Very high effect	10	8.00	8.00
	Total	125	100	100

Source: own survey 2019

The fifth item was designed to assess source of finance for the project. The responses of 4(3.20 %) and 8(6.40%) were shown as absence of adequate source of finance for the project had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 63(50.4%), 40(32%) and 10(8%) had indicated that source of finance for the project had influenced at medium, high and very high respectively highly influenced the quality of the construction.

Table 4.3.7.6. Inflation

Inflation		Frequency	Percent	Valid percent
Items included	no effect at all	3	2.40	2.40
	low effect	7	5.60	5.60
	medium effect	67	53.60	53.60
	high effect	38	30.40	30.40
	Very high effect	10	8.00	8.00
	Total	125	100	100

Source: own survey 2019

The sixth item was designed to identify the influence of inflation. The responses of 3 (2.40 %) and 11(5.60%) were shown as presence of inflation had no influence and had low influence on the quality of construction of Airport. However, the significant percent of responses, 67(53.60%), 38(39.40%) and 10 (8%) had indicated that inflation had influenced at medium, high and very high respectively highly influenced the quality of the construction.

Table 4.4. the average mean scores of the factors from least influencing to the highly influencing factors.

Components of the factors	Average mean scores	Standard deviation
Project Management System	3.50	0.934
Project Design Related Factors	3.56	0.954
Equipment Related Factors	3.57	0.955
Contract Administration Related Factors	3.58	0.959
Labour Related Factors	3.60	0.968
Finance Related Factors	3.60	0.968
Construction Material Related Factors	3.66	0.973

Source: own survey 2019

The average mean scores had been analyzed for the factors which have been influencing the construction of the Ethiopian Airport. The study focused on project design related factors, contract administration related factors, construction material related factors, labour related factors, equipment related factors, project management system and finance related factors. The factors were ordered from the least influencing factor to the highly influencing factors based on the average mean scores that had been analysed based on sub-comments of these factors as it was indicated and presented in the table below.

Table 4.5. Table of ANOVA to show difference among the four groups of respondents on the factors

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14.482	9.09	3.620	4.070	.330
Within Groups	101.057	113.636	2.020		
Total	115.536	122.727			

The above ANOVA table had shown there is no significant difference among the four group respondents on the listed factors on which the quantitative data had been collected and analyzed in one-way ANOVA as it was indicated in the above table in the column of significance rate. This indicates that all the respondents have similar opinion on the factors affecting quality of construction projects at Ethiopian Airports Enterprise.

4.6. Analysis on the document review

Document review had been conducted focusing on the agreement document, on report documents, on the time under agreement, on receiving the completed project and clearances that had been given for the contractor and on the document of supervisors. As it was indicated on these documents they were many complaint documents, warning reports that had been written for the contractors, concerning the quality the review documents had indicated as the employees of the construction projects were also punished due to the un punctuality on their work place , the

Jimma Aba Jifar Airport construction had been blow the standard they were employees those who had been fired from their position due to this reasons.

Furthermore, the qualitative data obtained from the document review also indicated that the projects were not completed in the required time line and it required the additional fund since the employees those have been employed as the permanent positions of employments have paid salary. When the time line of construction was extended, the quality of the construction martial those which used on the constructions process lose their quality.

4.7. Discussions

This discussion was focused on triangulating the results that obtained through quantitative data collecting approach and qualitative data collecting approach. The quantitative approach was used to collect data through questionnaire .Questionnaire was designed and data were collected quantitatively. The collected data were analyzed and the findings of this study were identified.

The qualitative approach particularly document review was used to collect the qualitative data. The qualitative data that had been collected through document review, the results were identified and discussed through text explanations.

The results that obtained through quantitative approach and through qualitative approach were similar and they the results that had obtained through both approaches were supporting each other this confirmed the validity of this study.

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. SUMMARY OF FINDINGS

This study was designed to assess the factors influencing quality of construction projects; a case of Ethiopian Airports Enterprise. The study was organized in to five chapters. In the first part of the study the background of the study were designed focusing on the previous works of researchers and scholars through reviewing carefully based on the related points to the topic of this study and followed with the statement of the problem in which the gap of the study was identified and purpose of the study was determined.

In the second part of the study, the literature review from various sources to establish work done by other researchers, their findings, conclusions and identification of knowledge gaps which forms the basis of setting objectives and research questions of the study. The theoretical and conceptual frameworks were also explained.

In the third part of the study points which were covered were the research design, target population of the study, sample size and sampling procedures. This was followed by data collection procedures, data collection instruments, validity of the instruments, reliability of instruments, data analysis techniques, ethical considerations and concludes with operational definition of variables.

In the fourth part of the study the collected quantitative data like, like demographic data, data collected through questionnaire were analyzed and presented in tables and followed with text explanations. On the basis of the analysis made of this study the direction of getting the findings were identified.

In the last part of the study the summary of the study, conclusions and recommendations were presented in this study.

5.2. Conclusions

The main objective of this study was to assess factors influencing quality of construction projects under Ethiopian Airports Enterprise. To achieve the intended objective of this study descriptive survey method with qualitative and quantitative approach was the research design adopted. Quantitative approach was used in this study for collecting the quantitative data collected from 125 respondents of two Ethiopian Airports Enterprise. Census was used to select the respondents since the total populations were selected as the respondents of this study. Data were collected from respondents through five scale Likerted close-ended questionnaire. The collected quantitative data were analyzed in mean standard deviation and central tendency to give meaningful conclusion for the data that analyzed in descriptive statistic. The qualitative data that were collected through document review were discussed in text explanations. On the basis of the analysis made of this study, the conclusions were made, and the findings of this study were identified and presented with the research questions side by side as follows.

The first research question was asked to identify the extent at which availability of labor influence quality of construction projects in Ethiopian Airports Enterprise. The result of this study had indicated that availability of labor influence quality of construction projects in Ethiopian Airports Enterprise is high. According to Chan (2010) labors have an important role toward improving quality of the project. Highly experienced labor is among the main sub-factors influencing quality. Labors are loyalty, and labor personal problems influence performance of projects (Cooke, B. and Williams P. 2003). Previous studies of (Cooke, B. and Williams P. 2003) and Chan (2010) had supported this current study.

The second research question was asked to assess the presence of construction materials influence on quality of construction projects in Ethiopian Airports Enterprise. The result of this study had shown as construction materials had influenced the quality of construction projects in Ethiopian Airports Enterprise. The previous study had supported this current study in that this previous study stated that Materials (including raw materials, finished products, semi-finished products, components and parts) are material conditions of construction, and material quality is one of necessary conditions to ensure construction quality(Cheng Hu, 2010) main contents of quality control of materials: material procurement.

The third research question was asked to identify the extent at which construction equipment influence quality of construction projects in Ethiopian Airports Enterprise. The result of this study had indicated that absence of adequate construction equipment had highly influenced the quality of construction projects in Ethiopian Airports Enterprise. The current finding of this study had been supported by the previous study that had been conducted by Liang Shilian (2010) since he found that construction machinery and equipment are essential facilities for the modern construction, reflecting the construction power of the enterprise, and having a direct impact on the project progress and quality in his previous study.

The fourth research question was asked to assess the extent at which availability of funds influence quality of construction projects in Ethiopian Airports Enterprise. The result of this study had shown that the extent at which availability of funds influence quality of construction projects in Ethiopian Airports Enterprise was high. This current finding was supported by the previous study that had been done Chen (2007) since he had mentioned that for a project to be successful there should be adequate fund allocated to finance its completion. Jackson, (2010) added that project funds availability is an important factor that influences delivery of a project.

The last research question was asked to identify the presence of influence of project management practices on the quality of construction projects in Ethiopian Airports Enterprise. The result of this study had indicated that project management practices had influenced the quality of construction projects in Ethiopian Airports Enterprise. The key problems of factors affecting quality of construction projects at Ethiopian Airports Enterprise are ownership problem. This current finding is similar with the previous that had been done by (Walker and Vines, 2000) since the management tools like monitoring; project organization structure, plan and schedule were stated as factors that affected the quality of construction in this previous study.

5.3. Recommendations

Based on the above findings the following recommendations are given:

- Quality and the adequacy construction materials of construction projects in Ethiopian Airports Enterprise should be improved in advance. The contractors and designers need to be compelled to follow strictly to the required standards of materials for construction of store buildings. This will ensure that the management competence put into consideration by encouraging those in management to embrace risk management practices such as risk identification, quantification, monitoring and mitigation to help prevent risks and improve quality (safety).
- Project management practices affect quality of construction projects in Ethiopian Airports Enterprise All managerial levels should be participated with sensitive and important decision-making. Continuous coordination and relationship between project participants are required through project life cycle in order to solve problems and develop project quality performance.
- Adequate funds should plan for construction projects in Ethiopian Airports Enterprise.
- Adequate construction equipment should be supplied to the construction projects of Ethiopian Airports Enterprise.
- Availability and skillful labor should be employed for construction projects of Ethiopian Airports Enterprise.
- These factors would suggest that successful project management requires planning with a commitment to complete the project; careful appointment of a skilled project manager; spending time to define the project adequately; correctly planning the activities in the project; ensuring correct and adequate information flows; changing activities to accommodating employees' personal goals with performance and rewards; and making a fresh start when mistakes in implementation have been identified.
- The researcher recommends other further additional researches to those who will be interested to conduct on this topic in the future. The further study should be conducted as comparative to the other construction projects like constructions at university within different setting areas of Ethiopia.

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APPENDIX

JIMMA UNIVERSITY

BUSINESS AND ECONOMICS COLLEGE

SURVEY QUESTIONNAIRE

I am a graduate student undertaking a degree in Master of Arts (MA) Degree in Project Management and Finance in the University of Jimma College of Business and Economics, Department of Accounting and Finance and I am currently conducting a research on Factors Influencing Quality of Construction Projects in Ethiopian Airports Enterprise. You have been selected to assist in providing the required information because your views are considered important to this study. I am therefore kindly requesting you to fill this questionnaire. Please note that any information given will be treated with utmost confidentiality and will only be used for the purpose of this study.

Part A. Background Information		
Organization _____	Position _____	
Educational Level: _____	Age: _____	
Specialization: _____	Sex: _____	
Experience: _____	Marital Status _____	

Part C: Construction Projects Quality Influencing Factors

Indicate the extent to which each of the following factors affect quality of projects at Ethiopian Airports Enterprise by circling the appropriate number assuming the following keys

4 = Very high effect 3 = high effect 2 = medium effect 1 = low effect 0 = no effect at all

No	Factors affecting quality of construction projects at Ethiopian Airport Enterprise	Scale				
Project Design Related Factors						
1.1	The extent in which project drawings are prepared in full details	4	3	2	1	0
1.2	The extent in which frequent Change of specifications	4	3	2	1	0
1.3	The extent in which the design Conformance to codes and standards	4	3	2	1	0
1.4	The extent in which adherence to specifications	4	3	2	1	0
1.5	The extent in which bill of quantity is detailed and accurate	4	3	2	1	0
Contract Administration Related Factors						
2.1	Transparent project awarding system	4	3	2	1	0
2.2	A written contract with clear conditions	4	3	2	1	0
2.3	Pervious successful relations between parties	4	3	2	1	0
2.4	Good and fair subcontracting conditions	4	3	2	1	0
2.5	Using a system to evaluate contractor/ subcontractors' performance	4	3	2	1	0
Construction Material Related Factors						
3.1	Using a comprehensive material management system	4	3	2	1	0
3.2	Cooperation between contractor and material suppliers	4	3	2	1	0
3.3	Availability of good quality construction materials	4	3	2	1	0
3.4	Using material storage and handling system	4	3	2	1	0
3.5	Construction materials supplier's monopoly	4	3	2	1	0
Labor Related Factors						
4.1	Experience and competency of supervisor	4	3	2	1	0
4.2	Lack of timely supervision and inspection	4	3	2	1	0

4.3	Skills and experience of workers	4	3	2	1	0
4.4	Training opportunities	4	3	2	1	0
4.5	Income level and wages of labor	4	3	2	1	0
Equipment Related Factors						
5.1	Availability of equipment	4	3	2	1	0
5.2	Equipment management system	4	3	2	1	0
5.3	Technology of mechanical equipment	4	3	2	1	0
5.3	Good utilization of equipment	4	3	2	1	0
5.5	Regular Equipment maintenance	4	3	2	1	0
Project Management System						
6.1	Project Planning and scheduling	4	3	2	1	0
6.2	Using integrated project execution system	4	3	2	1	0
6.3	Communication systems	4	3	2	1	0
6.4	Implement quality control and assurance system	4	3	2	1	0
6.5	Controlling and monitoring mechanism	4	3	2	1	0
6.6	Implementing a safety program	4	3	2	1	0
Finance Related Factors						
7.1	Contractors cash flow problem	4	3	2	1	0
7.2	Honoring payment by the clients	4	3	2	1	0
7.3	Increase in price of material and labor	4	3	2	1	0
7.4	Foreign exchange for purchasing machineries	4	3	2	1	0
7.5	Source of finance for the project	4	3	2	1	0
7.6	Inflation	4	3	2	1	0

Part D: Kindly provide any project quality affecting problems and appropriate solution for such a problem in the space provided

Part E: In your opinion which ways do you suggest will help in ensuring high quality performance in construction projects?

Thank you for your Response!!!