



**CONTRACTORS' CASH FLOW MANAGEMENT PRACTICES IN HAWASSA
CITY**

MSc. THESIS

TESHOME DEBESA NARAMO

HAWASSA UNIVERSITY, HAWASSA, ETHIOPIA

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CITY**

TESHOME DEBESA NARAMO

**A THESIS SUBMITTED TO THE DEPARTMENT OF CONSTRUCTION
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ADVISORS' APPROVAL SHEET

This is to certify that the thesis entitled “**Contractors’ Cash Flow Management Practices in Hawassa City**” submitted in partial fulfillment of the requirements for the degree of **Master's** with specialization in **Construction Technology and Management**, the Graduate Program of the **Department of Construction Technology and Management**, and has been carried out by **Teshome Debesa** (ID. No. **PGCoTMR/045/11**), under our supervision. Therefore we recommend that the student has fulfilled the requirements and hence hereby can submit the thesis to the department.

Desalegn Girma (Ph.D.)

Name of major advisor

Signature

Date

Tadewos Awugchew (MSc.)

Name of co-advisor

Signature

Date

EXAMINERS' APPROVAL SHEET

We, the undersigned, members of the Board of Examiners of the final open defense by **Teshome Debesa**, have read and evaluated his thesis entitled “**Contractors’ Cash Flow Management Practices in Hawassa City**”, and examined the candidate. This is, therefore, to certify that the thesis has been accepted in partial fulfillment of the requirements for the degree.

Dr. Desalegn Girma

Name of Major Advisor

Signature

Date

Name of Internal Examiner-I

Signature

Date

Name of Internal Examiner-II

Signature

Date

Name of External examiner

Signature

Date

SGS Approval

Signature

Date

Stamp of SGS Date: _____

DECLARATION

I hereby declare that this MSc thesis entitled “**Contractors’ Cash Flow Management Practices in Hawassa City**” is my original work and has not been presented for a degree in any other university, and all sources of material used for this thesis have been duly acknowledged.

Name: **Teshome Debesa**

Signature: _____

This MSc thesis entitled “**Contractors’ Cash Flow Management Practices in Hawassa City**” has been submitted for examination with my approval as thesis advisor.

Name: **Dr. Desalegn Girma**

Signature: _____

Place and Date of Submission: _____, Hawassa Ethiopia

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ABSTRACT

Contractors follow certain procedures to manage income (inflows), expenditures (outflows), and deficits in their projects. Effective management of these components is essential to the survival and continual improvement of the competitiveness of construction companies and successfulness of the construction projects. However, in Ethiopia, management of these components of the cash flow exhibits performance shortfalls. The financial management practices of contractors in South Nations Nationalities People's Regional State are poor and ineffective, and cash flow problems are problems of most contractors at different grade levels. Improving the performance needs understanding the practice and identifying the problems. It is in this light that, this study focuses on three specific objectives: assessing the current cash flow management practices of contractors, identification of causes of contractors' poor cash flow management practices and the level of impact of contractors' poor cash flow management practices on construction project performance in terms of cost and time. These objectives were achieved through quantitative and qualitative analysis of primary data; questionnaire survey and interview. Initially, different relevant literature were reviewed in depth in order to understand the practice and identify the variables for the questionnaire to address the objectives. The findings indicate that the cash flow management practices of the prime contractors are generally poor. The identified critical causes of these poor practices are lack of skill to manage cash flow, using payments for other purposes (not for the intended project purposes), poor project cash flow analysis, contractors' dependency only on the client's payments, poor project cash flow forecasting, and poor cash flow management strategies. These all causes have high negative impact on project time and cost performances.

Keywords: *Cash Flow Management Practice, Construction Projects, Cost and Time Performances, Prime Contractors*

CHAPTER ONE: INTRODUCTION

1.1. Background

The construction industry takes a big share of the country's budget. It also presents high levels of insolvency and failure which is a serious problem for the development of the country (Mereawi, 2016). One of the causes of insolvency in the construction industry is poor contractors' cash flow management practices in construction projects.

Cash flow management is one of the most critical issues in contractors' project management (Cui et al., 2010). Exercising proper cash flow management is crucial to the survival of businesses. Cash flow management refers to the practices that are adopted to balance income and expenses; it entails forecasting (planning), monitoring, and controlling practices of cash inflow and outflow and the arrangement of deficits over the life of a business (Shash & Qarra, 2018).

Cash flow analysis is a major aspect of managing a construction project to achieve the project success and to prevent liquidity problems of contractors during construction phase (Abdel & Khalaf, 2019). Nevertheless 24% of contractors in Saudi Arabia do not analyze their cash flows for better financial management although they are fully aware of cash flow into and out of their projects (Shash & Qarra, 2018). And also more than half of the contractors do not benefit from cash flow analysis in determining the amount of deficit and, consequently, deciding on suitable financial techniques and estimating the cost of deficit financing (Shash & Qarra, 2018). These activities of contractors indicate poor management of their cash flow.

If cash flow is poorly managed, it causes many negative impacts on construction project performance and similarly to construction companies' performance. Major causes of failure of construction firms are poor management and bad cash flow management (Mutti & Hughes, 2002). According to Shash and Qarra (2018), a significant percentage of contractors in Saudi Arabia (40%) undergo a financial failure as a result of poor cash flow management in at least one of their annual contracts. Unfortunately, some contractors, apply poor practices that subject their companies to bankruptcy situations. The contractors who perform no cash flow analysis, encounter project failures in their annually signed contract periods because of poor cash flow management and forecasting.

In Ethiopia, some research papers show that there is poor management of cash flow. The financial management practices of contactors in South Nations, Nationalities and Peoples Regional State (SNNPRS) are poor and ineffective (Beza, 2019). Even though there are plenty of cash flow forecasting methods and models in use internationally, the methods found in practice in Ethiopia are using spreadsheets and the detailed approach (break down of bill items into work/schedule) is incomplete, improper utilization of advance payment (disbursing it somewhere that is not specific to the project use), and poor practice of forecasting or planning. Similarly, it was reported that, the usage of cash flow forecasting method for construction cash flow management is very poor (Mereawi, 2016).

Improving the performance needs understanding the practice and identifying the problems. It is in this light that, this study focuses on investigating contractors' cash flow management practices in construction projects in the case of Hawassa city.

1.2. Problem Statement

Contractors follow certain procedures to manage income (inflows), expenditures (outflows), and deficits in their projects. Proper management of these components is essential to the survival and continual improvement of the competitiveness of construction companies (Shash & Qarra, 2018) and successfulness of construction projects. However, in Ethiopia, management of cash flow exhibits performance shortfalls. The financial management practices of contactors in SNNPRS are poor and ineffective and cash flow problems were problems of most contractors at different grade levels (Beza, 2019). Proper usage of cash flow forecasting methods for construction cash flow management is very poor (Mereawi, 2016).

The causes of the poor practices covers: not using advanced cash flow management tools and techniques, improper utilization of advance payment, the poor practice of forecasting or planning cash flow, inadequate or misused financial methods, lack of finance to run the projects, delays in payments from the client, level of inflation, not using cash reserve in solving cash deficit problems (Mereawi, 2016), and (Beza, 2019). These causes of cash flow problems are aroused from the role of the different stakeholders (client, consultant, contractor, etc.) of construction project. However, the causes only focusing on contractors' poor practices are not studied in depth.

According to Mutti and Hughes (2002), one of the major causes of construction industry failure is bad cash flow management. In SNNPRS, the current construction companies suffer from poor financial management and control that lead to extended completion of projects beyond the planned completion time, cost, and poor quality (Beza, 2019). However, in Ethiopia, research on the impacts of poor cash flow management on project performance is very little and not deeply studied.

Above raised problems were tried to be studied by only two local researches of Mereawi (2016) and Beza (2019). Both researches investigated issues at construction company level but not project level. Investigated companies were within top three grade levels, which were engaged in building construction. However, Beza (2019) investigated about general financial management practice but not specific cash flow practice and study area of Mereawi (2016) is Addis Ababa. In contrast, this research project investigated one up to five grade level contractors' cash flow management practices at construction project level including causes and impacts of the poor practices in Hawassa city.

1.3. Research Questions

Considering the three main points raised in the problem statement, the following research questions were framed:

- How is the current contractors' cash flow management practices?
- What are the causes of contractors' poor cash flow management practices?
- What is the level of impact of contractors' poor cash flow management practices on construction project performance?

1.4. Objectives

1.4.1. General Objective

The main aim of this research project is to investigate contractors' cash flow management practices in construction projects and identify the associated causes and impacts of poor practices.

1.4.2. Specific Objectives

The specific objective are:

- To assess current cash flow management practices of contractors.
- To identify causes of contractors' poor cash flow management practices.
- To measure the level of impact of contractors' poor cash flow management practices on construction project performance in terms of cost and duration.

1.5. Scope of the Study

This study has focused on grade one up to five contractors' cash flow management practices in construction projects. The Projects were building, road, and water works. Also analysis and interpretations of the data of the survey were focused on Hawassa city construction projects in particular due to time and budget limitations.

1.6. Limitations of the Study

This study is limited on some secondary data for literature review due to there were a few previous literature works on practical cash flow management in construction industry. In addition, qualitative analysis was done by only five contractors' interview responses because it was challenging to interview person due to Coronavirus Disease 2019 (COVID-19) pandemic.

1.7. Significance of the Study

Effective construction project cash flow management is essential for profitability beyond the survival of contractors and the success of their projects. Knowing the causes and impacts of poor cash flow management practices of contractors is helpful to correct the poor practices in order to make their cash flow management effective. From applied effective cash flow management, other project stakeholders can be indirect beneficiaries from success of the projects. The findings of the research will give insight for researchers and students interested in further investigation in related areas. Lastly, this study aimed at adding a valuable contribution to the construction literature in general, and give directions based on the study findings to indicate further study.

CHAPTER TWO: LITERATURE REVIEW

2.1. Theoretical Literature Review

2.1.1. Contractors' Construction Project Resources

There are different types of construction resources that are deployed, for project performance, by the contractor in order to meet its project objectives and business objective. They are mainly divided into manpower, material, equipment, and financial resource (Memon et al., 2011). Manpower resource refers to personnel who are skilled, unskilled, and professional people work in construction project sites on different activities and they get paid to replace their work performance. They can manage all types of construction project resources including themselves. Material resource is any input resource that is consumable during producing final project output. The material includes cement, reinforcement bar, fine aggregate, coarse aggregate, water, admixtures, epoxy, blocks, stones, roofing materials, nails, paints, electric materials, steel, timber and aluminum products, formwork, etc. they are purchased by financial resources. Equipment resource is any type of equipment used on-site to increase productivity and achieve construction goals in a quicker and easier manner. Some examples of commonly used construction equipment are bulldozers, excavators, dump trucks, loaders, graders, mobile cranes, tower cranes, batching plant, and concrete mixers. They need manpower to be operated, maintained, and managed. Lastly, the financial resource is the most important resource other than the other three types of resources because other resources are obtained by it. It is a liquid resource that can be changed into any other resource easily.

The financial resource is the first and foremost resource required for any construction work. If it is available, a contractor can employ manpower and pay employees' wages and/or salary, buy material resources, purchase or lease construction equipment and perform day to day construction activities. It needs proper management to proceed to work smoothly. Without proper management of finance resource (money), the management of other resources would be ineffective. The availability of sufficient funds and effective financial management are very important aspects of any project (Rahman et al., 2013). These two situations of financial resources are controlled by effective cash flow management.

2.1.2. Cash Flow Cycle of Construction Projects

Shash and Qarra (2018) explains the construction project cash flow cycle as follows; in a construction project, a contractor's cash flow occurs over the construction contract duration. The construction contractor uses cash from equity, advanced payment, and/or debt to finance initial construction operations and expected overdrafts whenever a contract dictates retention of a certain percentage of progress payments. The construction contractor uses available cash to purchase materials and to pay for labor, overhead, subcontractors, suppliers, and vendors. The combination of these resources is transformed into a finished product. This finished product typically takes the form of a completed or partially completed construction work. The project owner values the completed or partially completed construction work, based on an agreed-upon valuation method, and pays a certain amount of cash to compensate the contractor for the finished goods. The cash flow cycle also is explained by figure 2.1.

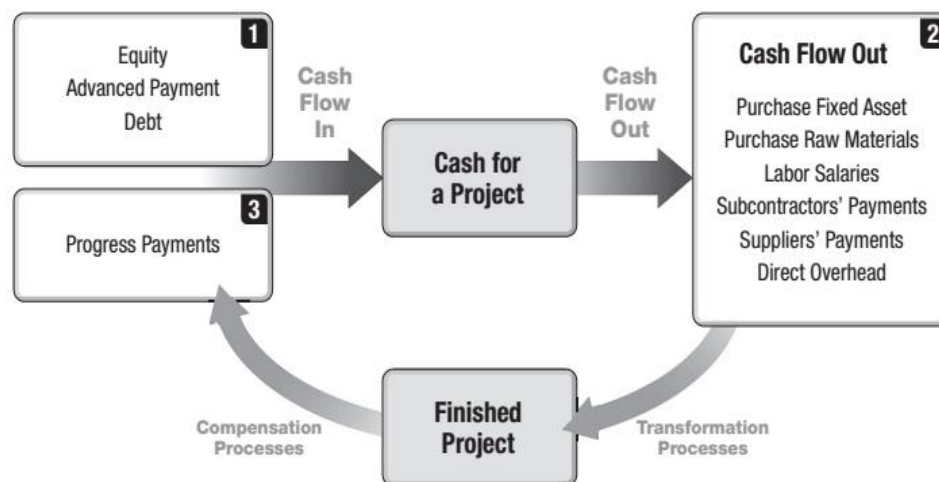


Figure 2. 1. Project Cash Flow Cycle (Source: Shash and Qarra (2018))

2.1.3. Impact of Cash Flow on Construction Project

Cash flow has both negative and positive impact on project performance. The disturbance of the original intended project programme is often a consequence of cash flow problems. Contractor's cash flow problem cause delay in project delivery but positive cash flow contributes a lot to project delivery effectiveness (Omopariola et al., 2017). The longer the negative cash flow period, the more likely the project will be halted or terminated (Al-Joburi et al., 2012).

Bad cash flow results in project delays, reduced profit margins and in the worst scenarios, abandoned projects (Omopariola et al., 2020). Lack of control over cash flow has been a major contributing factor to the high rate of insolvencies in the construction industry (Richard E. Gavin, 2011). However effective cash flow management might greatly reduce failures in the construction business (Liu et al., 2009).

Above studies' results tell that cash flow has great impact not only on project performance but also on contractor's business and general construction industry. So cash flow needs greater attention for success of project, contractor's business, and for healthy of the construction industry.

2.1.4. Cash Flow Management of Construction Project

2.1.4.1. Concepts of Cash Flow Management

Cash flow management is one of the most critical issues in contractors project management (Cui et al., 2010). Exercising proper cash flow management is crucial to the survival, continuous competitiveness, and profitability of business company. Cash flow management refers to the practices that are adopted to balance income and expenses; it entails forecasting (planning), monitoring, and controlling practices of cash inflow and outflow and the arrangement of deficits over the life of a business. Construction companies exercise cash flow management at both the company and project levels (Shash & Qarra, 2018).

Cash flow management starts with cash flow planning. Cash flow planning focuses on having future expected sources exceed uses of cash and what needs to be done to maintain that positive flow of cash (Reider & Heyler, 2003). It is knowing future cash inflows, outflows, and balances at time points along with the contractor's business duration and being ready for other cash sources or planning the method that increases positive cash balance if cash shortage will encounter the business. The contractor must plan its project cash flow before starting the execution of the project in order to proceed with the project smoothly and without cash shortage after the commencement of the project. According to Reider and Heyler (2003), the objectives of any cash flow plans should be to attempt to smooth out cash flow, make investments as early as possible, delay borrowing as long as possible, and get early information.

Cash flow monitoring is tracking and recording appropriately actual cash receipts, disbursements, and balance (net cash flow) during of contractor's project execution. It is base (input) for cash flow control.

Cash flow controlling is the last stage of cash flow management. It is comparing the planned cash flow with actually recorded cash flow so as to take appropriate measures if actual cash flow deviates from the planned one. Comparing actual results to the cash plan provides a basis for analysis and appropriate decision making (Reider & Heyler, 2003). Cash flow analysis is the study of the cycle of business' cash inflows and outflows, with the purpose of maintaining adequate cash flow for the business, and to provide the basis for cash flow management. Cash flow analysis involves examining the components of a business that affect cash flow, such as accounts receivable, inventory, accounts payable, and credit terms. By performing a cash flow analysis on these separate components, one will be able to more easily identify cash flow problems and find ways to improve its cash flow (Noor et al., 2012).

2.1.4.2. Cash Flow Management Tools

There are several different cash flow management tools that simplifies cash flow management process of the company including construction project. They are computer application software that can forecast, track, monitor, and/or analyze cash flow for control purpose at specified time difference. For example, **scoro** application is a much more ambitious and robust tool. It certainly includes cash-flow management in its suite of services, but it's really a business management tool, incorporating budgeting, customer relationship management and even project management (Michalowicz, 2018). Also Almohson (2015) advocates advantages of adoption of computer application software as it facilitates the management of cash flow for projects and gives a clear picture of financial position of the company thus helping the project manager to take appropriate decisions in a timely manner. As studies' findings, computer application software helps cash flow management of projects as well as companies of contractors in effective and efficient manner.

2.1.4.3. Cash Flow Forecasting Methods

Many scholars developed different applicable cash flow forecasting methods/models. However each has its own limitation(s) that make the construction company prefer one from

another. Nevertheless, Mereawi (2016) has identified five cash flow forecasting methods in order to test extent of usage of them among local construction companies' projects.

The methods are the detailed approach (forecasting derived from break down of bill of items into work schedule), value approach (forecasting done based on project product value), cost approach (forecasting done based on the cost of input resources), short cut approach (forecasting done using models/library of S curves based past similar projects) and integrated system (forecasting is done by integrating cost and schedule). Totally, each method has its own limitation(s) and advantage(s).

2.1.5. Benefits of Effective Cash Flow Management

Generally, Reider and Heyler (2003) enumerate eight benefits of cash flow management for all business types. These benefits coincide closely with benefits for the construction business. These are identifying peaks and valleys of cash requirements; assisting in the identification of related operational needs such as increases/decreases in assets (accounts receivable, inventory, property, plant, and equipment) and liabilities (accounts payable, debt, accrued expenses); pinpointing the need for and timing of important cash payments such as payroll, suppliers, debt service, taxes, dividends, and so on; showing in advance the need for outside funding, thus providing the opportunity for more effective negotiations; recognizing when and how much excess cash will be available to allow for more effective short-term investing; identifying the need for additional long-term funding (e.g., for capital improvements) and ability to repay; providing definitive information as to the amount of cash needed, when needed, why needed, and for how long; indicating when operations can be expanded or should be contracted based on the availability of cash resources or lack thereof.

In the construction project context, all the above enumerated benefits of cash flow management are benefit for the success of construction projects in different dimensions such as time, cost, and quality performance and for the profitability of contractor business. These benefits can be gained if and only if contractors adopt cash flow management properly on the project.

2.2. Empirical Literature Review

2.2.1. Contractors' Cash Flow Management Practices

Effective project cash flow management need accurate forecasting of cash flow schedules and synergistic integration of different cash flow management strategies (Cui et al., 2010), and these cash flow management practices can be done effectively and efficiently by a competent financial professional. For simplification, in this study, components of the cash flow management practices are classified into: (i) cash flow forecasting, (ii) cash flow management and (iii) cash flow management expertise related practices.

2.2.1.1. Cash Flow Forecasting Practices

Mereawi (2016) identified that contractors in Addis Ababa, Ethiopia, had an awareness of the importance of cash flow forecasting for cash flow management but they did not apply cash flow forecasting well. The study enumerated five cash flow forecasting methods; the detailed approach (break down of bill items into work/schedule), value approach (based on project value), Cost approach (based on the cost of input resources), short cut approach (using models/library of S curves based on past similar projects), and integrated system (forecasting is done by integrating cost and schedule). Out of five methods, the contractors used the first two methods for the contractual purpose only that to produce S curve for the sole use of the project owner or client.

Al-Joburi et al. (2012) found that negative cash flow existed in each of the selected subject projects, ranging from 30 to 70 % of their project durations and the high shortage values have ranged from two to four times the average monthly expenses. These results were obtained from cash flow forecasting. The results show that how long time and how much money needed to finance negative cash flow by the contractor.

Shash and Qarra (2018) obtained that contractors in Saudi Arabia were fully aware of cash flow into and out of their projects but only 76% of them analyze their cash flows for better financial management. Even those contractors who analyzed cash flow, focus mainly on how to temporarily survive rather than had a well-forecasted financial view. The study also identified five purposes of cash flow forecasting such as to determine the liquidity of the company, to set cash flow baseline for control purposes, to determine the financing method,

to determine the amount of money cost to include in the bid price, and to determine the amount of overdraft. Setting a cash flow baseline for control purposes was practiced by 85% of contractors as one of the benefits they gain from cash flow analysis. It seems that contractors were successful in setting cash flow plans.

Many research studies for cash flow management developed different cash flow forecasting and managing models. Mutti and Hughes (2002) found that although there were financial models that can be used to predict failure, construction firms were based on company accounts, which have been shown to be an unreliable source of data. Construction firms should not wait until the need for cash arises but should be actively looking into the future, trying to anticipate the need for cash well in advance of the arising need (Peterson, 2009). So using financial models to forecast and manage cash flow is more important.

Finally, summary of construction project cash flow forecasting practices raised by different literatures are indicated in Table 2.1.

Table 2. 1. Summary of Cash Flow Forecasting Practices Raised by Different Literatures

| Cash Flow Forecasting Practices | Authors |
|---|-------------------------|
| <ul style="list-style-type: none"> ➤ Cash flow forecasting methods <ul style="list-style-type: none"> • Integrated system • The detailed approach • Value approach • Cost approach • Short cut approach | Mereawi (2016) |
| <ul style="list-style-type: none"> ➤ Length of project negative cash flow ➤ The maximum value of negative cash flow | Al-Joburi et al. (2012) |
| <ul style="list-style-type: none"> ➤ Contractors' awareness of cash flow in to and out of the project ➤ Cash flow forecasting practice ➤ Purpose of cash flow forecasting <ul style="list-style-type: none"> • To determine the liquidity of the company | Shash and Qarra (2018) |

| | |
|--|-------------------------|
| <ul style="list-style-type: none"> • To set cash flow baseline for control purposes • To determine the financing method • To determine the amount of money cost to include in the bid price • To determine the amount of overdraft | |
| ➤ Cash flow model using practice | Mutti and Hughes (2002) |

Source: Literature review summarization, 2020

2.2.1.2. Cash Flow Management Practices

Beza (2019) identified that construction companies in SNNPRS, Ethiopia, finance their projects by 45% and 32.5% from payment as work completed (progress payment) and advance payment respectively out of five identified sources such as a loan from banks, payment as a work completed, family support, advance payment, and personal savings. This shows that contractors mainly depend on progress payments. This dependence may increase negative cash flow because the payment gets paid after some work completed. Also the study found that 30% and 42.5% of contractors do not and rarely respectively use written documents or manuals for financial management plan but almost all contractors prepare advance payment disbursement schedules. Without a written financial plan it is difficult to manage project cash flow effectively and efficiently.

40% of contractors in SNNPRS, Ethiopia, use their advance payment money for overhead and administration purposes and for completing other projects (Beza, 2019). Mereawi (2016) also found in Addis Ababa, Ethiopia, that contractors disperse their advance payment money somewhere that is not specific to the project use. These unwise use of the money lead to cash shortage to start and proceed with the intended project at initial stage.

Beza (2019) found that most contractors monitor their planned (forecasted) cash flow yearly and at the end of the project. This late monitoring practice is dangerous for project performance and the contractors' business.

According to Mereawi (2016), evaluation of the extent of usage of various strategies for resolving deficit of cash flow, tender unbalancing (front loading) mostly practiced strategy out of seven identified strategies (company's cash reserve, tender unbalancing, delayed

payment to subcontractors, delayed payment to suppliers, reduce the delay of interim payments from the client, borrowed funds, and develop realistic and well-considered budgets for each project). Frontloading is the best strategy to resolve cash deficit during project operation if possible to win the bid with it and cash can be properly used. But the company's cash reserve usage and developing realistic and well-considered budgets for each project are least practiced. These two practices are the safe and simple methods that all contractors should prefer.

Abubakar (2018) in Nigeria found that the contractors' usage/application of the key best practices (usage of bookkeeping system, performance measurement, strategies for addressing deficit cash flow, developing the annual budget plan, strategies for addressing surplus cash flow, usage of cash flow diagrams, usage of cash flow models) to monitor and control cash flow are low level. It is obvious, contractors may manage their cash flows effectively if they properly apply these practices. Also above enumerated cash flow monitoring and controlling practices seem important tools to measure cash flow management practices.

Cui et al. (2010) explained six cash flow management strategies under three categories (front end loading, back end loading, and optimal cash balance) for the main contractor only. Front end loading strategies are techniques that concentrate cash receipts from project operation in an early period. They include mobilization cost (advance payment- money taken from the client to initialize project operation), unbalanced pricing (overpricing work items have done early in the project, and underpricing work items to be completed in the later stage) and overbilling (billing materials that have not been installed). Back-end loading strategies include trade credit (exists when a contractor receives materials from a supplier but pays them later) and subcontracting (the main contractor uses subcontractors' labor, materials, and equipment to build projects, but pays them later). Optimal cash balance is determining a target cash balance that involves a tradeoff analysis of covering cash deficiency and avoiding excessive cash balance. (Cui et al., 2010) research in its case study by using above cash flow management strategies can reduce the project overdraft balance by 30.4%.

According to Shash and Qarra (2018), findings in Eastern Province, Saudi Arabia, contractors regularly utilize advance payments to pay for their mobilization costs and pay their own advance payments to subcontractors and/or suppliers engaged in a particular

project. Contractors' reactions toward clients' progress payment delays are continuing work and delay payments to labor, management, and suppliers, continuing work by borrowing money from a bank with the intention to claim the interest from the client, continuing work by borrowing money from another ongoing project account, continuing work by borrowing money from the organization's available cash with the intention of claiming interest from the client, stopping work until payments are made, and lowering the rate of work and strong follow up on the payment. Out of these reactions, continuing work by borrowing money from another ongoing project account and continuing work by borrowing money from the organization's available cash with the intention of claiming interest from the client are mostly exercised practices among Saudi Arabian Eastern Province contractors. The first mostly exercised reaction may lead to whole organization project failure if clients delay progress payments for a longer time. But the second reaction is most preferable.

Also Shash and Qarra (2018) findings, contractors mainly have two options to generate cash to finance the cash-flow deficit. These are self-financing techniques (finance from their own cash) and debt financing techniques (cash from a lending organization such as a bank). First financing techniques are mostly exercised practices among the contractors and include from retained profit, equity, and trade credit. The second one is less exercised and includes bank loans, overdraft accounts, invoice financing and hire purchase/leasing. Nevertheless there is the practice of using cash for a project from other ongoing projects.

Finally, summary of construction project cash flow management practices raised by different literatures are indicated Table 2.2.

Table 2. 2. Summary of Cash Flow Management Practices Raised by Different Literatures

| Cash Flow Management Practices | Authors |
|---|----------------|
| <ul style="list-style-type: none"> ➤ Contractors' finance source to project <ul style="list-style-type: none"> • Bank loan • Progress payment • Family support • Advance payment • From personal savings | Beza (2019) |

| | |
|--|-------------------|
| <ul style="list-style-type: none"> ➤ Written document using practice for financial management ➤ Period of monitoring forecasted cash flow | |
| <ul style="list-style-type: none"> ➤ Advance payment money usage ➤ Methods for resolving cash flow deficit <ul style="list-style-type: none"> • Company's cash reserve • Tender unbalancing • Delayed payment to subcontractors • Delayed payment to suppliers • Reduce delay of interim payments from the client, • Borrowed funds • Develop realistic and well-considered budgets for each project | Mereawi (2016) |
| <ul style="list-style-type: none"> ➤ Applications of cash flow management practice <ul style="list-style-type: none"> • Usage of the bookkeeping system • Performance measurement • Strategies for addressing deficit cash flow • Developing an annual budget plan • Strategies for addressing surplus cash flow • Usage of cash flow diagrams • Usage of cash flow models | Abubakar (2018) |
| <ul style="list-style-type: none"> ➤ Front end loading <ul style="list-style-type: none"> • Advance payment • Unbalanced pricing • Overbilling ➤ Back end loading <ul style="list-style-type: none"> • Trade credit • Subcontracting ➤ Optimal cash balance | Cui et al. (2010) |

| | |
|--|-------------------------------|
| <ul style="list-style-type: none"> ➤ Contractors’ reactions toward clients’ progress payment delays <ul style="list-style-type: none"> • Continuing work and delay payments to labor, management, and suppliers • Continuing work by borrowing money from a bank with the intention to claim the interest from the client • Continuing work by borrowing money from another ongoing project account • Continuing work by borrowing money from the organization’s available cash with the intention of claiming interest from the client • Stopping work until payments are made • Lowering the rate of work and strong follow up on the payment ➤ Methods to finance the cash-flow deficit: <ul style="list-style-type: none"> • Self-financing techniques are from retained profit, equity, and trade credit. • Debt financing technique is bank loans, overdraft accounts, invoice financing and hire purchase/leasing. • From other ongoing projects | <p>Shash and Qarra (2018)</p> |
|--|-------------------------------|

Source: Literature review summarization, 2020

2.2.1.3. Cash Flow Management Expertise

According to Beza (2019), most construction projects’ financial management expertise not led by financial management experts in contrast by construction company owners and project managers (that are not financial management experts). Similarly, according to Mereawi (2016) finding, 80% of construction projects’ financial management led by the construction company owner. Construction project finance is leading by inexperienced may lead to cash flow disruption and/or project failure.

2.2.2. Causes of Contractors' Poor Cash Flow Management Practices

There are no directly identified factors affecting contractors' poor cash flow management in the literatures but they can be derived out from contractors' cash flow management practices. The factors identified here are related only to contractors' cash flow management activities.

Forecasting project cash flow has many advantages but not forecasting has a negative effect on cash flow management. Cash flow forecasting is a perfect tool to avoid the risk of incompleteness of construction projects due to a shortage of funds (Mereawi, 2016). Obviously cash flow into and out forecasting of the project is important to know future cash receipts and disbursements and to take appropriate measures if the project will face cash challenges. Forecasting cash flow with an appropriate cash flow model in considering different parameters increases accuracy in identifying future cash receipts and disbursements. Mereawi (2016) found that there is no practice of using cash flow model among studied population even there are plenty of cash flow forecasting models. This situation may decrease the opportunity for effective cash flow management.

Cash flow analysis is an important financial activity to determine the necessary budget for a project (Shash & Qarra, 2018) and also to know cash deficit or surplus amount and staying time duration. It is basic to decide suitable alternative financing techniques with amount and time duration to a project if the project faces a cash deficit. It is for better financial management. So not analyzing cash flow reduce effective and efficient cash flow management.

Not analyzing project cash flow in a reasonable short time interval may challenge the contractor's cash flow management. and also, as Beza (2019) identified, this may have high negative impacts on the financial systems of the organization directly and indirectly. But well-timed analysis increases the efficiency and effectiveness of cash flow management.

Contractors' dependency only on client's payments may distort healthy cash flow for a project. According to Shash and Qarra (2018) in Saudi Arabia, some contractors stop work until payments are made or lower the rate of work and strong follow up on the payment if the client delays their payments. These practices show that contractors rely on only client payments to proceed with project work activities. So it is obvious that relying on only payments increases negative cash flow for contractors.

There is the bad practice of using payments for other purposes (not for the project purposes). Mereawi (2016) found that improper utilization of advance payment (disbursing it somewhere that is not specific to the project use) is a major cause exposing a project to cash shortages. It seems not only using improper utilization advance payment but also includes progress utilization. If contractors use their payments out of project purpose, hardly project face cash shortage leading to negative cash flow.

According to Mereawi (2016), companies are not using the realistically developed and well-considered budgets method for each project. The method which is proactively action taking mechanism by developing realistic cash flow forecasting. The companies usually face cash deficit without their prior or in advance knowledge of the problem as it is clearly shown in their practice. It is clear that if they work hard on the detailed planning for forecasting cash flow, they can be prepared for the deficit and as a result they will act carefully on unwanted expenditures and will look for fund in advance. And also not using a written financial management plan causes poor cash flow management. As a finding of Beza (2019) most contractors do not prepare in advance written financial management plans.

The contractors must have cash flow management strategies (front-end loading and back-end loading) and do trade-off analysis of covering cash deficiency and avoiding excessive cash balance in order to manage their cash flows effectively and efficiently. By these management strategies and trade-off analysis, Cui et al. (2010) in the study showed that the main contractor can reduce the amount of overdraft that is the money gained from debit finance. Debit finance has the cost of using money. So front-end loading and back-end loading management strategies have a better advantage than debt financing.

If contractors face cash deficit and have no capacity to finance the projects on their own, there is another opportunity that is debt financing. Debt financing includes bank loans (short term and long term), overdraft accounts, invoice financing, hire purchase facility, etc. each has its own advantages and disadvantages. According to Mereawi (2016) there is a practice of borrowing funds from a finance institution (bank) to cover project cash deficit. So this practice increases positive cash flow and ascertains the sustainability of the project.

Not managing cash flow by an expert is one of the factors affecting contractors' poor cash flow management practices. That means if cash flow management is handled by inexpert, the project's cash flow has a high probability to be distorted. Beza (2019) found that most

of the construction companies' finance system was running by owners of the companies who had no skill in the accounting profession. Consequently, this led to high risk for the financial management practice of the contractors.

Generally, the above-raised factors in each paragraph are causes that affecting contractors' cash flow management practices negatively. These factors are only related to contractors' activities when they managing their cash flows of the projects.

2.2.3. Impacts of Contractors' Poor Cash Flow Management Practices on Construction Project Performance

Contractors' good cash flow management results in good project performance but poor cash flow management impacts negatively the project performance. Gambo and Said (2014) found that the cash flow problem results in poor/low contractor's performance. Out of different project performance measuring dimensions, time, and cost are primarily affected by poor cash flow management practice. Beza (2019), Omopariola and Windapo (2019), and Hailu (2015) identified that cash related and cash flow problems impact (increase) highly predetermined project time and cost while project implementing.

2.3. Literature Gap

This chapter discussed about basic concepts of cash flow and cash flow management and critical parts of this research study that are cash flow management practices of contractors and causes and impacts (on time and cost project performance) of contractors' poor cash flow management practices. The discussion was done with help of reviewing different previous literatures that are related to the research title. These literatures has raised different concepts and ideas about construction cash flow management.

Most previous international studies focused on developing cash flow forecasting/management model and system but studies on cash flow management practices that are appearing in practice are low. In addition, the studies focus on the role of the different construction stakeholders' effect on cash flow management practices. However studies on separate contractors' activities to react to their project cash flow problems were not studied in broad and well.

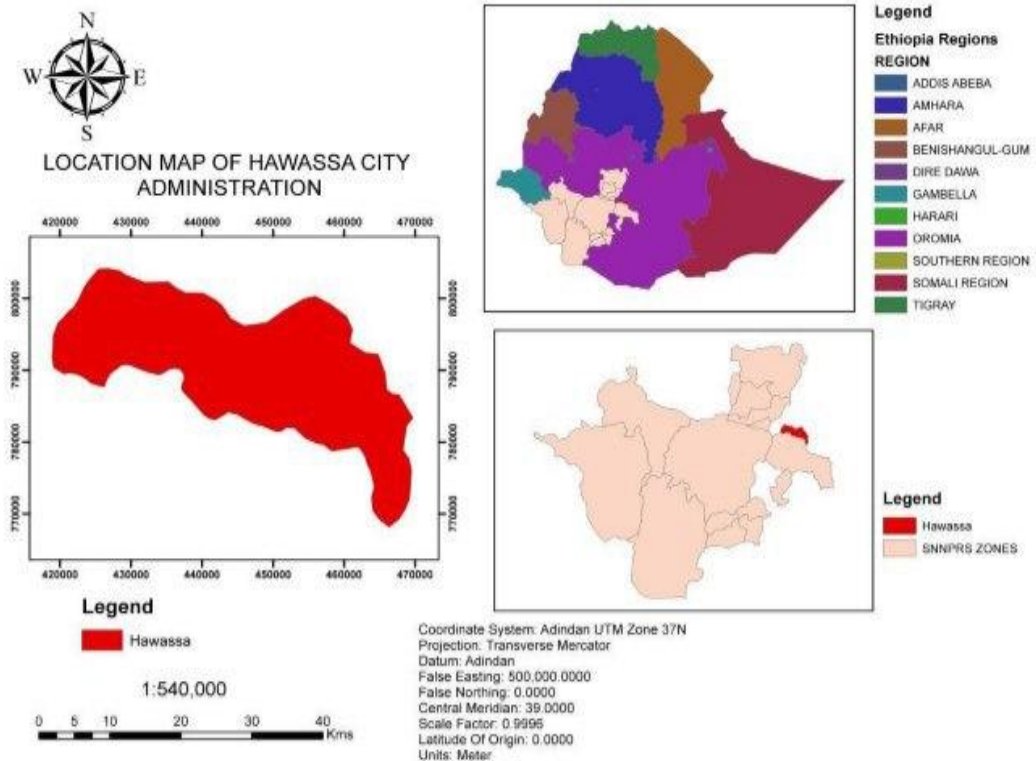
Considering the practice in Ethiopia, generally, studies on construction cash flow management are very few and the practice needs detail investigation to improve it. Thus this research study is going to fill above raised literature gaps and to provide additional knowledge to construction cash flow management practices study area.

CHAPTER THREE: MATERIALS AND METHODS

This chapter presents mainly the methods applied, materials and tools used to achieve objective of the study, which is to investigate contractors’ cash flow management practices in construction projects and identify the associated causes and impacts of poor practices. Beside this, the chapter also presents the description of the study area and study subject, validity and reliability of the study, and researcher’s ethical considerations.

3.1. Description of the Study Area

The study area of the research is Hawassa city, which is found in Ethiopia, on the shores of Lake Hawassa in the Great Rift Valley. It is located 273 km (81mi) south of Addis Ababa. The city serves as the capital of the Sidama Region and the South Nations, Nationalities, and Peoples’ Region (SNNPR). It lies on the Trans-African Highway from Cairo-Cape Town and has a latitude and longitude of 7°3’N 38°28’E and an elevation of 1,708 meters (5,604ft) above sea level (Hawassa City Administration, 2018).



3.2. Study Subject

The study subject of this research is cash flow management practice focusing on grade one up to five contractors who were active during data collection. Whose business type of work were building construction, road construction, water works construction, and general construction. The contractors have been studied were main (Prime) in the undergoing construction projects.

3.3. Research Approach

The purpose of research is to discover answers to questions through the application of scientific procedures (Kothari, 2004). To this achieve purpose, a researcher may select and apply the research approach as quantitative, qualitative or mixed of both based on their advantages and disadvantages. This study researcher has generally selected and applied inferential quantitative approach but additional qualitative analysis (Qualitative approach) was done to contractors' cash flow management practices in order to make robust the results of quantitative analysis.

3.3.1. Inferential Quantitative Approach

The purpose of inferential approach to research is to form a quantitative database from which to infer characteristics or relationships of population. This usually means survey research where a sample of population is studied (questioned or observed) to determine its characteristics, and it is then inferred that the population has the same characteristics (Kothari, 2004).

Because quantitative data is numeric, the collection and analysis of data from representative samples is more commonly used. In its simplest terms, the more representative the sample is, the more likely it is that a quantitative analysis will accurately and precisely reflect a picture of the research study results when generalized to the whole population. Quantitative research involves studies that make use of statistical analyses to obtain their findings (Marczyk et al., 2005). It provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population (Creswell, 2014). It is simple to collect and analyze data.

From above mentioned advantages of inferential quantitative approach, this research study partially applied inferential quantitative approach for primary data analysis and discussion also to reach conclusion.

3.3.2. Qualitative Approach

However, the shortcoming of quantitative approach is that it fails to provide an in depth description of individual experience. This shortcoming can be overcome by qualitative approach. Qualitative approach to research generates results either in non-quantitative form or in the form which are not subjected to rigorous quantitative analysis (Kothari, 2004). For this approach, the data are in the form of words and images from interviews, documents, and observations (Symeou & Lamprianou, 2014).

So to fill gap of inferential quantitative approach, this research study has applied additional qualitative approach.

3.4. Data Collection Procedure

To find answers to a research study question or problem it is important to collect data from relevant sources. There are two types of data based their source. These are secondary data and primary data. Both data types were used for this research study.

3.4.1. Secondary Data

Before primary data construction, it is compulsory for researcher knowing past knowledge under the research objectives. This can be done through secondary data discussion. For this research study, secondary data were gathered through selecting and reviewing books, journals, thesis, dissertations and internet source articles that are related to the research study. Review of secondary data provided past experiences, which related contractors' cash flow management practices, and causes and impacts of poor cash flow management practices. Therefore, it gave a big ground to this research study. Structured questionnaire was prepared based on the secondary data that were already collected and reviewed.

3.4.2. Primary Data

The primary data are those which are collected afresh and for the first time, and thus happen to be original in character (Kothari, 2004). These data are inputs and necessarily important

for research study analysis. For this study, structured questionnaire and semi-structured personal interview primary data collection methods were used.

3.4.2.1. Questionnaire

This method of data collection is quite popular, particularly in case of big enquiries (Kothari, 2004). Using questionnaires to collect people's opinions about various issues is a very efficient, and often reliable, data collection method (Symeou & Lamprianou, 2014). Also Pandey and Pandey (2015) stated merits of questionnaire as is very economical, is a time saving process, covers the research in wide area, is very suitable for special type of responses, is most reliable in special cases and is easy to prepare and to administer.

In this method of data collection, a questionnaire is sent by different ways (email, post, face to face self-administer) to the persons concerned with a request to answer the questions and return the questionnaire. Face-to-face self-administered questionnaire may get a better response rate, but take a lot of the researcher's time. Postal and email surveys are very likely to have lower response rates and possibly poorer answers, because the researcher is not available to respond to participants' demands for additional clarification ; but these methods allow a larger population to be considered (Blaxter et al., 2006). Thus, for this research the researcher has distributed the questionnaire via email that made in google forms and face to face self-administered method were followed.

3.4.2.1.1. The Constructs Used for Questionnaire Preparation

In preparing the research questionnaire, important constructs used as inputs which were derived from an extensive review of the literature that were related to the objectives of the research study. These constructs were listed under different groups, which could be helpful for summarization of analysis results. Each group contained related constructs (factors).

3.4.2.1.2. Questionnaire Design

The questionnaire was designed in to four sections. First section contains questions about respondents and companies' background. The questions are of multiple choices. Second section comprised of two sub sections which contain questions about contractors' cash flow management practices. First sub section questions were structured for checkboxes and

second sub section questions were structured for rating five point Likert scale. Third section questions are about causes of contractors' poor cash flow management practices and arranged for rating five point Likert scale. The last section questions are about degree of impact of contractors' poor cash flow management practices on construction project time and cost performances, and structured for rating five point Likert scale. The whole questionnaire structure is shown in Appendix I.

3.4.2.1.3. Sampling Technique

For this research study, the researcher selected probability simple random sampling technique. Because Random sampling ensures the law of Statistical Regularity which states that if on an average the sample chosen is a random one, the sample will have the same composition and characteristics as the universe (Kothari, 2004). This is the reason why random sampling is considered as the best technique of selecting a representative sample.

3.4.2.1.4. Sample Size

The concept of sampling involves taking a small portion of the population which could provide the information in request (Symeou & Lamprianou, 2014). Thus, a sample is a smaller set of elements which a researcher selects from the entire population. For this research study, because of impossibility to get data from all contractors' representatives included in the study population due to time and cost constraints, sample was taken in order to have a size that would be representative of whole population being studied. The target population was Grade I up to Grade V contractors' representatives. Their number was unknown. For unknown population, following Cochran (1977) iterative formula was used to determine minimum sample size.

$$n = \frac{z^2 p(1 - p)}{e^2}$$

where: n is sample size , z is standard normal deviation set at percentage confidence level, p is percentage picking a choice or response, and e is confidence interval (or marginal error).

For this research study, the researcher took 90% confidence level so $z = 1.645$, $e = \pm 10$ (0.1), and $p = 50\%$ (0.5).

$$n = \frac{1.645^2(0.5)(1 - 0.5)}{(0.1)^2} = 67.65 \approx 68$$

This means minimum 68 respondents are needed for quantitative data analysis. But questionnaires have been distributed to 81 contractors' representatives and whom followed up strongly by phone call and face to face contact in order to meet minimum respondents. 73 representatives have replied all questionnaire questions and then returned questionnaires back to the researcher. Minimum $68 \leq 73$ is true, so it is valid for analysis.

3.4.2.2. Interview

This method of data collection is very useful in extensive enquiries and can lead to fairly reliable results (Kothari, 2004). For these advantages, the researcher has prepared interview questions based on quantitative data analysis results of contractors' cash flow management practices section. For interviewing, from each grade (I, II, III, IV, and V) of contractors, randomly one contractor could be selected and then interviewed. This method of selection participated all grade levels of contractors and the sample size could be five (5) since the study subject of this research was grade one up to five contractors. The interview questions are shown in Appendix III

3.5. Method of Data Analysis

It is important for research to adopt appropriate techniques of data analysis in order to get objective results (Blaxter et al., 2006). Two types of primary data were collected, the qualitative and quantitative data. Hence, this research could employed both quantitative and qualitative data analysis methods to improve the reliability the research results.

3.5.1. Quantitative Data Analysis

In quantitative data analysis, statistical methods such as percentage and/or frequency distribution were used to analyze the extent of the practice of contractors' cash flow management and the level of impact of contractors' poor cash flow management practices on project time and cost performances. The mean score and standard deviation were used to rank factors of contractors' cash flow management practice, and cause factors of contractors' poor cash flow management practice that could be impacted due to contractors' poor cash flow management practice. Spearman correlation analysis was used to check the existence, direction, and degree of association between cause and impact factors of contractors' poor cash flow management practices. For accurate and reliable analysis results, these all above-mentioned types of analysis were processed through the computer application software of

Statistical Package for the Social Sciences (SPSS) version 26. The analysis results have been presented by graphs and tables.

3.5.2. Qualitative Data Analysis

Qualitative data was gathered from key informants (Financial Manager, General Manager, Project Manager or Office Engineer) through semi-structured interviews then organized and categorized thematically and written up into narratives.

3.6. Validity and Reliability of the Study

3.6.1. Validity

Validity is concerned with whether a research is believable and true and whether it is evaluating what it is supposed (Zohrabi, 2013). To ensure that this research study is being believable, true and objective oriented, the researcher has carefully prepared simple convenient and objective based questionnaire from extensive literature review, checked and corrected by 10 respondents pilot survey, distributed and collected via both emails and face to face, fed in to and summarized at google forms, and then analyzed by the computer application software. Questionnaires' google summary are shown in Appendix II.

3.6.2. Reliability

One of the main requirements of any research process is the reliability of the data (Zohrabi, 2013). Reliability is measure of internal consistency of collected data. It is necessary to check reliability of the data before subsequent analysis of the data.

Table 3. 1. Cronbach's Alpha Values of Groups of Factors

| Group of Factors | Cronbach's Alpha Value | No. of Variables/Factors |
|---|-------------------------------|---------------------------------|
| Contractors' Cash Flow Management Practice Factors | 0.853 | 26 |
| Contractors' Poor Cash Flow Management Practice Cause Factors | 0.783 | 10 |
| Project Performance Factors | 0.707 | 2 |

Source: Computed from questionnaire survey, 2020

The reliability can be checked by Cronbach's alpha (α) test. Cronbach's alpha (α) is a function of the average inter-correlations of variables, and the number of variables in the scale. Its reliability coefficient typically varies between 0 and 1. The data whose Cronbach's alpha value greater than 0.7 is generally acceptable and satisfactory (Mohajan, 2017). For this research study, Cronbach's alpha values of all groups of factors data are greater than 0.7. Therefore, the data of each group of factors are reliable for subsequent analyses. Cronbach's alpha values of groups of factors are indicated in table 3.1.

3.7. Ethical Consideration

Before undertaking any study involving human participants, it is necessary to a researcher to consider researching ethical principles. These are informing respondents about objective and purpose of research study, respecting rights and privacy of respondents, obeying willingness of respondents, acknowledging all the works of others used in study. According to Yin. (2014) adherence to ethical principles by researchers will add credibility to the study. Thus the researcher conducted the research study in considering the ethical principles.

CHAPTER FOUR: RESULTS AND DISCUSSION

This chapter covers discussion of results of both quantitative and qualitative analyses. The analysis and discussion include questionnaire survey response rate, respondent profile, contractors' cash flow management practices, and causes and impacts of poor cash flow management. The results are presented by tables and graphs which accompanied by correspondent discussion.

4.1. Questionnaire Survey Response Rate

Table 4. 1. Questionnaire Survey Response Rate

| Contractor Grade Level | No. of Questionnaire Distributed | No. of Questionnaire Returned | (%) Percentage Returned |
|-------------------------------|---|--------------------------------------|--------------------------------|
| Grade I | 32 | 30 | 93.75% |
| Grade II | 12 | 11 | 91.67% |
| Grade III | 12 | 11 | 91.67% |
| Grade IV | 12 | 9 | 75.00% |
| Grade V | 13 | 12 | 92.31% |
| Total | 81 | 73 | 90.12% |

Source: Computed from questionnaire survey, 2020

Table 4.1 describes that response rates of questionnaire survey from different grade level construction company. In detail, thirty two (32) questionnaire were distributed for Grade I contractor, twelve (12) for each Grade II, III, & IV and thirteen (13) for Grade V. Totally eight (8) questionnaire were not returned. So aggregate response rate is 90.12%. Richard Fellows (2015) stated that for the construction industry researches, the minimum response rate of 25-30% is acceptable for analysis. Therefore, this research study questionnaire 90.12% response rate is acceptable for analysis.

4.2. Respondent Profile

This section presents about characteristics (background) of participant respondents (personnel) and organizations. Two tables of 4.2 and 4.3 depict summary of those participant personnel and organizations respectively for research study.

Table 4.2. presents respondents' (who completed research questionnaire) characteristics. Out of all respondents, 76.72 percentage taken by Office Engineers and Project Managers those were at construction project sites. The rest 4.11% and 19.18% were Finance Manager and General Manager respectively at contractor head office. About 70% of respondents held

college degrees, 20.55% were with master's degrees and remainders with certificate/diploma education level.

Table 4. 2. Respondents' Characteristics

| Characteristics | Categorical Distribution | | | | | |
|--|-------------------------------------|---------------------------------------|--|--|--------------------------------|-----------------------------|
| | Position in Construction Company | Finance Manager 3(4.11%) | General Manager 14(19.18%) | Office Engineer 29(39.73%) | Project Manager 27(36.99%) | |
| Level of Education | Certificate/ Diploma 7(9.59%) | First Degree 51(69.86%) | Master's Degree 15(20.55%) | Doctoral Degree (Ph.D.) 0(0.00%) | | Total 73(100.00%) |
| Years of Experience in Construction Industry | Less than 5 years 23(31.51%) | 5 to less than 10 years 27(36.99%) | 10 to less than 15 years 13(17.81%) | 15 to less than 20 years 8(10.96%) | 20 and above years 2(2.74%) | Total 73(100.00%) |

Source: Computed from questionnaire survey, 2020

When come to respondents' years of experience in construction industry, about 55% of respondents had experience in range of 5 to less than 15 years, 13.7% had experience of in range 15 and above years. However 31.51% had less than 5 years' experience.

Table 4. 3. Organizations' Characteristics

| Characteristics | Categorical Distribution | | | | | |
|--|---|--|---|--|-------------------------------------|-----------------------------|
| | Business Category | Building Contractor 34(46.57%) | General Contractor 31(42.46%) | Road Contractor 4(5.48%) | Water Works Contractor 4(5.48%) | -- |
| Grade Level | Grade I 30(41.10%) | Grade II 11(15.07%) | Grade III 11(15.07%) | Grade IV 9(12.33%) | Grade V 12(16.44%) | Total 73(100.00%) |
| Years of Experience in Running Construction Business | Less than 5 years 3(4.11%) | 5 to less than 10 years 26(35.62%) | 10 to less than 15 years 21(28.77%) | 15 to less than 20 years 14(19.18%) | 20 and above years 9(12.33%) | Total 73(100.00%) |
| Average Annual Turnover | Less than 50 million Birr 21(28.77%) | 50 to less than 100 million Birr 23(31.51%) | 100 to less than 500 million Birr 21(28.77%) | 500 to less than 1000 million Birr 6(8.22%) | Above 1000 million Birr 2(2.74%) | Total 73(100.00%) |

Source: Computed from questionnaire survey, 2020

Above table 4.3. Presents about organizations' (contractors') characteristics that survey questionnaire respondents work in them. Number of contractors that participated in questionnaire survey were taken as number of personnel respondents. That means more than

one respondent might represent one contractor organization because most of respondents were at project site and rest were at head office.

In this study participants, 89.03% were Building Contractor and General Contractor however each Road Contractor and Water Works Contractor took parts 5.48%. In contractor grade level category participation, Grade I contractors took majority (41.10%) portion out of participating Grade I up to Grade V contractors. Grade V contractors took second position by 16.44% participation, each Grade II and III had 15.07% and Grade IV had 12.33% participation.

Participating contractors' organizations experience in running construction business presents that most (about 65%) contractors had 5 to less than 15 years' experience. This implies that survey questionnaire participants are dominated by young organizations. In contrast 15 and above years experienced contractors' organizations were low (31.51%) and junior contractors (that had less than five years' experience) took part very low percent (4.11%).

About 60% of participating contractor organizations' annual average turnover was in range of 50 million to less than 500 million Birr, 28.77% was in range of less than 50 million Birr and about 11% was in more than 500 million Birr.

4.3. Cash Flow Management Practices of Contractors

This section is intended to address the first specific objective of this research study.

4.3.1. Contractors Practices of Usage of Cash Flow Forecasting Methods and Purposes and Monitoring Time Intervals

Methods: Forecasting cash flow is first step of cash flow management and it needs accuracy and reliability to achieve anticipated project performance. There are different cash flow forecasting methods that can be used by contractors. They have their own weak sides and strong sides.

The detailed approach is one of methods. 53.4% of questionnaire survey respondents answered that contractors use only detailed approach method to forecast their project cash flow but 30.2% replied that contractors use detailed approach and other method/s. The

detailed approach method is forecasting derived from break down of bill of items into schedule. This means simply allocating Bill of Quantity (BoQ) items' price to planned work schedule. It does not consider future risk costs. 12.3%, and 26.1% of respondents replied that contractors adopt only cost approach method (forecasting done based on the cost of project input resources), and cost approach and other methods respectively. Forecasting by this method is based on input resources that are needed by the project over contract duration. As 16.5% of respondents' reply, contractors use value approach (forecasting done based on project product value), short cut approach (forecasting done using models/library of S curves based past similar projects) and integrated system (forecasting is done by integrating cost and schedule). Project cash flow forecasting methods that are practiced by contractors are presented in figure 4.1.

Purposes: Forecasting cash flow has different purposes for contractors. For example it is aimed to use to determine the liquidity of the company, set cash flow baseline for control purposes, determine the financing method, determine the amount of money cost to include in the bid price and determine the amount of overdraft. Anticipating it to use for multiple purposes has more advantages.

According to 38.4% of respondents' answers, contractors intend to use forecasted cash flow to determine the liquidity of the company and set cash flow baseline for control purposes but as most (65.8%) respondents, contractors intend to use it to set cash flow baseline for control purposes. In contrast, as 2.7% of respondents' answers, contractors plan to adopt their forecasted cash flow for all purposes other than for overdraft purpose. Figure 4.2 presents purposes of conducting cash flow forecasting that are perceived by contractors.

Time Intervals: Different contractors may have different project cash flow monitoring time interval policies. But monitoring (observe and check) the project forecasted cash flow in short time interval is most important practice to take early controlling measure on cash flow if problem encounter. This practice helps to achieve anticipated project performance and contractor's business success. However, at longer time interval monitoring has high probability of negative impact on both the project performance and the business success.

As 57.7% of participants' response, there is contractors' practice of monthly monitoring, in contrast as the rest (42.3%) participants, contractors do not do monthly monitoring. 38.5% of participants assure that contractors make monthly and another additional longer time

interval/s monitoring. According to 8.2% and 6.8% of participants answer, contractors do cash flow monitoring only at the end of the project and only yearly, respectively. Time interval/s used by contractors to monitor forecasted cash flow are presented in figure 4.3.

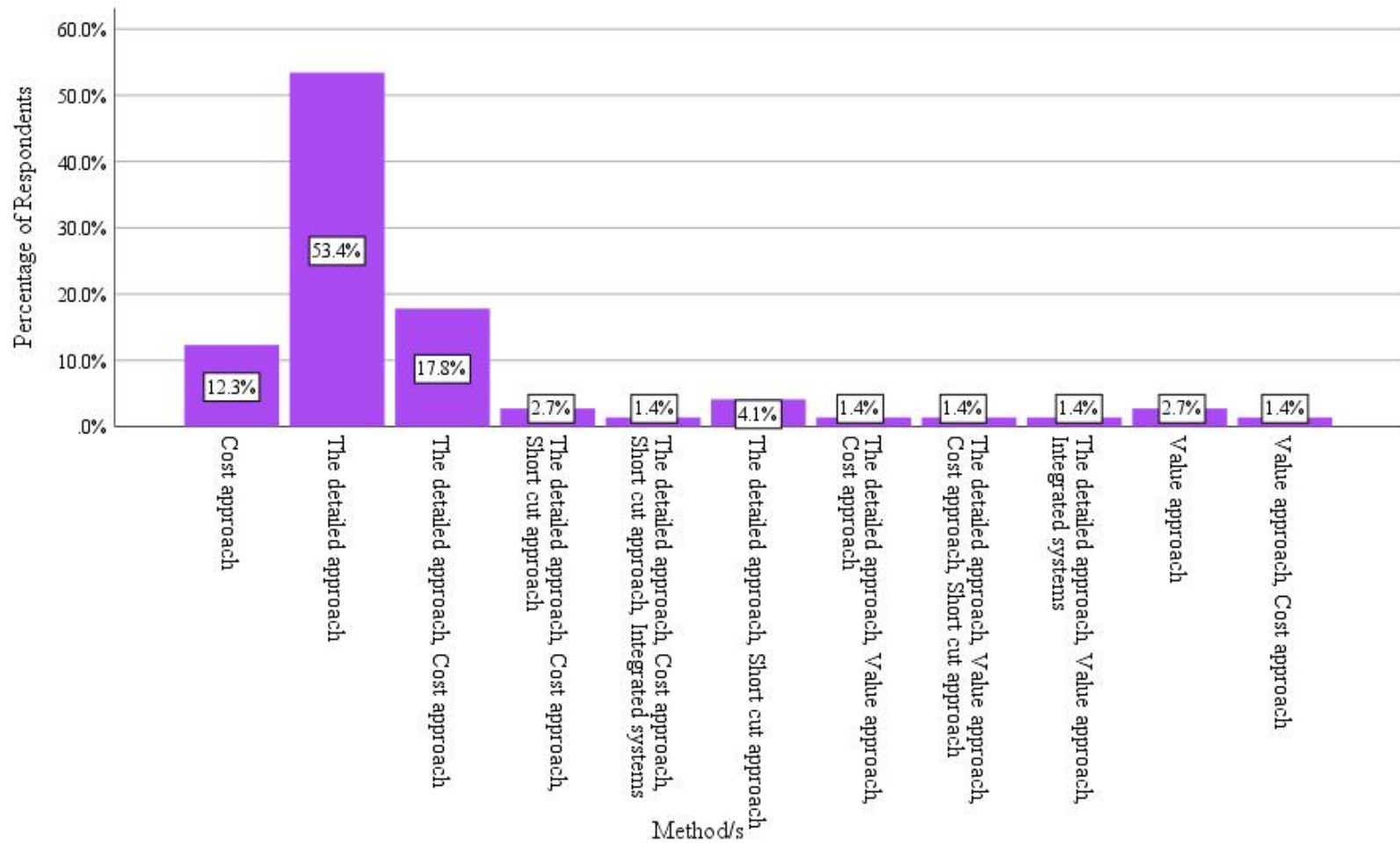


Figure 4. 1. Method/s Used by Contractors to Forecast their Project Cash Flow (Source: Drawn from questionnaire survey, 2020)

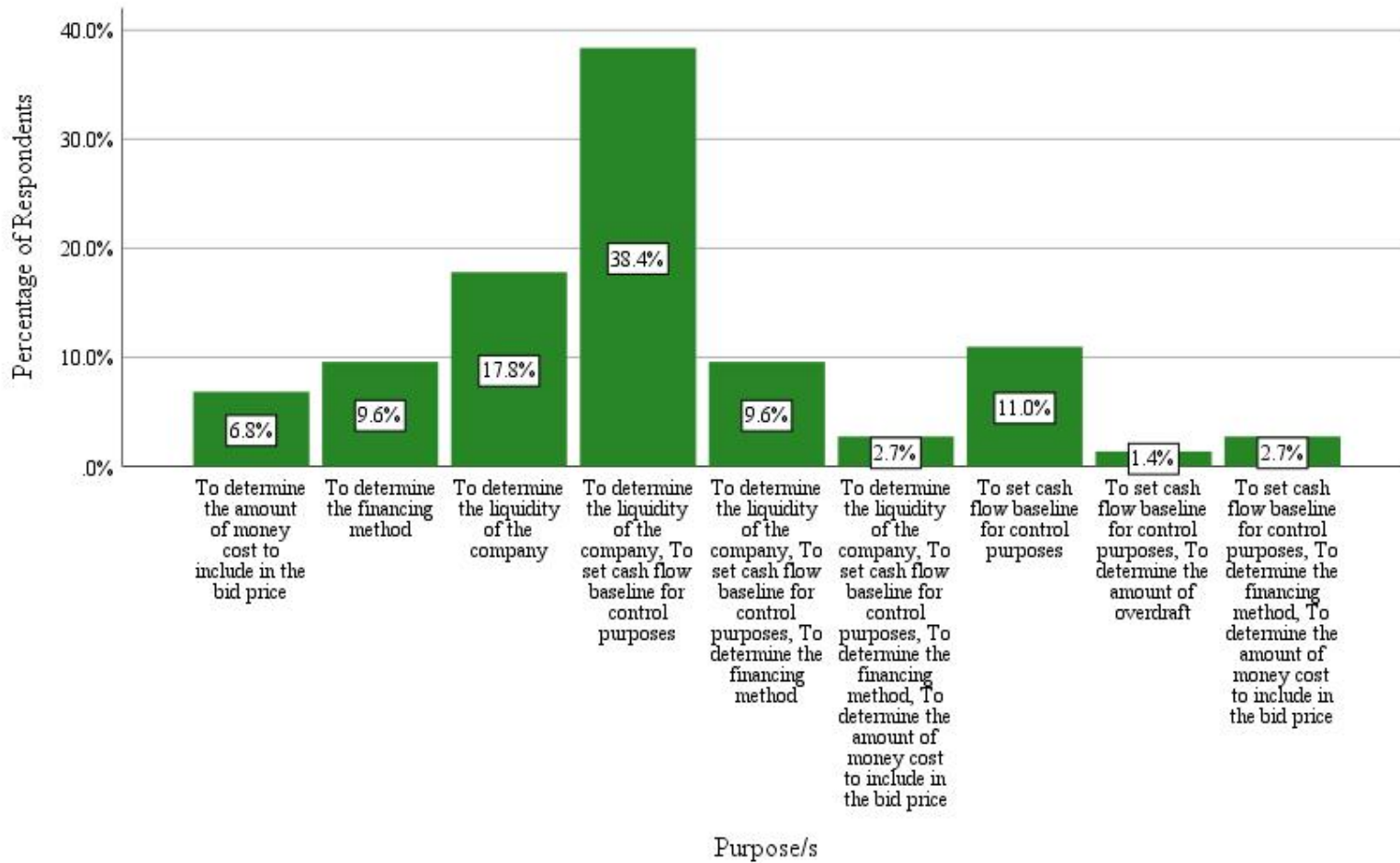


Figure 4. 2. Purpose/s of Forecasting Construction Project Cash Flow (Source: Drawn from questionnaire survey, 2020)

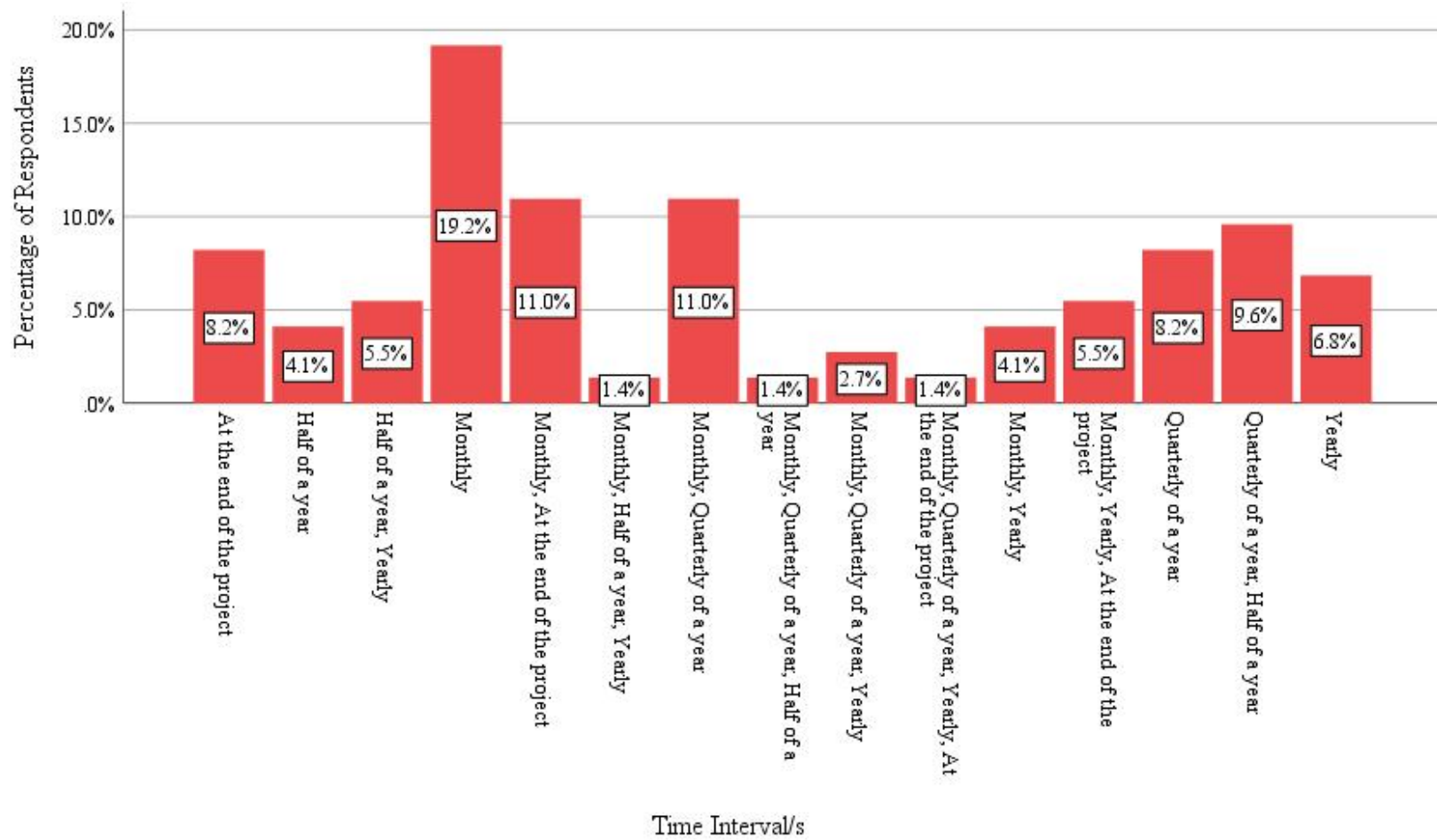


Figure 4. 3. Time Interval/s Used by Contractors to Monitor Forecasted Cash Flow of their Project (Source: Drawn from questionnaire survey, 2020)

4.3.2. Analysis of Cash Flow Management Practice Factors Data with Five Point Likert Scale

The factors identified in the literature review were arranged conveniently and distributed to respondents in the study area to measure degree of contractors' cash flow management practice in their construction projects. Respondents were requested to rate on a five-point Likert scale of Very Poor, Poor, Average, Good, and Very Good. A scoring system was used to transform the Likert scale points into quantitative data, where 'Very Poor' scores 1 point and 'Very Good' scores 5 points. The mean score which is nearest to 1 indicates 'Very Poor' whereas the mean score which is nearest to 5 indicates 'Very Good' for each of the factors. The factors were ranked according to the mean score of highest value to lowest value. In cases where the mean score of two or more factors in a group were the same, the standard deviation was used. Additionally, for more clear understanding, the frequency of respondents under different Likert scale scores was used for the analysis. The analyses are presented the following sub sections.

4.3.2.1. Cash Flow Forecasting, Monitoring, and Controlling Practices

According to Table 4.4 results, about 52(71.2%) of respondents replied that contractors' usage of cash flow management models for their projects is poor (mean = 2.05). But 21(28.8%) of respondents replied positive score values. Generally, it can be concluded that the model usage among contractors is poor. It is similar to Mereawi (2016) finding in Addis Ababa, Ethiopia. Also out of nine listed factors, cash flow management model usage is least practiced among contractors.

The contractor must determine a target cash balance that involves a tradeoff analysis of covering cash deficiency and avoiding excessive cash balance (Cui et al., 2010) for its project performance and business success. To determine cash balance, contractor must have strategies for addressing deficit cash flow and surplus cash flow. However in practice, having strategies for addressing deficit cash flow and surplus cash flow for contractors are poor with mean scores 2.33 and 2.22 respectively. Also they are third and second poorly practiced factors.

Planning a project budget in considering all future parameters, which affect cash flow, is proactive action taking mechanism. Where this is on ground, 32(43.9%), 30(41.1%) and

11(15%) of respondents answered negative, average and positive score values respectively on “developing realistic and well-considered budgets for a project” factor with mean score of 2.63. Obviously respondents with negative score values higher than respondents with positive score values. So by centering on frequency [30(41.1%)] of respondents with average score, it can be concluded that contractors’ practice of developing realistic and well-considered budgets for their projects is poor. Similarly, Mereawi (2016) found that there was no practice of developing realistic and well-considered budgets in Addis Ababa Ethiopia. It is 4th poorly practiced factor.

As the table presentation, 32(43.8%), 24(32.9%) and 17(23.3%) of participants responded negative, average and positive score values respectively on “company’s forecasted cash flow monitoring of its projects” factor with mean score of 2.82. This shows that respondents on the negative score side higher than respondents on the positive score side and respondents with average score are common for both sides. Thus contractor’s practice of monitoring forecasted cash flow for their construction projects is poor. According to Beza (2019), majority of the contractors in SNNPRS monitor the planned project total cost once a year. This may have high negative impacts on the financial systems of the organization directly and indirectly. This factor is 5th poorly practiced.

Using cash flow diagram is the most important and essential for financial analysis which helps contractors to make appropriate financial decision. In practice, 23(31.5%), 39(53.4%) and 11(15%) of participants responded negative, average and positive score values respectively on “Usage of cash flow diagrams” factor with mean score of 2.85. These respondents frequency distribution shows that the practice of contractors’ usage of cash flow diagrams is poor. This poor practice can affect negatively efficiency of cash flow management of contractor. It is 6th poorly practiced factor.

Having good bookkeeping system for recording financial transactions of construction projects allows contractors to manage their cash flow easily. However on ground, 26(35.6%), 33(45.2%) and 14(19.2%) of respondents reacted negative, average and positive score values respectively on “usage of the bookkeeping system” factor with mean score of 2.89. From these respondents frequency distribution, it can be concluded that contractors’ usage of the bookkeeping system of cash flow data is poor. In contrast, Abubakar (2018)

found in Nigeria there was good practice of usage of the bookkeeping system of cash flow data. It is 7th poorly practiced factor.

Lastly, “company’s cash flow forecasting practices for its projects” with mean score of 2.92 and “cost performance measurement” with mean score of 3.00 are 8th and 9th poorly practiced factors.

Table 4. 4. Cash Flow Forecasting, Monitoring, and Controlling Practices

| Factors | Level of Practice | | | | | Mean Score | Std. Deviation | Rank |
|--|-------------------|--------------|--------------|--------------|-------------|-------------|----------------|-----------|
| | 1 | 2 | 3 | 4 | 5 | | | |
| Company’s cash flow forecasting practices for its projects | 1(1.4%) | 24(32.9%) | 32(43.8%) | 12(16.4%) | 4(5.5%) | 2.92 | 0.878 | 2 |
| Company’s forecasted cash flow monitoring of its projects | 2(2.7%) | 30(41.1%) | 24(32.9%) | 13(17.8%) | 4(5.5%) | 2.82 | 0.948 | 5 |
| Usage of the bookkeeping system | -- | 26(35.6%) | 33(45.2%) | 10(13.7%) | 4(5.5%) | 2.89 | 0.843 | 3 |
| Cost performance measurement | -- | 26(35.6%) | 28(38.4%) | 12(16.4%) | 7(9.6%) | 3.00 | 0.957 | 1 |
| Strategies for addressing deficit cash flow | 16(21.9%) | 26(35.6%) | 22(30.1%) | 9(12.3%) | -- | 2.33 | 0.958 | 7 |
| Developing realistic and well-considered budgets for a project | 11(15.1%) | 21(28.8%) | 30(41.1%) | 6(8.2%) | 5(6.8%) | 2.63 | 1.061 | 6 |
| Strategies for addressing surplus cash flow | 18(24.7%) | 31(42.5%) | 15(20.5%) | 8(11.0%) | 1(1.4%) | 2.22 | 0.989 | 8 |
| Usage of cash flow diagrams | 1(1.4%) | 22(30.1%) | 39(53.4%) | 9(12.3%) | 2(2.7%) | 2.85 | 0.758 | 4 |
| Usage of cash flow models | 27(37.0%) | 25(34.2%) | 12(16.4%) | 8(11.0%) | 1(1.4%) | 2.05 | 1.053 | 9 |
| Aggregate | 11.6% | 35.2% | 37.8% | 13.2% | 4.3% | 2.63 | -- | -- |
| 1 = Very Poor, 2 = Poor, 3 = Average, 4 = Good, 5 = Very Good | | | | | | | | |

Source: Computed from questionnaire survey, 2020

As known from Table 4.4 aggregate result, greater percentage (46.8%) of respondents reacted negative score points (1 or 2) than that of respondents (17.5%) with positive score

points (4 or 5). The aggregate mean score is 2.63. Thus, it can be finalized that contractors' cash flow forecasting, monitoring, and controlling practices are poor.

<< From Quantitative analysis result, top five poorly practicing factors were taken for interview process >>

As result of quantitative analysis, usage of cash flow models, strategies for addressing surplus cash flow, strategies for addressing deficit cash flow, developing realistic and well-considered budgets for a project, and company's forecasted cash flow monitoring of its projects are 1st, 2nd, 3rd, 4th, and 5th respectively poorly practicing factors among contractors. As further interview results, strategies for addressing surplus cash flow, strategies for addressing deficit cash flow, company's forecasted cash flow monitoring practice factors are better practiced by grade I & II contractors than grade III, IV & V contractors. This is because grade I & II contractors may have better financial management experience than others. There is no practice of using cash flow models among all interviewed grade levels of contractors because contractors may have no knowledge of there is having cash flow management models. Developing realistic and well-considered budgets for a project factor is better practiced by grade I contractors than others.

4.3.2.2. Cash Flow Management Strategies

Table 4.5 presents practices of cash flow management strategies of contractors that to minimize/avoid cash scarcity during their project commencement and execution.

In the table, 18(24.7%) and 48(65.8%) of participants responded 'Good' and 'Very Good' respectively on contractors' advance payment usage practice (mean = 4.53). Explicitly the respondents' frequency distribution shows that over 90% of participants replied positive reactions ('Good' & 'Very Good') but 'Very Good' reactions are much greater than 'Good' reactions. Hence contractors' advance payment usage practice is very good. Beza (2019) obtained that advance payment is, next to payment as a work completed, main source of cash for contractors. It is first well practiced factor out of list.

When come to overbilling, 23(31.5%) and 33(45.2%) of participants responded 'Good' and 'Very Good' respectively on contractors' practice of overbilling (billing materials that have not been installed) with mean score of 4.14. This condition tells 76.7% of respondents react

positive responses. Therefore overbilling practice among contractors is good. As Cui et al (2010), the value of materials stored at the site is allowed to be added to the application for payment if the materials are suitably stored and not likely to be lost on account of theft or deterioration. It is second well practiced factor.

Respondents with positive score side are greater than respondents with negative score side for ‘Unbalanced pricing’ factor (mean score = 3.51) and ‘Trade credit’ factor (mean score = 3.34). Respondents with ‘average score’ are common for both sides. The situation explains that contractors’ unbalanced pricing and trade crediting practices are good. Similarly Mereawi (2016) obtained that both practices are well in Addis Ababa, Ethiopia. They are 3rd and 4th respectively well practiced factors.

Table 4. 5. Contractors’ Cash Flow Management Strategies

| Factors | Level of Practice | | | | | Mean Score | Std. Deviation | Rank |
|--|-------------------|--------------|--------------|--------------|--------------|-------------|----------------|------|
| | 1 | 2 | 3 | 4 | 5 | | | |
| Advance payment | -- | 2(2.7%) | 5(6.8%) | 18(24.7%) | 48(65.8%) | 4.53 | 0.747 | 1 |
| Unbalanced pricing (overpricing work items have done early in the project, and underpricing work items to be completed in the later stage) | -- | 12(16.4%) | 26(35.6%) | 21(28.8%) | 14(19.2%) | 3.51 | 0.988 | 3 |
| Overbilling (billing materials that have not been installed) | -- | 6(8.2%) | 11(15.1%) | 23(31.5%) | 33(45.2%) | 4.14 | 0.962 | 2 |
| Trade credit | -- | 8(11.0%) | 35(47.9%) | 27(37.0%) | 3(4.1%) | 3.34 | 0.731 | 4 |
| Subcontracting | 12(16.4%) | 29(39.7%) | 12(16.4%) | 16(21.9%) | 4(5.5%) | 2.60 | 1.164 | 5 |
| Determining cash balance | 28(38.4%) | 16(21.9%) | 12(16.4%) | 13(17.8%) | 4(5.5%) | 2.30 | 1.298 | 6 |
| Aggregate | 9.1% | 16.7% | 23.0% | 27.0% | 24.2% | 3.40 | | |
| 1 = Very Poor, 2 = Poor, 3 = Average, 4 = Good, 5 = Very Good | | | | | | | | |

Source: Computed from questionnaire survey, 2020

Respondents with positive score side are less than respondents with negative score side for ‘Determining cash balance’ factor (mean score = 2.30) and ‘Subcontracting’ factor (mean score = 2.60). As known respondents with ‘average score’ are common for both sides. So it

can be concluded that determining cash balance and subcontracting practices among contractors are poor. They are 1st and 2nd poorly practiced factors.

From aggregate results, generally it can be concluded that practices of cash flow management strategies among contractors are good.

<< From Quantitative analysis result, top tow poorly practicing factors were taken for interview process>>

As quantitative data analysis result, determining cash balance and subcontracting are 1st & 2nd poorly practicing factors among all grades of contractors. From interview results, practice of determining cash balance of the project at arbitrary point of time is not exercised by all interviewed grade level of contractors. However, practice of subcontracting for cash increase on hand purpose is rarely adopted by only grade I contractors. These may due to knowledge shortage of contractors on advantages of both subcontracting and determining cash balance.

4.3.2.3. Contractors' Reactions toward Clients' Progress Payment Delays

Table 4.6 presents about contractors' reactions when client delays progress payments. This table contains two types of factors. Factors which are written in normal text form are positives whereas factors which are written in italic form are negatives. For negative factors, respondents' positive reactions ('Good' or 'Very Good') have poor results and vice versa.

Positive Factors: 34(46.6%) and 10(13.7%) of respondents replied negative (1 or 2) score values and positive score (4 or 5) values respectively on contractors' practice of 'continuing work by borrowing money from the organization's available cash with the intention of claiming the interest from the client' (mean score = 2.67) and average (3) respondents are common/center for both positive and negative score respondents. Obviously 34(46.6%) greater than 10(13.7%). From these conditions, the practice of 'Continuing work by borrowing money from the organization's available cash with the intention of claiming the interest from the client' among contractors is poor. Similarly this factor is practiced by few contractors in Eastern Province of Saudi Arabia (Shash & Qarra, 2018).

Most [53(72.6%)] of participants responded negative score values (1 or 2) on practice of 'continuing work by borrowing money from a bank with the intention to claim the interest

from the client' (mean score of 2.25). Therefore it can be concluded that the practice among contractors is poor.

Table 4. 6. Contractors' Reactions toward Clients' Progress Payment Delays

| Factors | Level of Practice | | | | | Mean Score | Std. Deviation | Rank |
|---|-------------------|--------------|--------------|--------------|--------------|-------------|----------------|------|
| | 1 | 2 | 3 | 4 | 5 | | | |
| Continuing work by borrowing money from a bank with the intention to claim the interest from the client | 7(9.6%) | 46(63.0%) | 17(23.3%) | 1(1.4%) | 2(2.7%) | 2.25 | 0.760 | 2 |
| Continuing work by borrowing money from the organization's available cash with the intention of claiming the interest from the client | 3(4.1%) | 31(42.5%) | 29(39.7%) | 7(9.6%) | 3(4.1%) | 2.67 | 0.867 | 1 |
| Positive factors aggregate | 6.9% | 52.8% | 31.5% | 5.4% | 3.4% | 2.46 | --- | --- |
| Continuing work and delay payments to labor, management, and suppliers | 2(2.7%) | 27(37.0%) | 26(35.6%) | 12(16.4%) | 6(8.2%) | 2.90 | 0.988 | 4 |
| Continuing work by borrowing money from another ongoing project account | 1(1.4%) | 5(6.8%) | 14(19.2%) | 43(58.9%) | 10(13.7%) | 3.77 | 0.825 | 1 |
| Stopping work until payments are made | 10(13.7%) | 14(19.2%) | 8(11.0%) | 33(45.2%) | 8(11.0%) | 3.21 | 1.269 | 3 |
| Lowering the rate of work and strongly follow up on the payment | 8(11.0%) | 7(9.6%) | 11(15.1%) | 39(53.4%) | 8(11.0%) | 3.44 | 1.155 | 2 |
| Negative factors aggregate | 7.2% | 18.2% | 20.2% | 43.5% | 11.0% | 3.33 | --- | --- |

1 = Very Poor, 2= Poor, 3 = Average, 4 = Good, 5 = Very Good
Source: Computed from questionnaire survey, 2020

Negative Factors: in the table 4.7, 53(72.6%), 47(64.4%), and 41(56.2%) of respondents replied positive score values (4 or 5) with mean scores of 3.77, 3.44, and 3.21 respectively on 'Continuing work by borrowing money from another ongoing project account',

'Lowering the rate of work and strongly follow up on the payment', and *'Stopping work until payments are made'* factors respectively. Evidently respondents with negative score values (1 or 2) are few for each factor. Thus this situation explains that these negative factors are practiced well among contractors. But these practices are not good because they affect negatively project performances and put another ongoing project at risk.

As the table presentation, 29(39.7%) and 18(24.6%) of respondents reacted negative and positive score values respectively on *'Continuing work and delay payments to labor, management, and suppliers'* factor (mean = 2.9). As known respondents with average score is common for both sides. Since 29(39.7%) > 18(24.6%), it can be concluded that contractors' practice of continuing work and delay payments to labor, management, and suppliers during client payment delay is not well. But the result is acceptable good. Constantly Shash and Qarra (2018) obtained that very few contractors practice this factor in Eastern Province of Saudi Arabia.

Generally, contractors' practice of reactions toward clients' progress payment delays is not good.

<< Contractors' reactions toward clients' progress payment delays were taken for interview process>>

All grade level contractors replied that continuing work by borrowing money from another ongoing project account is their first choice. Lowering the rate of work and strongly follow up on the payment, and stopping work until payments are made are their second and third choice respectively. These results similar to quantitative analysis results. But no practices of continuing work by using bank credit as well as own available cash among all grade levels of contractors.

4.3.2.4. Options Usage by Contractors to Generate Cash to Finance the Cash Flow Deficit

Table 4.7 presents about available options usage by contractors to generate cash to finance their projects during cash flow deficit.

Self-financing technique: is one of contractors' financing options for ongoing projects that which face cash flow deficit during execution period. This option is funding cash from

contractors' equity and/or shareholders' investment to the projects. According to Shash and Qarra (2018), contractors in Saudi Arabia appreciated the self-financing techniques and stated that they are highly suitable for their businesses, highly effective in financing, and involved average risk. Nevertheless, as this study, contractors' usage of self-financing with mean score of 2.81 is poor. This shows that most of contractors do not finance their projects (that which face cash deficit) by their own cash. Similarly, most of the contractors in Addis Ababa, Ethiopia, do not use their cash reserve in solving cash deficit problems (Mereawi, 2016).

Bank Loans: Loans are typical forms of banking facilities and consist of short-term, mid-term, and long-term loans. As Shash and Qarra (2018), contractors of Saudi Arabia believe that loan facilities are very suitable, effective, reasonable in finance charges, and moderate in the risk involved. However, as this study, contractors' usage of these all term loans with mean score of 2.53 is poor. This indicates that most of contractors do not use bank loans to solve cash deficit problem for their projects.

Overdraft Accounts: An overdraft allows contractors to borrow money through their bank accounts based on a loan arrangement under which the bank extends credit up to a maximum amount (called the overdraft limit) against a current (checking) account through which the contractor can write checks or make withdrawals (Shash & Qarra, 2018). It is simply an extension of credit from a lending institution when an account reaches zero. However, the loan facility can be canceled at any time by the lender at its discretion, without any warning. This type of banking facility is used only for emergencies or short-term borrowing. According to Shash and Qarra (2018), contractors in Saudi Arabia believe that overdraft facility is appropriate because of its effectiveness, low interest charges, and low risk. Nevertheless, as this study, about 80% of contractors' usage of overdraft bank facility with mean score of 1.92 is poor. This indicates that there is no practice of using overdraft bank facility among very high percentage of contractors.

Invoice Financing: Invoice financing is a form of short-term borrowing often used to improve a company's working capital (cash). Invoice financing allows a contractor to draw money against its invoices of progress payments before the owner has actually paid (Shash & Qarra, 2018). To get cash, the contractor borrows a percentage of the value of its invoice from a bank, effectively using the unpaid sales invoices as collateral for borrowing. Invoice

financing is common when client delays progress payments. As Shash and Qarra (2018), contractors in Saudi Arabia believe that invoice financing is a highly effective and highly suitable technique. However, in this study, contractors' usage of invoice financing technique with mean score of 1.70 is poor. This indicates that invoice financing is not practiced by most of contractors.

Hire Purchase/Leasing: Hire purchase is a contract that a purchaser agrees to pay for goods in part or a percentage over a number of months. This practice is common for contractors to purchase construction equipment. It decreases cash out flow of contractors. Under this purchasing technique, the purchaser leases equipment and does not obtain ownership of them until the full amount of the contract has been paid. According to this study, construction equipment hire purchasing practice among contractors is good with mean score of 3.14.

Table 4. 7. Options Usage by Contractors to Generate Cash to Finance the Cash-Flow Deficit

| Factors | Level of Practice | | | | | Mean Score | Std. Deviation | Rank |
|--|-------------------|--------------|--------------|--------------|-------------|-------------|----------------|------|
| | 1 | 2 | 3 | 4 | 5 | | | |
| Self-financing technique (finance from their own cash) | 2(2.7%) | 32(43.8%) | 21(28.8%) | 14(19.2%) | 4(5.5%) | 2.81 | 0.967 | 2 |
| Bank loans | 4(5.5%) | 35(47.9%) | 26(35.6%) | 7(9.6%) | 1(1.4%) | 2.53 | 0.801 | 3 |
| Overdraft accounts | 29(39.7%) | 28(38.4%) | 10(13.7%) | 5(6.8%) | 1(1.4%) | 1.92 | 0.968 | 4 |
| Invoice financing | 45(61.6%) | 11(15.1%) | 12(16.4%) | 4(5.5%) | 1(1.4%) | 1.70 | 1.023 | 5 |
| Hire purchase/leasing | 3(4.1%) | 11(15.1%) | 34(46.6%) | 23(31.5%) | 2(2.7%) | 3.14 | 0.855 | 1 |
| Aggregate | 22.7% | 32.1% | 28.2% | 14.5% | 2.5% | 2.42 | | |

1 = Very Poor, 2 = Poor, 3 = Average, 4 = Good, 5 = Very Good

Source: Computed from questionnaire survey, 2020

Aggregately, as more percentage of respondents are side of negative score points (1or 2) than side of positive score points (4 or 5) and mean score is 2.42, this section whole practice is practiced poorly.

<< From Quantitative data analysis result, Top three poorly practicing factors were taken for interview process>>

As quantitative data analysis result, invoice financing, overdraft accounts, and bank loans are 1st, 2nd and 3rd respectively are poorly practicing factors. As from interview gained, grade I contractors seldom use overdraft accounts. But grade II, III, IV & V contractors do not use overdraft accounts. Bank loan are not practiced by all grade levels of contractors. Invoice financing method is not known by interviewed all contractors.

4.3.3. Summarization of Cash Flow Management Practices of Contractors

Table 4.8 depicts summary of whole cash flow management practices around contractors. It is summarized by aggregation of all factors' effects of respondents.

Table 4. 8. Summary of Cash Flow Management Practices of Contractors

| Factors Group | | Level of Practice | | | | | No. of Factors | Aggregate Mean Score |
|--|------------------|-------------------|-------------|-------------|-------------|------------|----------------|----------------------|
| | | 1 | 2 | 3 | 4 | 5 | | |
| | | In Percent (%) | | | | | | |
| Cash Flow Forecasting, Monitoring, and Controlling Practices | | 11.6 | 35.2 | 37.8 | 13.2 | 4.3 | 9 | 2.63 |
| Cash Flow Management Strategies | | 9.1 | 16.7 | 23.0 | 27.0 | 24.2 | 6 | 3.40 |
| Contractors' Reactions toward Clients' Progress Payment Delays | Positive Factors | 6.9 | 52.8 | 31.5 | 5.4 | 3.4 | 2 | 2.46 |
| | Negative Factors | 11.0 | 43.5 | 20.2 | 18.2 | 7.2 | 4 | 1.77 |
| Options Usage by Contractors to Generate Cash to Finance the Cash Flow Deficit | | 22.7 | 32.1 | 28.2 | 14.5 | 2.5 | 5 | 2.42 |
| Summary | | 12.7 | 33.0 | 29.3 | 16.8 | 8.9 | 26 | 2.62 |

Source: Computed from questionnaire survey, 2020

There are two types of factors. These are positive factor and negative factor. In the table, 'contractors' reactions toward clients' progress payment delays' factors group has both types of factors. In order to summarize whole factors practices, negative factor scoring must coincide positive factor scoring. This can be done by interchanging symmetrical positions of percentage of respondents under Likert scale scores.

In the summary row of table, respondents with negative scores (1 or 2) much greater than with positive scores (4 or 5) and mean score is 2.62. Respondents with average scores are

common for both sides. Thus it can be summarized as the whole practices of contractors' cash flow management for their construction projects are poor.

4.4. Causes of Contractors' Poor Cash Flow Management Practices

This section is to accomplish 2nd specific objective of this research study.

Cause factors of Contractors' poor cash flow management practice in the questionnaire section were ten and whole were scaled with five point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree). Then the questionnaire section structured, distributed to respondents and returned back to the researchers. For analysis purpose, the factors were ranked using the mean score of highest value to lowest value. In cases where the mean score of two or more factors in a group were the same, the standard deviation was used.

Table 4. 9. Ranking of Contractors' Poor Cash Flow Management Practice Cause Factors

| Factors | Mean Score | Std. Deviation | Rank |
|---|-------------------|-----------------------|-------------|
| Poor project cash flow forecasting | 4.30 | 0.861 | 5 |
| Poor project cash flow analysis | 4.38 | 0.793 | 3 |
| Inappropriate adoption of cash flow forecasting and managing models | 3.84 | 0.913 | 7 |
| Contractors' dependency only on the client's payments | 4.34 | 0.870 | 4 |
| Using payments for other purposes (not for the project purposes) | 4.49 | 0.915 | 2 |
| Poor cash flow management strategies | 4.18 | 0.887 | 6 |
| Constraints to accessing funds from the financing institution | 2.79 | 0.881 | 9 |
| Lack of skill to manage cash flow (i.e. not managing cash flow by the right expert) | 4.49 | 0.884 | 1 |
| Inappropriateness of price adjustment mechanism | 2.86 | 0.902 | 8 |
| Shortage of lease and rent options | 2.71 | 0.790 | 10 |

Source: Computed from questionnaire survey, 2020

In the table 4.9, Lack of skill to manage cash flow factor with mean score of 4.49 and 0.884 std. deviation is ranked first cause of poor cash flow management of contractors. Using payments for other purposes (not for the project purposes) factor with mean score of 4.49 and 0.915 std. deviation is ranked as second cause. Similarly, Mereawi (2016) identified

utilization of advance payment (disbursing it somewhere that is not specific to the project use) is the one exposing a project to cash shortage.

Poor project cash flow analysis (mean = 4.38), contractors' dependency only on the client's payments (mean = 4.34), poor project cash flow forecasting (mean = 4.30), poor cash flow management strategies (mean = 4.18), and inappropriate adoption of cash flow forecasting and managing models (mean = 3.84) are third, fourth, fifth, sixth and seventh causes of poor cash flow management of construction projects.

However, inappropriateness of price adjustment mechanism, constraints to accessing funds from the financing institution, and shortage of lease and rent options factors have no contribution for poor cash flow management practices.

4.5. Impacts of Contractors' Poor Cash Flow Management Practices on Construction Project Performance

This section is to achieve 3rd specific objective of this research study.

Project time and cost performance factors were scaled with five point Likert scale (1 = Very Low, 2 = Low, 3 = Moderate, 4 = High, 5 = Very High) under impact questionnaire section. Then the questionnaire section structured, distributed to respondents and returned back to the researcher. The data which collected under this section is analyzed by frequency distribution and mean score.

Table 4. 10. Impact Level of Contractors' Poor Cash Flow Management Practices on Construction Project Performance

| Performance dimensions | Level of Impact | | | | | Mean Score |
|---|-----------------|---------|-----------|-----------|-----------|------------|
| | 1 | 2 | 3 | 4 | 5 | |
| Time performance | 1(1.4%) | 1(1.4%) | 4(5.5%) | 39(53.4%) | 28(38.4) | 4.26 |
| Cost performance | | | 16(21.9%) | 28(38.4%) | 29(39.7%) | 4.18 |
| 1 = Very Low, 2 = Low, 3 = Moderate, 4 = High, 5 = Very High | | | | | | |

Source: Computed from questionnaire survey, 2020

Table 4.10 presents that both time (mean score = 4.26) and cost (mean score = 4.18) of the construction projects are impacted negatively and highly by contractors' poor cash flow management practices but degree of impact on time is higher that of cost. Similarly Beza (2019), Omopariola and Windapo (2019), and Hailu (2015) identified that cash related and

cash flow problems impact (increase) highly predetermined project time and cost during project implementation.

4.6. Correlations between Causes and Performance Dimensions

Correlations are analyzed between seven identified causes of contractors' poor cash flow management practices and project time performance as well as project cost performance. Seven identified causes are discussed in section 4.4.

Table 4. 11. Correlations between Causes and Performance Dimensions

| | | | Causes | | | | | | |
|-------------------------------|------------------|-------------------------|------------------------------------|---------------------------------|---|---|--|--------------------------------------|---|
| | | | Poor project cash flow forecasting | Poor project cash flow analysis | Inappropriate adoption of cash flow forecasting and managing models | Contractors' dependency only on the client's payments | Using payments for other purposes (not for the project purposes) | Poor cash flow management strategies | Lack of skill to manage cash flow (i.e. not managing cash flow by the right expert) |
| Performance Dimensions | Time performance | Correlation Coefficient | 0.343 | 0.291 | 0.402 | 0.228 | 0.298 | 0.248 | 0.313 |
| | | Significant factor | 0.003 | 0.013 | 0.000 | 0.048 | 0.010 | 0.045 | 0.007 |
| | Cost performance | Correlation Coefficient | 0.351 | 0.310 | 0.312 | 0.233 | 0.356 | 0.302 | 0.298 |
| | | Significant factor | 0.002 | 0.008 | 0.007 | 0.047 | 0.002 | 0.009 | 0.010 |

Source: Computed from questionnaire survey, 2020

As from Dancey and Reidy (2011), if correlation coefficient between two variables is positive, there is direct relationship between them and is negative, there is inverse relationship. In addition, if significant factor is less than 0.05, the relationship is statistically significant. Table 4.11 shows that all correlation coefficients are positive, this means all causes of contractors' poor cash flow management practice have direct relationship with both construction project time and cost performances. Correlation of cost performance as well as time performance with all causes is statistically significant.

To sum up preceding paragraph statements, contractors' poor cash flow management practices have significant direct impact on both time and cost performances of the construction projects.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

5.1. Conclusion

Cash flow management is decisive issue for contractor's business success as well as its project performance achievement. Nevertheless, contractors in Hawassa City do not give care for their construction projects' cash flows. Findings of this study indicates that cash flow management practices of grade I up to V contractors are generally poor. In detail, cash flow forecasting, monitoring, and controlling are poorly practiced by contractors, however, grade I contractors practice better than others. The strategies to increase cash on hand or minimize cash shortage, that are advance payment taking, unbalancing pricing (front loading), and overbilling are adopted well among contractors but subcontracting and determining cash balance are poorly practiced. In addition, when client delays progress payment to contractors, continuing work by borrowing money from another ongoing project account is the first choice of contractors. This practice has high probability to expose other projects at risk. Self-financing technique, bank loans, overdraft accounts, and invoice financing are options used by contractors when they face cash deficit for the execution of the project. But these options are hardly practiced among contractors in Hawassa city.

Most of contractors use only detailed approach method to forecast their project cash flow. The detailed approach method is forecasting derived from break down of bill of items into schedule. It does not consider future risk costs. On the other hand, although anticipating cash flow forecasting to use for multiple purposes has many advantages, almost all contractors do not plan to use their cash flow forecasting for multi-purposes.

Monitoring (observe and check) the project forecasted cash flow in short time interval is most important practice to take early controlling measure on cash flow if problem encounter. But 42.3% of contractors do not do monthly monitoring forecasted cash flow of their construction projects

The causes of this poor practices are mainly lack of skill to manage cash flow, using payments for other purposes (not for the project purposes), poor project cash flow analysis, contractors' dependency only on the client's payments, poor project cash flow forecasting, and poor cash flow management strategies. These all causes have high negative impact on project time and cost performances.

5.2. Recommendation

The contractors are advised to improve current cash flow management practices by implementing proper, on time, and continuous forecasting, monitoring and controlling over the stages of the project's execution. Following are suggestions that may improve the cash flow management practices for contractors:

- Improve project cash flow forecasting and analysis practice by adopting integrated system of cash flow forecasting and computerizing the cash flow management.
- Stop depending only on the client's payments and try to use other optional cash source for the project execution.
- Continue using properly and thoroughly strategies of increasing cash on hand such as: advance payment, overbilling, trade credit, unbalanced pricing, subcontracting and any else.
- Restrict the available cash in a project account to its construction activities only and refrain from moving cash from one project to another.
- Practice using invoice financing, overdraft accounts, bank loans and self-financing technique if the project face cash deficit during execution.
- Employ right expert or skilled person at cash flow management for better cash flow.
- Stop using project payments for other purposes (not for the project purposes).
- Take into account future many benefits (to determine the liquidity of the company, to set cash flow baseline for control purposes, to determine the financing method, to determine the amount of money cost to include in the bid price, to determine the amount of overdraft, etc.) of cash flow plan during forecasting cash flow.

Besides, this study suggest for future study that a researcher to focus on solutions of contractors' cash flow problems.

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Appendix I: Google Forms Questionnaire

QUESTIONNAIRE

Dear Sir/Madam,

I am undertaking a research study entitled "Contractors' Cash Flow Management Practices in Hawassa City" for the partial fulfillment of the requirements for the degree of Master of Science in civil engineering specialization in construction technology and management.

This questionnaire survey is used as input to my academic research that aims to investigate contractors' cash flow management practices in construction projects. Its objectives are to study contractors' cash flow management practices and to identify the causes and impacts of poor cash flow management practices. So the result of my research study will help your company for better construction project cash flow management.

You and your company are chosen as important to participate in my research study by answering all sections of the questionnaire related to the title. I appreciate your valuable contribution from your experiences in the field of construction management by completing all questions by taking your precious time. All the information that you will provide will be kept in strict confidentiality and it will be used for academic purposes only.

With best regards!

Teshome Debesa

Postgraduate student in Construction Technology and Management program

At Hawassa University, Institute of Technology

Tel: +251916651467/+251909672707

E-mail: debesateshome@gmail.com

Hawassa, Ethiopia

*Required

Section A: Respondent and Company Background

Please respond to the question by ticking like "✓" in the box of your corresponding answer from given alternatives and write your response for a short question.

1. What is your company's business category? *

- General Contractor
- Building Contractor
- Road Contractor
- Water Works Contractor

2. What is the grade level of your company? *

- Grade I
- Grade II
- Grade III
- Grade IV
- Grade V

3. What is your position in your company's current project? *

Your answer _____

4. What is your level of education? *

- Certificate/Diploma
- First Degree
- Master's Degree
- Doctoral Degree (Ph.D.)

5. How long experience in total have you been working in the construction industry? *

- Less than 5 years
- 5 to less than 10 years
- 10 to less than 15 years
- 15 to less than 20 years
- 20 and above years

6. How long has your company been running a construction business? *

- Less than 5 years
- 5 to less than 10 years
- 10 to less than 15 years
- 15 to less than 20 years
- 20 and above years

7. How much is your company's average annual turnover? *

- Less than 50 million Birr
- 50 to less than 100 million Birr
- 100 to less than 500 million Birr
- 500 to less than 1000 million Birr
- Above 1000 million Birr

Section B: Cash Flow Management Practices of Contractors

Section B: Questionnaire Type One

Based on your experience in your construction company project, please answer the following questions by ticking like "✓" in the box of your corresponding answer from given alternatives.

1. Which method your company uses to forecast its project cash flow? *

NB: you can tick more than one.

- The detailed approach (break down of bill of items into work/schedule)
- Value approach (based on project value)
- Cost approach (based on the cost of input resources)
- Short cut approach (using models/library of S curves based on past similar projects)
- Integrated systems (cost/schedule integration)
- Other: _____

2. For what purpose your company forecast the cash flow of the current project? *

*

NB: you can tick more than one.

- To determine the liquidity of the company
- To set cash flow baseline for control purposes
- To determine the financing method
- To determine the amount of money cost to include in the bid price
- To determine the amount of overdraft

3. When your company monitors the forecasted cash flow of the project? *

*

NB: you can tick more than one.

- Monthly
- Quarterly of a year
- Half of a year
- Yearly
- At the end of the project

Section B: Questionnaire Type Two

From your experience, please rate the level of practice of cash flow management at your company project level. Use the following rating scale and put your response by ticking like "√" in the box. (1 = Very Poor, 2 = Poor, 3 = Average, 4 = Good, 5 = Very Good)

Cash flow Forecasting, monitoring, and controlling practices *

| | 1 | 2 | 3 | 4 | 5 |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Company's cash flow forecasting practices for its projects | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Company's forecasted cash flow monitoring of its projects | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

| | | | | | |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Usage of the bookkeeping system | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Performance measurement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Strategies for addressing deficit cash flow | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Developing realistic and well-considered budgets for a project | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Strategies for addressing surplus cash flow | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Usage of cash flow diagrams | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Usage of cash flow models | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Cash flow management strategies *

| | 1 | 2 | 3 | 4 | 5 |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Advance payment | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Unbalanced pricing (overpricing work items have done early in the project, and underpricing work items to be completed in the later stage) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

| | | | | | |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Overbilling (billing materials that have not been installed) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Trade credit | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Subcontracting | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Determining cash balance | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Contractors' reactions toward clients' progress payment delays *

| | 1 | 2 | 3 | 4 | 5 |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Continuing work and delay payments to labor, management, and suppliers | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Continuing work by borrowing money from a bank with the intention to claim the interest from the client | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Continuing work by borrowing money from another ongoing project account | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Continuing work by borrowing money from the organization's available cash with the intention of claiming the interest from the client | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

| | | | | | |
|---------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Stopping work until payments are made | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|---------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|

| | | | | | |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Lowering the rate of work and strongly follow up on the payment | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|

Options to generate cash to finance the cash-flow deficit *

| | 1 | 2 | 3 | 4 | 5 |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Self-financing technique (finance from their own cash) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Bank loans | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Overdraft accounts | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Invoice financing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Hire purchase/leasing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Section C: Causes of Contractors' Poor Cash Flow Management Practices

From your experience, please rate your level of agreement about the causes of contractors' poor cash flow management practices. Use the following rating scale and put your response by ticking like "✓" in the box. (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

Causes of Contractors' Poor Cash Flow Management Practices *

| | 1 | 2 | 3 | 4 | 5 |
|------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Poor project cash flow forecasting | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Poor project cash flow analysis

Inappropriate adoption of cash flow forecasting and managing models

Contractors' dependency only on the client's payments

Using payments for other purposes (not for the project purposes)

Poor cash flow management strategies

Constraints to accessing funds from the financing institution

Lack of skill to manage cash flow (i.e. not managing cash flow by the right expert)

Inappropriateness of price adjustment mechanism

Shortage of lease and rent options

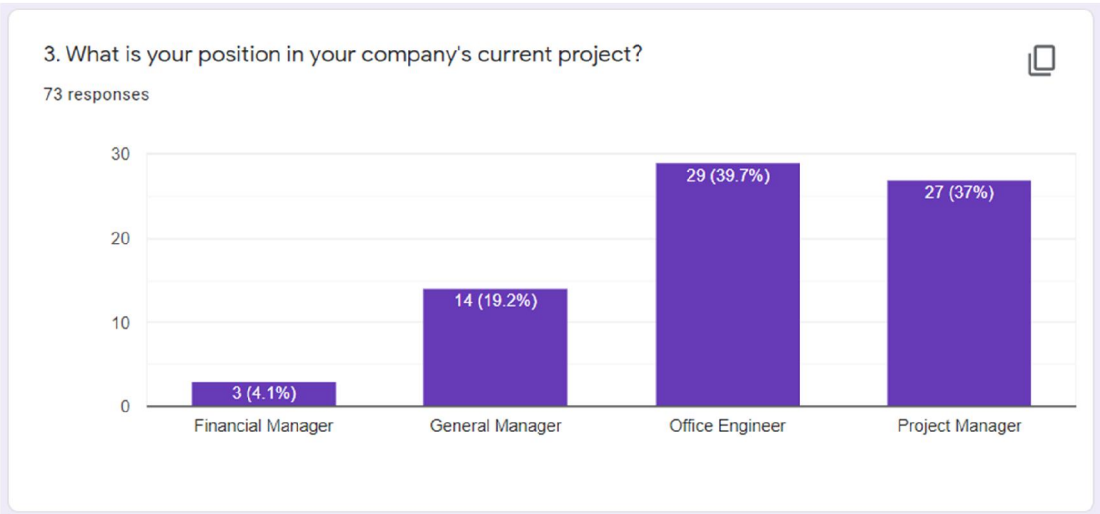
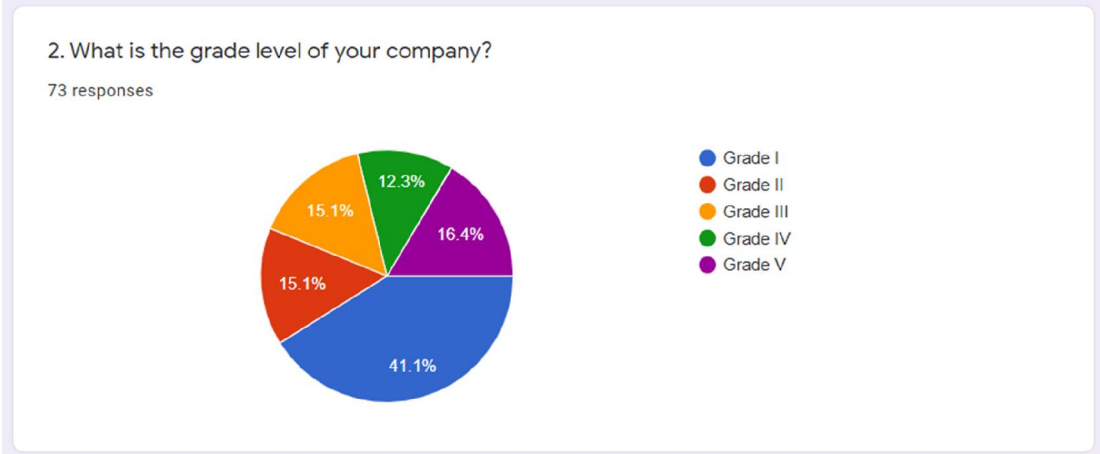
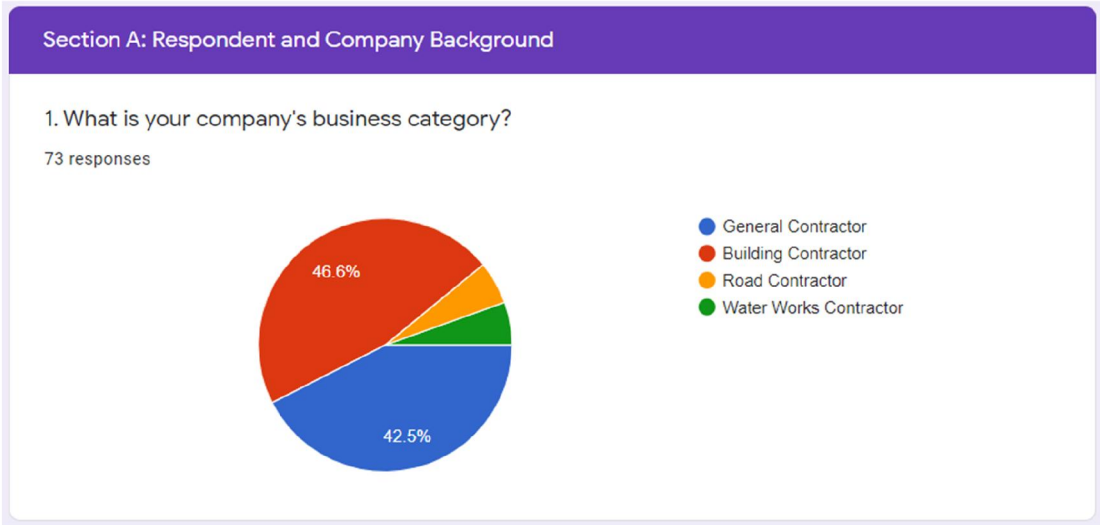
Section D: Impacts of Contractors' Poor Cash Flow Management Practices on Construction Project Performance

From your experience, rate the degree of impact of financial management practice on construction project performance. Use following rating scale and put your response by ticking like "✓" in the box. (1 = Very Low, 2 = Low, 3 = Moderate, 4 = High, 5 = Very High)

Project Performance Dimensions *

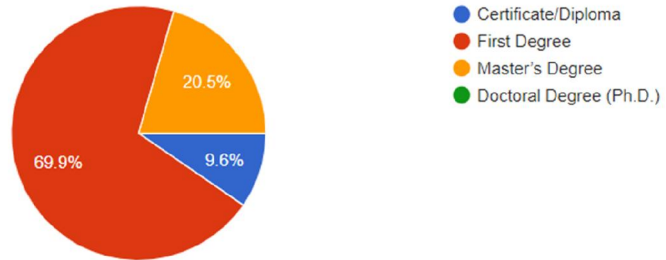
| | 1 | 2 | 3 | 4 | 5 |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Time performance | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Cost performance | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Appendix II: Questionnaire Responses Summary of Google Forms



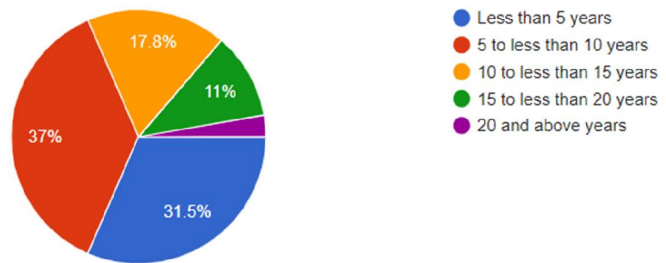
4. What is your level of education?

73 responses



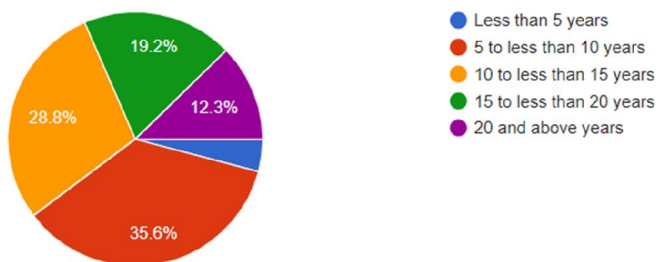
5. How long experience in total have you been working in the construction industry?

73 responses



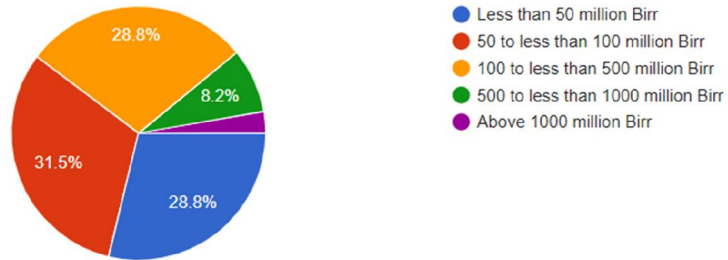
6. How long has your company been running a construction business?

73 responses



7. How much is your company's average annual turnover?

73 responses

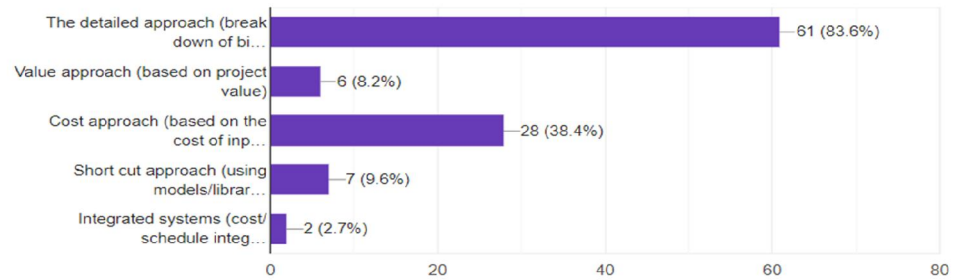


Section B: Cash Flow Management Practices of Contractors

Section B: Questionnaire Type One

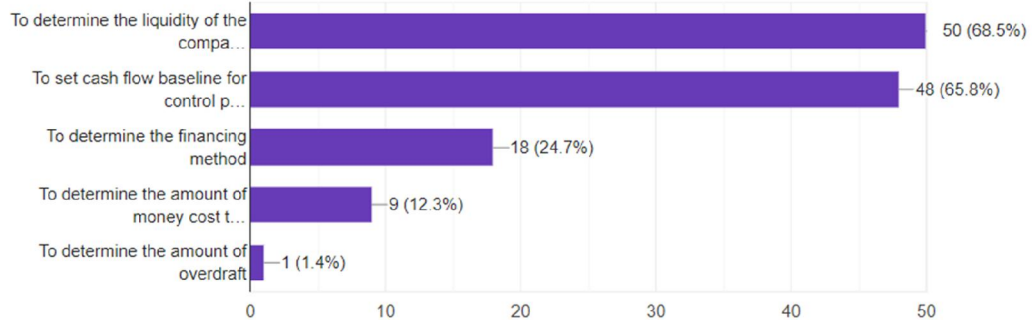
1. Which method your company uses to forecast its project cash flow?

73 responses



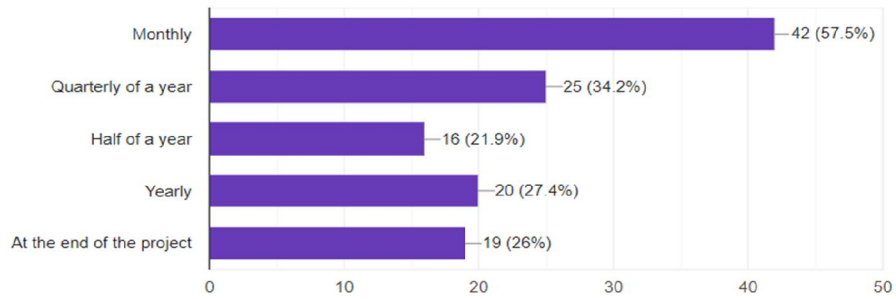
2. For what purpose your company forecast the cash flow of the current project?

73 responses



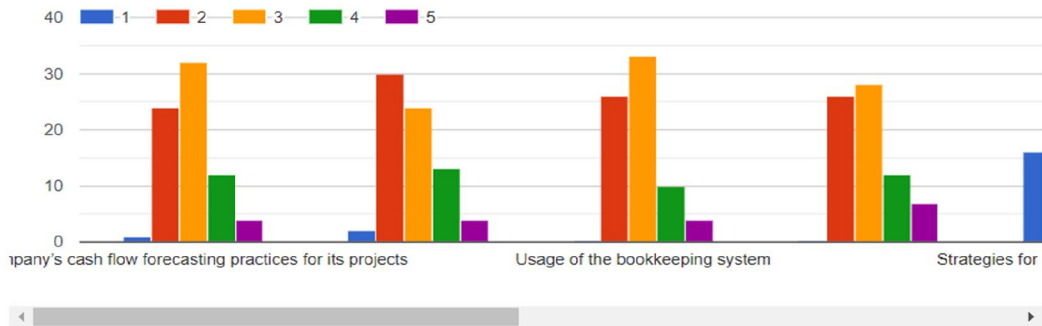
3. When your company monitors the forecasted cash flow of the project?

73 responses

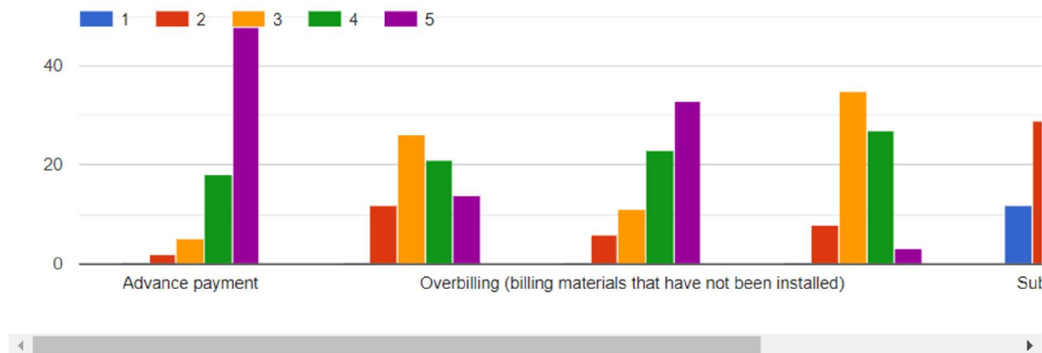


Section B: Questionnaire Type Two

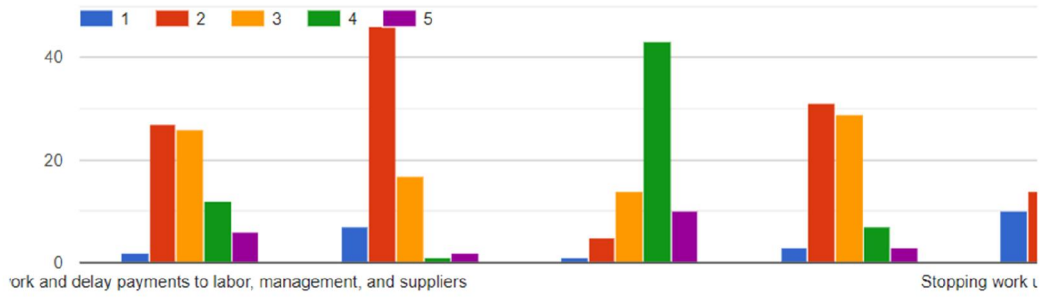
Cash flow Forecasting, monitoring, and controlling practices



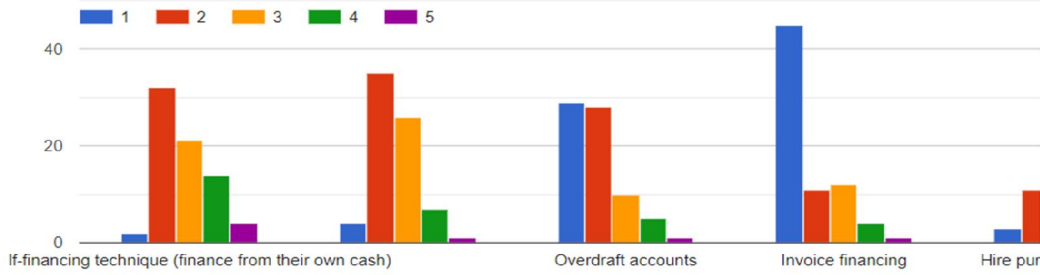
Cash flow management strategies



Contractors' reactions toward clients' progress payment delays

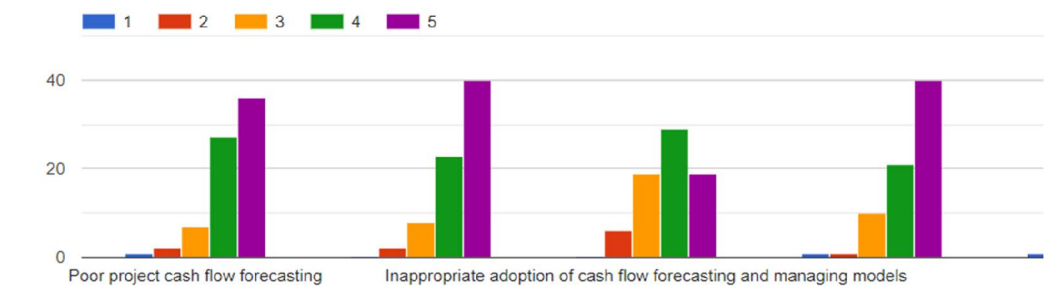


Options to generate cash to finance the cash-flow deficit



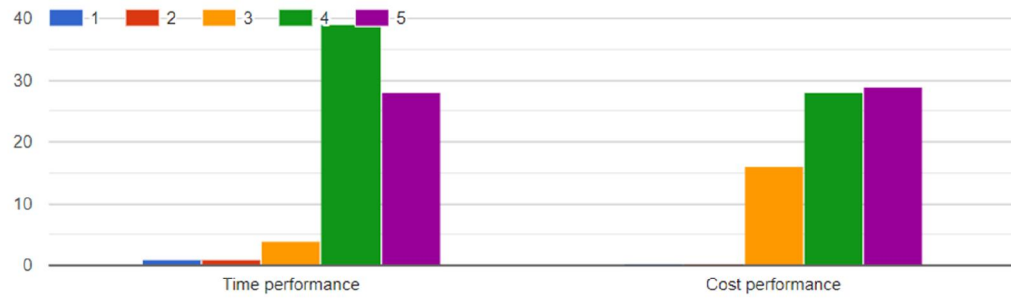
Section C: Causes of Contractors' Poor Cash Flow Management Practices

Causes of Contractors' Poor Cash Flow Management Practices



Section D: Impacts of Contractors' Poor Cash Flow Management Practices on Construction Project Performance

Project Performance Dimensions



Appendix III: Interview Questions

Interview Guideline

- The researcher (interviewer) introduces himself for the interviewee and asks for voluntariness to respond for the interview.
- The interviewee introduces himself for the researcher including his position in company, and company's grade level.

Interview Starting Questions

Q #1. How is your company on the following factors of project cash flow management?

- Usage of cash flow models
- Strategies for addressing surplus cash flow
- Strategies for addressing deficit cash flow
- Developing realistic and well-considered budgets for a project
- forecasted cash flow monitoring practice

Q #2. How is your company on the following factors of increasing cash on hand for project execution?

- Determining cash balance
- Subcontracting

Q #3. What measure/s your company takes if your client delays progress payment?

Q #4. How is your company on the following options of to generate cash if your project faces cash deficit?

- Invoice financing
- Overdraft accounts
- Bank loans