ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

FACTORS AFFECTING FOR ADOPTION OF DESIGN BID BUILD DELIVERY METHOD ON PROJECT TIME AND COST MANAGEMENT IN THE CASE OF SELECTED CONSTRUCTION PROJECTS AT COMMERCIAL BANK OF ETHIOPIA

BY

TIGIST DABESA DIRO

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A THESIS SUBMITTED TO ST. MARY'S UNIVERSITY SCHOOL OF GRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF ARTS IN PROJECT MANAGEMENT

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This is to certify that the thesis prepared by Tigist Dabesa Diro entitled: "factors affecting for adoption of design bid build delivery method on project time and cost management in the case of selected construction projects at commercial bank of ethiopia" and submitted in partial fulfillment of the requirements for degree of masters of project management complies the regulations of the university and meets the standards with respect to originality and quality.

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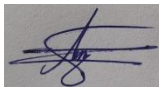
Tibebu Tulu (Ph.D.)		06/07/2024
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DECLARATION

I, Tigist Dabesa Diro the undersigned, declare that this thesis is my original work, prepared under the guidance of Dr. Muluadam Alemu. All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of learning any degree.

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ENDORSEMENT

This thesis has been submitted to St. Mary's University, School of Graduate Studies for examination with my approval as a University Advisor.

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List of Acronym

CBE	Commercial Bank of Ethiopia
DB	Design Bid
DBB	Design Bid Build
ER	Employers Requirement
ETB	Ethiopian Birr
PA	Provisional Acceptance
PDS	Project Delivery System
PM	Project Managers
PSC	Project Selection Criteria
RII	Relative Importance Index

ABSTRACT

The basic factor for the successful completion of a construction project is the proper selection and implementation of project delivery methods to meet project objectives. Therefore the main objective of this research is to determine the factors affecting the adoption of Design Bid Build Delivery Method on Project Time and Cost management in the case of selected construction projects at CBE. In this research descriptive research design was used. Census sampling was also used to determine the population size of the study. The documents reviewed revealed that all of the CBE construction projects experienced time overruns that ranged from 98.2% to 354.8%, and considering price adjustment requests cost overruns ranged from 63.98 % to 400.05% from the agreed contract time and budget. For the data analysis, simple descriptive statistics were used using SPSS software, and the RII was used to determine the relative importance of the factors. The research concluded that the major factors for time overrun due to the adoption of DBB delivery method, from client related side are slow decision making, contract scope change, and financial problems such as delayed payments. From the consultant related side, delayed and slow supervision in making decisions, absence on site, and incomplete documents. For the contractor related, delay in the delivery of materials to the site, a shortage of materials on site, and financial problems. The major factors of cost overrun due to the adoption of DBB delivery method are time delay, Material, machinery, and labor cost increment, and Inaccuracy of material take-off and estimation. Therefore, it is recommended to learn lessons from other projects which are considered as a benchmark to improve the factors that affect the adoption of DBB delivery method on time and cost management.

Keywords: *Design bid build, CBE projects, Time overrun, cost overrun*

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

The construction industry is a major contributor to any country's economy. The impact of this contribution largely depends on the successful and efficient delivery of construction projects. One of the critical success factors in any construction project is the managerial decision of the project delivery method. This is due to the fact that it has a direct effect on key performance indicators such as cost, schedule, quality, project execution, and safety Oyetunji and Anderson (2006).

According to the Commercial Bank of Ethiopia website, (2024), The Commercial Bank of Ethiopia was founded in 1942, which is the largest commercial bank in Ethiopia that introduced modern and full-fledged banking services in Ethiopia. The bank played a tremendous role in the development of the country. Accordingly, from the bank reports (2020), the bank has different construction projects in the area of high-rise buildings for headquarters, districts, and branch office purposes throughout the country. This construction project helps the bank to reduce unnecessary costs caused by office rentals and it is a way for investment.

It is acknowledged that a construction project can be considered successful and satisfy its client if it is completed by meeting the project objective. Project success can be defined as meeting goals and objectives as prescribed in the project plan. A successful project means that the project has accomplished its technical performance, maintained its schedule, and remained within budgetary costs according to Frimpong, Oluwoye, and Crawford (2003).

Construction time and cost are fundamental considerations in project management and are regarded as the most important parameters for measuring the success of any project. Poor performance of time and cost can lead to a significant amount of time and cost overrun which is a global phenomenon Memon, Rahman, & Azis,(2012).

Time is an important part of project management and includes skills such as planning, goal setting, and prioritization for better project performance. Project time management begins at the very beginning of the project by determining the required duration of the project to reach the project milestone. Failure of proper project time management leads to time overrun. Time overrun can be defined as the late completion of work as compared to the planned schedule or

contract schedule. It occurs when the progress of a contract falls behind its scheduled program. It may be caused by any party to the contract and may be a direct result of one or more circumstances. A contract delay has adverse effects on both the owner and contractor (either in the form of lost revenues or extra expenses) and it often raises the contentious issue of delay responsibility, which may result in conflicts that frequently reach the courts (Abbas, 2006). There are several causes for a project to be delayed such as inadequate project planning, changes in the project design, adverse weather conditions, lack of sufficient resources, project management gaps, unforeseen site conditions, and disputes between project stakeholders, such as the client, contractor, and consultant.

Project cost management processes related to planning cost, forecasting, budgeting, and controlling costs so that the project can be implemented within the approved budget and failure of this leads to cost overruns. Cost overrun can be considered as the difference between the actual cost of a project and its Cost limit. It occurs when the resultant cost target of a project exceeds its cost limits where the cost limit of a project refers to the maximum expenditure that the client is prepared to incur on a completed building project while the cost target refers to the recommended expenditure for each element of a project Jackson, & Steven, (2001). Some causes that can contribute to cost overruns in construction projects are inadequate estimation, changes in the project scope, lack of project management practices, time overruns, market price fluctuations, failure to identify and manage project risks effectively, contract disputes between project stakeholders (clients, contractors, and consultant).

Selecting the appropriate project delivery method is one of the most important managerial decisions as it has a direct impact on the success of the project since it affects key performance indicators such as cost, quality, schedule, and safety. Indeed, project delivery methods have evolved over the years, and there have been many variations and alternatives introduced in the construction industry to meet various consumer demands Ahmed, & El-Sayegh, (2020).

The use of an appropriate PDS can significantly increase the efficiency and the success rate of a construction project. Because each method has certain strengths and limitations, decision makers need to choose the one that best meets their specific decision-making circumstances. To do this, they first need to know what methods are available. They also need a

comprehensive understanding of how these methods work, how they vary from each other, and their strengths and limitations Ibbs, and Chih(2011).

The design-bid-build delivery method is one of the approaches to construction projects to accomplish the work. DBB, also known as the conventional method, where the owner issues two separate contracts, one with the building consultant for the design phase and the second contract with a construction professional for the execution of the project Azhar, Kang, & Ahmad,(2014).

According to Hale and Shrestha (2009), Design bid delivery is a project delivery method in which the owner enters into a contract with a consultant firm that provides design services based on the requirements provided by the owner. The consultant deliverables include plans and specifications for the construction of the project. These documents are subsequently used by the owner as the basis for making a separate contract with a construction company. Although many methods are used for awarding this contract, the most common approach is to solicit bids from different construction companies. The company providing the lowest bid will then build the project based on the documents produced by the consultant. Therefore, two separate contracts, with two separate entities, are utilized by owners to complete one construction project, including two solicitations and procurement steps.

This research covers factors affecting the adoption of Design Bid Build Delivery Method on Project Time and Cost management in the case of selected construction projects at CBE. The main purpose of the research is to assess the current practices of CBE construction project's performances for factors affecting the adoption of DBB delivery method on the project time and cost management, and how the delivery method is chosen to improve performance and successful completion of the project.

1.2. Statement of the Problem

The construction industry is one of the main sectors that provide important ingredients for the development of an economy. However, many projects experience extensive delays and thereby exceed initial time and cost estimates. Construction delays are considered to be one of project success in terms of time, cost, quality, and safety (Muhammed, 2015).

The Commercial Bank of Ethiopia is the largest bank in Ethiopia managing various construction projects for internal use. The bank has many district and branch offices throughout the country and most of them are renal. To overcome this problem also for investment purposes, there are several building projects under construction to help to own its

working space and create its brand by constructing standard buildings that can reflect the bank's history.

Project delivery method is one of the issues to be considered by management decisions to meet the objective of a project. DBB delivery method is commonly referred to as the traditional approach and it is a known way of doing business, results in competitive prices, and provides the owner exclusive control over the designer and contractor (Bender, 2003). Accordingly, the construction project of the Commercial Bank of Ethiopia mainly implements the design bid build delivery method to its ongoing construction projects by budgeting a huge amount of capital. However, fewer studies have been conducted to date for choosing DBB delivery method.

Traditionally the project delivery system is selected according to the project management team's previous experience leading to a vicious circle where the same problems are faced in every project. New innovative thinking in developing project delivery systems is needed to answer (Payphonen, et al., 2017). Hence, it is required to assess the appropriateness of the DBB delivery method for meeting project objectives however less attention is given by CBE to how important it is to choose a proper project delivery method for the project's success.

Furthermore, overviewing, CBE construction project's status report, it is observed that most of the projects are not going or completed as per the planned schedule and budget. The project status shows there is a deviation between the planned to be achieved and the actual status of the projects in terms of time and cost, this results in a time overrun, cost overrun, and dissatisfaction for the bank. Besides the delay of the project completion impacts the bank's business profit due to unnecessary costs such as rental costs for office purposes, demolishing, and modification works on the rental office. Hence this study intends to bridge the existing issue gaps with a detailed assessment and analysis of factors affecting the adoption of DBB delivery method on cost and time management.

Therefore, this research is conducted to analyze the factors affecting the adoption of Design Bid Build Delivery Method on Project Time and Cost management in the case of selected construction projects at CBE to make a recommendation and conclusion based on findings to increase the success of project completion within the intended time and budget.

1.3. Research questions

- What are the factors used by CBE to adopt DBB project delivery method?
- What are the effects of DBB delivery method on project time management in the selected construction projects of CBE?
- What are the effects of DBB delivery method on project cost management in the selected construction projects of CBE?

1.4. Objective of the Study

1.4.1 General objective

The general objective of the study is to assess the factors affecting the adoption of Design Bid Build Delivery Method on Project Time and Cost management in the case of selected construction projects at Commercial Bank of Ethiopia.

1.4.2 Specific objectives

- To asses factors used by CBE to adopt DBB project delivery method?
- To assess the effect of DBB delivery method on project time management in the selected construction projects of CBE.
- To assess the effect of DBB delivery method on project cost management in the selected construction projects of CBE.

1.5. Significance of the Study

The study is significant for the Commercial Bank of Ethiopia, researchers, and governmental and private bodies who are involved in the construction of commercial Bank of Ethiopia construction projects. In addition, this study contributes to the understanding of the importance of project delivery methods, as there seems to be some linkage between project delivery methods, cost, and time management of a project. Moreover, this thesis will be used for those who are interested in undertaking further study on a related topic.

1.6. Scope of the Study

The scope of the study is to assess the factors affecting the adoption of Design Bid Build Delivery Method on Project Time and Cost management in the case of selected construction projects at CBE out of nine ongoing construction projects. The building projects of CBE are classified as district and branch depending on purpose, size, and complexity. Therefore for this research study, the level of data collection and analysis is only focused on a case study for each category from district and branch. These are Bahir Dar District office project, Motta

branch office project, and head office projects by the client side were selected. Additionally, due to the project's difference in size and progress status stage, it gives an advantage of finding different perspectives for the research.

1.7. Limitations of the study

Due to time and financial constraints, this study is limited and focuses on the factors affecting the adoption of Design Bid Build Delivery Method on Project Time and Cost management in construction projects at CBE only, even though there are different problems in the execution of CBE construction projects that determine the success of the project. The research is census type which is done on the entire targeted study population who are familiar only with the selected case projects and the data were collected and concerned with only the client, consultant, and contractor.in addition, while doing this research there was a challenge of late response from the respondents.

1.8. Organization of the Thesis

This research is organized into five chapters. Chapter One describes the introduction (Background of the study), problem statement, research question, objective of the study, significance of the study, and its scope and limitation. Chapter Two covers the literature review part of the thesis; the literature review will include theoretical and empirical literature concerned with project delivery, project time management, and project cost management. Chapter Three covers the research methodology that consists of the overall research strategy, the research design, the analysis of the data, and writing. Chapter Four contains the discussion, analysis, and interpretation of the findings. Finally; Chapter Five covers a summary of findings, conclusions, and recommendations.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This section provides a review of various related literature works. It has two major sections theoretical and empirical literature review on the subject matter. The first section is on theoretical literature, that are concerned with existing theories (concepts) and the extent the theories have been studied whereas the second section is about works of literature reviewed concerned with empirical findings which are based on observation, experience, and experiment.

2.1 Theoretical Literature Review

2.2.1 Construction project delivery method

British Colombia Construction Association, British Colombia Construction manual (2012) defines a project delivery system as a structure of the relationships of the parties, the roles and responsibilities of the parties, and the general sequence of activities required to deliver the project. Regardless of how they are structured, all delivery methods involve three elemental parties: Owner, Consultant, and Builder/Constructor. The relationships, roles, and responsibilities of the parties involved may vary considerably under the different project delivery systems. Consequently, the selection of the project delivery system is one of the most important decisions affecting the success of a project and is, therefore, a decision that should be made very early in the process. Each of the major project delivery systems has its advantages and disadvantages in different circumstances and suitability should be considered separately for each particular project.

The main differences among delivery methods lie in:

- Contract formation and, most crucially, the parties to whom the various responsibilities and risks are assigned;
- The incentives to meet the contract requirements;

According to Gbadebo, M. A. (2012) who researches critical selection criteria for project delivery methods, procurement systems are methods through which clients create the pre-conditions for the achievement of project objectives–time, cost, and quality. The selected system under an appropriate contract type and control will help to avoid problems and attainment of these objectives. Any procurement strategy/method includes how risks are distributed, responsibilities are allocated, works are divided, and compensations and payment

are structured. However, the basic criteria for selecting suitable and appropriate procurement strategies by clients are undefined, cumbersome, and often inappropriate in Nigeria. The emerging and increasing results such as economic loss, poor communication and coordination, disputes and acrimonies, delayed project delivery, and poor quality projects have proved those decision rules abortive. There seem not to be standard or statutory guidelines or regulations provision to comply with the choice of suitable Procurement strategy/Method.

According to Kim et al. (2000), they concluded that the selection of a project delivery method greatly affects the successful completion of project design and construction. Based on questionnaires completed by construction clients and contractors, the project delivery method has a close or extremely close relation with final construction results.

Liebing, R. W (2001) through his review of construction delivery systems broadly classifies construction delivery systems as follows:

Design-Bid-Build: - This is commonly referred to as the traditional approach. The advantages for owners are that it is a known way of doing business, results in competitive prices, and provides the owner exclusive control over the designer and contractor. Many public entities use this method combined with a lump sum low bid as a basis for payment. Several variations in contractor selection or payment type may be used with this method. For example, the traditional method may be used with a low bid lump sum or the contractor may be selected based on past performance and paid under a Guaranteed Maximum Price (GMP) with incentives for being under budget. The major disadvantage of this method is that it is slow. Other disadvantages are: has a propensity to result in adversarial relationships, may not result in best value, quality may suffer, and the potential for costly change orders.

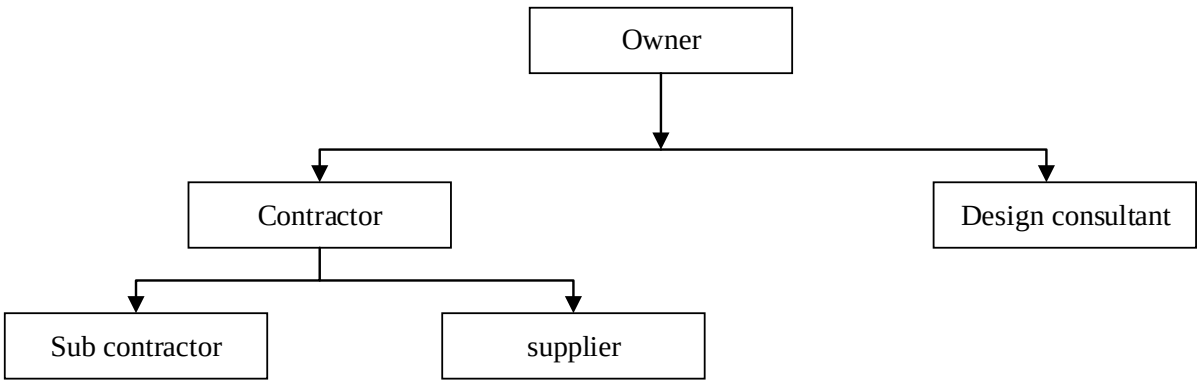

Figure 2. 1 Project organization structure for DBB method(Source: Ghadamsi & Braimah , 2012)

Design-Build (DB):- In this method, the owner contracts directly with one entity for both the design and construction of a project. Variations to this method include the level of pre-design, payment type, and a hybrid design build of only certain work packages, for example, the mechanical systems. The advantages to this system are that it is generally quicker and the owner only has one contact that bears sole responsibility for both design and construction. Some disadvantages are that the owner must have an understanding of construction systems to fully understand what is being provided and some owners may feel they lose control of the design to construction interests. Payment for this delivery method is generally based on a lump sum low bid when it is priced and awarded based on a percentage (25-35%) of the design completed. An alternative method of payment is to use a GMP when the design has only been conceptualized.

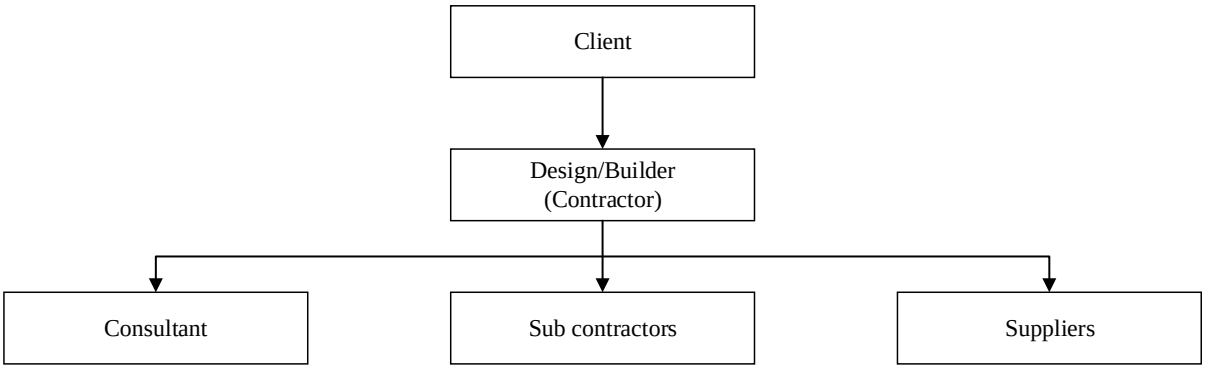

Figure 2. 2 Project organization structure for DB method (Source: Ghadamsi & Braimah, 2012)

Construction Management (CM):- Several variations of this method exist; owner contracts with several subcontractors, agencies (the CM acts as the owner agent), and at risk (the CM actively bids the work). In each method, the CM may be brought on board early in the construction process, sometimes even before a designer is selected. Payment for CM services is generally paid as a fixed fee, based on a percentage of the total construction cost.

2.2.2 Project delivery selection

Ghadamsi, A., & Braimah, N. (2012) Highlighted the different procurement methods now available have partly made clients' decisions to adopt any of the methods for any given project a complex task to grapple with. Various factors have to be taken into consideration before any informed decision can be made on the right procurement choice. The factors can be classified into two groups

- **External environment** such as economics, politics, finance, legal, natural disasters, technology factors, and;
- **Internal environment** can be divided into three main factors; project characteristics, client's characteristics, and client's requirements. Client requirements can be sub-divided into cost-related factors, time-related factors, and quality-related factors

Luu, D. T., Ng, S. T., & Chen, S. E. (2005) studied the mechanism of procurement selection by developing a semi-structured interview conducted with managers who are experienced in construction procurement selection accordingly The research results, two consecutive stages in construction procurement selection, namely, PSC formulation and procurement selection.

Stage 1: Procurement Selection Criteria Formulation Before various available procurement options are evaluated, there is a need to ascertain the client's needs, the requirements of the project, and the characteristics of the external environment as these affect the PSC. In practice, the distinctive nature of the client, project, and external environment would be established through discussions with relevant stakeholders. Unless these characteristics and/or requirements are identified, it would be impossible to compare the benefits and weaknesses of each procurement approach. the most commonly considered PSC for construction procurement selection, and these include speed (SP), time certainty (TC), price competition(PC), cost certainty (CC), flexibility (FL), responsibility(RE), complexity (CO), risk allocation (RA), and quality level(QL). However, the selection of these PSCs may be affected by underlying factors pertinent to the requirements of the client, project, and external environment.

Stage 2: Procurement System Selection The second stage of the procurement selection process aims at establishing the relevancy and appropriateness of each procurement system to the set of PSC formulated during the preceding stage. Because the importance of each PSC to the client, project, and external environment varies, a weighting is allocated to each PSC used. A common practice is for decision-makers to compare the PSC with the benefits and weaknesses of each procurement system and to select the procurement system that is thought to meet most of the PSC. This approach relies on the accuracy of the prediction of the decision-makers. Another method of procurement evaluation is recalling the outcomes of previous similar examples. Given a set of PSC for the current situation, decision-makers would recall a case or cases! Which closely reassembles the PSC established and considers how successful the procurement system was e.g., design and build! Used. Depending on the

degree of success, some modifications to the previously used procurement system e.g., more stringent design control might be needed to improve the outcome. The modified procurement approach would be considered the most desirable system for the current project. Each procurement system can then be compared to this standard, and the one with the closest fitting will be selected.

Ratnasabapathy et al. (2006) describe graphical factors to be considered when selecting procurement methods as, client requirements can be subdivided into cost-related factors, time-related factors, and quality-related factors. All these factors and their relationships have been summarised in the figure below.

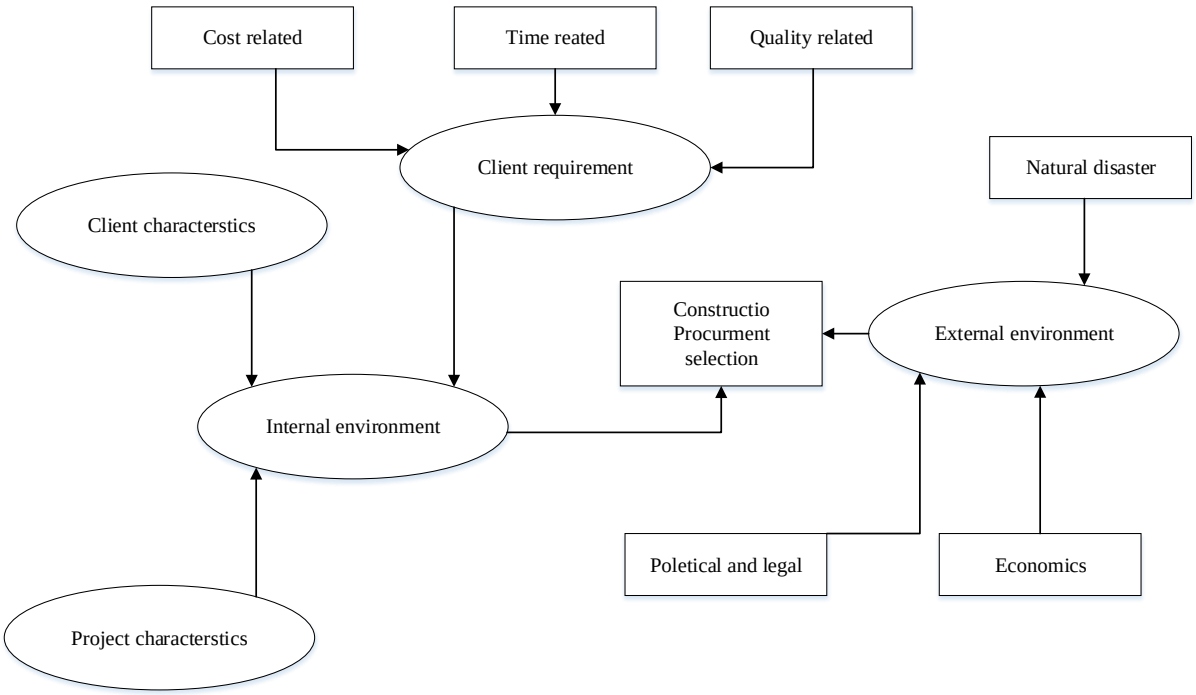

Figure 2. 3 Factors affecting the selection of a procurement method (Source: Ratnasabapathy et al. 2006)

2.2.3 Construction project performance measures

Bassioni et al.,(2004) agree that project performance can be measured and evaluated using a large number of performance indicators or criteria but time, cost and quality appear to be the three common performance measures.

Bryde and Brown (2004) concluded that the traditional distinction between good and poor project performance focused on the meeting of cost, time, and product quality-related criteria. These criteria have been described as the iron triangle of project performance.

Jing et al. (2010) described project success as it is usually measured differently from the perspectives of the different parties. Comparing success criteria as measured by contractors and clients and found that clients put more emphasis on satisfying the needs of other stakeholders, while contractors emphasize minimizing project cost and duration. They also found that all project stakeholders put products satisfying the owner's needs as the first criterion.

2.2.4 Project time management

Mackenzie(1999) defines time management: "Time Management is the function required to maintain the appropriate allocation of time to the overall conduct of the project through the successive stages of its natural life-cycle, (i.e. concept, development, execution, and finishing) through the processes of time planning, time estimating, time scheduling, and schedule control.

2.2.5 Time overrun and its cause

Akhund, M. A. et al. (2017) defined time overrun and methods as time overrun (delay) is a condition the actual work is not complete in an estimated period. Most of the construction projects experienced time overrun. Delay is the process in which the construction project slows down without stopping it entirely while suppression is the stoppage of the project directed from the clients to the contractor. Time overrun (delay) is based on two methods one is the Inexcusable delay (non-excusable delay and the second is the Excusable delay.

Inexcusable delays (Non-Excusable delays) The Contractor or its suppliers are responsible for inexcusable delay and they are entitled to accelerate their work done in the estimated time are to pay compensation to the owner. The contractor compensates based on either liquidated damages or actual damages, provided that there is no section of liquidated damages in the contract. Liquated damages are based on the daily rate of estimated costs which is likely to incur in the delay of construction projects by the owner by the contractor.

Excusable delays there are two kinds of excusable delays discussed below:
Non-compensable delays: It is a delay that is not caused by the owner and the contractor rather it is acted by a third party. Examples include natural calamity, unhealthy weather, and wrongdoing by masses (strikes, fires, acts of government in its sovereign capacity). Due to this, the contractor gets an extension in time and does not pay any compensation to the owner and contractor for delay damages.

Compensable delays: It is a delay that is not caused by a third party but is acted by the owner or the owner's agents. An example of no completion of drawings in the required time by the architect of the owner leads to the extension of the schedule and it imposes economic damages to the owner by the contractor. In this condition, the contractor will have to face extra indirect costs for both the extended field office and the home office.

According to Sambasivan, M., & Soon, Y. W. (2007). The study done in the Malaysian construction industry and 28 well-recognized construction delay factors were identified and these causes were categorized into the following eight major groups:

1. Client-related factors: finance and payments of completed work, owner interference, slow decision-making, and unrealistic contract duration imposed by owners.
2. Contractor-related factors: delays caused by subcontractors, site management, improper construction methods, improper planning and errors during construction, and inadequate contractor experience.
3. Consultant-related factors: contract management, preparation and approval of drawings, quality assurance, and waiting time for approval of test and inspection.
4. Material-related factors: quality of material and shortage in material.
5. Labor and equipment-related factors: labor supply, labor productivity, and equipment availability and failure.
6. Contract-related factors: change orders and mistakes or discrepancies in contract documents.
7. Contract relationship-related factors: major disputes and negotiations, inappropriate overall organizational structure linking to the project, and lack of communication between the parties.
8. External factors: weather conditions, regulatory changes, problems with neighbors, and unforeseen site conditions.

2.2.6 Project cost management

Cost Management is defined by PMI (1996) as "the processes involved in planning, estimating, budgeting, and controlling costs so that the project can be completed within the approved budget. There are three fundamental elements in cost management. The cost management includes the processes involved in the following so that the project can be completed within the approved budget: cost estimating which is developing estimates and measurement for the costs needed for a resource to complete the project tasks and activities.

Cost budgeting which is collecting the cost estimates, and combining them to develop an overall cost and baseline. And cost controlling which is managing and controlling factors that change or affect the budget.

2.2.7 Cost overrun and its cause

Lee (2008) defined Cost overrun as the difference between the actual and estimated costs as a percentage of the estimated cost, with all costs calculated in constant prices. Actual costs are defined as the accounted costs spent, as determined at the time of project completion. Estimated costs are defined as the budgeted or forecasted costs at the time of project approval, which are typically similar to costs presented in the business case for a project.

According to Subramani, et al. (2014), Construction costs are classified into cost elements. These cost elements include labor costs, material costs, plant and machinery costs, administration costs, and other expenses. To identify costs associated with an activity, construction costs are categorized into direct costs and indirect costs or overhead costs. Direct Costs: Direct costs are costs that can be correlated to a specific activity or a work item, which is being done or produced. The direct cost of permanent work items is the summation of direct material cost, direct labor cost, and other direct expenses. Direct material costs cover all costs connected with materials, which are incorporated into the permanent works of the project. Direct labor costs cover net expenses for procurement, maintenance, and wages of all categories of workers employed at the work site for the execution of an item of the project. Other direct expenses include all other expenses on account of services rendered, which can be directly attributed to and identified with the execution of an activity or work item. Indirect Costs: Indirect costs include all costs, which are attributable to a given project but cannot be identified with the performance of a specific activity or a work package. In other words, all costs other than direct costs are covered under indirect costs.

Causes of Cost Overrun According to Chitkara (2011) stated that the main controllable causes of project cost overruns include but are not limited to the following:

1. Inadequate project formulation: Poor field investigation, inadequate project information, bad cost estimates, lack of experience, inadequate project formulation and feasibility analysis, poor project appraisal leading to incorrect investment decisions.

2. Poor planning for implementation: Inadequate time plan, inadequate resource plan, inadequate equipment supply plan, inter-linking not anticipated, poor organization poor cost planning.
3. Lack of proper contract planning and management: Improper pre-contract actions, poor post-award contract management.
4. Lack of project management during execution: Insufficient and ineffective working, delays, changes in the scope of work and location, law and order.

2.2 Empirical Literature Review

Many researchers have studied the main cause of time and cost overrun in various and different scales of construction projects. Studies conducted on the causes and impact of time and cost overrun in different countries have been examined in this section.

2.2.1 DBB delivery method in construction project

According to Carpenter, N. (2014) research It has been reported that the Design-Bid-Build project delivery method provides for an easily understood and well-documented process, the perception of fairness, owner control of the process, and reduced issues of corruption as well as sound schedule predictability and initial cost certainty. Disadvantages of this approach are reported to include: adversarial relationships brought on by the allocation of risks within the separate contracts, the competitive nature of the selection process driving prices to levels at or below the actual cost, construction documents and budgets that are prepared without the input of those that will ultimately construct the project, and the lack of flexibility to incorporate changes due to the linear process of design followed by construction. Each of the issues noted above increases the risk of reduced quality, schedule overruns, change orders, claims, and litigation. And, although the magnitude of the impact that these issues have on the initial project cost is unknown, the issues can lead to an increased final project cost that may exceed the owner's budget.

2.2.2 Time overrun in construction project

According to the study done by Assaf, S. A., & Al-Hejji, S. (2006) The major Causes of delay in large construction projects are analyzed that the construction process is subject to many variables and unpredictable factors, which result from many sources. These sources include the performance of parties, resource availability, environmental conditions, involvement of other parties, and contractual relations. However, it rarely happens that a project is completed within the specified time. Seventy-three (73) causes of delay were

identified through a literature review and discussion with some parties involved in the construction industry. Accordingly, the most frequent delays from the perspective of the contractor, consultant, and client are identified. Results indicate that owners are realizing that awarding projects to the lowest bidder is one of the highest frequent factors of delay. The contractors indicate that the most frequent causes of delay are related to the owners. Consultants, like owners, assign awarding the lowest bidder as the most frequent factor of delay. The lowest bidders are unqualified contractors with a shortage of resources and low capabilities, which lead to low performance and cause delays in the completion of the work. In addition, the client underlines that the delay of progress payment by the owner is one of the most severe causes of delay. Others are Shortage of labor, Unqualified workforce, Inadequate contractor experience, Difficulties in financing projects by contractors, Ineffective planning and scheduling of projects by contractors, Low productivity level of labor, Rework due to errors during construction, Delay in progress payments by clients, and Original contract duration is too short. The consultants indicate that the most severe causes of delay are related to contractors such as difficulties in financing projects by contractors, Inadequate contractor experience, shortage of labor, delay in progress payments by the owner, delay in material delivery, poor site management, and supervision by contractor, ineffective planning and scheduling of project by the contractor, type of project bidding and award, poor qualification of the contractor's technical staff, low productivity level of labor and unqualified workforce.

According to Sambasivan and Soon (2007) effect of the time overrun can be different according to the type of project. For example, a time overrun in infrastructure development that projects like High Way will cause huge economic loss to the whole country, whereas a delay in the construction of a house can only affect the respective client. He identified the six most frequently observed effects of delays in his survey on the causes and effects of delays in the Malaysian construction industry. These were time overruns, cost overruns, disputes, arbitration, litigation, and total abandonment.

2.2.3 Cost overrun in construction project

Abusafiya, H. A., & Suliman, S. M. (2017) Studied the cause of cost overrun on construction projects in Bahrain, and these are frequent design changes that can affect the project's estimated budget and its consequences involve not only the work package for which the change is directed but other work packages and overhead functions as well. Mistakes during construction are the other cause which can be explained by the amount of reworks, delays,

and subsequent claims. the other is inaccurate time and cost estimates. Many construction companies suffer from a lack of engineer's understanding of cost and value and the subsequent cost implications of what is being included in the design, and estimators who are inexperienced with the estimating process or the Bahrain market. But even with experienced estimators, some companies tend to include unrealistically low allowances, to keep their bids attractive. Another factor is the shortage of site workers, the labor shortage has a high price for construction businesses, leads to long lead time, and causes loss of work, therefore in Bahrain over time is a very familiar practice in all construction firms, and if this isn't enough they head to rent labor with higher expenses; and that leads to huge cost escalation.

Although, A. F., & Doh, S. I. (2019) analysis shows that cost overruns can be classified into several factors that are either uncontrollable or that are unmanageable to a varying degree, as follows: (1) Accuracy of original cost estimate; (2) Degree of government regulation and control; (3) Construction completion delays; (4) Number of design changes; and (5) Labor related matters such as (a) Availability; (b) Skills, and (c) Increases in fringe benefits.

Mbachu and Nkado (2004) further stated that cost overruns have obvious effects on the key stakeholders in particular, and on the construction industry in general. To the client, cost overrun implies added costs over and above those initially agreed upon at the onset, resulting in less returns on investment. To the end user, the added costs are passed on as higher rental/lease costs or prices. To the professionals, cost overrun implies the inability to deliver value for money and could well tarnish their reputations and result in a loss of confidence reposed in them by clients. To the contractor, it implies loss of profit for non-completion and defamation that could jeopardize his/her chances of winning further jobs, if at fault. To the industry as a whole, cost overruns could bring about project abandonment and a drop in building activities, a bad reputation, and an inability to secure project finance or secure it at higher costs due to added risks. All these consequences undermine the viability and sustainability of the construction industry.

2.2.4 Approach to minimize time and cost overrun in the construction industry

According to Bentil, et al. (2017) Studied a construction project in Ghana, the following approaches are proposed to minimize cost and time overrun that is Proper stakeholder management strategy should be adopted to ensure that the stakeholders' needs, expectations, and influence on the project requirements are catered for and managed to ensure project success. This will ensure that all the requisite information needed to make the project

successful at the design and construction phases is available and incorporated into the designs, thus, minimizing the need for new information which will in turn minimize cost and time overruns. The other is the adoption of an integrated change control mechanism in building construction projects, which will also ensure that changes/variations that heavily contribute to cost and time overruns are properly managed and controlled to limit their impact on the project. An effective design management approach should be adopted for all building construction projects to ensure that the cost and design are properly coordinated, managed, and controlled from the preparation, design, preconstruction, and construction stages to make sure that the situation of incomplete designs before construction and its associated cost and schedule challenges are eliminated from the on-set and throughout the construction. Another point is Comprehensive cost planning and cost control during pre and post-contract stages should be enforced to make sure that project cost is contained within the budget. The overall project budget should be converted to a more stable currency and be managed for the client so that the depreciation of the local currency and inflation do not heavily impact the cost of the project estimated in the local currency. Clients should be committed to honoring payment certificates in time to prevent cash flow challenges, delays, and interest on delayed payments from affecting the project. Proper planning and assessment of the magnitude and complexity of building construction projects should be undertaken to ensure that an accurate estimation of the project time is achieved. Moreover, price and physical risk allocation on projects should be properly assessed to assign an appropriate contingency sum to a project. This will therefore limit the occurrence of cost overrun on the project

2.2.5 Practice of DDB delivery method in Ethiopia's construction industry

According to, Werku & Koshe (2016), Construction delays (time overrun) occur in every phase of a construction project and are common problems in construction projects in Ethiopia. The researchers identified 88 key factors causing delays in Ethiopian construction industries. The findings showed that the main critical factors that cause construction delays in Ethiopia are: Difficulties in financing projects by a contractor, Escalation of the materials price, Infective project planning, Scheduling or resource management, Delay in progress payments for completed works, Lack of skilled professionals in the field of construction management in the organization, and Fluctuating labor availability season to season /Seasonal labor availability. In addition, the study shows that in Ethiopia only 8.25% of projects have been finished by the original targeted completion date. The remaining 91.75% delayed 352% of its contractual time.

According to Abdurezak Mohammed and Neway Seifu (2019) the top ten factors that cause construction time overrun in public building construction projects in Addis Ababa are:

1. Difficulty in project financing (poor financial system)
2. Poor Project management system
3. Delay in issuance of designs and working drawings
4. Shortage of availability of imported construction materials and goods on the market
5. Design errors and complexity of designs
6. Delay in progress payments for completed works
7. Late start & resource mobilization to the site
8. Financing problems
9. Inaccurate Site Investigation report
10. Price Inflation

2.3 Knowledge Gap

In the review literature it is observed that most developing countries constructions are being delivered using the traditional delivery method which is DBB and projects are facing significant cost and time overruns that affect the successful completion of the project. Even though there is a good start at learning and adopting project delivery methods on construction projects, there is very little experience in developing models and feasibility studies when selecting project delivery methods and cost and time overruns continue to be major challenges in the construction industry. Identifying the level of influence of project delivery methods on project performance of construction projects shifting to perform better and minimize cost and time overrun of projects is needed. Even if much researches are done to identify and improve the outcome of DBB delivery method it has not been fully addressed. such as the stakeholder involvement especially between client, consultant, and contractor, improving flexibility and adaptability for unforeseen circumstances, risk management framework, how to integrate sustainable design principles, Investigating how to better incorporate and adopt technological and innovation advancements, and Addressing these research gaps could help enhance the effectiveness and adaptability of the Design-Bid-Deliver project delivery method in the construction industry. Accordingly this research, it is tried to identify the issue gaps for the factors that affect the adoption of DBB project delivery method on time and cost management selected construction projects of CBE by analyzing problems or unmet needs of not achieving the planned time and cost through identifying factors that have not been adequately understood and proper attention is given using census

research method since no such previous research has been conducted on CBE construction projects.

2.4 Conceptual framework

There is a wide range of views for DBB delivery method, time management and cost management for construction projects. The literature reviewed reveals that project delivery methods have a direct impact on the successful completion of a project This improves time and cost overrun that may be caused by any party to the contract. The cause can be from client related factors, consultants related factors, contractor related factors, and external related factors. Hence, this study examined the effect of DBB delivery method on time and cost management on selected construction projects of CBE. the findings showed that the main critical factors that cause construction time and cost overrun in Ethiopia are: Difficulties in financing projects by a contractor, escalation of the materials price, infective project planning, scheduling or resource management, delay in progress payments for completed works, lack of skilled professionals in the field of construction management in the organization, and fluctuating labor availability season to season /Seasonal labors availability. Therefore it is essential to define the effect of DBB delivery method on time and cost management to minimize time and cost overrun.

The conceptual framework for this study on DBB delivery method on time management is majorly on the impact of different timing of design phase and construction phases on project scheduling and coordination, the influence of multiple stakeholders (client, designer, contractor) relationships among them on decision-making and change management processes, the degree of flexibility and control in the design and construction processes, additionally it considers project characteristics, such as project size, complexity. For cost management, the conceptual framework is majorly on considering factors such as market conditions, industry regulations, and cost drivers such as material prices, labor costs, and equipment expenses. In addition, Cost estimation, the impact of change orders and variations on project costs, additional work, and the role of stakeholder coordination and communication in cost management are considered.

CHAPTER THREE

RESEARCH DESIGN & METHODOLOGY

3.1 Introduction

In this chapter, the research design, approach, and methodology will be described to enable and identify the factors affecting the adoption of Design Bid Build Delivery Method on Project Time and Cost management in the case of selected construction projects at CBE. Research is defined as a process that includes collection of data, recording, analysis, and interpretation of data, and it is all about providing answers to questions and developing knowledge (Wilson, 2014).

Accordingly, in a general description the methodology to execute this research starts from identifying the data source that contains consistent and accurate project information, then for the data collection CBE the client, consultants, and contractors are considered in providing the required data, and data analysis using SPSS is followed respectively. In addition, data and information sources, research instruments, research design, approach, and method of analysis are presented.

3.2 Research design and approach

Research methodology is the path through which researchers need to conduct their research. It shows the path through which these researchers formulate their problem and objective and present their results from the data obtained during the study period. Sileyew, K. J. (2019). For this study, a descriptive research design was used. According to Cozby (2005), The purpose of descriptive studies is to describe individuals, events, or conditions by studying them as they are in nature. The researcher does not manipulate any of the variables but rather only describes the sample and/or the variables. Although a descriptive study can explore multiple variables, it is the only design that can also explore a single variable. Descriptive studies look at the characteristics of a population; and identify problems that exist within a unit, an organization, or a population.

Both quantitative and qualitative approaches were used for this research. The qualitative approach generates non-numerical results and it is used to identify people's beliefs, experiences, attitudes, and interactions. However, the quantitative approach was used on numerical data to develop a statistical picture of a trend or connection. A questionnaire and

interview were designed and distributed to contractors, consultants, and the client to get their professional opinion based on their experience.

3.3 Target population and Research survey type

The target population for this research focuses on a construction project managed by Commercial Bank of Ethiopia that is administered by the design bid build delivery method. Different construction projects of the bank, head office, Bahir Dar district office, and Motta branch office projects are selected as the target population. All buildings constructed by the bank are divided into two categories as district office and the branch office. The type of buildings is differentiated and selected based on the capacity of the building (number of floors), its advancement, and based on whether the region is a capital city or not. Therefore these projects are selected as a case study and they are a good representative of the bank's project since Bahir Dar project is a district office and Motta project is a branch office the result will apply to the other projects as they have similar characteristics. The research population will be drawn from three stakeholders who are working and participating in the construction (clients, contractors, and consulting firms). The following table summarizes the target population of the study.

Table 3. 1 Total population of the research

No	Project	Client	Consultant	Contractor
1	Bahir Dar district office	33	9	8
2	Motta Branch office		9	8

Sample were selected using the census method. A census survey is a collection of data from all units in the population or a complete enumeration of the population.

3.4 Data source and Data collection

3.4.1 Data source

In this research, the data were collected from both primary sources and secondary sources. Primary data collection is used to collect first-hand data directly from the source through direct interaction with the respondents. The primary data was gathered from the client, contractor, consultant professionals, and project managers through questionnaires and interviews.

On the other hand for the secondary data collection, the data was gathered and analyzed from project documents that include contract documents, letters, bills of quantities, claim reports,

complaint reports, monthly progress reports, variation orders, and project program. Also journals, articles, and internet sources on the related topic.

3.1.1 Data collection

The required data were collected by using a well prepared and pretested questionnaire. The questionnaire survey was all-inclusive semi-structured multiple choice questions. Moreover, it was ensured that all the respondents must have completely understood the design of the questionnaire. Besides interviews were conducted with project managers to give one-to-one interviews with project managers from clients, contractors, and consultants. In addition, proper care was taken to ensure the originality of the data and source reliability. The questionnaire and interview questions were aimed at answering the research questions.

Questionnaires

The questionnaire is one of the instruments in this research used to gather primary data and helps to be focused on issues which further assists as a survey to understand the main concerns and attitudes of respondents towards the problems. The questionnaire was distributed to the targeted population of the client, consultant, and contractor to gather their professional judgment, observation, opinion, and attitude. For the questionnaire, a Likert scale of (1) for not import “very poor”, (2) for slightly important “poor”, (3) for moderately important “medium”, (4) for very important “high”, and (5) for extremely important “very high” were used.

The first part of the questionnaire consisted of questions about the general profile, information, and background of the respondents. The second part comprised questions regarding the major factors/causes considered for adopting DBB delivery method in respective to project characteristics, owner characteristics, and other factors. The third part focused on factors that affect time (Schedule) from the perspective of the client, consultant, and contractor and external factor aspect. The final is regarding factors that affect cost. In addition, the questionnaire was designed to be close ended questions to choose from the presented options including with few comment spaces.

Interview

For this research Semi-structured interviews were used, that is some questions are pre-coded but others are left open so that respondents still have the opportunity to add their views, and judgments this allows the respondent some freedom to talk about issues that interest them this also helps the researcher to follow topics raised that may not have been considered in

advance. Interview questions were conducted to 6 project managers from the client, contractor, and consultant side.

3.5 Data Analysis

After all the data is gathered screened, organized, and encoded to SPSS software tool, which will be used to analyze the data. Descriptive statistics from SPSS software tool is used and the analysis is presented in a tabulated format consisting of frequency and percentage. The relative importance index is also used to rank the factors from the output of the SPSS analysis as per the frequency of the responses. The RII is used to establish the relative importance of each factor and prioritize the factors that affect the adoption of DBB delivery method on time and cost management of selected construction projects of CBE from the perspective of clients, consultants, and contractors.

The relative importance index ranges from 0 to 1 according to Tam and Le (2006) formula is as follows and Microsoft Excel is used to calculate RII.

$$Relative\ Importance\ Index. RII = \frac{1n_1 + 2n_2 + 3n_3 + 4n_4 + 5n_5}{5(n_1 + n_2 + n_3 + n_4 + n_5)}$$

Where,

n_1 = number of respondents who answered it is not important
n_2 = number of respondents who answered it is slightly important
n_3 = number of respondents who answered it is moderately important
n_4 = number of respondents who answered it is very important
n_5= number of respondents who answered it is extremely important

After this step, interpretation is drawn based on SPSS output, and interview questions were summarized to conclude and recommend to improve the success of construction projects at Commercial Bank of Ethiopia

3.6 Validity and Reliability

3.1.2 Validity

Validity is defined as the extent to which an instrument measures what it purports to measure (Kimberlin, et.al. (2008). the concept of validity gives assurance on the research findings accuracy and that the research reflects the phenomenon they are supposed to describe in addition it reaffirms the researcher to convey an accurate account of the experiences and

perspectives of study participants.. In this research a pilot test was conducted by distributing a sample questionnaire to check the validity and the test provided positive results to proceed further.

3.1.3 Reliability

Reliability is defined by Joppe, M. (2000) it is the extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and the results of a study can be replicated under a similar methodology, then the research instrument is considered to be reliable. Cronbach's Alpha method was used in SPSS to measure the internal consistency and reliability of the research as shown in the table below.

Table 3. 2 Data reliability result

S.N	Factors	Cronbach's Alpha	Internal Consistency
1	Factor choosing the delivery method	0.916	Excellent
2	Factor on the performance practicing DBB	0.702	Acceptable
3.	Causes that affect time based on owner responsibility	0.819	Good
4	Causes that affect time based on contractor responsibility	0.897	Good
5	Causes which affect time based on consultant responsibility	0.884	Good
6	External Factors	0.789	Acceptable
7	Factor /Causes for effect on cost increase	0.824	Good

3.7 Ethical Considerations

It is mandatory to follow ethical principles while doing research therefore during this research following issues are taken into consideration as informed consent of the research participant that the main purpose of the data collected is for purely academic purposes and to protect research participants from harm, voluntary participation, confidentiality, and anonymity of the respondent, and in presenting results honestly so on…

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter is about the data analysis, findings, and interpretation of the study on the factors affecting the adoption of Design Bid Build Delivery Method on Project Time and Cost management in the case of selected construction projects at CBE. The finding is presented in the form of descriptive methods through document reviews, questionnaires, and interviews.

In the distributed questionnaire, for criteria of adopting DBB delivery method 17 potential factors or causes grouped into 3 categories respective of project characteristics, owner characteristics, and other factors, were selected from different previous studies, For criteria of factors affecting adopting DBB delivery method on time and cost management 32 potential factors grouped into four categories such as client related, contractor related, consultant related and external factors related were selected. These factors had a five point scale ranging from 1 to 5 in level importance from Non-important which is very poor to extremely important which is very high and finally the results are discussed.

4.2 Analysis of Questionnaire Response

4.2.1 Rate of response

A total of 67 questionnaires were distributed to experts of client, consulting firms, and, contractors. Responses to the questionnaire were then collected and analyzed. Out of 67 questionnaires distributed 56 were returned. From the returned questionnaires the portions of client, consultant, and contractors, there were 29 (51.78%) questionnaires from client side, 14 (25.%) from the consultant side, and 13 (23.21%) from the contractor side.

Table 4. 1 Response rate

Stake holders	Distributed questioner	Returned questioners	Percentage response rate
Client	33	29	87.87
Consultant	18	14	77.78
Contractor	16	13	81.26
Total	67	56	83.58

Source: Own Survey (2024)

From the above table 4.1 out of 67 questionnaires distributed, 56 were returned which is 83.58 % of the total. From 33 questionnaires distributed to the client 29 (87.87%) were collected, from 18 questionnaires distributed to the consultant 14 (77.78%) were

collected and from 16 questionnaires distributed to the contactor 13 (81.26%) were collected. This indicates that of the total distributed questionnaires 83.58% were collected and it can be said that enough questionnaires were returned to analyze the data and infer from this study.

4.2.2 Work experience of Respondents

The work experience of the respondents is summarised in the following table to ensure they are familiar with the field of study.

Table 4. 2 Work experience of the respondent

Work experience	Frequency	Percent
1-5	18	32.1
6-10	21	37.5
11-15	13	23.2
above 15 years	4	7.1
Total	56	100.0

Source:Own Survey(2024)

As shown in the table above Table 4.4 Out of 56 respondents 18 (32.1 %) of the respondents had related work experience between 1 year to 5 years of working experience, 21 (37.5%) had 6 to 10 years of experience, 13 (23.2%) had 11 to 15 years of experience and 4 (7.1 %) had more than 15 years of experience. This indicates that the respondents are capable of providing relevant data on the effect of DBB delivery method on the time and cost management of the projects.

4.2.3 Familiarity with the Project delivery methods

It was important to represent a summary of the respondent's familiarity with the project delivery methods. The following Table 4.3 summarizes the results for project delivery method familiarity and which type the respondents are familiar respectively.

Table 4. 3 Familiarity with project delivery method

Familiarity with project delivery method	Frequency	Percent
Yes	56	100
No	0	0
Total	56	100.0

Source: Own Survey (2024)

Accordingly, from the above table, all respondents know about the project delivery method which ensures the respondents are well-suited for the research study.

4.2.4 The major cause of project delay

This parameter is about the major cause of delay, which is an important variable to know which part of the stakeholder is more responsible for the time overrun problem in CBE projects. Accordingly from the following table As shown out of 56 respondents 2 (3.6 %) of the respondents say consultant cause of delay is the major one, 6 (10.7 %) of the respondents say client related cause of delay is the major one, 5 (8.9%) of the respondents says contractor related cause of delay is the major one, 41 (73.2%) of the respondents says all (client, contractor, and consultant) related cause of delay is the major one, 1 (1.8%) respondents says other and the cause is which is due to late handover of the project site, variation work is the major cause of delay in CBE projects and one respondent failed to answer.

Table 4. 4 Cause of time delay

Cause of delay	Frequency	Percent
Consultant related	2	3.6
Client related	6	10.7
Contractor related	5	8.9
All	41	73.2
Other	1	1.8
Total	55	98.2
Missing System	1	1.8
Total	56	100.0

Source: Own Survey (2024)

Therefore the above table indicates that most of the respondents agreed that the cause of the time delay is the contribution of all stakeholders (client, contractor, and consultant).

4.2.5 The major cause of cost overrun

This parameter is about the major cause of cost overrun, which is an important variable to know which part of the stakeholder is more responsible for the cost overrun problem in CBE projects. Accordingly from the following table out of 56 respondents 4 (7.1 %) of the respondents say consultant related cause of delay is the major one, 7 (12.5 %) of the respondents say client related cause of delay is the major one, 11 (19.6 %) of the respondents says contractor related cause of delay is the major one, 32 (57.1%) of the respondents says all (client, contactor a consultant related cause of delay) is the major one,1 (1.8%) respondent fail to answer, and 1(1.8%) respondents say other, which is variation work and security problem on the project area is the major cause of delay in CBE projects.

Table 4. 5 Causes of cost overrun

Cause of cost overrun	Frequency	Percent
Consultant related	4	7.1
Client related	7	12.5
Contractor related	11	19.6
All	32	57.1
Other	1	1.8
Total	55	98.2
Missing system	1	1.8
Total	56	100.0

Source: Own Survey (2024)

Therefore the above table, indicates that most of the respondents agreed that the cause of cost overrun is the contribution of all stakeholders (client, contractor, and consultant).

4.3 CBE construction project time and cost of the project status

The documents of CBE construction projects were reviewed to get a general overview of the projects time and cost management trends even though the study focused on Bahir dar district project office and Motta branch project office. The following tables 4.7 and 4.8 describe the time and cost data of CBE construction projects which are under working contract respectively.

4.3.1 CBE construction project time comparison

From the reviewed document the time overrun in the design bid build CBE construction projects ranges from a minimum of 98.2% to a maximum of 354.8% of the contract time. Based on the result found all the projects experienced time overruns with different scales of days of delay.

Table 4.6 CBE ongoing construction project contract time data

No	Project Name	Building type	Commencement date	Contract Period (days)	Revised Completion date	Time elapsed (days)	Project Status (%)	%
1	Bahir Dar district	2B+G+M +12	January, 2018	900	23-Oct-21	2182	27.70	242.4
2	Mekele district	2B+G+M +17	June, 2016	900	4-Mar-22	2224	20.27	247.1

3	Hawassa district	2B+1SB+G+M+11	January, 2018	900	29-Oct-21	884	27.37	98.2
4	Dire Dawa district	B+G+M+3	February, 2012	720	-	2555	97	354.8
5	Bole office	3B+M+G+14	Auget,2021	900	20-Apr-24	2382	20.27	264.6
6	Motta branch	B+G+M+3	June, 2019	540	14-Jun-24	680	91.14	125.9
7	Gilgel beles branch	B+G+M+3	Oct, 2019	540	5-Aug-24	620	41.76	114.8
8	Butajira branch	B+G+M+4	April, 2018	450	28-Jan-21	1158	77.65	257.3
9	Debremarkos branch	2B+G+M+5	April,2017	540	28-Aug-19	PA	98.16	-

Source: Own Survey (2024)

For example, Bahir Dar district project contract time was 900 days, but it was revised to 1730 days with mutual agreement, however, the project was delayed 2182 days which is around 242.2%, and for Motta branch office project the contract time was 540 days, but the contract time revised to 1825 days with mutual agreement, however, the project delayed 680 days which is around 125.9% from the contract time. This implies that there is a time overrun in construction projects of CBE.

4.3.2 CBE construction project cost comparison

The document revealed that all of CBE's construction project status work reflects the work is overdue which led to cost overrun. The reviewed document shows, there is a cost overrun in the design bid build CBE construction projects considering the request of price adjustment which is required to finalize the project, and this ranges from a minimum of 63.98% to a maximum of 400.5 % of the contract budget. In addition to that from the reviewed documentation each project is subjected to either variation or request of price adjustment to finalize the project due to price escalation or both.

Table 4. 7 CBE ongoing construction cost data

No	Project Name	Building description	Contract amount(ETB)	Revised Cost due to variation	Requested price adjustment	Status of work (%)	%age
1	Bahir Dar district	2B+G+M+12	888,410,773.19	968,938,466.74	1,336,948,551.52	27.70	150.49

2	Mekele district	2B+G+M+17	974,659,075.87	1,018,233,874.17	3,653,859,864.32	20.27	358.84
3	Hawassa district	2B+1SB+G+M+11	895,641,880.36	900,689,383.07	1,642,220,685.46	27.37	183.36
4	Diredawa district	B+G+M+3	49,073,399	60,946,149.49	PA	97	124.19
5	Bole office	3B+M+G+14	750,966,363.31	1,799,769,581.43	3,007,641,157.61	20.27	400.50
6	Motta branch	B+G+M+3	201,285,196.22	128,785,050.66	-	91.14	63.98
7	Gilgel beles branch	B+G+M+3	91,694,100.26	117,375,078.59	-	41.76	128.01
8	Butajira branch	B+G+M+4	122,984,573.66	147,581,488.4	PA	77.65	120
9	Debre Markos	2B+G+M+5	101,785,981.33	132,321,775.7	PA	98.16	130

Source: Own Survey (2024)

From the table analysis,for example, Bahir Dar district project has both variation and request for price adjustment which is above the budget of around 150.49% of the contract while the status of the work is 27.7 %. Similarly, for Motta branch office project there is a revised cost due to a variation which led above budget of around 63.98% from the contract while the status of the work is 91.14 %. In addition, some projects are at provisional acceptance to finalize the projects even though they are above budget. This indicates that CBE construction projects did not get completed on budget.

4.4 Factors affecting the adoption of DBB delivery method on time and cost management on selected CBE construction projects

To analyze the factors that affect the adoption of DBB project delivery method on time and cost management on CBE selected construction projects, survey questions are distributed to the respondents who are working at the head office, Motta project, and Bahir Dar project.

4.4.1 Factors used by CBE to adopt DBB project delivery method

4.4.1.1 Based on project characteristics

Following the ranking parameter for factors to adopt DBB project delivery method for CBE project. The ranking based on project characteristics to choose DBB project delivery is represented in detail in the following table.

Table 4.8 Project Characteristics

No	Factors used to adopt DBB Project Delivery Method	Scale					RII	Rank
Project characteristics		**5**	**4**	**3**	**2**	**1**		
1	Size and complexity of the project	6	19	20	7	4	0.669	3
2	Available budget for the project	4	20	19	9	4	0.651	5
3	Sources of funding for the project	3	16	22	9	6	0.615	7
4	Ensuring project Quality	7	19	18	7	5	0.669	3
5	Time factor	8	17	19	7	5	0.669	3
6	The urgency of completing the project	9	16	16	10	5	0.662	4
7	controlling project cost	9	20	18	6	3	0.705	2
8	Project design/ innovation (The complexity and innovation in the design)	6	18	19	10	3	0.662	4
9	Risks associated with the system (Clients transfer of risk/allocation to others)	8	24	15	7	2	0.716	1
10	Third-party agreement (flexibility for input to design and construction of with third party agreement).	0	18	26	10	2	0.625	6
11	Capability and creativity of the project owners	1	21	24	8	2	0.651	5

Source: Own Survey (2024)

Accordingly, from the project characteristics perspective the top five, are Risks associated with the system (Client transfer of risk/allocation to others) *(RII 0.716)* rank first, the need to control project cost *(RII 0.705)* second, Size and complexity of the project, Ensuring project quality, and time factor with *(RII 0.669)* are selected in third place with the same response rate. Both urgency of completing the project and Project design/ innovation (*RII 0.662)* are the fourth factors that were chosen.

4.4.1.2 Based on owner characteristics

Based on the owner or the client's perspective the ranking is analyzed to understand what factors are considered when adopting DBB project delivery method. This factors are selected to understand in perspective of owner to the project while adopting DBB delivery method. The ranking with owner characteristics to choose DBB project delivery is represented in detail in the following table.

Table 4.9 Owner Characteristics

No	Factors used to adopt DBB Project Delivery Method	Total					RII	Rank
Owner characteristics:		**5**	**4**	**3**	**2**	**1**		
1	Reduction of the owner's administrative burden	7	13	25	9	2	0.662	2
2	Owners' goals (meeting ER)	6	18	19	10	3	0.662	2
3	Owner control (Clients desire of high degree of control)	5	22	16	12	1	0.676	1
4	Owner staff involvement (Clients desire substantial or minimum use of its staff)	4	16	18	16	2	0.625	3

Source: Own Survey (2024)

Accordingly, Owner control which is the client's desire for a high degree of control *(RII 0.676)* takes first, reduction of the owner's administrative burden and Owners goals (meeting employer's requirement) (RII 0.662) are both ranked second and the third chosen factor is Owner staff involvement (Clients desire of substantial or minimum use of its staff) with *(RII 0.625)*.

4.4.1.3 Other factors

Based on the external factor perspective the ranking is analyzed to understand what factors are considered when adopting DBB project delivery method. The ranking is represented in detail in the following table.

Table 4.10 Other factors

No	Factors used to adopt DBB Project Delivery Method	Total					RII	Rank
Other factors		**5**	**4**	**3**	**2**	**1**		

1	Legal and regulatory ability to use various innovation	4	22	20	9	1	0.680	1
2	Construction claims/dispute (Clients desire minimum claims and disputes)	2	9	24	9	2	0.502	2

Source: Own Survey (2024)

Accordingly legal and regulatory ability to use various innovations (RII 0.680) is the first ranked which is considered for adopting DBB delivery method and then Construction claims/dispute (Clients desire minimum claims and disputes) (RII 0.502) is the second-ranked.

4.4.2 Factors that affect time (Schedule) due to adopting DBB delivery method

4.4.2.1 Based on owner's responsibility

From the data analysis, factors that affect time at the side of owner responsibility for adopting DBB delivery method in CBE projects are ranked and represented in detail in the following table.

Table 4.11 Time factor related to owner's responsibility

No.	**Factors that affect time in CBE DBB project**	**Total**					**RII**	**RANK**
The factors related to the owner's responsibility		**5**	**4**	**3**	**2**	**1**		
1	Financial problems (delayed payments and financial difficulties)	12	18	15	7	4	0.709	3
2	Lack of coordination with contractors	10	17	20	6	3	0.702	4
3	Slow decision making	16	26	4	7	3	0.775	1
4	Contract scope change/modification	12	19	16	8	1	0.731	2
5	Right of way problem (client unable to clear construction site on time)	5	15	18	11	7	0.611	7
6	Inadequate planning	7	21	16	9	3	0.684	5
7	Lack of coordination with local authorities	6	19	21	7	3	0.676	6

Source: Own Survey (2024)

Slow decision making (*RII 0.775)* is the first one, then contract scope change/modification *(RII 0.731)*, financial problems (delayed payments and financial difficulties) *(RII 0.709)*, lack

of coordination with contractors *(RII 0.702)* and inadequate planning *(RII 0.684)* follows respectively.

4.4.2.2 Based on the contractors responsibility

From the data analysis, factors that affect time at the side of contractor responsibility for adopting DBB delivery method in CBE projects are ranked and represented in detail in the following table.

Table 4.12 Time factor related to contractor's responsibility

No.	Factors that affect time in CBE DBB project	Total					RII	RANK
Related to the contractor's responsibility		**5**	**4**	**3**	**2**	**1**		
1	Lack of experience	8	16	16	13	3	0.658	7
2	poor site management	11	20	14	7	4	0.709	4
3	Lack of machinery and equipment on the market	11	16	15	11	3	0.687	5
4	Delay in delivery of materials to the site	15	21	13	4	3	0.760	1
5	Shortage of materials on-site	10	31	8	4	3	0.759	2
6	Lack of subcontractor’s skills	4	17	19	11	5	0.625	8
7	Coordination problems with others;	7	21	21	6	1	0.709	4
8	Financial problems	17	15	13	8	3	0.738	3
9	Shortage and low productivity of labor	6	19	21	6	4	0.673	6

Source: Own Survey (2024)

The analysis shows that delay in delivery of materials to the site *(RII 0.760)*, shortage of materials on site *(RII 0.759)*, financial problems *(RII 0.738)*, poor site management *(RII 0.709)*, coordination problems with others *(RII 0.687)* are the top five respectively which is ranked from the contractor view.

4.4.2.3 Based on the consultant's responsibility

For factors that affect time at the side of consultant responsibility for adopting DBB delivery method in CBE projects are ranked and represented in detail in the following table.

Table 4.13 Time factor related to consultant responsibility

No.	Factors that affect time in CBE DBB project	Total					RII	RANK
The factors that related to consultant		**5**	**4**	**3**	**2**	**1**		

	responsibility							
1	Lack of experience on the part of the consultant's staff.	8	16	22	7	3	0.680	5
2	Poor supervision and slowness in giving instruction	9	15	21	9	2	0.684	4
3	Incomplete documents	7	21	17	9	2	0.691	3
4	Absence on site	5	16	29	6	4	0.698	2
5	Delayed and slow supervision in making decisions	8	20	19	7	2	0.702	1

Source: Own Survey (2024)

The top five ranked from consultant's responsibility are, delayed and slow supervision in making decisions *(RII 0.702),* absence on site *(RII 0.698),* incomplete documents *(RII 0.691),* poor supervision and slowness to give instruction *(RII 0.684),* and lack of experience on the part of the consultant's site staff *(RII 0.680)* respectively.

4.4.2.4 External factors

The external factor that is impacting time for using DBB project delivery method is ranked and represented in detail in the following table as follows.

Table 4.14 Time factor Related to external factor

No.	**Factors that affect time in CBE DBB project**	**Total**					**RII**	**RANK**
External factors:		**5**	**4**	**3**	**2**	**1**		
1	Adverse weather condition	2	10	28	8	8	0.575	5
2	Poor site condition(unforeseen ground condition)	4	18	21	10	3	0.647	4
3	Lack of materials, equipment, and tools on the market	6	27	11	10	2	0.702	2
4	Poor economic conditions (currency, inflation rate, etc.);	20	22	7	5	2	0.804	1
5	Changes in laws and regulations;	8	14	24	7	3	0.673	3

Source: Own Survey (2024)

The first one is poor economic conditions (currency, inflation rate, etc.) *(RII 0.804)*, then lack of materials*)*, equipment tools on the market *(RII 0.702)*, changes in laws and regulations *(RII 0.637)*; Poor site condition (unforeseen ground condition) *(RII 0.647)*, and lastly adverse weather condition *(RII 0.575)*.

4.4.3 Factors that affect cost due to DBB delivery method

Factors that affect cost due to DBB delivery method in CBE projects analysis are executed and the ranking is as follows in detail in the following table.

Table 4.25 Based on factors that affect cost

No	Factors for Cost overrun in CBE projects	Total					RII	RANK
1	Additional works	11	15	18	8	4	0.687	3
2	Time delay (client, consultant, and contractor)	11	26	9	7	3	0.738	1
3	Material, machinery, and labor cost increment	11	24	13	5	3	0.738	1
4	Inaccuracy of material take-off and estimation	8	18	24	2	4	0.698	2
5	Inadequate pre-planning	5	20	20	9	2	0.673	4
6	Fraudulent practices	3	7	20	18	8	0.535	5

Source: Own Survey (2024)

Both time delay (client, consultant, and contractor) and material, machinery, and labor cost increment *(RII 0.738)* ranked first, inaccuracy of material take-off and estimation *(RII 0.698)*, additional works *(RII 0.687)*, inadequate pre-planning (*RII 0.673)* are ranked second, third fourth respectively. The ranking based on factors that affect cost due to DBB delivery method is represented.

4.5 Summary of interview question

Interview questions are semi-structured type and they are intended for the project managers working from client side 2 and from consultant 2 and contractor 2 who are in charge of representing the studied construction projects of CBE. The interview is to obtain some thoughts on the effect of DBB delivery method on time and cost management and similar ideas and concepts summarized together to avoid replication of ideas.

4.5.1 Effect of DBB on project performance

To identify the effect of DBB on project performance, interviews were made with project managers from the client, contractor, and consultant of CBE project. One of the PM from the client side said:

> *DBB project delivery method can affect the performance of the project in different ways such as the ability to control cost since the client does not fully participate (most of it is the consultants duty) in the design and construction contracts, thus it increases the risk of cost overruns or budget issues. The other is lack of adequate planning impacted the performance negatively. Lastly, it is raised that since the design and construction phases are at different times it creates a gap between the design team and the construction team leading to communication problems resulting change of work.*

One of the PM from the consultant side also points out some issues on the effect of DBB on the project performance of CBE,

> *There is a performance effect on the time and cost of the project due to the construction being started after a long time from the design preparation this limits their ability to provide ongoing design support, address construction-related issues, or make necessary design adjustments this creates a communication gaps and misunderstandings between the consultant and the contractor. The other major effect is using DBB project delivery method gives less flexibility for consultants to propose new innovative design solutions and to collaborate with contractors as most of the design work is finalized before the construction phase begins.*

The contractor PM also mentioned that :

> *Since the contractors have a limited chance of involving in the design stage it leads to challenges in constructability, and coordination with the design concept which results in increased change orders, rework, and conflicts between all parties involved during the construction phase that affect both time and cost .in addition the contractor holds a larger share on the project risks, as they are more visible during the construction phase This can increase the contractor's exposure to risks and potentially impact their profitability.*

4.5.2 Evaluation of DBB on CBE projects

On the evaluation of DBB project delivery method on the CBE project most of them have similar ideas and when it is summarised:-

The construction projects of CBE are not going as intended due to many reasons and one of them is the project delivery method implemented led to difficulties in managing costs due to unexpected costs during construction since the design is pre-defined and change orders which led to major cost overrun. The evaluation in terms of the performance of the schedule (time), due to coordination issues between design and construction, disputes arise between the three parties contributing to schedule delays, the other is lack of Opportunities for innovation and flexibility due to pre-determined BOQ leads client's dissatisfaction and frustration.

4.5.3 Causes of Time delay due to DBB project delivery on CBE construction project

From the interview, it is summarised that the major listed and mentioned causes of the time delay of the project are the following.

Design completion before the construction phase and other approval and commencement decisions required from different high-level managers resulted in a longer overall project duration. The other time taking are design review, approval processes, and potential design revisions. In addition, since the design is conceptual when it comes to construction constructability becomes an issue and these lead to delays and rework. The other is a delay during procurement, change orders, and disputes between client, consultant, and contractor. Delay due to unforeseen ground conditions, delay due to design submission, and responses, in the provision of design/instruction/Change Order. Security in the working area/region) is also the major cause.

4.5.4 Causes of cost overrun due to DBB project delivery

Lastly, the project managers interviewed the causes of cost overrun due to DBB project delivery in CBE construction projects, accordingly, it is summarised as follows.

Incomplete or inaccurate designs cause change orders, rework, and additional costs during the construction phase, Inefficient coordination and communication which is a challenge between the design team and the contractor, and misunderstandings, and incurs additional costs associated with resolving these issues. Delays when procurement and material provision, and additional overhead expenses also disturb the construction schedule and lead to cost overrun. The other is the longer project duration associated with the DBB delivery method the project is exposed to changing market conditions, such as inflation, material price fluctuations, and labor cost increases which raise requests for price adjustment. The other is unforeseen Ground conditions, overlooked quantities, and new additional works are considered causes.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATION

5.1 Summary of the main finding

The first section of the survey was about identifying the respondent's knowledge of basic organizational and project nature accordingly all of the respondents are familiar with the project delivery method and project delivery method type which gives confidence and reliability of the responses obtained to the research.

According to design risk, around 39.3% of the respondents agreed that DBB had design risk however most of the respondents which is 60% agreed that DBB delivery method has no design risk. From the analysis of efficient utilization of the schedule due to the implementation of DBB delivery method 46.4% responded that using DBB delivery method schedule can be utilized effectively however 53.6% agreed that the schedule is not effectively utilized by using DBB delivery method. Therefore, the result implies that DBB is not efficient for achieving the project schedule efficiently.

The completion period of the CBE projects is analyzed in a general view, and it is found that no project is completed ahead of time or on time, consequently, 25 (44.6%) of the respondents say the projects are delayed and no activity is there on the work too, and the remaining 30 (53.6%) of the respondents say the projects are under progress but delayed from the schedule. This indicates that all of the respondents agreed that the CBE projects are not completed on time and face a time overrun problem. The cause of time overrun is examined and it shows that the majority of delay is caused by all parties (client, consultant, and contractor) which is 41 (73.2%), the other 2 (3.6 %) is by consultant, 6(10.7 %) client and 5 (8.9%) contractor related causes.

The budget of the project using DBB delivery method is analyzed and it is found that no project is completed below or on budget. Thus most of the respondents say the projects are under progress but above budget which is 43 (76.8 %) and 12(21.4%) of the respondents say the projects are completed above budget, Besides. Therefore this indicates that almost all of the respondents agreed that CBE construction projects are not completed on the planned budget and face a cost overrun problem. The cause of cost overrun is analyzed in a general view, and 57.1% of the response was all stakeholders (client, contractor, and consultant) responsible for the cause. The others are 7 (12.5 %) by client, 4 (7.1 %) by consultant and 11 (19.6 %) by contractor. Other causes also mentioned which are variation work and security problems in the project area have contributed.

The second section of the survey is about the main objectives of the research it shows the factors CBE considered while adopting DBB delivery method based on the project characteristics, the top three are risks associated with the system (Client transfer of risk/allocation to others), controlling project cost, and size and complexity of the project. However based on owner characteristics owner control which is the client's desire for a high degree of control, reduction of the owner's administrative burden, and owner's goals (meeting the employer's requirement are both ranked in second place.

The top three factors that affect time on the side of owner responsibility due to DBB delivery method in CBE projects are slow decision making, contract scope change/modification, and financial problems (delayed payments, financial difficulties). For the contractor's responsibility delay in delivery of materials to the site, shortage of materials on site, and financial problems. Factors that affect time due to the consultant's responsibility are delayed and slow supervision in making decisions, absence on site, and incomplete documents. The external factors on time are poor economic conditions (currency, inflation rate, etc.), lack of materials, equipment tools on the market, and changes in laws and regulations.

Factors that affect cost due to DBB delivery method in CBE projects analysis are executed and both time delay (client, consultant, and contractor) and Material, machinery, and labor cost increment ranked first, then inaccuracy of material take-off and estimation follows.

On the other hand, according to interview respondents, the effect of DBB project delivery on CBE project resulted in time overrun and cost overrun and it was mentioned and identified as since DBB project delivery method requires the design phase to be completed before the construction phase it takes longer time, The other is time taking design review, approval processes, and potential design revisions contribute to delays in the design phase is the major problem and these lead to time overrun. Mostly the cost overrun is due to incomplete or inaccurate designs causing change orders, rework, additional costs during the construction phase, inefficient coordination and communication, and delay in procurement and material delivery also mentioned.

5.2 Conclusion

Identifying the effect of DBB project delivery method on time and cost management is a prerequisite for CBE construction projects to minimize or avoid time and cost overrun caused by the project delivery method. Therefore, the main objective of this research is to conduct an assessment of the effect of Design Bid Build Delivery Method on Project Time and Cost management in the case of selected construction projects at Commercial Bank of Ethiopia.

A questionnaire survey was used to identify the effects of DBB on time and cost on selected construction projects of CBE and clients, consultants and contractors were asked to identify the variables. The data gathered from the survey are analyzed using SPSS and ranked with the Relative Important Index (RII) using Excel tool. Interview questions were carried out using descriptive analysis.

The documents reviewed revealed that all of the CBE construction projects experienced time overruns that ranged from 98.2% to 354.8%, and considering price adjustment requests cost overruns ranged from 63.98 % to 400.05% from the agreed contract time and budget.

The major factors that CBE practiced in adopting for project delivery method are analyzed from different perspectives (project characteristics, owner characteristics, and other additional factors).Accordingly the three top major factors related to project characteristics were clients desire to transfer the project risk to others, controlling project cost and size and complexity of the project. The client's desire for a high degree of control, reduction of the owner's administrative burden, and meeting ER are related to owner characteristics.

From the research, it is found that the cause time overrun were identified, these are slow decision making, contract scope change/modification, and financial problems (delayed payments, financial difficulties) respectively. Consultant related causes are delayed and slow supervision in making decisions, absence on site, and incomplete documents. contractor related causes are delays in delivery of materials to the site, shortage of materials on site, and financial problems. Additionally, Poor economic conditions (currency, inflation rate, etc.), lack of materials, equipment tools on the market, and changes in laws and regulations were the top three major causes of time overrun related to external factors.

The cause of cost overrun on DBB projects of CBE are also analyzed in the research and it is concluded that time delay (client, consultant, and contractor) and Material, machinery, and labor cost increment ranked first had the same effect, then Inaccuracy of material take-off and estimation follows.

5.3 Recommendation

From the findings and the conclusion of the research, the following recommendations are forwarded to minimize or avoid the effect of DBB delivery method on time and cost management in selected construction of CBE to minimize time and cost overrun.

- Based on the findings of the practice of CBE for the choice of project delivery method it is also recommended to CBE the client to identify and engage key stakeholders to discuss delivery method options and gather feedback on any concerns, learn from the lessons

learned, and experience for using other project delivery methods, examine their risk allocation and the scale of client control under each approach, review the pros and cons of different types of delivery methods such as DB. In addition to this capacity building programs in the area of project delivery methods in the form of workshops and training can improve the skills and knowledge of in-house staff, contractors, Consultants & other stakeholders.

- To improve the time management of DBB projects of CBE construction project it is recommended for the client (CBE) to make timely decisions and smooth communication as much as possible to avoid time overruns, to assign qualified professionals to review and approve the design, and construction material according to the schedule, to avoid contract scope change and to pay the contractor for completed work according to the terms of contract to avoid disappointments and financial problem for the contractor. For the consultant, it is recommended to give timely instruction by assigning adequate staff on site and by preparing standard schedule and checklists for inspection of completed works so that delayed and slow supervision in making decisions, and incomplete documents are avoided. For the contractors, it is recommended to prepare a proper and realistic master plan/work program comprising of resources schedule, and equipment schedule and avoid delay in delivery of materials to the site and shortage of materials on site.
- To improve the cost management of DBB projects of CBE it is recommended to set realistic contract duration for the project by considering the complexity of the projects since it has a direct impact on the project cost so that the necessary budget will be allocated to the project before starting the projects. Moreover, apply an effective site management system for different activities of the project to avoid rework of activities and low labor productivity that will result in cost overruns.

5.4 Suggestion for future work

For future work, it is suggested to study the DBB delivery method effect on the performance of the project in respective of quality such as on defect and rework minimization, warranty claims, adherence to design specification, quality of design-construction coordination. risk management such as the ability to identify and mitigate risk proactively, dispute resolution, and claims prevention.

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APPENDICES I

QUESTIONNAIRE

ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

Department of Project Management

Questionnaire to be filled

Dear Respondents:

I would like to thank you in advance for the time and effort involved in your participation in this research. This questionnaire is prepared to obtain information from selected respondents. The information is required for the academic research entitled **"Factors affecting for adoption of Design bid build delivery method on project time and cost management in the case of selected construction projects at Commercial Bank of ethiopia**", which is being conducted as a partial fulfillment of the requirement for the degree of Master of Arts in project management. The main objective of the research is to assess the effect of Design Bid Build Delivery Method on Project Time and Cost management in the case of selected construction projects at Commercial Bank of Ethiopia. This questionnaire is divided into three sections: General profile of the respondent, basic organizational and project nature questions, effect and practice of DBB delivery method on CBE construction projects, and interview questions.

Please do what you can to assemble this information as fully as possible. Your detailed responses will allow me to meet the objective of the study. The confidentiality of the participants on this questionnaire will be maintained. The data gathered will not be placed in any place except for educational and research purposes. The identity of the person who provided all this information will remain anonymous. The data obtained during this interview will not be linked in any way to participants' names.

Please return this questionnaire **by Google Forms and forward it** to the following email address:

Email: - hantg16@gmail.com.

Tigist Dabesa

Cell phone: 0913185299

St. Mary's university school of graduate studies

Department of Project Management

Addis Ababa, Ethiopia

I. General Profile of the Respondent

1. Organization name_____(optional)
2. Which organization do you represent
   1. Client ☐ 2. Consultant ☐ 3. Contactor ☐
3. How long you have worked in the construction industry?
   1. 1-5 Years ☐ 2. 6-10 Years ☐ 3. 11-15 Years ☐ 4. Above 15 years ☐
4. Which project are you participating in?
   1. Head office ☐ 2. Bahir D ☐ ☐
   2. ar project 3. Motta project

II. Basic organizational and project nature questions

5. What is your field of specialization?
   1. Architect ☐
   2. Civil Eng ☐
   3. Sanitary ☐
   4. Electrical Eng ☐
   5. Contract admin ☐
   6. Others, please specify……
6. Your position in the company?
   1. Consultant (Designer team) ☐
   2. Resident engineer ☐
   3. Sub- Consultant ☐
   4. Site Supervisor ☐
   5. Sub-Contractor ☐
   6. Manager ☐
   7. Project Manager ☐
   8. Senior expert ☐
   9. Expert ☐
   10. Others, please specify……
7. Are you familiar with project delivery methods?
   1. Yes ☐ 2. No ☐
8. If yes please specify it
   1. DBB ☐ 2. DB ☐ 3.Both ☐ 4. if other specify it_____

9. The procurement Methods used for Design Bid Build contract delivery method of the Projects is

   1. Low price bid ☐ 3. Multi-parameter bidding ☐
   2. Alternative bids/designs ☐ 4. Best-value ☐

10. From your experience, does Design Bid Build project delivery method have a design risk?

    1. Yes ☐ 2) No ☐

11. Do you believe that using Design Bid Build delivery system project schedule is efficiently utilized?

    1. Yes ☐ 2) No ☐

12. Concerning the projects, according to the Design Bid Build delivery method, did the project you involve

    1. Completed a head time ☐
    2. Completed on time ☐
    3. Delayed and work is not active ☐
    4. Construction under progress but delayed from the schedule ☐

13. If your answer to Question No. 12 is delayed, by how many days?

    1. Less than 50 days ☐ 2. 50 – 150days ☐
    3.150 – 270 days ☐ 4. More than 270days ☐

14. If your answer to question No. 13 is delayed, who is the major cause of delay is

    1. Consultant related ☐ 2. Client related ☐ 3. Contractor related ☐
    4. All ☐ 5. Other ☐

    If your answer to question No. 14 is other, please specify_____

15. Concerning the projects according to the DBB delivery method did the project you

    1. Completed below budget ☐
    2. Completed on budget ☐
    3. Completed above budget ☐
    4. Construction is under progress but above budget ☐

16. If your answer for Question No. 12 is above budget, by how much?

    1. Less than 50% ☐ 2. 50 % – 75% ☐ 3. More than 100% ☐

17. who is responsible for the major cause of the cost overrun?

    1. Consultant related ☐ 2. Client related ☐ 3. Contractor related ☐
    4. All ☐ 5. Other

    If your answer to question No. 19 is other, please specify_____

III. Effect and practice of DBB delivery method on CBE construction projects

The purpose of this survey is to rank the factors for the questions, how choice is made for the appropriate project delivery system, and the effect of project delivery system on performance, DBB effect on time, and DBB effect on cost.

In the following survey, you are kindly requested to circle the appropriate point you think reasonably from (1-5)for the bottom table.

5= very high, 4= high, 3= medium, 2= poor and 1= very poor

DBB stands for Design Bid Build

A. Factors that CBE practiced to adopt for project delivery method

No	Factors/ causes used to choose DBB Project Delivery Method	Please circle on the appropriate point (select only one category)				
		5	4	3	2	1
	Project characteristics					
1	Size and complexity of the project	5	4	3	2	1
2	Available budget for the project	5	4	3	2	1
3	Sources of funding for the project	5	4	3	2	1
4	Ensuring project Quality	5	4	3	2	1
5	Time factor	5	4	3	2	1
6	The urgency of completing the project	5	4	3	2	1
7	Controlling project cost	5	4	3	2	1
8	Project design/ innovation (The complexity and innovation in the design is critical)	5	4	3	2	1
9	Risks associated with the system (Clients transfer of risk/allocation to others)	5	4	3	2	1
10	Third-party agreement (flexibility for input to design and construction of third party agreement).	5	4	3	2	1
11	Capability and creativity of the project owners	5	4	3	2	1
	Owner characteristics:					
12	Reduction of the owner’s administrative burden	5	4	3	2	1
13	Owners' goals (meeting employers requirement)	5	4	3	2	1
14	Owner control (Clients desire of high degree of control)	5	4	3	2	1

15	Owner staff involvement (Clients desire substantial or minimum use of its staff)	5	4	3	2	1
	Others	5	4	3	2	1
16	Legal and regulatory ability to use various innovative project delivery systems	5	4	3	2	1
17	Construction claims/dispute (Clients desire minimum claims and disputes)	5	4	3	2	1

B. Factors that affect time (Schedule) due to DBB delivery method

In the following survey, you are kindly requested to circle the appropriate point you think reasonably from (1-5) for the bottom table.

5= very high, 4= high, 3= medium, 2= poor and 1= very poor

N.o	**Factors that affect time in CBE DBB project**	Please circle on the appropriate point (select only one category)				
		5	4	3	2	1
The factors related to owner's responsibility						
1	Financial problems (delayed payments and financial difficulties)	5	4	3	2	1
2	Lack of coordination with contractors	5	4	3	2	1
3	Slow decision making	5	4	3	2	1
4	Contract scope change/modification	5	4	3	2	1
5	Right of way problem (client unable to clear construction site on time)	5	4	3	2	1
6	Inadequate planning	5	4	3	2	1
7	Lack of coordination with local authorities	5	4	3	2	1
factors that related to the contractor's responsibility						
8	Lack of experience	5	4	3	2	1
9	poor site management	5	4	3	2	1
10	Lack of machinery and equipment on the market	5	4	3	2	1
11	Delay in delivery of materials to the site	5	4	3	2	1
12	Shortage of materials on-site	5	4	3	2	1
13	Lack of subcontractor’s skills	5	4	3	2	1
14	Coordination problems with others;	5	4	3	2	1

15	Financial problems	5	4	3	2	1
16	Shortage and low productivity of labor	5	4	3	2	1
17	**The factors related to the consultant's responsibility:**					
18	Lack of experience on the part of the consultant's site staff.	5	4	3	2	1
19	Poor supervision and slowness in giving instruction	5	4	3	2	1
20	Incomplete documents	5	4	3	2	1
21	Absence on site	5	4	3	2	1
22	Delayed and slow supervision in making decisions	5	4	3	2	1
23	**External factors:**					
24	Adverse weather condition	5	4	3	2	1
25	Poor site condition(unforeseen ground condition)	5	4	3	2	1
26	Lack of materials, equipment, and tools on the market	5	4	3	2	1
27	Poor economic conditions (currency, inflation rate, etc.)	5	4	3	2	1
28	Changes in laws and regulations;	5	4	3	2	1

C. Factors that affect cost due to DBB delivery method

In the following survey, you are kindly requested to circle the appropriate point you think reasonably from (1-5) for the bottom table.

5= very high, 4= high, 3= medium, 2= poor and 1= very poor

. N.o	**Causes for Cost increase in CBE projects**	Please circle on the appropriate point (select only one category)				
		5	4	3	2	1
1	Additional works;	5	4	3	2	1
2 2	Time delay (client, consultant, and contractor)	5	4	3	2	1
3	Material, machinery, and labor cost increment	5	4	3	2	1
4	Inaccuracy of material take-off and estimation	5	4	3	2	1
5	Inadequate pre-planning	5	4	3	2	1
6	Fraudulent practices	5	4	3	2	1

APPENDICES II

Semi-structured Interview Questions

INTERVIEW QUESTIONS (Case analysis)

1 Effect of DBB on Project Performance of CBE

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2 Evaluation of DBB on CBE projects

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3 Causes of Time delay due to DBB project delivery on CBE project

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4 Causes of cost overrun (if exists) due to DBB project delivery on CBE project

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APPENDIX III

SAMPLED DBB PROJECTS FOR CASE STUDY GENERAL DESCRIPTION

Commercial Bank of Ethiopia undertakes various types of construction works, to fulfill the needs for Office, Residence, and Other Facility Services for Branches, Districts, and Head Office Organs. In connection with the implementation of these construction projects, the Bank allocates a significant amount of budget every fiscal year. CBE has established a Building Construction Management department under the Facilities Management division. This building management department has three sub-departments focused on Building Construction Business Analysis and quality management, Construction contract management, and land management.

All the construction projects under BCM were being designed& constructed by competitive consultants & contractors respectively selected through open bid and the project delivery method was the conventional approach in technical terms called the Design-Bid-Build (D-B-B) project delivery method. the following two projects are selected for this study.

Bahirdar District office

Bahir Dar district office is located in the northern region of Ethiopia and the total land area of the project is around 29,361 m^2 to build a 16-floor district office building including two basements, a ground floor, mezzanine floor.

Motta project office

Motta branch office is located in the northern region of Ethiopia and the total land area of the project is 14,746 m2 to build a 5 floors branch office building including one basement, ground floor, and mezzanine floor