ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

CASH MANAGEMENT IN THE CONSTRUCTION SECTOR A CASE STUDY ON DEFENCE CONSTRUCTION ENTERPRISE

BY

YITAGESU TERFA

DECEMBER 2018

ADDIS ABABA, ETHIOPIA

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A THESIS IS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF ST. MARY'S UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS ADMINISTRATOR/GENERAL MBA/.

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DECLARATION

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of my advisor Asmamaw Getie (Ass.prof), 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 earning 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 abbreviations

- NPV   Net Present Value

- DCE   Defense Construction Enterprise

- DCF   Discounted Cash Flow

- CVR   Cost Value Reconciliation

- AC   Actual Cost

- BAC   Budget at Completion

- EV   Earned Value

- PV   Present Value

- EAC   Estimate at Completion

- ETC   Estimate to Completion

- RII   Relative Importance Index

Abstract

Cash is one of the most important resources of a construction company which determines the survival of a company. Given the management expertise and experience that is available to the construction industry, it seems strange that, according to the literature, the major causes of failure are lack of financial control and poor management. The purpose of this paper is to assess the practice of cash flow management in Defense Construction Enterprise. It focuses on the planning and controlling of cash flow management in construction sector and factors affecting project cash flow. The research approaches use both qualitative and quantitative methods. Questionnaires were distributed to forty projects management team during the enterprise quarter meeting in Addis Ababa and ten head office higher officials. In addition, an interview was prepared, based on the analysis of the questionnaire, to get recommendation of practitioners for a remedial measure. From the result of the questionnaire, the cash flow planning is done both at project and head office level. Yet many factors hinder the efficient management in which delay in material delivery, overdue payment from client and delayed project schedule was found to be the contributor to the enterprise cash flow difficulties. The result also showed that time overrun to be the significant effect of poor cash flow management followed by claim and cost overrun consecutively. From the evidence cash flow problems are the causes of failure, even when they are known, do not appear to be taken seriously. They must be if a company is to survive. The enterprise should also exhaustively work on cash planning both at projects and head office. In this way projects can proactively manage the negative effect of all the factors which can affect their cash flow. Existing developments and methods in cash flow forecasting and modelling can serve as a starting point for managers to rethink their cash flow management.

Key words: cash flow, management, project, forecast, contractor, factors

CHAPTER ONE
INTRODUCTION

1.1   Background

Where's the cash? This question is all too common in the construction industry, and even profitable construction companies can have cash flow problems. For years, lack of control over cash flow has been a major contributing factor to the high rate of insolvencies in the industry; therefore, it is a subject that should be taken seriously by all contractors. Simply stated, contractors go out of business because they run out of money, not because they run out of work.

Cash flow is one of the major tools required for controlling the cash movement of the company by determining the cash in and cash out in the project and demonstrating the possible results clearly with time effect (Melik, 2010). The traditional approach to cash flow prediction usually involves the breakdown of the bill of quantities in line with the contract program to produce an estimated expenditure profile.

Several attempts have been made to devise a 'short cut' method of estimation, which will be both quicker and cheaper to utilize (Odeyinka and Lowe, 2000). According to Blyth and Kaka (2006), the majority of cash flow forecasting models developed have been based on standard value S-curves representing the running cumulative value of work, and using data from completed construction projects. They are valuable to project management in stating current status and predicting the future of projects. Although they are used in scheduling and planning, for reporting actual, earned and planned values and for resource loading various activities of a project, but according to Miskawi, (1989, cited in Blyth and Kaka, 2006), their reliability and accuracy is still in question.

In construction, financial problem studies have focused on explaining failure at the project level, rather than the company level, where there has been comparatively little work (Arditi, Koksal and Kale 2000).

A model for accurately predicting trends in a project's cash flow prior to the construction phase has been indefinable. But advance knowledge of the factors affecting cash flow and an understanding of their impact is essential to the contractor (Liu et al., 2009). Advance

knowledge of factors affecting project cash flow helps project management to be proactive in managing them both at the planning and controlling stage. Therefore this research will mainly focus on cash management of Defense construction enterprise with wide coverage on the topic.

1.1.1 Organizational Background

Defense Construction Enterprise/DCE/ was established in 2010 by ministry of council regulation NO 185/2010 as public enterprise. the enterprise has mainly been undertaking various construction projects like road, dams, irrigation infrastructures and buildings projects that have been undertaking in different part of the country.

Like other construction companies, DCE face challenges on cash management. The study document of 2014 in the enterprise tries to give short term solution at a time. However, this document doesn't include the causes of cash shortage and future strategies' rather it focus on short term solution. So that the problem of cash shortage in DCE still persist. Since this study tries to cover the enterprise cash flow problems from the grass root it will gives awareness and direction to DCE management.

1.2 Statement of the problem

Financial problem is one of the leading factors for the failure of firms around the world (Arega 2016). Studies and investigations have shown that lack of liquidity is a major problem causing construction project failure (Al-Issa and Zayed, (2007, cited in Liu et al., 2009)). 'Cash flow is a blood line of construction companies' (Ihab, 2014). Thus, the sustainability of construction firms highly depends on the management of their cash flow. Many researches showed that financial problem is a leading factor for the delay of construction projects (Sweis et.al, 2008; Abd El-Razek et,al, 2008; Alaghbari et.al,2007).

According to Siraw (2014) financial problem by contractor was ranked to be the second significant factor contributing to time overrun in Addis Ababa road constructions. A similar research by Abubeker (2015) revealed that financial problem to be second ranked factor affecting time overrun as well as cost overrun.

Construction projects of DCE are seen being dormant at some point due to insufficient cash to run the project. This problem not only affects the project time but also leads additional cost to be incurred by the enterprise and minimizing profitability of the company. Insufficient cash at project sites are even causing troubles in employees' household. Some projects do not even pay wages to their employees on time. This situation affects employees' motivation and morale against the work decreasing productivity. Manpower cost is not the only expenditure those projects fail to meet but also other direct costs and indirect costs.

Insufficient cash flow may arise due to lack of financial source or proper allocation of enough budget. In any case there is an implication towards management. Therefore, this thesis is an attempt to address this critical and current issue that must be given attention by the enterprise.

1.3   Research Objectives

1.3.1   General objective of the study

The main objective of the research is to investigate the practice of cash management at DCE.

1.3.2   Specific objectives of the study

The specific objectives of the research are:
- To examine cash management techniques.
- To identify factors affecting the enterprise cash flow.
- To assess the impact of factors affecting cash flow.
- To examine the main sources of financing projects.

1.4   significance of the study

The findings of the study have practical significance. This study is expected to give insights to understanding of the importance of financial planning on construction firms. The study is expected to raise the management awareness on project cash management, to identify the factors that contribute to projects inefficiency. In due course it is hoped that this study will provide information for further studies

1.5   Research questions

The basic research questions are:

1.   Is cash flow planning practiced in the enterprise?
2.   What are the techniques used to manage cash flow?
3.   What are the methods of cash flow forecasting/ planning used?
4.   What are the main sources of financing projects?
5.   What kinds of cost controlling techniques are used by the enterprise?
6.   What factors are affecting cash flow management?
7.   How is the impact of factors affecting cash flow reflected on the project?

1.6   Scope and limitations

The focus of the research is to investigate the practice of Defense construction cash flow management. The research scope mainly covers investigating the practice of cash management, factors affecting cash flow, cost control technique and impact of factors affecting cash flow of the enterprise; beside the review of literatures related to these topics. The investigation is done on Head office of the enterprise and projects with a contract amount of birr one hundred million and above. The focus is narrowed by reason of most projects with a contract amount of less than one hundred million have limited project life, less than one year and have no formal structure and cash flow planning. Since, study is also limited to Defence Construction Enterprise the findings can't generalize to whole construction companies.

1.7 Organization of the research

This research contains of five chapters. Chapter one is about introduction in which the motives of this research, the background, problem, research question, objective and the significance are addressed. Chapter two is a literature review in which includes the current knowledge including substantive findings, as well as theoretical and methodological contributions. The chapter three is about methodology that introduces the research method, sampling, data collection, questioner design, and plan of analysis. Data analysis, interpretation and presentation of this research will be presented in chapter four. Chapter five will be about Summary, conclusion and recommendations.

CHAPTER TWO
LITERATURE REVIEW

2.1   Theoretical Literature

2.1.1 Importance of cash

Cash is one of the most important resources of a construction company, because more companies become bankrupt due to lack of liquidity for supporting their day-to-day activities, than because of inadequate management of other resources (Singh and Lakanathan 1992, cited in Blyth and Kaka, 2006). Therefore the importance of forecasting and controlling cash flow for construction companies is non-questionable.

Forecasting project cash flow is necessary for a construction company, as it gives a chance to plan for deficit and ensures sufficient cash availability to meet the demands. Cash flow shows the contractor the amount of cash required and when it will be required. Thus, the contractor can make arrangements to secure the required cash(Emad, 2012).

According to Melik (2010), Cash flow enables tracking both cost and revenue of the project through time. A cash flow chart visualizes the net amount of money that will be required during the project as a function of time displaying the financial risk of the project and giving an alert before the project/company will be in trouble.

Cash flow is a good cost planning technique helps in taking bid/no bid decisions of the company during tendering stage of the project (Kirkham, 2007). Besides, cash flow will assist the contractors in the selection of contracts that will not cause serious cash problems due to the lack of sufficient financial resources (Kaka and Price, 1991). It will be useful in pretender stage for making good estimation and determine the contingency, mark-up percentage of the bid cost.

Cash flow provides cash management strategies in order to plan, monitor and control the cash shortage or surplus (Melik, 2010). Cash flow forecast provides a reliable indicator to lending institutions that loans made can be repaid according to an agreed program (Emad, 2012).

A cash flow forecast develops a cash conscious culture in the company by promoting allocation, usage and control of resources effectively (CIB, 2000). Companies learn they need to maximize cash flow by negotiating better payment terms with project owners before contracts are signed.

2.1.2 Components of project cash flow

The three main ingredients in determination of project cash flow are (Emad, 2012): expenses, income and time of payment. Expense (cash out) represents the aggregate payment the contractor makes over time. Income (cash in), a receipt of cash for rendering services. Timing of payments in cash flow analysis, related to the work done by the contractor both for cash in and cash out.

Expenses (cash out)

Construction costs are classified into two (Chitkara, 1998), Direct cost and Indirect cost. Direct costs are costs that can be assigned for a specific activity in a project. These costs go to permanent works. Indirect costs are costs that are attributable to a given project but cannot be identified with the performance of a specific activity or work package. Indirect costs also addin overhead costs of the enterprise.

Project income (cash-in)

Ashley and Teicholz (1977) defined the cash in as earnings minus held retention. The flow of money from the owner to the contractor is in the form of progress payments. Estimates of work completed are made by the contractors periodically (usually monthly) and are verified by the owner's representative. Depending on the type of contract (e.g. Lump sum, unit price, etc.), these estimates are based on evaluations of the percentage of total contract completion or actual field.

Time effect of money

The value of money is dependent on the time at which it is received. A sum of money on hand today is worth more than the same sum of money to be received in the future because the money on hand today can be invested to earn interest to gain more than the same money in the future

(Emad, 2012). Thus, studying the present value of money (or the discounted value) that will be received in the future is very important.

In construction projects one can figure out the three components explained above at the beginning of the project having at hand the construction cost estimate, the work schedule and the contract agreement. The cost estimate helps to determine the cash out. The schedule helps to arrange timing of cash out. The payment terms help to determine the timing and amount of cash in. Thus three inputs are the basics for developing the first cash flow plan. Further considerations will be made for financial source. Therefore the three inputs together with source of finance play a great role in affecting project cash flow during planning stage. In addition there are design related factors and managerial factors affecting project cash flow at pre-construction or during construction stage. These factors together with those factors affecting project cash flow during implementation will be discussed in the next section.

2.1.3 Factors affecting cash flow

A model for accurately predicting trends in a project's cash flow prior to the construction phase has been elusive. But advance knowledge of the factors affecting cash flow and an understanding of their impact is essential to the contractor (Liu et al., 2009).

Construction sector is vulnerable to economic changes, especially in Ethiopia where the exchange rate fluctuate time to time it increase the construction projects financial risks. Borghezi and Gaudenzi (2013) consider the interest rate of credit, currency and liquidity are the factors which generate highest financial risks in construction projects. In (Hlaing et al., 2008) there are listed the most relevant risk factors in the construction industry and the top four risk factors are financial ones: the lack of financial resources of the contractor, the financial stability of the client, the costs overruns and the financial stability.

This research will discuss some factors affecting cash flow based on the inputs discussed above for the pre-construction stage. Also factors affecting project cash flow during execution of work will be covered.

- **Influencing factors at pre- construction stage**

Before looking at the factors related to cost estimate a brief look to the types of cost estimate is essential. According to Hendrickson (1998) there are three types of cost estimates; design estimate, bid estimate and control estimate.

Design estimate: the type of cost estimate during designing stage by designing firm,Bid estimate: is the cost estimate submitted by the contractor to the owner during bidding. Control estimate: contractor's estimate for monitoring the project during construction. A control estimate should be updated periodically. Bid estimate may be used as control estimate depending on its accuracy. Since this research is dealing with cash flow management the concern will be about bid estimate and control estimate Hendrickson (1998).

A cost estimate usually involves preparation of cost break down. A typical cost break down is composed of three costs; manpower, machinery and material costs. These costs are basically derived from the scope of work and method of work to be used. Hence, a cost estimate heavily depends on this scope definition. In fact lack of proper scope definition has been stated to be a major source of bad estimate (Cowie, 1987 as cited in Akinci and Fischer, 1998). The accuracy of a cost estimate is highly dependent on the level of detailing the scope definition. A cost estimate based on a detailed design should be more accurate than one without any design information.

The level of accuracy also depends on the estimator. Estimators have motivational and cognitive biases and these biases can lead to distorted and inaccurate cost estimates (Akinci and Fischer, 1998). Clerical error due to estimator is also another factor leading to inaccurate cost estimate.

There may be many or only a few work methods available. For instance, should the estimator assume central mortar mixing or mix concrete manually using labor force? Will timber be used or metal scaffolding is used? Generally different ways of how to do the job may result different amount of money to be incurred.

Performance of manpower and machinery indicating the output of these resources will be required for the estimation. According to Sinclair et.al (2002) the output chosen will be based

on past performance, since the estimator will assume that this performance will be repeated in the future. Accuracy of this standard is highly desired as decreases in actual output lead to the increase in cost.

Contingency has been defined as the amount of money or time needed above the estimate to reduce the risk of overruns of project objectives to a level acceptable to the organization (PMI, 2004). Therefore consideration of this cost in the estimate should not be overlooked

- **Influencing factors related to contract agreement**

Factors affecting project cash flow related to Contract agreement can be contract type, terms of payment, change work orders. According to Akinci and Fischer (1998) contract types may be grouped into two major categories; cost-reimbursable contracts and fixed-price contracts. Cost-reimbursable contracts allow price adjustments relative to project costs. Cost plus contracts are example of this type of contracts. On the other hand, fixed price contracts include all contract types that require the contractor to establish a stipulated sum for the completion of a defined scope of work. Examples of this type of contract are lump-sum and unit price contracts. Most of DCE contracts are cost plus type.

In fixed-price contracts contractors bear all the financial burdens of cost overruns. Also, these types of contracts can create an adversarial relationship between the owner and the contractor, which can lead to significant disputes (Ibbs and Ashley 1987, cited in Akinci and Fischer, 1998) and may have negative effect on project cash flow.

Various clauses in general conditions of contract can have indication on project cash flow. To mention some, there are clauses dealing with the preparation of cash flow forecast, payment terms, retention, taxes, currencies, price adjustment etc. These terms need to be considered and negotiated, if possible, during pre-contract meeting.

- **Influencing factors related to project schedule**

After an award of construction project, the contractor plans how and when to do specific tasks which combine to deliver the agreed construction project. Project schedule is developed having defined the work activities, their relation and associated duration. All scheduling procedures

rely upon estimates of the durations of the various project activities as well as the definitions of the predecessor relationships among activities. Therefore, any change in the precedence of activities affects the timing of the activity to be accomplished. This in turn affects the timing of expenses to be incurred and income to be received which directly affects project cash flow. The longer the duration of a project the greater the effect of economic factors affecting the cost of the project (Akinci and Fischer, 1998). Also, additional overhead cost will be incurred as time overrun take place. Petros (1996) investigated the effect of having different works plans on the cost flow curve of one project. Results showed the significant variability of the possible S-curves.

- **Influencing factors related to design**

As mentioned earlier, project scope describes the work to be performed; hence a cost estimate heavily depends on this scope definition and lack of proper scope definition has been stated to be a major source of bad estimate. In addition, it creates a potential for changes in scope (Akinci and Fischer, 1998). These effects of vague scope in turn affect the cash flow of a project. Change orders have a negative impact on cash flow due to slow approval processes and eventual payment (Venkataraman and Pinto, 2008)

- **Influencing factors related to management**

Poor management like poor resource management, time management...etc. can have a significant effect on project cash flow negatively. The literature shows that apart from poor management, lack of adequate financial control is the most common characteristic of declining firms (Slatter 1984). The management at corporate level affects project cash flow significantly because the source of central managerial decisions emanates from corporate level. Management decisions on investment have their effect on cash flow. Alternatives should be well investigated and compared before such decisions are made.

As discussed above work methods and resources are important inputs of a cost estimate. Therefore, poor plan of such input will have a negative effect on project cash flow. Management and planning team should consider the effect of such inputs on the project cash flow at the planning stage.

- **Influencing factors during implementation**

Price fluctuations are the result of highly complex effect of various elements such as the value of money, supply and demand, added value of products (Akinci and Fischer, 1998). Over/ under measurement of work during interim valuation affects project cash flow either positively or negatively. A strong working relationship and an open line of communication should also be developed with client as well as consultant.

The process of discounted cash flow analysis is enormously dependent upon prevailing interest rate. Thus, higher interest rates could adversely affect cash flow. According to Van Horne (1971 cited in Geofrey, 1996) inflation in forecasting cash flows must also be reflected in a discount rate. Therefore, interest rate and inflation have a direct impact on the DCF.

A contractor incurs the cost first, but needs time to assemble all invoice supporting documents leading to delayed payment. This situation is one of the key factors leading to cash flow variance mentioned by Mark (2007).

Failure of subcontractor: uncertainties related to subcontractors' performance raise the risk of a cost increase during construction (Akinci and Fischer, 1998). If subcontractors fail to perform the work then the main contractor will have to bear the cost and time of finding a new subcontractor which affects the project cash flow.

When resources like labor, material and equipment are unavailable while construction is on progress it affects the project performance and schedule which in turn affects the project cash flow due to additional overhead costs and inflation. Poor project management like poor resource management can have a significant effect on project cash flow negatively.

It has been widely accepted and reported that weather conditions affect the productivity in construction (Nkado, 1995, cited in Akinci and Fischer, 1998). It was also reported it is the major cause of cost overrun by Hetland (1994, cited in Akinci and Fischer, 1998).

If the company could not take the necessary actions contractually for improving cash flow, lending strategies should be developed for meeting the financial needs of the project. Due to the risky nature of the construction industry, high rates of business failure and bankruptcy occurred in the construction sector and many banks are unwilling to lend money to the contractors unless they are reliable (Atallah, 2006). Besides, even if the company is found eligible by the financial supplier, the lenders will loan with high rate of interest at time of cash shortage since the late interference on to project may not reduce the financial risk (Halphin and Woodhead, 1998, cited in Melik , 2010)

This cost of borrowing widely varies from source to source. In addition to the impact varying rates, factors like company size and maturity, market niche, credit history, potential for growth and local market conditions play a great role in getting a financial source to meet needs.

2.1.4 Project cash flow management

The construction industry suffers the largest number of bankruptcies of any sector of the economy, with many companies failing because of the poor financial management, especially inadequate attention to the cash flow management (Kaka, 1996)
Like other management tools, cash flow forecasting is a repeated process. At first, a forecast, plan or target is compiled and then when the project is in progress, the performance is measured and compared with the plan (Navon, 1995). If there is inconsistency between planed and actual performance, the plan must be adjusted to meet the original target or at least to attain it as closely as possible. With good knowledge of cash flow forecasting, the contractor could more efficiently and accurately manage cash flow during the construction process to prevent extra expenses and avoid project collapse (Liu et al., 2009).

- **Project cash flow forecasting**

Financial management has long been recognized as an important management tool. Throughout the construction process, contractors need to be comparing the actual income and expenses against the forecasted values. If there are discrepancies between these values, the contractor needs to adjust the schedule and update the project plan to match

the estimated situation as early on as possible. With good knowledge of cash flow forecasting, the contractor could more efficiently and accurately manage cash flow during the construction process to prevent extra expenses and avoid project collapse (Yaqiong et al., 2009).

The S-curve stands for 'standard' curve, but it also takes the shape of the letter 'S' when shown on a graph. The S-curve figure represents the project budget baseline against which actual cumulative budget expenditures will be evaluated. It helps project managers understand the correlation between project duration and budget expenditures and provides a good sense of where the highest levels of budget spending are likely to occur (Venkataraman and Pinto, 2008).

- **Minimizing negative cash flow**

A cash flow deficit arises when payments are due, and the cash balance is too low to meet the obligations. As one of the purposes of cash flow projection is to give time to plan for deficit rather than reacting at the last minute, there must be time to explore the options of a company in overcoming this deficit. So far in literatures, there are several ways of managing a cash flow deficit.

It is very important to a contractor to minimize negative cash flow because this may hinder performance of work due to lack of financial resources. Among the procedures one contractor may follow to minimize negative cash flow, before engaging in the work and face the difficulties, can be: Negotiation for favorable advanced or mobilization payment. - To negotiate with the client for getting fair and logical payment terms and retention (Atallah, 2006). Adjust the timing of delivery of large material orders to be with the submittal of the monthly invoice.

Contractors also have a way of minimizing the happenings of cash flow deficit during implementation, among them are, Achievement of maximum production in the field to increase the monthly payments. according to Atallah (2006), contractors can speed up collections by submitting the first invoice as soon as possible introducing the completed works to the client as soon as possible for making checks and strictly following up the deserved receivables. Delay in paying labor wages, equipment rentals, material suppliers

and subcontractors. But explaining the situation honestly and requesting a revised payment schedule is much better than simply ignoring bills when you are in a bind with vendors.

Sub-contracting is often used as negative cash flow minimizing technique. If the company has its own workforce, they need the money available to pay the workforce weekly. But if the company makes use of sub-contractors, the money can be held for much longer, awaiting a monthly invoice to pay after receiving it. Besides this application of retention to sub-contractors is mentioned to be a way to enhance cash flow by Atallah (2006).

- **Project cost control**

Project cost control is the process influencing the factors that create changes to the cost baseline to ensure that changes are beneficial. It is managing the actual changes when and as they occur. According to keith (2008) the three main types of contractors' project cost-control systems are as follows:
 Cost-value reconciliation (CVR) brings together the established totals for cost and value to illustrate the profitability of a company. Its intention is to ensure that the profits shown in the company accounts are accurate and realistically display the current financial position.
Earned value analysis (EVA) is defined by Howes (2000) as 'an established method or the evaluation and financial analysis of projects throughout their life cycle'. Earned value management (EVM) is a fully integrated project cost- and schedule-control system which allows through trend analysis, the formation of 'S'-curves and cost/schedule variances. EVM, regarding cost management, is concerned with the relationships between three formulas that reflect project performance.
Cost Variance (CV) is a very important factor to measure project performance. CV indicates how much over or under budget the project is.

2.2 Empirical Evidence

The study of construction project cash flow became increasingly popular in the 1970s and 1980s (Kenley and Wilson 1986). While the importance of financial or cash flow management is normally discussed with reference to the company level, most of the

models for cash flow forecasting are individually developed for specific project types (Navon 1995). This section is devoted to review the empirical studies on cash Management and its effect. Siraw (2015) analyzed the effect of cash flow management on Addis Ababa City Administration Road Construction Projects completed from 2000-2005EC. A total of 47 contractors and consultants were collected on the common factors to contribute for time overrun on asphalt road construction projects by using a purposive sampling technique and analyzed using both descriptive and inferential statistics. From the result, it was found that 80% of the projects suffered time overrun. The most important causes of time overrun next to slow cite clearance were found to contractors' financial problems.

Cristine Mutti (2002) shows the major causes of construction firms' failure. Which are poor management and bad cash flow management. From the evidence of the impact of cash flow on failure," it is clear that the causes of failure, even when they are known, do not appear to be taken seriously" They must be if a company is to survive.

CHAPTER THREE
REASERCH METHODOLOGY

3.1 Introduction

This chapter describes the methodology used in order to conduct the study. It describes the types of methods selected for data collection and analysis and the reasons for why these methods were chosen in comparison to the other alternative methods. The chapter consists of four sections. The first two sections present the research design and sample selection approach. The third section present the Sources and tools of data collection adopted for this study. The final section outlines about data analysis methods.

3.2 Research design

As per Creswell (2003) there are three approaches that are used in conducting a given research. These are quantitative, qualitative and mixed research approach. Quantitative research approach focuses primarily on the construction of quantitative data, and quantitative data is a systematic record that consists of numbers constructed by researcher utilizing the process of measurement and imposing structure (Kent, 2007). The quantitative research approach employ measurement that can be quantifiable while qualitative cannot be measured. In mixed research approach inquirers draw liberally from both qualitative and quantitative assumptions (Creswell, 2009). This paper uses mixed research approach; the rationale for combining both quantitative and qualitative data is to better understand a research problem by combining both numeric values from quantitative research and the detail of qualitative research and to neutralize limitations of applying any of a single approach.

3.3 Target population and sample size selected

As discussed in the scope, the research's target population was Head office and projects of the enterprise. Accordingly, there are 28 projects in the enterprises, of which four of them have no formal structure and have a project life less than a year. Thus, 24 projects selected out of the total 28 projects. Therefore, the research was targeted to cover all those projects by using a purposive sampling technique. The sampling includes each project

manager, office engineers, construction engineers and a finance adept which has the experience and exposure to the budget and cash flow management of the enterprises. Therefore, the questionnaire was distributed to those 24 projects members at the annual meeting of the enterprise in Addis Ababa. Since all project management team attend this meeting at the head office which involve project managers office and construction engineers.

When we come to the number of interviews covered, after the analysis of questionnaire survey conducted, seven head office management team selected. Selection was done considering the experience and exposure to the budget and cash flow management of the enterprises to get a good response given on the questionnaire.

3.4   Sources and tools of data collection

This study used both primary and secondary data sources. Primary sources of data include interview and questionnaire. Secondary data, from various literature reviews, was used to devise the survey questions.

In case of factors affecting construction project's cash flow, factors affecting cost of projects were also picked from the sources due to the fact that increment in cost, which implies the expense part of cash flow, will definitely make a change to the cash flow.

3.4.1 Questionnaire

Questionnaires were distributed to professionals involved in cash flow management, at project and head office level, to get a perspective on its practice with an expectation to understand the implementation and challenges encountered in the process of cash management in their work unit.

In order to be able to select the appropriate method of analysis, the level of measurement must be understood. For each of measurement, there are /is an appropriate method/s that can be applied and not others. In this research, ordinal scale is used. Ordinal scale is a ranking or a rating data which uses integers in ascending and descending order. The

respondents were asked to indicate their level of agreement on a five-point Likert scale with the following ratings.

Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Scale	5	4	3	2	1

The relative importance index technique has been widely used in research for measuring attitudes with respect to surveyed variables. The average RII is calculated as the sum of RII of each factor divided by the number of factors. The average RII will help in determining the significant factors by simple comparison made to the individual RII. An RII having greater value than the average is taken as significant and vice versa.

3.4.2   Interview

Interview with the selected seven top and middle management members at head office was conducted. Managements who have a direct relation in cash flow planning and project control selected for interview. The purpose of the interview was to make a concrete recommendation of remedial measures for the gap found in the result of the questionnaire. Thus, the questions of the interview were devised from the result of the questionnaire and were designed for top/ middle level managers at head office levels.

3.5   Method of data analysis

Computations of percentage and frequency count are the methods that are used for analysis of the collected data. The component part of descriptive statistics such as mean, mode and standard deviation is used while analyzing the data. Tables were employed to present the data and statistical package for social science (SPSS) version 22 were used to support the analysis. Formulae were established on Microsoft Excel to analyze the relative importance index.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

As mentioned earlier in the previous chapter, the investigation was done using both questionnaire survey and interview. The interview was used to get professionals recommendations for remedial measures based on the output of the questionnaire's analysis. The discussion on data analysis and interpretation of both the questionnaire and interview is covered in the next sections.

4.1   Questionnaire

The analysis and interpretation of this study is based on the data collected from Head office and employees of the selected projects. The data was collected through survey questionnaire which was made to 24 construction projects and Head office. And a 100% response was achieved through close communication and follow up with respondents. The data gathered were organized and analyzed in a manner that enables to answer the basic research questions raised at the beginning of the study. Responses provided by the respondents are analyzed in the following sections.

4.1.1   Socio-economic characteristics of respondents

The chart below shows the job position composition of the respondent where 44% of respondent were project managers and 20% were construction engineers. It means most of the respondents were project managers of selected companies. Office engineers cover 16%. Project follow-up teams and finance cover 8% each and also contract administration heads and budget section hold 2% each.
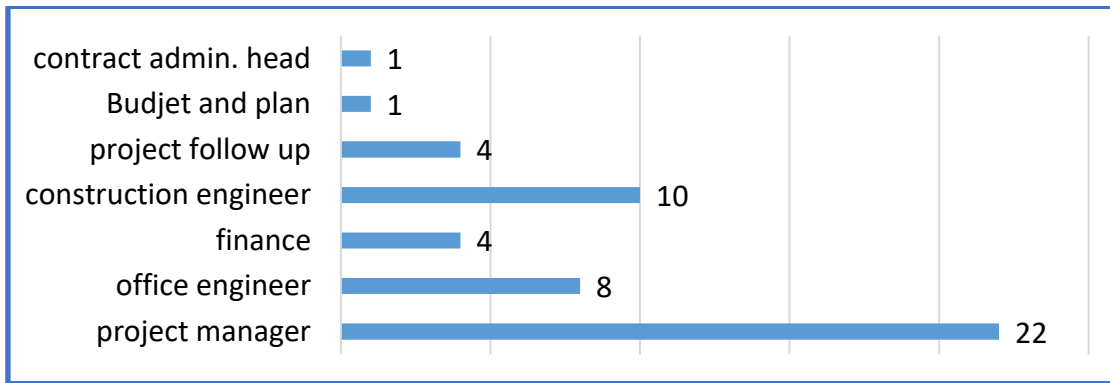
Figure 1   Job position and number of respondents participated

The figure below shows the respondents work experience. Regarding work experience of respondent, most of the respondents (68%) were above 5 years of experience and 22% are between 4 and 5 years of experience. Those having a work experience between 2 to 3 years was 6% and between 2-3 years cover 4%.
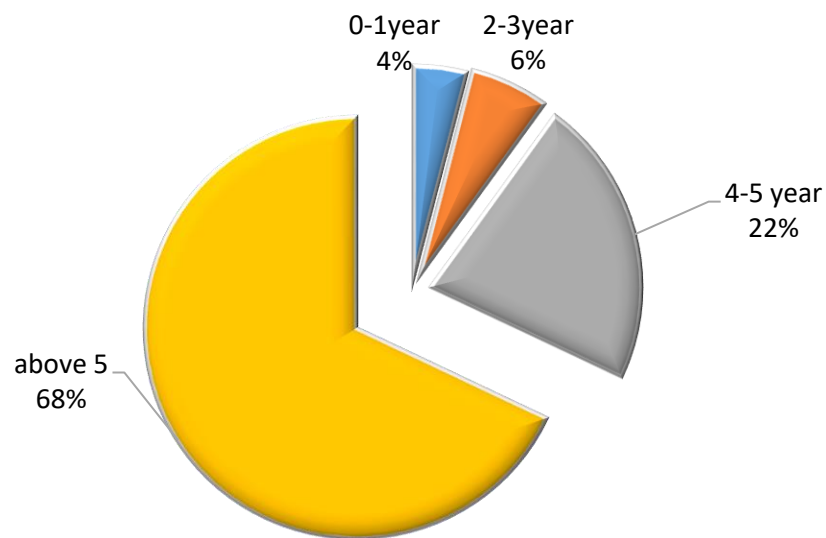
Figure 2   Respondents experience category

The result of socio economic character of the respondents shows that the majorities of respondents have a managerial position and are aged with experience. This contributes to the quality of response with respect to their understanding to the subject matter.

4.1.2 Type of projects studied

As the target population was Head office and projects different type of projects were addressed by the investigation out of which building projects cover larger portion which was found to be 50% followed by road projects which cover 30%. Head office staffs take 20% each.
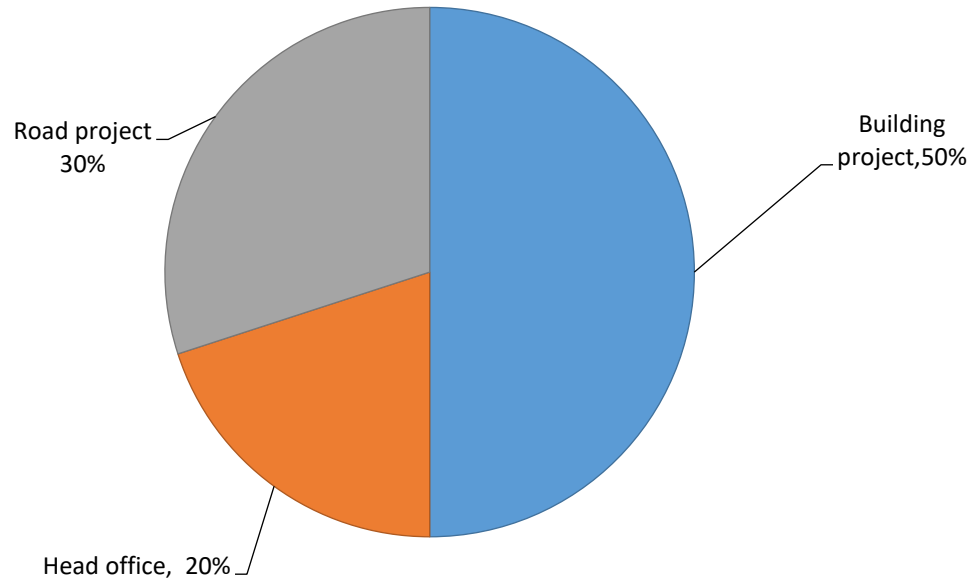
Figure 3 Type of project studied

4.1.3 Cash flow practice

Cash flow planning practice

Respondents were asked if DCE under take cash (both in and out) planning practice in the organization and 37.7% respondents agree that cash flow planning undertake at project and 50.18% at head office level and the rest (12.12%) answered that cash flow planning undertake at both head office and project level. From the response it was found that almost all projects plan their financial source at head office level. Planning by one side said to be less efficient.

Table 1   Cash flow practice

Type of forecast/ plan	Where forecast is done (%)			
	project	Head office	At both project & head office	no where
cash out	37.7%	50.18%	12.12%	-
cash in	37.7%	50.18%	12.12%	-

Cash flow forecasting method

There are various tools to undertake cash flow forecasting. Respondents were asked to indicate the type of method that used by the enterprise to make cash flow forecasting at both project and head office level and most of (54%) respond computer spread sheet, 43 % detailed approach and 3% primavera software. A similar result reported by Odeyinka et.al (2003) that the detailed approach and computer spread sheet are the top two methods of factor.

Table 2   Method of cash flow forecast

	Method of forecasting cash flow	percentage
a	The detailed approach (break down of bill items into work/ schedule)-manually	43%
b	Using computer spreadsheet	54%
c	Short cut approach (using models/library of s curves based on past similar projects)	0%
d	Using software like FINCASH	0%
e	others_ primavera	3%

Frequency of cash flow forecasting

Cash flow forecasting is critical to construction sector as it is the riskiest business where the cash in and cash out must be managed in the way the organization smoothly run its day to day construction activity. In line with this, respondents were asked to indicate how frequently the enterprise makes a cash flow forecasting. The entire respondent agrees there is a cash flow forecast at least on annual basis. Most of respondents (45%) indicated that there is cash flow forecasting on quarterly basis. The result of the analysis shows that 29% of the respondents believe a forecast of every month and 13% of respondents agree a forecast of cash flow on a weekly basis. From the result it can be concluded that most projects forecast cash flow on a quarterly basis but not as frequent as a weekly basis nor late frequently as once in a year. This shows very frequent forecast is not practiced well, as it makes the enterprise to incur cost of doing the task and also to take time. On the other hand, doing the task in less frequent manner affects the precision of the forecast as there may be changes in between.
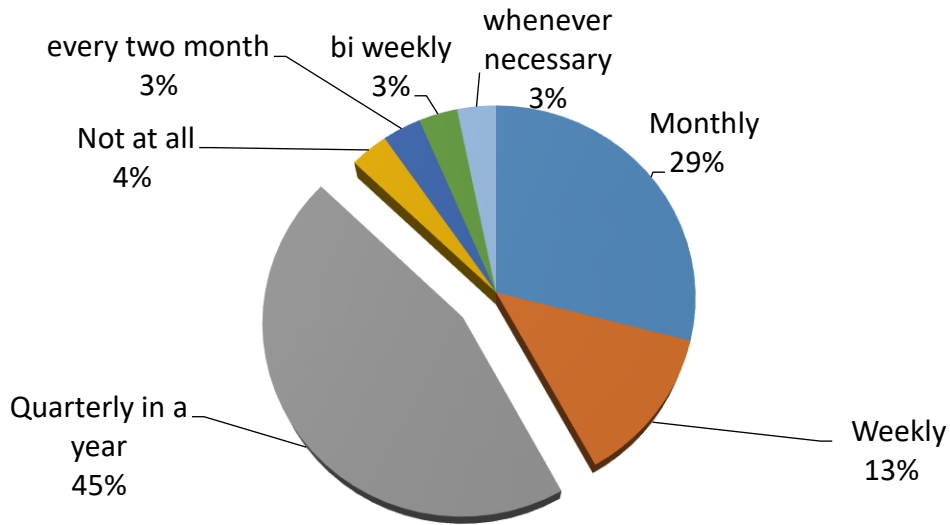
Figure 4   Frequency of cash flow forecasting

Type of cost estimate used for cash forecasting

In forecasting cash out one can use bid estimate or control estimate. In most of DCE projects (82%) use control estimate to forecast cash flow. But there is some (18%) uses of bid estimate

to forecast cash flow. Result shows that there is a better use of control estimate than bid estimate which helps to attain a better precision of the forecast by the use of updated cost.
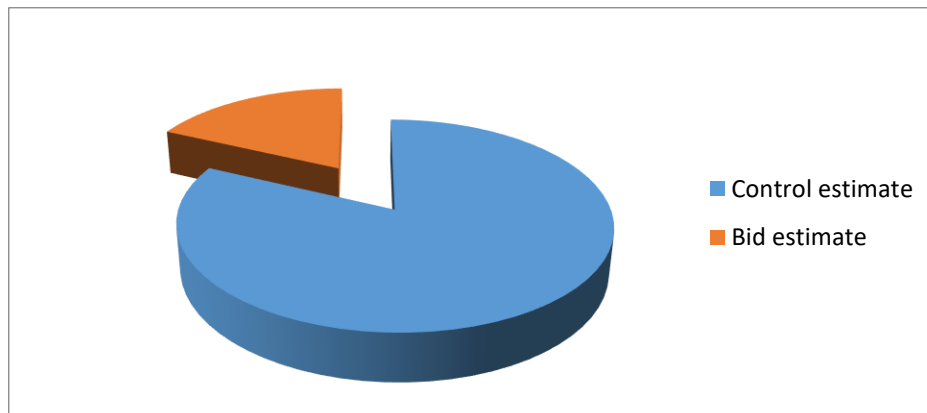
Figure 5   Type of cost estimate used in cash flow forecasting

Source of project finance

The respondents were asked to indicate the type of project financing fund and to rank the level of source of financing method. The response of respondents is shown in the next table.

Table 3   Sources of finance

Source of finance	Percentages			total	Average ranking
	ranked first	ranked second	ranked third		
Payments	85.5	14.5	0	100	1
Own fund	5.5	94.5	0	100	2
Bank facilities	0	0	0		

Source: Own survey

Majority of respondents (85.5) ranked payment as the first source of financing. The other respondents (14.5%) believe own fund as the second financial source. None of respondents ranked bank as a source of finance. Therefore, the analysis shows that the enterprise doesn't use any loans either from banks or others.

Negative cash flow minimizing Strategies

The respondents were asked to value the level of significance regarding negative cash flow minimizing mechanism, using the five point Likert scale 1 up to 5. Mean and standard deviation were calculated using SPSS 23 and the findings shown in table below.

By comparing every single RII with the average RII, those having higher value than the average RII will be considered as significant means of minimizing negative cash flow. Accordingly, advance payment, delaying payment to supplier delaying payment to subcontractor and adjustment of material delivery were found to be significant. The ranking using mean of the analysis also give the same ranking. From the result the top three means of negative cash flow minimizing strategies are rely on other parties i.e. client, suppliers and subcontractors.

Table 4   Ranking of techniques of means of minimizing negative cash flow

Negative cash flow minimizing strategies	Frequencies (percentage) for the ratings below (1-5)					Mean	SD	RII	rank by RII
	1	2	3	4	5				
Advance payment	5(11)	9(18)	9(18)	16(32)	11(21)	3.35	1.3	0.8	1
Delaying supplier payment	5(11)	7(14)	13(25)	18(36)	7(14)	3.28	1.2	0.7	2
Delaying subcontractor payment	7(14)	5(11)	15(29)	16(32)	7(14)	3.21	1.3	0.7	3
Adjustment of Material delivery	3(7)	11(21)	16(32)	13(25)	7(14)	3.17	1.2	0.7	4
Large profit	11(21)	13(25)	16(32)	5(11)	5(11)	2.64	1.3	0.6	5
Overvaluation	15(29)	3(7)	19(39)	13(25)	0(0)	2.6	1.2	0.6	6
Reducing retention	15(29)	11(21)	16(32)	5(11)	3(7)	2.46	1.2	0.6	8

The average RII = 0.65

Source: Own survey

Effect of corporate financial management on project cash flow

The respondents were asked the extent to which the corporate finance management affects the project cash flows. Mean and standard deviation were calculated, and the findings are shown in next table.

Table 5   Effect of corporate financial management on project cash flow

Degree of corporate financial management on project cash flow in Percentages				Mean	SD
No interference	Little interference	Significant	Very significant		
0	6.25	31.25	62.5	3.56	0.62

Source: Own survey

The majority of respondents (62.5 %) answered that the interference of corporate financial management had a very significant effect on the cash flow of the project. 31.25% of respondents rate the effect as significant and the rest 6.25% said it is of little significant. Payments are collected from projects through the head office and are managed to be distributed to projects for their expense. The interference is directly reflected on the cash out of projects which intern will have an effect on the cash in.

Payment negotiation during agreement

Respondents were asked the existence of payment term negotiation during contract agreement with clients. The response of respondents is shown below: -

Table 6   Existence of negotiation on payment terms during contract agreement

Is there Payment Term Negotiation During Contract Agreement?	Percentage	
	Yes	No
	65	35

Source: Own survey

From the table above, it can be seen that (65%) respondent indicates that there is a Payment Term Negotiation during Contract Agreement with clients. On the other hand, (35)% respondents believe there is no payment term negotiation during contract agreement.

4.1.4 Cost control techniques

Respondents were asked to select the type of cost control technique/s they are familiar with. Most of them (53.13%) are familiar with none of the techniques listed and one fourth are familiar with unit costing followed by earned value analysis which is 12.5%. From the result 25% of respondents showed their familiarity to unit costing and 6.25 % to cost value reconciliation. Only 3% of respondents know all the listed cost control techniques. Further the respondents were also asked which cost control techniques they use. The results of the response are shown in the following tables.

Table 7   Respondents' familiarity with cost control techniques

		percentage
Cost control techniques you are familiar with?	cost value reconciliation	6.25
	unit costing	25.00
	earned value analysis	12.50
	none	53.13
	all	3.13

Table 8   Cost control techniques used at projects

Cost control technique used at the DCE	**percentage**
overall profit or loss	29.4
Budget allocation to cost center	35.3
unit costing	26.5
earned value analysis	8.8

27

Source: Own survey

Accordingly, budget allocation to cost center was the leading cost control techniques with 35.3 % rating followed by overall profit or loss (29.4) and unit costing (26.5%). The least practiced cost control techniques at the projects is earned value analysis which takes only 8.8 percent.

4.1.5   Factor affecting project cash flows

Twenty seven factors were studied to be rated with a five point Likert scale as factors affecting DCE cash flow negatively. A relative importance index was then calculated by creating a formula on excel spread sheet using the output of frequency of ratings from SPSS 23. The result was further filtered according to the significance i.e. a significant factor will be based on the RII having a larger figure than the average RII which is calculated as mentioned earlier in subsection 3.4.1. Accordingly, thirteen factors were found to be significant in affecting the company cash flow. The result of the analysis is shown in the next table.

<p style="text-align:center">Table 9   Factors affecting DCE cash flow</p>

	no significance		minor significance		average significance		high significance		extreme significance		RII	rank
Delayed delivery of material	2	(0.03)	2	(0.03)	9	(0.19)	28	(0.56)	9	(0.19)	0.77	1
Delayed payment from owner	2	(0.03)	3	(0.06)	13	(0.25)	19	(0.38)	14	(0.28)	0.76	2
Delay in project schedule	3	(0.06)	3	(0.06)	9	(0.19)	27	(0.53)	8	(0.16)	0.72	3
Inflation	9	(0.19)	2	(0.03)	9	(0.19)	14	(0.28)	14	(0.28)	0.69	4
Material availability	3	(0.06)	3	(0.13)	19	(0.22)	20	(0.53)	5	(0.06)	0.68	5
Poor productivity	3	(0.06)	6	(0.06)	11	(0.38)	27	(0.41)	3	(0.09)	0.68	6
Poor plan of resource & construction method	3	(0.06)	8	(0.16)	17	(0.34)	17	(0.34)	5	(0.09)	0.65	7
Overall project management capability	5	(0.09)	9	(0.19)	16	(0.31)	9	(0.19)	9	(0.19)	0.64	8
Unpredicted weather and geologic condition	8	(0.06)	6	(0.22)	13	(0.38)	19	(0.25)	5	(0.09)	0.62	9
Vagueness in scope of the work	11	(0.22)	6	(0.13)	13	(0.25)	13	(0.25)	6	(0.13)	0.59	10
Erroneous cost estimate	3	(0.16)	11	(0.13)	19	(0.25)	13	(0.38)	5	(0.09)	0.59	11
change order (omission)	5	(0.16)	11	(0.25)	16	(0.28)	8	(0.16)	5	(0.16)	0.59	12
investments on fixed assets	3	(0.09)	7	(0.22)	10	(0.31)	5	(0.16)	3	(0.09)	0.59	13

<p style="text-align:center">Frequencies (percentage)</p>

As we can see from the analysis the top critical factor affecting cash flow of DCE is delayed delivery of material. This shows a late response of head office to project's material request.

Delayed payment from client goes to the second top factor affecting cash flow. As we have seen earlier in subsection 2.3.2 the cash in, which is one of the Two main ingredients of cash flow, is earned from payments made by clients. As a result, a delay in earning from client will have a great and direct contribution to affect company cash flow.

The third top factor affecting DCE cash flow is delay in project schedule. Time component of cash flow is strongly connected to schedule as it determines the time frame of project start and end. Also, timing of cash disbursement and collection highly depend on the schedule. Thus, project schedule has a strong connection to the   project cash flow and still can be seen having such a strong effect on project cash flow according to the respondents.

The fourth top factor affecting cash flow is inflation. According to Melese (2008) the number one cause of cost overrun was found to be inflation. The increase in costs (expenditure) on the enterprise side will directly affect the cash out which is a very important ingredient of the enterprise cash flow.

The fifth is material availability followed by poor productivity. Sometimes construction materials may not be available at the time of demand. When materials are not available it disturbs on schedule progress of the work which, as explained, has an effect on cash flow the enterprise. Poor productivity will also have a direct effect on the expected progress of the work which then will be related to the schedule in the same manner.

Poor management of resource will take the seventh rank and the eighth factor is still related to management, "weakness in overall project management". As we are talking about management of cash flow the capability of the management will have a significant effect.

The ninth ranked factor affecting construction cash flow is unpredicted geologic and weather conditions. According to Akinci and Fischer (1998) unpredicted geological conditions result in lost time and increase cost of the contractor. Unpredicted weather conditions also result in loss of productivity.

The tenth top factor is vagueness in scope. Vague scope results in lost time which will have an incremental contribution to the cost of a project. The last three factors affecting cash flow are erroneous cost estimate, change order (omission) and investment on fixed asset.

4.1.6   Effect of poor cash flow management

The respondents were asked to rate the level of significance that the following effects of factors affecting cash flow as reflected on the enterprise. Mean and standard deviation were calculated, and the findings are shown in the next table.

Table 10   Effect of poor cash flow management

effect of poor cash flow management	Frequencies (percentage) for the ratings below (1-5)					RII	rank
	1	2	3	4	5		
Time overrun	2(3.23)	3(6.45)	15(29.03)	13(25.81)	18(35.48)	0.77	1
Claim	5(9.38)	5(9.38)	8(15.63)	25(50.00)	8(15.63)	0.71	2
Cost overrun	2(3.33)	8(16.67)	18(36.67)	12(23.33)	10(20.00)	0.68	3
Delayed payment to suppliers	7(13.33)	7(13.33)	12(23.33)	17 (33.33)	8(16.67)	0.65	4
Delayed payment to subcontractors	5(12.50)	17(34.38)	13(25.00)	6(12.50)	8(15.63)	0.57	5
Delayed payment to employees	15(30.00)	8(16.67)	8(16.67)	7 (13.33)	12(23.33)	0.57	6
Quality compromise	16(31.25)	5(12.50)	14(28.13)	11(21.88)	3(6.25)	0.52	7

Source: Own survey

From the analysis the top ranked effects of poor cash flow management are time over run, claim and cost overrun. This supports the finding of many researchers indicating poor cash flow management as a major cause of in time overrun and cost overrun.

4.2   Interview

The interview was designed to get the recommendation of higher management on the remedial measures of the prevailing cash flow problem. Accordingly, the focus of the questions was mainly on the factors significantly affecting DCE cash flow. Thus, top significant factors were presented for interview questions. Also, the interview tried to cover the question of effectiveness on current practice of the enterprise negative cash flow minimizing techniques, pre-contract payment negotiation and method of cash flow forecast. Six practitioners at head office level participated on the interview. The background of the practitioner's experience is as follows.

Table 11   Background of interview participants

	Role/position	experience
1	Office engineer	11
2	Plan and Business development department	15
3	Finance team leader	18
4	Building projects cost estimation team leader	17
5	Road projects cost estimation team leader	13
6	Construction resource supply manager	24

4.2.1   Software application to forecast cash flow

The first question on the interview was about the method of forecast used by the enterprise. From the result of the questionnaire only three percent of respondents use software application to forecast their cash flow. From the interview, 97% of respondents agreed on the use of software application to enhance cash flow forecasting. The rationale behind the remaining disagreement is first, as the numbers of parameters are too many in our country it might be difficult to adopt the software which is developed abroad. Second the poor know-how of practitioner in handling the software. Respondents were also asked to indicate the responsible body to adopt the usage of software. Many laid the responsibility upon the core process & top managers.

4.2.2   Method of minimizing negative cash flow

The result of questionnaire showed that top significant means of minimizing negative cash flow rest on the involvement of other parties (see appendix 2) therefore the respondent were asked if the enterprise can use self-dependent means of minimizing negative cash flow, then depending on the generosity of other parties, to overcome significantly the problem of negative cash flow. All respondents gave a positive response with a special emphasis for "Adjustment of material delivery". Also, some pointed other means of self-dependent techniques to minimize negative cash flow like having enough working capital and using revenues from other projects of the company. In a road project it was emphasized on adjustment of machinery delivery than material delivery.

4.2.3   Respondent's know how of cost control techniques

According to the result of questionnaire practitioner's familiarity with cost control techniques is poor. And the respondents were asked measures to be taken in building professionals' capacity to fill this knowledge gap and also who can be responsible in filling this gap. Among the answers: Professionals themselves were considered responsible in building their capacity, the company should also train them well and government should work on professional's capacity building too.

4.2.4   Importance of negotiation on payment terms

The other part of the interview question is the necessity of negotiation on payment terms before signing of contract agreement. Since DCE is a public enterprise and the primary mission is to satisfy National defense construction need there is a practice of negotiation with the infrastructure sector on the contract term. So that, more than half of the respond positively towards negotiation while the other's say it is not that significant to enhance cash flow as the existing payment terms are not that harsh on the enterprise.

4.2.5   Managing factors affecting cash flow

Respondents gave their comment on the remedial measures to avoid the negative impact of the top significant factors affecting DCE cash flow. Their response is discussed below.

The remedial measure suggested by respondents towards the delayed delivery of material places a responsibility to the enterprise, the government as well as suppliers. Respondents suggested that DCE should exhaustively work on resource planning.

As a remedial measure to delay in payment from client, respondents made the enterprise and client to be responsible for the matter. Accordingly, the enterprise should give a timely notice to the client by avoiding negligence to avoid such delay of payment and also the enterprise need to have a backup financing method just in case if the delay is difficult to avoid. For the client side respondents suggest that clients should secure sufficient budget before getting in to cash deficit to run their project.

According to respondents, the main responsibility in avoiding the effect of delay in project schedule goes to the enterprise as there is a lot to be done in a well preparation of the project schedule by assigning qualified professionals in sufficient number.

As to inflation the government will have the leading role in minimizing its effect. According to respondents also, price adjustment and compensation methods should be improved to minimize risk.

DCE should assess material availability well before the need of that material and also consider the use of equivalent material during the unavailability of the construction material needed for the project. Government may be involved in resolving this problem, having a stock for construction materials and way of supply. Also, the government can take part in minimizing the time taken by shipping processes which are taking long time than necessary.

CHAPTER FIVE
CONCLUSION AND RECCOMEDATION

5.1   Conclusion

Cash flow management is one of the critical issues allied to the survival of construction companies. There are various activities in construction enterprises which combine to deliver the intended output need. Among the very basic resource for the successful accomplishment of a construction project is financial resource. Lack of this basic resource has been found a major cause for construction projects failure. From the above analysis we can conclude that DCE lacking proper cash flow planning practice both at head office and projects. Therefore, proper management of this basic resource is crucial to the success of construction projects.

The importance of cash flow management is concentrated more on pre-construction stage by giving future indications and helping decision making such as bid/ no bid decisions and selecting best arrangements for the benefit of the enterprise when deciding for bid. Nevertheless, it helps in cost control and monitoring by easy tracking of the cash flow through time.

Various factors can affect the forecasted cash flow leading to deviation. Hence, in forecasting cash flow, the advance knowledge to the risk factors affecting cash flow plays a great role to the precision of the forecast. From the result of the study, almost all respondents claimed to have cash flow forecasting practice whether at Head office or project level. In any case, the interference of the enterprise management upon the cash flow management of projects was found to be very significant.

There is a wide use of computer spread sheet as a method of forecasting cash flow where the use of different software is negligible. The top thirteen factors having significant effect on the enterprise cash flow are delayed delivery of material, Delayed payment from owner, Delay in project schedule, Inflation, material availability, Poor productivity, poor plan of resource & construction method, overall project management capability, unpredicted weather and geologic condition, vagueness in scope of the work, Erroneous cost estimate, change order (omission) and investments on fixed assets.

Delay is a relative word expressing some lag from some reference plan bounded by time and the top three factors affecting cash flow are linked to this word. Therefore, the very significant problem in cash flow, faced by the enterprise, is the difficulties to be on track with the first plan. A well prepared plan of resource and risk management mechanism is a base for a good cash flow management.

The impact of factors affecting DCE cash flow is reflected on projects in different ways. The depth of the effect can vary from project to project. As analyzed from the rating of the respondents, the top three effects of factors affecting cash flow management are time overrun, claim and cost overrun. These three effects are very interrelated in which one can be a cause/effect of the others.

5.2 Recommendation

All parties involving in the enterprise can take part in minimizing the effect of factors affecting the enterprise cash flow. The enterprise should exhaustively work on basic function of management, which is planning. In this way projects can proactively manage the negative effect of all the factors which can affect their cash flow. To do this, the enterprise should assign qualified professionals to the task, as it is a key input. The enterprise should also work on capacity building of existing professionals and train them to work with updated technology.

Clients should prepare sufficient budget before engaging in any construction contract, to avoid the delay in due payment to the contractor. Clients need to be very aware of the contract agreement in which they are engaged in and should abide accordingly.

The enterprise should hire a capable sub-contractor, in terms of financial capacity, to secure the successful accomplishment of the project. The enterprise can set qualification criteria on the financial capacity of the sub-contractor.

DCE should have enough reserve cash and a backup plan in case of any delay in payment from the client. But also, should practice on time notification of delay to the client and claim for the justified compensations.

The enterprise should play a better role in in-time delivery of materials to projects by creating credit facilities from construction material suppliers. The enterprise should select a supplier list which can deliver materials to projects without creating any difficulties.

As a critical issue, cash flow management has not been given enough attention by research works in Ethiopia. Further investigation and researches should be done by future researches on cash flow management at corporate level.

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Appendix 1 Questionnaire

This questionnaire is prepared for a thesis in partial fulfillment of degree of masters in General management. The main objective of the research is to investigate the practice of Defense construction Enterprise cash flow management.

Your contribution to the research is very significant as findings of the research are dependent on this survey therefore I would appreciate your great cooperation in filling out all the questions.

I thank you in advance for your willingness to fill the questionnaires and returning them back on time.

Yitagesu Terfa

Questionnaire

General back ground

*   Work place

    Head office [ ]   Project [ ]
*   Project type (if you are in project)

    Road [ ]   Building [ ]
*   Department/work unit_____
*   Years of experience

    0-1 [ ]   2-3 [ ]   4-5 [ ]   above 5 [ ]

Description of abbreviation

➢   NA – not applicable
➢   HO– head office task
1.   Is there a cash flow planning practice at your project?   Yes [ ] no [ ]

If your answer is no, which one of the following is the possible reason/s

- Cash flow is done only at the head office level   [ ]
- The amount of cash flowing into and out of the project is very low [ ]
- Accurate resource planning is inapplicable   [ ]
- Other_____

If you answer is yes, check on the appropriate box for the following specific questions.

- Cash out is forecasted   yes [ ] no [ ]NA [ ]HO [ ]
- Cash in is forecasted   yes [ ] no [ ] NA [ ] HO [ ]
- Financial source was planned at the beginning of project yes [ ] no [ ] NA [ ] HO [ ]

2.   Which method is used to forecast cash flow at your project? (circle the one you used)

a.   The detailed approach (break down of bill items into work/ schedule)-manually
b.   Using computer spreadsheet
c.   Short cut approach (using models/library of s curves based on past similar projects)
d.   Using software like FINCASH
e.   Other _____

3.   How frequently is your cash flow updated? (circle the one you used)

a)Monthly   b)Weekly   C)Quarterly in a year   c)Twice a year   e)Not at all   f)Other

_____

4.   Which one of the following cost estimates do you use to forecast and control your cash flow? (check in the box)

    [ ]   Bid estimate (the estimate by the enterprise at tendering stage)

     [ ] Control estimate (new cost estimate by the enterprise for monitoring the project)

5.   Rate the significance of the following means of minimizing negative cash flow **according to the application at the enterprise**, by circling a number

1.   No significance
2.   Minor significance
3.   Average significance
4.   High significance
5.   Extreme significance

a.	delay in payment to subcontractors	1	2	3	4	5
b.	delayed payment to suppliers	1	2	3	4	5
c.	advance payment	1	2	3	4	5
d.	reducing retention	1	2	3	4	5
e.	large profit	1	2	3	4	5
f.	adjustment of material delivery	1	2	3	4	5
g.	overvaluation	1	2	3	4	5

6. Rank your financial source of the enterprise according to its contribution 1 to the most contributors 2 for the second most and so on

a.   Bank loan   RANK _____

b.   Company fund   RANK _____

c.   Payments (advance and progress)   RANK _____

d.   Other _____   RANK _____

7.   If the major financial source is bank loan, is cost of borrowing (interest) considered in your cash flow?   Yes [ ] No [ ]

8.   How do you express the effect of corporate (head office) financial management on projects cash flow management?

    a)   No interference

    b)   Little interference

    c)   Significant

    d)   Very significant

9.   Was there an open door for negotiation on payment terms with client during agreement?

Yes [ ]   No [ ]

For questions from 10 up 36 to rate the **negative impact** of the factors affecting project cash flow **at your project** by checking in the appropriate box

1   No significance
2   Minor significance
3   Average significance
4   High significance
5   Extreme significance

	factors affecting your project's cash flow	1	2	3	4	5
10	Erroneous cost estimate					
11	poor plan of resource & construction method					
12	vagueness in scope of the work					
13	Insufficient advance payment					
14	Retention payment					
15	Contract type					
16	Delay in project schedule					
17	Delayed payment from owner					
18	Delayed payment to subcontractor					
19	Delayed payment to suppliers					
20	interest rate					
21	Inflation					
22	Poor productivity					
23	Under measurement					
24	Lack of inadequate insurance					
25	change order (Addition)					

26	change order (omission)					
27	labor availability					
28	material availability					
29	delayed delivery of material					
30	incorrect work execution					
31	failure of subcontractor					
32	investments on fixed assets					
33	unpredicted weather and geologic condition					
34	communication with consultant					
35	communication with client					
36	overall project management capability					

37. Check on the techniques used for project cost control which you are familiar with

a.   Project Cost-Value Reconciliation   ☐

b.   Unit Costing   ☐

c.   Earned Value Analysis   ☐

d.   other _____

38.   Check on the techniques used for project cost control at DCE

   a.   Project Cost-Value Reconciliation   ☐

   b.   Overall profit or Loss   ☐

   c.   Profit or loss on each contract items   ☐

   d.   Unit Costing   ☐

   e.   Earned Value Analysis   ☐

   f.   Other_____

   Rate the following effects of cash flow problem from question no. 39 to 45 **as reflected on DCE**.

45

	effects of poor cash flow	1	2	3	4	5
39	Delayed payment to suppliers					
40	Delayed payment to employees					
41	Delayed payment to subcontractors					
42	Cost overrun					
43	Quality compromise					
44	Time overrun					
45	Claim					

Any comment_____

_____ __

Appendix 2

Interview questions

Interview

1.   Your position and experience

2.   Most contractors don't use software to analyze their cash flow. Do you think using software can improve the management of cash flow? If yes, who can be responsible to introduce such technology to the enterprise and Ethiopian construction industry?

3.   The top most means of minimizing negative cash flow involve other party's decision. Do you think DCE can use other means which don't involve other parties to the best and be successful in minimizing negative cash flow?

4.   Negotiation with clients on payment terms is not practiced especially on road projects most of the time. Is it advantageous to the enterprise to negotiate? If yes, as an enterprise what measure do you think can help change this situation?

5.   The following factors were ranked the top 12 out of 26 factors, for affecting project cash flow negatively. What measures can be successful in avoiding/ minimizing these problems. Which party takes the major responsibility in solving these problems?

6.   Most Project managers are not familiar with different variety of cost control techniques. What measurement should be taken from top managements and core process in building professional's capacity?