

2020-07

# STUDY ON THE EXTENT OF PROBLEMS CAUSED BY DELAYED PAYMENT ON PUBLIC BUILDING PROJECTS IN GONDAR CITY

SAMSON, WORKU TESHOME

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**BAHIR DAR INSTITUTE OF TECHNOLOGY**  
**SCHOOL OF RESEARCH AND POSTGRADUATE STUDIES**  
**FACULTY OF CIVIL AND WATER RESOURCE ENGINEERING**

**STUDY ON THE EXTENT OF PROBLEMS CAUSED BY DELAYED  
PAYMENT ON PUBLIC BUILDING PROJECTS IN GONDAR CITY**

**BY**

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**BAHIR DAR, ETHIOPIA**

**JULY, 2020**

STUDY ON THE EXTENT OF PROBLEMS CAUSED BY DELAYED PAYMENT ON  
PUBLIC BUILDING PROJECTS IN GONDAR CITY

**By**  
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A thesis submitted to the school of Research and Graduate Studies of Bahir Dar Institute of Technology, BDU in partial fulfillment of the requirements for the degree

Of

M.Sc. in Construction Technology and Management in faculty of Civil and Water Resource Engineering

Main advisor: Ahmed Mohammed (Ph.D.)

Co-advisor: Rahel Ayalew (M.Sc.)

July, 2020

Bahir Dar, Ethiopia

### DECLARATION

I, the undersigned, declare that the thesis comprises my own work. In compliance with internationally accepted practices, I have acknowledged and referred all materials used in this work. I understand that non-adherence to the principles of academic honesty and integrity, misrepresentation/ fabrication of any idea/data/fact/source will constitute sufficient ground for disciplinary action by the University and can also evoke penal action from the sources which have not been properly cited or acknowledged.

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## **ACKNOWLEDGEMENTS**

First of all I would like to thank GOD to give me power to do this research. Next I would like to express my gratitude to my advisor Dr. Ahmed Mohammed for his willingness, advice, and comment during preparation of my thesis. I would like also to thank my co-adviser Rahel Ayalew (M.Sc.) for her support in this thesis. Lastly I would like express my gratitude for project managers, offices engineers and other personnel's who help me during my work. And thank you my friends Aylasew Amero and Yibeltal Alamirew.

## ABSTRACT

The practice of efficient and timely payment in construction projects is a major factor that can contribute to the success of a project. The study identifies causes that contribute payment delay, impacts of delayed payments in the Gondar city public building construction projects, solutions for the problem and develop frame work. In order to obtain reliable data for the study questionnaires and case study were used. Relative Importance Index was used to determine the ranking of the results with Excel and SPSS software's. From the case study that the researcher did all payments were delayed when we compare with the provisions of PPA and FIDIC condition of contracts. From the questionnaire result budget deficient, employer's poor financial management, employers withholding payment, poor planning system and procurement problem were identified as top five causes of delay in payment in construction industry. Amongst the studied different impacts of delayed payment cash flow problems, construction delays, creates negative chain impact on other parties, disputes among parties and reduced employment in construction projects were the top five impacts of payment delays. From several potential solutions to mitigate delayed payment suspension of work, setup trust with bank prior to work start to get paid, payment of stipulated interest, better communication and better specifications prior to start work were top solution for the effect of delayed payment.

**Key Concept:** public building, delayed payment, improper practice, impacts, potential solutions



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## **ABBREVIATIONS**

ANOVA	One way analysis of variance
CCA	Construction Contracts Act
CIDB	Construction Industry Development Board
FDI	Foreign direct investment
FIDIC	International Federation of Consulting Engineers
GCC	General Condition of contract
IDIP	Infrastructure Delivery Improvement Program
HGCRA	Housing Grants, Construction and Regeneration Act
NDPW	National Department of Public Works
PPA	Public procurement agency
RII	Relative importance index
SPSS	Statistical Package for the Social Sciences
UK	United Kingdom

# CHAPTER ONE

## 1. INTRODUCTION

### 1.1. Background

One of the critical problem facing the construction industry and contractors in Gondar city public building construction projects is payment delay. The practice of well-organized and timely payments in construction projects is one of the main issues leading to a project's success. According to (Amoak, 2011) the importance of payment is further amplified by the fact that the construction industry relatively involves long durations to complete projects, large amounts of money to spend and the wide use of credit payment term rather than payment on delivery in purchasing of materials.

It is generally accepted that delayed payment would cause severe cash flow problems especially to the contractor and this would have a disturbing knock-on impact down the contractual payment chain. Any delay of payment will affect their cash flow and cause them difficulty in financing. Delayed payment issues or contractors' payment afflictions are considered to affect many players in the Gondar city construction projects, especially, on government funded projects. As such, there is the urgency to find alternative remedies which could effectively put an end to the cash flow problems (Thomas Tether, April 2015).

Contractors today continue to struggle with a number of fundamental challenges to receiving payment on construction projects. Was the payment package in the correct format? Were all of the detailed contract requirements related to timing and proper documentation for change orders and claims met? The processes and requirements for a contractor to obtain payment on any particular job are typically set forth in its contract with the owner or upstream contractor. These provisions generally provide the prerequisites for the contractor's right to receive payment, as well as the methodology for calculating payment, the paperwork the contractor is required to submit with its payment application, the timing for payment, and the contractor's rights in the event payment is not made (Thomas Tether, April 2015).



## **1.2. Problem Statement**

Payment has a significant role in the construction industry, so without payment it is difficult to run construction projects. A failure of the contractor in getting regular and timely payment could result in project delay, reduced profitability and in the extreme case the company may go into liquidation. It will also have a knock-on impact on the entire construction value chain because when clients do not pay the main contractors on time, the sub-contractors, suppliers, hirers and everyone in the construction value chain will suffer (al, 2014). For example in one project that I observe payment is delayed up to 470 days , so we can see that how much delayed payment affects the project.

Payment delay occurs in many of construction projects and the magnitude of payment delay considerably different from project to project. So it is essential to study the extents of problems caused by delayed payment in public building projects in Gondar.

## **1.3. Research Questions**

Either in private or public construction project, payment is life for a project in order to complete in the definite period. In Gondar public building construction projects there is delay in payment. Hence it is important to solve out this problem. To find the solution, we must know the causes of influence delayed payment. Therefore, this research answers for the following questions.

1. What are the factors that contribute to delay in payments for building construction projects?
2. What are the impacts followed due to delay in payments for building construction projects?
3. What are the solutions to minimize delay in payment in the construction industry?

## **1.4. Objective**

### **1.4.1. General Objective**

The main objective of this research was Study the extent of problems caused by delayed payment on public building projects in Gondar City.

### **1.4.2. Specific Objectives**

The following are the specific objectives in addition to the main objective.

- To Study causes that contribute to delay in payments in public building construction projects in Gondar.

- To Study the impacts of delayed payment in public building construction projects in Gondar city.
- To Study the potential solutions to mitigate problems due to delayed payment in public building construction projects in Gondar city.

### **1.5. Scope and Limitation of the Study**

The scope of this study is limited to study the extent of problems caused by delayed payment on public building projects in Gondar City. The study focus only on public building construction projects due to the fact that public constructions of buildings are highly affected by delayed payment due to many causes such as public projects are expected to give service with short period of time but budget shortage happen many times.

This research was focusing on the main parties, which is a contractor, client and consultant. Contractors are responsible to carry out the works on site and receiver of payment to make sure the construction works in the progress. And the clients are responsible to pay. Consultants are responsible to check work done by the contactor and send to the client to pay for the contractors.

### **1.6. Significant of the Study**

This research aims to create awareness of both contractors and employers in relation to the payment issues. Since delayed in payment affects the overall project environment.

This research help to find out the most common reasons cause the delay in payment for construction project in public sector. Public projects usually involve more parties in preparing the payment certificate. After identify the factors that causes delay the next step is to find the solution to solve the problems.

The findings of the research assists the relevant parties such as developers or government and the contractors in addressing problems associated to delayed payment in an interactive and timely manner to create a win-win situation for all parties in the construction industry. It is hoped that the relevant parties will adopt and implement the necessary plan of action in order to minimize disputes on payment in any construction project, so as to create a friendly and enjoyable working environment for all parties and to improve the payment flows in the construction industry.

## CHAPTER TWO

### 2. LITERATURE REVIEW

#### 2.1. Payment in the Construction Industry

Payment is a sum of money paid to someone in return for goods, work done or services rendered. In the construction industry, payment is the sum of money paid to contractors after their work for certain projects has been successfully completed. In a typical engineering and construction contract, it is apparent that the contractor has promised to carry out all the works under the contracts. On the other hand, the employer must keep his side of the promise by giving necessary consideration to payment when due which in most cases comes in monetary form. Payment is considered as the life blood of the construction industry because construction projects often involve very large capital outlay. In order to ensure the flow of the work activities under the contract and its eventual successful realization, construction contracts have to be drafted (Anash S. k., 2011).

#### 2.2. Source of Finance for Building Construction Projects in Ethiopia

Construction activities in Ethiopia are generally financed by government budgets and private equity and capital, NGOs and banks. Government budget finances public infrastructures and other public constructions such as schools, clinics, etc. Government budget consists of resources originating from government treasury, domestic borrowing and foreign loans and grants. The private sector, on the other hand, finances buildings for residential and business purposes. Private sector's sources of financing originate from own capital and loans from formal and informal money markets (Association, 2007).

##### 2.2.1. Financing of Public Construction Projects

The total expenditure on construction activities from government budget has increased from Birr 4.7 billion in 2003/04 to Birr 7.0 billion in 2004/05 G.C and further to Birr 8.5 billion in 2005/06 G.C depicting an average annual increase of 34.4 percent over the period. The growth of the expenditure in the industry is higher when compared to the increase in capital expenditure (30.5 percent) and the total expenditure (20.3 percent) over the period 2003/04 -2005/06 G.C Of the total government expenditure and capital expenditure in 2003/04 G.C the respective share of construction expenditure is 23.4 percent and 57.7 percent. The share, however, increased to

28.9 percent and 60.2 percent in 2005/06 G.C. The share of construction expenditure in the total capital budget allocated to different sectors varies by sector. Though construction expenditure constitutes a significant proportion of capital expenditure in the indicated sectors, the highest share of construction expenditure (90.4 percent) has been allocated to the road sector while the lowest (12 percent) was allocated to the trade and tourism sector (Association, 2007).

### **2.3. Types of Payment in Construction Industry**

Payment in construction are Advance payment, interim payment, stage payment, final and retentions.

#### **2.3.1. Advance Payment**

This is the sum of money paid to the contractor by the employer well before the work involved is executed. This practice is usually done in public works contracts. The main purpose of implementing this scheme is to assist the contractor to start up and finance the contract without having to resort to unnecessary and costly external borrowings (Anash S. k., 2011)

#### **2.3.2. Interim or Progress Payment**

During contract periods, the most common method used is interim payments or the so-called progress payments. In Standard Forms, the interim or progress payments are affected by the issuance of 'interim certificates'. An interim certificate is actually the periodic certification for the payment due to contractor. The failure of the certifier to issue the relevant 'interim' certificates in line with the stipulation of the contract can expose his employer to a possible claim of breach of contract by the contractor. The frequency of periodic payment could be varied from a fortnight to a month. The actual duration is normally the period as agreed to in the contract conditions signed (Anash S. k., 2011).

#### **2.3.3. Final Payment**

This is the method of payment to contractor triggered by the achievement of the contract milestone of practical or substantial completion and/or the so-called handing over of the works to the employer. Hence, unless such stage is reached and certified by the contract administrator, the contractor is not entitled to any payment whatever. In using this method, the contractor is basically financing the works to a large degree, which costs would eventually build into the contract sum. The employer must also be prepared to shoulder this burden as well as be in a

position to source and impact payment ultimately of a sizeable lump sum amount upon the taking over of the works (Amoak, 2011).

#### **2.3.4. Retentions**

Retention is a percentage of the value of a construction contract which is held by the client as an assurance of project completion and as a safeguard against defects which may subsequently develop and which the contractor may fail to remedy. Retentions can be held first by the client employing the main contractor and this typically filters down into all sub-contracted work on the project throughout the supply chain. The retention is retained from payments made throughout the length of the contract (Consulting, 2017).

#### **2.4. Payment Limits specified in Different Condition of Contracts**

Payment limitations different condition of contracts are explained in different ways.

FIDIC (2006) condition of contract explain payment in clause 14.7 as the following.

The employer shall pay to the contractor:-

- a. The first installment of the advance payment within 42 days after issuing the letter of acceptance or within 21 days after receiving the documents in accordance with sub clause 4.2 [Performance security] and sub-clause 14.2 [Advance payment], whichever is later.
- b. The amount certified in each interim payment certificate within 56 days after the engineer receives the statement and supporting documents; or, at a time when the bank's loan or credit (from which part of the payments to the contractor is being made) is suspended, the amount shown on any statement submitted by the contractor within 14 days after such statement is submitted, any discrepancy being rectified in the next payment to the contractor.
- c. The amount certified in the final payment certificate within 56 days after the employer receives this payment certificate; or, at a time when the bank's loan or credit (from which part of the payments to the contractor is being made) is suspended, the undisputed amount shown in the final statement within 56 days after the date of notification of the suspension in accordance with sub- clause 16.2 [Termination by contractor].

PPA GCC (2011) condition of contract explain delayed payment in clause 67 sub clause 67.1 as the following. Once the time-limit referred to in GCC Clause 59.3 has expired, the Contractor – unless the Contractor is a public body which is partly or wholly financed by the Federal Government Budget – shall upon demand, submitted within two months of receiving late payment, be entitled to late-payment interest at the rediscount rate applied by the National bank of Ethiopia on the first day of the month in which the time-limit expired, plus three and a half percentage points. The interest shall be payable for the time elapsed between the expiry of the payment deadline and the date on which the Public Body’s account is debited. Any default in payment of more than 120 days from the expiry of the period laid down in GCC Clause 67.1 shall entitle the Contractor either not to perform the Contract or to terminate it.

In PPA GCC (2006) condition of contract payment is explained in clause 43 sub clause 43.1, 43.2, 43.3 and 43.4 as the following. Sub clause 43.1 Payments shall be adjusted for deductions for advance payments and retention. The Employer shall pay the Contractor the amounts certified by the Engineer within 30 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made at the prevailing rate of interest for commercial borrowing for each of the currencies in which payments are made.

And in sub clause 43.2, if an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.

In sub cause 43.3 all payments and deductions will be paid or charged in Ethiopian Birr.

In sub clause 43.4 items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

Civil code; explained about payment in General for all type of works in the following articles. **Art. 1751** states that the rate of interest rate shall be of nine percent per annum where interest is due and the rate has not been fixed. **Art. 1804** states that where the debtor fails to make

periodical payments which constitute an income for the creditor/Contractor, such as rents, arrears of life or perpetual annuities or interest on capital, **interest for default** shall be due from the day on which proceedings for recovery are instituted where the debtor is one year in arrears. **Art 1005(2)** states that where a sum of money has been bequeathed, interest thereon at the legal rate shall run from the day when the liquidator has been called upon to impact payment. **Art 1803** states that where the debtor owes a money debt and he is in default, he shall pay interest for default at the rate fixed by law (Art. 1751) notwithstanding that the contract fixes a lower rate in respect of interest to be paid before the debt is due. If a higher rate of interest is fixed in the contract, such interest shall be due in lieu of interest stated above. Moreover, they said provision states that Interest shall be due notwithstanding that no loss is incurred by the creditor.

When we see the abroad condition of contracts for example in United Kingdom late payment legislation. The UK government has been aware of the systemic late payment problem, and, over the past two decades, has implemented legislation to mitigate the potential for such detrimental financial occurrences. There are five main pieces of relevant legislation and agreements.

- a. Part II of the Housing Grants, Construction and Regeneration Act 1996 (as amended by the Local Democracy, Economic Development and Construction Act 2009): The acts help clarify payment rules in the construction industry, introduce a more balanced payment regime, and make adjudication more accessible. Specific changes include expanded rights for contractors to suspend performance for non-payment, abolishing conditional payment clauses, and new requirements for submitting payment notices.
- b. Late Payment of Commercial Debts (Interest) Act 1998: The act establishes that if another business is late paying for goods or a service, the payee business can charge ‘statutory interest’, which is defined as 8 per cent plus the Bank of England base rate.
- c. Late Payment of Commercial Debts Regulations 2013: These regulations impose payment period limits of 60 days for businesses and 30 days for public authorities.
- d. Prompt Payment Code: This code is a voluntary agreement managed by the Chartered Institute of Credit Management. The code of conduct is meant to standardize payment practices and ensure that each business within a supply chain has its invoice settled on time. By signing the code, businesses are expected to follow these three practices:

- Pay suppliers within 30 days, with a maximum limit of 60 days. Businesses are required to pay 95 per cent of their undisputed invoices within 60 days, unless there are exceptional circumstances.
  - Give clear guidance on payment procedures to suppliers. This should include providing a system for dealing with complaints and disputes.
  - Encourage good payment practices within their industry. In addition, businesses should work to convince non-signatories to follow the code
- e. Construction Supply Chain Payment Charter: This charter is a voluntary agreement managed by the Construction Leadership Council. To apply, businesses must first be a signatory to the Prompt Payment Code. By signing the charter, businesses are expected to follow 11 fair payment commitments. While each of the commitments are beneficial and relevant, the following six are especially important:
- A business will make the full payment as specified in the contract for all work that is properly carried out or when products are supplied.
  - A business will not deliberately delay or unreasonably withhold payment.
  - A business will ensure that payments are made to its supply chain no more than 45 days from the end of the calendar month in which the work was carried out or that product were supplied. Starting January 2018, businesses will be required to make payments no later than 30 days.
  - A business will issue any ‘pay less’ notices at the earliest opportunity and no later than seven days prior to the final date for payment.
  - A business will establish processes to ensure that any potential changes to a contract can be agreed upon promptly and fairly.
  - A business will adopt a transparent, honest and collaborative approach when resolving differences and disputes.
  - As a construction firm or subcontractor, it is important to work with other businesses that adhere to either (or both) the Prompt Payment Code and the Construction Industry Payment Charter. Businesses that have agreed to follow this display a commitment to support a culture of fair, prompt payments.



## **2.5. Payment Problem Types in Construction Industry**

The following are types of payment problems in construction industry according to stunning and associates (2006).

- a) Late payment where the time taken to make payment is beyond the contracted payment period is due to the usual practice of late payment of invoices.
- b) Partial payment an invoices where payment is withhold for any reason
- c) Non –payment of a building professional for any part of the contracted building works by end customers, developers or main contractors.

### **2.5.1. Causes Contributing to Payment Problems in Construction projects**

The following are causes of payment problems in construction industry Cash flow difficulties due to delays and non-payments on other projects, Disputes over payment claims and responses, Cash flow difficulties due to lack of initial capital, Easy exit of players: Little/no liability to creditors, Payment culture of the industry: Chain payment & work first get paid later, Improper supervision and financial control, Easy entry of players with little/no capital backing , Cost overruns and contract failure, Lack of knowledge and experience in the field, High capital investment nature: Reliance on loan capital, Economic and market conditions, Time overrun of projects, Disputes over quality of work, Administration/bureaucracy, Financial difficulties due to failure to secure contracts, Complications from contractual conditions, Financial difficulties due to drop in building prices, Procurement methods used, Contract types used, Standard forms of contracts used (right to payment and non-payment provisions), Legislative procedures (Construction Contracts Act), Disputes with debtors/creditors, Structure of the industry, Involvement of many commercial parties, Duration of projects (long-run or short-run), Internal conflicts/disputes between owners or management team and Political/policy changes (Djokoto, 2017).

### **2.5.2. Payment Problems International Perspective**

In New Zealand, the Construction Contracts Act (CCA) was promulgated to curb bad payment practices within the construction industry, especially following the liquidation of some large companies because of nonpayment by their clients and developer. Prior to the CCA in New Zealand, the Wages Protection and Contractors' Liens 1939 Act was in impact and provided

security to head contractors, subcontractors and workmen who perform work upon or in respect of any land by claiming a lien over the estate or interest of the owner in the land. Workmen and subcontractors were entitled to a charge over money payable under any superior contract for the work. However the repeal of the Act in 1989 left contractors and subcontractors unsecured. The removal of conditional payment provision (pay-if-paid and pay-when-paid) with the repeal of the 1939 Act, enabled subcontractors to get paid on time whether or not lead contractors are paid by the client. This protects contractors also as they may be in better position to understand the client's financial status and procure necessary security, which may be required in the event of insolvency (Ramachandra, 2013).

In the United Kingdom, makes mention of a grave warning from a credit manager pointing to the serious risk to small companies due to the late payment culture in that country. Some reports highlighted the significant loss of income because of late payment at 1.6% and the average settlement of invoice time in the United Kingdom as 17.4 days overdue (Banfai, 2013).

Countries like New Zealand, the United Kingdom, Singapore and certain states in Australia, e.g. New South Wales have laid down laws that govern their very own construction industry specific legislative payment security systems. These rules purposely legislate provisions to assist in the determination of issues of timely payment in the construction industry in order to help eradicate poor payment practices and promote seamless contractor cash flow (Noushad Ali Naseem Ameer Ali, 2006).

In South Africa, the Construction Industry Development Board (CIDB) has through its partnership program with the National Treasury, Development Bank of Southern Africa (DBSA), and National Department of Public Works (NDPW) developed the Infrastructure Delivery Improvement Program (IDIP). This program has identified that delayed payment to contractors is one of the main blockages to infrastructure delivery in the public sector. Failure by the employer to pay contractors within the period stipulated in their contracts potentially results in, the slowing of service delivery, poor quality of infrastructure built, poor performance of contractors, and the potential demise of contractors due to severe negative cash flow, particularly emerging contractors who are the most vulnerable clients being exposed to the risk of unfinished or poorly finished projects, interest charges being incurred, i.e. fruitless and wasteful expenditure (Djokoto, 2017).

Late and non-payment in China, in addition to absent or inadequate security, has been the cause of considerable cash flow difficulty for contractors often leading to the risk of bankruptcy for construction companies. Cautious contractors who may anticipate payment delay from a particular client may include when pricing, a risk factor, to absorb the financial impact in the unfortunate event of late/nonpayment. The back side of this is that it causes contractors to increase tender prices, also if a client has a reputation for late payment. Late and nonpayment leads to disagreement and ensuing suspension and termination of works.

The main cause of construction delays in Malaysia besides manpower shortage has been found to be financial problems. When several head contractors failed to pay 16000 Grade G1 contractors for the roads they had built even though they had been paid in full for their services by the government, many of these small businesses found themselves on the brink of bankruptcy. Clearly, failure to pay can be linked to an attitudinal problem which, if commonly accepted by the industry or society in general, can become a culture of a particular industry (al, 2014).

In the Ghanaian road construction industry, to identify effective options available and strategic methods developed by contractors to improve their cash flow forecasting. From the result of analysis, it was observed that, fifty-one (51) of the road contractors representing 98.1% have experienced delayed payment since 2006. Also, the result showed that delayed payment creates cash flow problems, stress and financial hardship on the contractors and that some reactions to delayed payment adopted by the contractors may have adverse impacts on their own businesses. Amongst the most appropriate solutions to overcome the problem of delayed payment faced by local contractors include: a right to regular periodic payment, a right to a defined time frame for payments and a right to a speedy dispute resolution mechanism. The survey results indicated that the five (5) impacts of late payment were: resulting in cash flow problems, making it difficult to procure material and services, creation of enormous stress on contractors, leading to interruption of program of works and likely suspension and resulting in disputes e.g. litigation/ arbitration. There are the five (5) dominant strategies suggested by contractors were: issuance of a promissory note by the employer, introducing the construction contract act, discounting facility from the banks, leasing of plant and equipment and contractors seeking for loan. It also highlighted the three ways which could be used by contractors to recover long outstanding debts

and it includes; "Adjudication", "Litigation" and "Creation of a right to a lien" as right to a speedy dispute resolution mechanism (Amoak, 2011).

## **2.6. Factors Contribute for Delayed Payment**

Knowing factors that causes delayed payment helps us to take appropriate solutions or remedies for payment problems. There are many factors that are causing the delayed payment problems in construction industries. Therefore it is good to identify the contributing factors which leads to a delay in payments .Some of them include.

- i. **Employer's poor financial management:** It is anticipated that employers' poor financial management could cause them to have insufficient operating funds when they are obliged to pay the payees. Payment is considered as the life blood of the construction industry because construction projects often involve very large capital outlay (al, 2014).
- ii. **Employer's withholding payment:** As provided in many standard forms of contract, the employer may withhold payment to the main contractor or subcontractor for a variety of reasons. Such reasons are major defective construction work, disputed work, failure to comply with any material provision of the contract, third party claims filed or reasonable evidence that a claim will be filed, and failure to make timely payments for project resources. These reasons may cause the employer to refuse to make payments which will result in delayed payments. Conflict among parties involved: 'Payment, not unexpectedly, has always been the main subject of disputes. It is anticipated that conflict if unsettled will escalate into disputes which can also cause delayed payment (Ramachandra, 2013).
- iii. **Delay in certification:** delay in certification by parties involve in the project might also cause of late payment issues. The parties involve may delay in approving the application for payment claim due to certain reasons which may arise because of his own or other parties involve (al, 2014).
- iv. **Clients failure to implement good governance in the business**
- v. **Technical Problems:** The main reasons for late payment is when there are errors in submitting claims. This includes claims without adequate supporting documents, wrongly calculated claims and those submitted without using the right procedures and when this happens, contractors need to resubmit the claims and repeat the whole process after making necessary corrections. The payment of the tender awarded would commonly be based on the progress of the project. The contractors need to submit the progress billing attached with the

approve percentage of completion by the authorized person in charge. The general guideline is to honor payment within 14 days on submission of completed information and documentation with the Finance Department. Most of the problems occur when contractors missing some necessary documents required. In order to avoid delay in paying the contractors, the payment officers have to make sure that documentation is complete (al, 2014).

- vi. **Disagree on the valuation of work done:** It is a normal in the construction industry where one of the contracting parties disagrees about the valuation of work done. The disagreement may cause delay in certifying the amount of work executed on site (al, 2014).
- vii. **Local culture/attitude:** Before the introduction of the Housing Grants, Construction and Regeneration Act 1996 (HGCRA) the construction industry in the UK was prone to a culture of late payment where a delay of 53 days in making payment after the receipt of invoice was not uncommon (Nasser, 2013). There are also other less frequent causes which are responsible for delay in payment in the construction industry. These causes are disagreement on valuation of work done; deliberate withholding by client, budget deficit for the year, poor communication and conflict between parties, delay in submitting contractors payment claim, and lack of understanding of the contract. (Ramachandra, 2013).
- viii. **Financial market instability:** such as inflation, increment of interest rate in repayment of loan and increment of foreign exchange rate. In practice, the main causes of late payment reported by business are insufficient cash flow, imbalances of power between companies, the structure of the supply chain (and the potential accumulation of delays at each point), administrative inefficiencies and intentional use of late payments as a form of financing. (Tolhurst, 2018)

## **2.7. Impacts of Delayed Payment**

Payment delay has many impacts on the construction industry. Some of them are listed below.

### **A. Construction Disputes**

Payment problems are major cause of dispute within the industry. The following are some of the causes of disputes in construction projects (Noushad Ali Naseem Ameer Ali, 2006).

- i. Variations claims by contractors
- ii. Delays of interim payments from clients

- iii. Non-payment for sub-contractors by main contractor
- iv. Failure to comply with payment provisions
- v. Arguments on prolongation costs claimed by sub-contractors
- vi. Non-payment for certified sums
- vii. Delay in progress payment
- viii. Misleading payment procedure according to terms of contract
- ix. Argument about the amount to be paid
- x. Unpaid for further payment because of debt settlements are most responsible causes of disputes

### **B. Construction Delays**

Payment delay is one of the major causes for construction delays in many countries in the world. In general contractors have no right to suspend work for non-payment under common law principles. However contractors can suspend the work as a remedy for delayed payment. If the delayed payment is prolonged the contractor can terminate the contract. This suspension and termination could increase the contracts duration, causing project delays (Ramachandra, 2013).

The following are some of the causes which cause delays in construction projects.

- Delays in payments to contractor for completed work
- Clients and contractors financial difficulties
- Clients cash flow difficulties
- Delays in honoring certificates
- Delays in release of advance payments for mobilization

### **C. Construction Productivity Reduction**

Payment delay could affect directly or indirectly to productivity of the industry. Productivity in the industry is defined as solution of how efficiently inputs are being used in the economy to produce out puts. It is commonly measured as the ratio of a volume of output to input. In this sense, there are views expressed that impacts of payment default could affect the efficiency and development of the whole industry. Engineering contractors suggested that unfair payment practices undermine the principles of integrated team working and ability and motivation of specialist's suppliers to invest in innovation and capacity. Failure to ensure the timely and fair

payments for works done or materials supplied lead to likely delay, disputes and substandard works. This result in cost overrun and time overrun which impact the productivity (Ramachandra, 2013).

#### **D. Cash Flow Problems**

When payments are delayed in any part of the construction payment process, contractor cash flow is directly affected. Cash flow is crucial to project success and survival of the industry as a whole. For example, seriously delayed payments can influence the time, cost, and quality of a project, ultimately causing dispute, arbitration or litigation, total abandonment, or the liquidation of a construction firm anywhere in the supply-chain.

In some cases, when delayed payments lead to arbitration or litigation, sub-contractors abandon their right to payment in favor of maintaining cash flow by moving on to other projects. Most contractors can attest, the ability of a company to manage their cash flow is critical. Payments cover various project-related costs incurred by contractors: payment of materials, accounts rendered preliminary expenses, general overhead and labor. When cash flow is affected, contractors may incur financial stresses. Generally delayed payments have the following impacts .Extension of time for project, Low quality works due to contractor's uncertain financial condition, Abandonment of the project, Creates negative relationship among parties, Creates financial hardship for the company, Subcontractors refuse to continue works on the project works on the project and immigration of laborers (Megan Kinal, 2015).

Payment to contractors or lack of it is a common cause of disputes in the construction industry. Timeliness of payments affects many contractors, for whom receiving payment delay from their owners is a cause of friction between the two parties. (Megan Kinal, 2015) In his works stated that all problems in construction begin when payment is not received at the exact amount or date. Disagreements then leads to arguments as relationships sour, and the stage become a setting for conflict, blame, finger pointing and lawyers. Project exceeds initial time and cost estimates and experienced extensive delays. But contractor are the one who suffers the most when things like this occur. This is the case especially when design and built construction contract are practiced more and more nowadays. Payment delay never brings justice to contractors. Sub-contractors are very much the same, if not worse condition, because of payment

delay. The impacts of payment delay according to contractors create cash flow problems, create stress on contractors creates financial hardship, creates negative chain impact on other parties, results in delay in completion of projects, creates negative social impacts, leads to abandonment of projects, results in formal dispute resolution (litigation / arbitration), leads to bankruptcy or liquidation (Nasser, 2013).

Late payment is found to have significant consequences for companies and the economy. It directly creates administrative costs for creditors and cash flow issues, and can indirectly lead to income loss, hindered growth and inability to pay or hire employees (Tolhurst, 2018).

Contractors experienced long payment durations due to their reduced negotiating power, and suffer detriment because they may not have easy access to finance to cover temporary shortfalls, may face more expensive rates for accessing finance, and not always have appropriate credit management systems for preventing or managing payments (Tolhurst, 2018).

At the extreme, late payments can lead to insolvency. A recent European survey found that a quarter (24%) of UK companies report that late payments are a threat to their survival, which is the highest reported level among all polled European countries. Late payments are repeatedly found to affect cash flow and, subsequently, ability to invest and grow. Those having to wait for long periods before receiving payments will be suffering worse cash flow whilst bolstering the liquidity of other firms in the supply chain, and businesses generally supplying more trade credit than they receive may have restricted investment opportunities. The overall impact of this on the economy would depend on whether net suppliers of trade credit have better or worse investment opportunities than the net receivers. As well as reduced cash flow for investment, there may be further productivity impacts due to reduced growth and hiring potential and the need for staff to devote time to chasing payments rather than focus on other, more productive, activities. In the worst cases, delayed payment can force businesses to exit the market. (Tolhurst, 2018)



According to (Geza Banfai, 2013) late payment practices are an important issue for the construction industry. These practices have negative consequences or impacts for the construction industry and for the broader economy, including:-

- i. **Employment in The Construction Industry is lower:** because Contractors must limit their payroll commitments to reflect the amount of payment risk that they can afford to take on.
- ii. **Less investment in apprentices:** The logic of the apprenticeship system is that an employer recoups its investment in the latter stage of an apprenticeship. However, that requires a long-term commitment to increase payroll. Payment risk discourages long-term payroll commitments and by doing so discourages investment in apprenticeships. This has a broader economic impact because the construction industry accounts for roughly 40% of all apprenticeship.
- iii. **Greater use of ‘independent operators’** (*i.e.*, individuals working as subcontractors) in place of hourly-paid workers. This reduces exposure to payroll risk, but also eliminates deductions at source. This, in turn, significantly increases the opportunity for tax evasion and complicates the collection of WSIB contributions.
- iv. **Less investment in new machinery and equipment:** Faced with the risk of late or uncertain payment, contractors curtail the overhead risk that comes with leasing or purchasing new machinery and equipment. It affects productivity of the contractor
- v. **Construction costs are higher:** because contractors must factor into their bids the financing costs associated with the risk of late payment. Owner-developers in both the public and private sector must pay this risk premium even when they adhere to prompt payment norms. The opportunistic behavior of the minority drives up costs across the board.
- vi. **Construction costs are also higher because bidding pools are smaller:** Payment risk limits the amount of work that contractors can take on. As a result, bidding pools are often reduced.
- vii. **Late payment practices erode the level playing field:** Those that maintain honorable practices are put at a disadvantage compared to those who ‘game the system’.
- viii. **Reducing Productivity:** An increase in payment risk reduces that amount of fixed costs that a Contractor will take on. This implies limiting lease or purchase commitments for new

machinery and equipment. The impact of this is to hold down productivity growth (Geza Banfai, 2013).

## **2.8. Common Cash Flow Management Mistakes**

Here are some of the most common construction cash flow mistakes to watch out for (Merced, 2019).

### **i. Paying vendors before you get paid**

No matter how big or small a project is, limiting the cash you are fronting for jobs costs is always ideal for your cash flow while it's not possible to get enough upfront payment to cover the startup costs for a job, the next best thing is to set up accounts receivable and accounts payable schedules in a way that frees up cash flow. It's just a truth if you are paying vendors before getting paid yourself, you are shifting all the financial burden on yourself. Now it's easy to understand why many construction business owners make this mistakes over and over they empathize with vendors and know how helpful it is when clients pay early. However, being altruistic in this sense can put you in the cash flow danger zone. Extended payment terms are part of the game. Make sure that, contractually, the payment terms you give clients are shorter than the terms you have with vendors.

### **ii. Not enforcing your credit policy or not having one**

Construction is a credit heavy industry. This is why it's especially important for all contractors to have an established credit policy. Without a credit policy, it's very easy to lose control of your cash flow.

### **iii. Sales and finance are not aligned**

Success in construction is largely dictated by competence in two things: acquiring customers and getting paid, carried out by sales and finance respectively. Growing companies departmentalize sales and finance. Ideally the whole company is on the same page as far as vision and business goals go. Growing your revenue fast is a good problem to have. However, having to front too much cash for new projects with less favorable payment and credit terms will burn cash quickly. This happens when sales and finance are not on the same page. It can and will wreak havoc on your cash flow.

### **iv. Poor data management**

Poor data management is a common problem. Have you ever sent an invoice to the wrong address? Is a point of contact not responding? These issues are usually caused by poor data

management. These costly errors are avoidable when customer information and project data are regularly cleaned up and updated.

## **2.9. The Path to Better Cash Management**

Cash flow management is a mix of enforcing policies and being flexible when the situation calls for it. Avoid the stress of negative cash flow by familiarizing yourself with the above four common mistakes. These represent the root of smaller day to day accounting and operational problems that impact your working capital. Take a close look at your accounting practices and identify if you are making these mistakes so you can adjust accordingly and manage your cash flow better (Merced, 2019).

## **2.10. Potential Solutions for Delayed Payment**

Multiple parties are at risk of delayed payment within the supply chain on any construction project. Risk should be evenly allocated and enforced among all parties involved; actions that can help foster trust among owners and contractors. Construction companies have a desire for external assistance to reduce debtor time to pay via legislation countries (e.g., Australia, New Zealand, United Kingdom, and United States of America) have already adopted prompt payment legislation. Geographically, legislation differs drastically; however, multiple aspects are taken into consideration. In New Zealand, strategies to secure payment include; regulation around placing change orders, registering interest over properties, lodging bankruptcy and liquidation proceedings, holding money in a trust account, and direct payments made by sureties. In Australia, the prompt payment act enables contractors to receive progress payments, charge interest on late-payments, provides the right to suspend or lien work, voids pay-when-paid clauses in contracts, and rapid independent dispute adjudication. These examples provide a base for the Alberta government to implement prompt payment legislation within the construction industry (Megan Kinal, 2015).

The following are some of the remedies for delayed payment (Megan Kinal, 2015):-

- a. Suspension of work
- b. Slowing down the work,
- c. Claiming for interest
- d. Mandatory creation of a trust account
- e. Setup trust with bank prior to work start to get paid
- f. Better communication

- g. Automatic penalties charged to client for delayed payment
- h. Create maximum time to pay
- i. Unmodified standard contracts
- j. Define warranty
- k. Prompt payment legislation
- l. Better specifications prior to start work
- m. Ability to report infractions
- n. Client checks
- o. Better management of change orders
- p. Risk should be evenly allocated among all parties involved
- q. Apply for summary judgment,
- r. Apply for the winding up of Employer's company
- s. Determining the contract with the Employer.

**a. Suspension of Works**

It is universally known that there is no right of suspension of work due to nonpayment under the common law. The general principle is that the Contractor has no legal right to suspend work, and on the part of the Employer, he has also no legal right to order any suspension of work. Once the construction work started, the Contractor is contractually obligated to carry out the work “regularly and diligently” until the project is completed.

Suspension is a temporary halting by one party of the performance of their obligations under the contract on the grounds that the other party is in breach contract for failing to make payment in accordance with the terms agreed between them. Suspension is temporary in nature because where there is a right to suspend, the procedure does not bring the contract to an end; but putting on hold the obligation of the suspending party until the breach has been properly remedied. It is not uncommon to find that a Contractor or Sub-Contractor, who has not been paid what is due, threatens to suspend the work under the contract until payment is made. It must be noted that without a clear contractual right to suspend the works, the Contractor is not entitled to do so even though the Employer has failed to pay him within the time stipulated in the contract. In this respect, if the Contractor suspends the works the court may find him guilty of repudiating the contract (Rashid, 2010) .

### **b. Slowing Down The Work**

A study of the various standard form of contract in Malaysia i.e. PAM 98/2006 standard form, PWD 203A standard form and CIDB 2000 standard form shows that there is no express provision that give the Contractor the right to slow down the progress of the work on reason of late or nonpayment by the Employer. Therefore, in whatever the circumstances, the Contractor should not slow down his work because he is not being paid or payment was unduly delayed by the Employer, unless there is a written provision in the contract that allows him to do so (Rashid, 2010).

### **c. Claim for Interest**

The question of whether a Contractor is entitled to damages or interest due to late or non-payment by the Employer is still unclear. Let us look into the various standard forms of construction contract, law cases and the provisions under the common law and determine whether a Contractor has the right to claim for interest if the Employer unduly delayed the interim payment to the Contractor (Rashid, 2010).

### **d. Application for Summary Judgment**

Summary Judgment is defined in the Dictionary of Law as: “Procedure where the court decides a claim or particular issue against claimant or defendant without trial” 37. It means that a plaintiff may at an early stage of proceedings try to obtain judgment on his claim or part of his claim without going to trial. It will save time and cost for trial and hearing process.<sup>38</sup> The procedures of application for summary judgment is mandatory and the party who apply must strictly complied with the procedure governed stated in Order 14 of HCR, Order 26A of SCR or other alternatives such as Order 81, Order 73 and Order 18 (Rashid, 2010).

### **e. Winding Up Petition**

The primary function of insolvency procedure is to maximize the returns to the existing claimants: that is to implement the most efficient plan for the company. On one hand this could be end up selling the company for cash – either as piecemeal or as a going concern. On the other hand the company could be reorganized, with a new financial structure (creditors agree to forgive some of the debt, perhaps in exchange for cash and or equity) and possibly with new management. The secondary function is the preservation of priority. This is also a criterion for a

good insolvency procedure. The question arise on present insolvency procedure is whether it can guarantee the preservation of priority (Rashid, 2010).

#### **f. Termination of Contract**

For most construction contract, payment within the contractually agreed framework is not specified to be “of the essence” and therefore a failure to make payment would not be a breach that went to the root of the contract. Under the law of contract, failure to pay on time what is due will not be treated as a sufficient breach to justify the other party in terminating the contract. Failure to pay on time what is owed on another contract will not be a repudiator breach. However, while late payment is not in itself repudiator, a continued refusal to pay may become so (Rashid, 2010).

#### **2.11. Fair Payment**

Payment is remuneration for work or services properly carried out. “Fair payment” is concerned with whether the contractual terms relating to the discharge of the payment obligation and the payment process are fair and adhered to. The process and payment periods should minimize transaction costs and financing charges across projects (commerce, 2007).

#### **The case for change**

- a) Fair payment issues arise from commercial pressures, “custom and practice”, lack of industry sophistication and maturity, as well as deliberate manipulation. Although the problem is often characterized as being one between the lead contractor and subcontractors, issues can and do occur throughout the supply chain from clients paying late, to material suppliers invoicing inefficiently.
- b) Extended payment periods and delayed payment do not just incur short-term finance costs. Poor payers may experience higher tenders, with surcharges being imposed by both lead contractors and their supply chains that place a very high value on ‘payment certainty’.
- c) The aim of the recommended improvements is to provide greater certainty on payment to everyone in the supply chain and to optimize payment periods to minimize financing charges. As part of a consultancy study for the working group, typical existing payment regimes were mapped against a best practice process. Based on analysis corroborated by interviews with contractors and the supply chain, public sector clients could expect to save

up to 2.5% on construction costs from the introduction of better payment processes. These savings could rise over time if the supply chain were able to reduce overheads relating to debt chasing and administration. The additional knock-on benefits of greater productivity and a reduction in construction disputes are difficult to quantify but they are likely to be substantial.

- d) It is estimated that widespread adoption of the principles and fair payment practices set out in this guide would save the public sector some £200M rising to over £750M as the processes become embedded and the confidence in the system increases.

### **Principles and characteristics of an exemplary “Fair Payment” process**

The following are the principles of fair payment according to (commerce, 2007).

- a) Companies have the right to receive correct full payment as and when due. Deliberate late payment or unjustifiable withholding of payment is ethically unacceptable.
- b) “Fair payment” should apply equally between the client and lead contractor and throughout the supply chain.
- c) The process should be transparent; for example companies in the supply chain should have access to information on the certification procedures, payment procedures and payment times, issued on the clients’ behalf, relevant to their work packages, in order that they have certainty of how much and when they will be paid.
- d) The correct payment should represent the work properly carried out, or products supplied, in accordance with the contract. Any withholding of payment due to defects or non-delivery should be proportionate and justified.
- e) Contractual payment times should be designed to optimize finance charges across the whole supply chain recognizing the lower financing charges on Government borrowing compared to the high short-term marginal rates available to small businesses.
- f) The process needs to be practicable and efficient for all participants, reducing unnecessary transaction costs and without the need for additional regulatory and auditing activities.
- g) A range of tools and models is applicable depending on the nature of the client’s work (e.g. occasional clients vs. multi-project programs), the project size and the different levels of sophistication of companies in the construction sector.

- h) The process should seek to provide protection to the client and all supply chain members in event of a company becoming insolvent.
- i) The process should be seen as part of a wider agenda to achieve better collaborative working, thereby decreasing disputes and providing a good value for money project outturn (commerce, 2007).

### **2.12. The Relationship between Payment Delay and Delay of Construction**

Causes of Construction Delays in Ghana” identify that payment delay to contractors for work done rank as number one cause of construction delay in Ghana, from the perspective of Clients, Contractors and Consultants. Construction works involve huge amounts of money and most of the contractors' found it very difficult to bear the construction expenses when the payments are delayed. Payment delay for completed work lead to disputes between all project parties, the disputes, if not resolved amicably, can lead to arbitration or litigation. The owner has related a group of delay factors; it is mainly due to financing issues and owner interference. The speed of work depends largely to the efficiency and availability of workers. Most of contractors are using sub-contractors to do the construction work and when the payment delay to the sub-contractors, the sub-contractors have limited resource to work with and subsequently reduce the number of workers or stop work until they get payment from the contractors. Although there are abundant of workers in the construction sector, the reluctant of the contractors or sub-contractors to hire more workers contribute to shortage of site workers and then delay in the project period occurred (Nasser, 2013).

### **2.13. Payment Delay and Cash Flow Relationship**

Cash flow is the movement of cash into or out of a business, a project, or a financial product. It is usually solution during a specified, finite period of time. For a business to be successful, good cash flow is crucial. Cash flow is the primary indicator of a business“ financial health. It’s the solution of your ability to pay your overheads such as rent, insurance and wages. Ultimately, effective cash flow is a key business skill and will help to protect the financial security of your business. Good cash flow forecasting is a balancing act, juggling your cash inputs and outputs. One of the reasons why many businesses fail is poor cash flow management. A payment delay by one party may affect the whole supply chain of payment of a construction project. For instance, if an employer delays in making payment to the contractor, this in turn will result in



contractor's delay in making payment to the sub-contractor. The further consequences of the negative chain impact will create cash flow problems. Lack of access to finance, both during pre-construction which disqualifies emerging contractors from meeting guarantee and performance bond requirements and during construction, which leads to cash flow problems, incomplete work and even liquidation are financial constraints facing emerging contractors. The payment predicament of the construction industry cannot be singly explained. All parties including the owners, consultants, contractors, subcontractors, suppliers and even public sector employers have an important role and must act in concert to take ownership of the problems and challenges. (Nasser, 2013).

Cash flow in the construction industry is critical because of the relatively long duration of projects. Any deviation due to either project delays or cash flow delays can have a major impact on the project (Noushad Ali Naseem Ameer Ali, 2006) .

The problem of late payment is closely linked with that of cash flow. In the construction industry, cash flow is critical because of the relatively long duration of projects. Any Many construction projects have negative net cash flows until the very end of construction when final or advanced payment is received before starting the project, the delay of payment from owners will affect the cash flow of the contractor and retention withheld by the client will also create cash flow problems to the contractor. When taking into consideration the payment delayed from owners and negative cash flow of contractors, prompt payment from owners in this circumstance is utmost important to minimize financial hardship of a contractor. Cash flow requires a combination of estimating and planning an evaluation in which estimating evaluates the use of resources in terms of time. Adding both of these together is to obtain the cash flow. As cash flow, profits and growth can all be adversely affected. Longer payment periods mean that other participants in the downstream supply chain will and can become cash starved, forcing greater reliance on borrowing. There is general consensus between all players within the industry that if clients pay their project main contractors timely, then the timing of head contractor's payments to their subcontractors can be considerably improved. The timeliness of payment has further highlighted the significance of prompt payment from clients to main contractors in order to ensure payment requirements further down the supply chain are met. The daily operations of small businesses can be seriously affected by interruptions in cash flow caused by late payment

depending on the magnitude and period of delay. Timely payment is key to ensuring the seamless operation of construction companies (Djokoto, 2017).

#### **2.14. The Important of Prompt Payment**

The Government understands the importance of prompt, fair and effective payment for all businesses, and particularly for small and start-up companies. Being paid promptly for work done ensures businesses have a healthy cash flow, improving productivity and potential for growth. This is especially important for smaller businesses that may not have the reserves of larger companies. (Tolhurst, 2018)

The objectives of atypical construction industry on time are:

- a. Cash in hand is fuel to run the project without stopping.
- b. The contractor's ability to tender and obtain new work.
- c. It is very important to contractors to acquire a new technologies, machineries, management techniques and developments in the industry around the world.
- d. Foreign contractors are able to make such investments because they receive huge financial support from their government with very low interest rates.
- e. The contractor's perform their benevolent activities in their areas such as donating funds for charitable projects.
- f. The development of contractor's enterprises is their aim as well as the country's aim which can be achieved if the contractors get their payments in time.
- g. Unlike many other industries, the durations of construction projects are relatively long.
- h. The size of each construction project is relatively large and each progress payment sum involved is often relatively large.
- i. Payment terms are usually on credit rather than payment on delivery.
- j. The construction industry is one of the most significant sources of employment to engineers, technicians, skilled labor and managers. When the monthly salary not paid on the set date the employee as well as his family faces difficulties. To pay progress payment to the contractor on time because it impairs the contractors ability to finance the work, while contractors were satisfied with most of the contractual factors investigated under both procurement systems, they were dissatisfied with two of the factors, namely, time lag between entitlement to receive and actually receiving cash payment and percentage of

contract sum retained. This dissatisfaction calls for action to consider devising alternative means of dealing with retention and payment delay (Nasser, 2013).

### **2.15. Payment Certificate in the Construction Industry**

It is nothing about quality of materials or workmanship, nor does it indicate satisfaction with the work done to date. The regular flow of cash is very critical to a contractor's survival. As a result, interim certificates are issued at intervals as the work proceeds, and their issue entitles the contractor to be paid a certain proportion of the contract price. Under a construction contract, there is usually a prescribed time for the engineer to issue a progress certificate and the issue of such a certificate by the engineer imposes upon the employer a strict obligation to make payment. Interim certificates exist simply as a mechanism for confirming that an installment of the consideration is due to the contractor. Anything included in such a certificate may yet be the subject of a later certificate. It is only the final certificate that is ever conclusive which signifies the contract administrator's satisfaction with the work, or the amount that is finally due to the contractor, or both of these things (Hailu, 2015).

## CHAPTER THREE

### 3. RESEARCH METHODOLOGY

#### 3.1. Introduction

This chapter describes the research method used in this study and provides information about the research design; data sources; data collection method; target population and sample size determination; and the process and method of data Analysis. The statistical tools for the data analysis are also discussed.

#### 3.2. Research Design

Research design is the blueprint for fulfilling research objectives and answering research questions. In other words, it is a master plan specifying the methods and procedures for collecting and analyzing the needed information. This is to identify and analyze all the elements of phenomenon, processor system such as identification and recording will be done from a particular perspective and often for a specified purpose, However it should always be done as objectively and accurately.

#### 3.3. Research Instruments

This study was conducted using the following approaches.

##### a) Literature Review

This includes the secondary data and information collected from different sources which can be used to conduct the research. The sources include books, journals, magazines, newspaper, dissertations, conference papers and information from the internet. These materials were used as background information in order to fully understand the information needed for discussion and analysis in the research.

##### b) Questionnaire Survey:

The questionnaire survey was adapted to get feedback on opinions of respondents about cause and impact of delayed payment in Gondar city public building construction projects in order to achieve the objective of the study. This instrument was used to answer the first three objectives.

**c) Case Study:**

Besides questionnaire survey, case study sessions will adapt to collect the primary data. In order to get more exact and detailed information by studying the Contract documents, Project documents, Progress reports and Contractor's Payment Certificates. The case study was used as validation of the questionnaire survey part.

In this research methodology a flow chart which shows the sequential arrangements of the methodology to be used was designed before starting the research work. The methodology flow chart presented in figure below. It shows how the research work proceeds in a structured way so as to make the work in an organized manner. Questionnaire, case study and ideas from literature reviews related to delayed payment in the construction industry were used for data gathering. Statistical analysis was used to analyze the collected data.

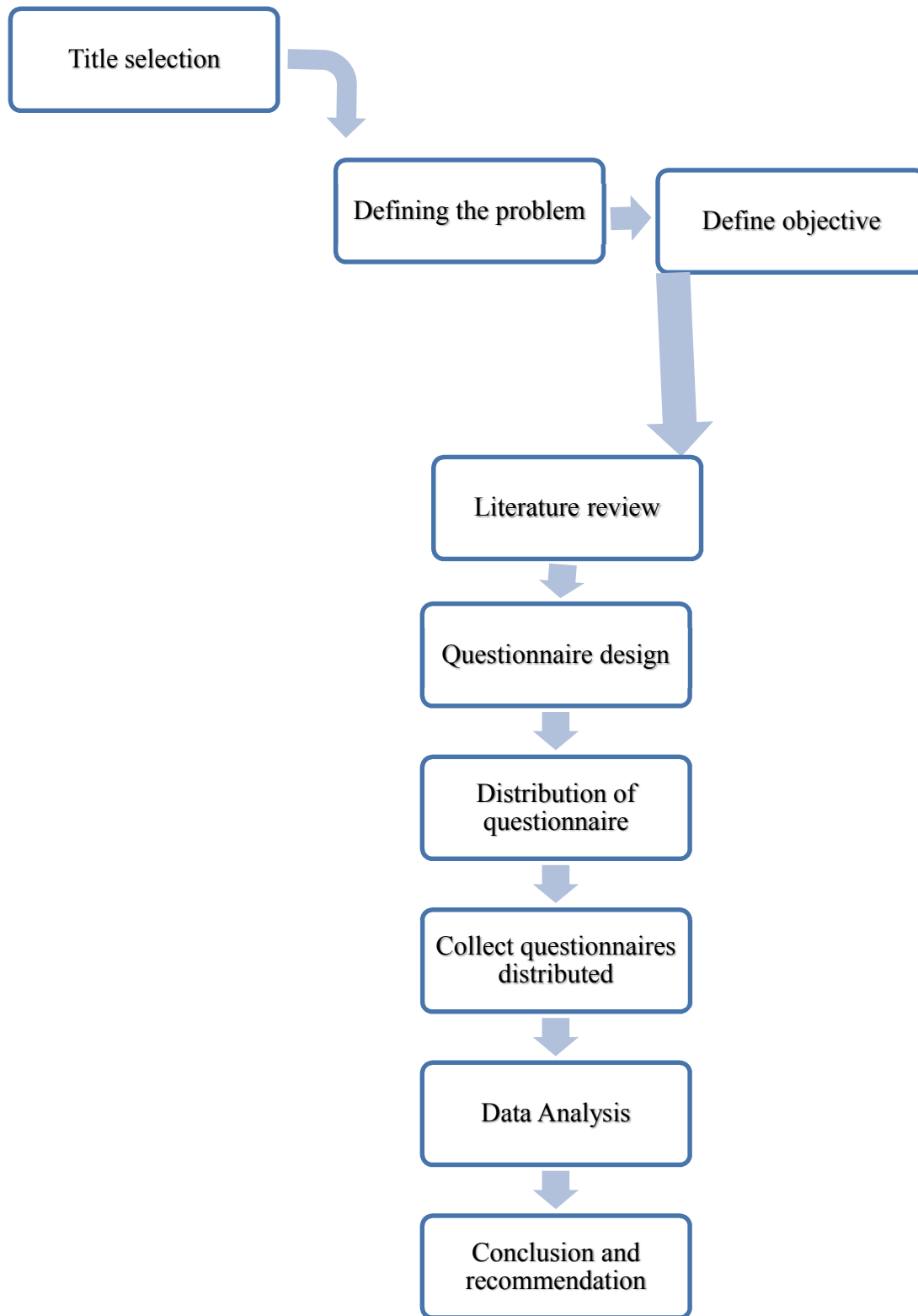


Figure 3-1: Research Flow Chart

### 3.4. Sources of Data

For this study, data was collected using both primary and secondary sources. The primary data was obtained through questionnaire directed to contractors, consultants and clients that were involved in building projects and case study. The secondary data was obtained from previously done different researches, internet, journals, books and different articles in published documents. The secondary data was used as a source for problem identification and was used as criteria for developing and analyzing the primary data. Questionnaire is chosen as a research instrument to gather data.

### 3.5. Sample Size Determination

This refers to the number of items to be selected from the universe to constitute a sample. It is a major issue before a researcher headed to collection of data. The size of sample should neither be excessively large, nor too small. It should be optimum. An optimum sample is one which fulfills the requirements of efficiency, representativeness, reliability and flexibility. While deciding the size of sample, researcher must determine the desired precision as also an acceptable confidence level for the estimate and hence 95% confidence level is used to calculate the sample size. Sample size can be calculated as the following equation for 95% confidence level (Assaf, 2001).

$$n = n' / [1 + (n'/N)]$$

Where N= total number of population

n = sample size from finite population

$$n' = \text{sample size from finite population} = S^2/V$$

Where  $S^2$  is the variance of the population elements and V is a standard error of sampling population (usually  $S= 0.5$  and  $V= 0.06$ )

There for number of sample projects that questionnaire was distributed are calculated as follows

$$n = n' / [1 + (n'/N)]$$

$$N = 25$$

$$n' = S^2/N^2$$

$$n' = 69.44$$

$$n = 69.44 / [1 + (69.44/25)]$$

$$n = 18$$

### **3.6. Questionnaire Design**

The questionnaire was developed to Study the perceptions of clients, consultants, and contractors due to the importance index of common factors for delayed payments in construction projects. Practices of payment and impacts of them with solutions in building construction projects in general. First they are examined and identified through a relevant literature review and then based on the questionnaire data review the perceptions of clients, consultants, and contractors. Finally, the factors or practices that contributing to payment delay, impacts and possible solutions to minimize the problem were Studied by the client, contractor and consultant. From literature review it has been discussed about types, causes, impact and reducing solutions of payment delay, factors contributing to payment delay and possible solutions to minimize payment delay in building projects in various countries around the world. But not all of these types, causes, impacts and reducing solutions of payment delay in Gondar public building projects are practical.

Therefore, only 37 factors relevant to Gondar public building projects were selected and included in the questionnaire. The questionnaire includes 17 causes that causes of payment delay, 10 impacts of delayed payment and 10 possible solutions to minimize payment delay. The respondents were asked to fill the questionnaire and it was promised that any information they provide would be treated in a highly confidential way and used only for academic purpose.

### **3.7. Sampling Technique**

The sampling technique that used in this research was purposive sampling. In this technique, sampling units are selected according to the purpose. Purposive sampling provides biased estimate and it is not statistically recognized. This technique can be used only for some specific purposes (Singh, Nov 2014).



The target groups in this study are 18 public building construction projects in Gondar city. According to Gondar city municipality house and Gondar university project office information, fifty questionnaires were distributed.

### **3.8. Validity**

Validity is concerned with the meaningfulness of research components. Validity refers to the extent to which an instrument measures what it was intended to measure and not something else. Generally, a strong correlation should be demonstrated with measures addressing similar constructs and a weak correlation with measures addressing disparate constructs. There are three main subtypes of validity: content, criterion, and construct (Frost, 2007).

- a. Content Validity.** This is the extent to which the instrument measures the appropriate content and represents the variety of attributes that make up the measured construct. Another way of expressing content validity is the adequacy of sampling of the material in the measure, which is best ensured by a plan for content and item construction before the measure is developed. Focus groups and other qualitative methods (e.g., cognitive interviews) are sources for appropriate content. A group of experts can examine items and can either endorse the content validity or identify any important gaps in content (Frost, 2007).
- b. Criterion Validity.** This refers to the extent to which the measure agrees with an external standard measure. Because measures typically have no standard, criterion validity is usually not applicable. For situations where it is appropriate, evaluation of criterion validity would involve determining the extent to which the new measure is consistent or captures the essence of the standard measure (Frost, 2007).
- c. Construct Validity.** This is the extent to which the measure “behaves” in a way consistent with theoretical hypotheses; it represents how well scores on the instrument are indicative of the theoretical construct. Construct validity evaluation includes the degree to which a measure correlates with other measures to which it is similar and does not correlate with (diverges from) measures that are dissimilar. Construct validity is typically examined using bivariate correlations, factor analysis, and multivariate regression models (Frost, 2007).

There are different techniques that are used to check validity among these that I was used were content validity. According to (Frost, 2007) content validity shows the extent to which the

instrument measures the appropriate content and represents the variety of attributes that make up the measured construct. Another way of expressing content validity is the adequacy of sampling of the material in the measure, which is best ensured by a plan for content and item construction before the measure is developed. Content validity can be checked by using Focus groups and other qualitative methods (e.g., cognitive interviews) are sources for appropriate content. And also by a group of experts can examine items and can either endorse the content validity or identify any important gaps in content .In my condition I was checked my questionnaire validity by asking professionals in the field and they give some suggestions and I corrected the mistakes.

### **3.8.1. Pilot Study**

Pilot study was done to test the validity of the questionnaire in order to check whether the questionnaire is intelligible, unambiguous and easy for respondent to understand. The professionals participated in this research were from client, contractor and consultant. It was conducted by discussing with professionals about my questionnaire by taking sample questionnaires. Five questionnaires were distributed to engineers such as projects managers, site engineers and office engineers who has an experience in the construction industry. Some of the suggestion given by the professionals were the following.

- ❖ Some factors and sentences should be modified or represented with more details.
- ❖ Some factors were repeated more than one time with the same meaning. So, it should be eliminated.
- ❖ Some factors and sentences should be modified in order to give more clear meaning and understanding.
- ❖ Some factors should be rearranged in order to give more suitable and consistent meaning
- ❖ There are some questions which are not practical or realistic with respect to local situations of building construction projects. Such questions should be removed.

Based on the comments obtained from the pilot study, the questionnaire was modified and corrected and as a result the final questionnaire have been made more clearer by replacing ambiguous words with simple and understandable ones.

### **3.9. Reliability of the questionnaire**

The reliability of an instrument is the degree of consistency which measures the attribute it is supposed to be measure. The lesser the variation an instrument produces in of an attribute, the

higher its reliability. Reliability can be equated with the stability, consistency, or dependability of a measuring tool (Frost, 2007).

The first attribute evaluated and reported typically is reliability, the extent to which a measure yields the same number or score each time it is administered when the construct being measured has not changed. Internal consistency reliability, the primary method of estimating reliability for multi-item scales, provides information about the associations among different items in the scale (Frost, 2007).

The reliability of an instrument is the degree of consistency which solutions the attribute; it is supposed to be measuring. The less variation an instrument produces in repeated measurements of an attribute, the higher its reliability. Reliability can be equated with the stability, consistency, or dependability of a measuring tool. The test is repeated to the same sample of people on two occasions and then compares the scores obtained by computing a reliability coefficient (Al-Najjar, 2008). When reliability is greater than 0.7 it is considered as satisfactory.

### 3.10. Data Analysis Method

After collecting the questionnaire from each site the raw data entered to computer and analyzed by using MS excel and SPSS software.

In this study, an ordinal measurement scale 1 to 5 was used to determine the degree of influence and impact of factors of delayed payment. Respondents were asked to rank each factors according to the degree of importance (Very high contribution=5, High contribution=4, Medium contribution=3, Low contribution=2, Very low contribution=1) and (significantly high impact =5, High impact =4, Medium impact =3, Low impact =2, No impact =1). For analyzing data by ordinal scale, a relative importance index (RII) was used by following equation (1).

$$RII = \frac{\sum W}{5 * N} \dots\dots\dots \text{equation (1)}$$

WHERE

RII= Relative importance index

W = the rating given to each factors by the respondents ranging from 1 to 5

N=Total number of response collected for the ordinal scale

5= the highest value given to factors by the respondents

The relative importance index (RII) for all factors were calculated. Then after calculating the relative importance index for each factors rank the values gained (A.Soekiman, 2011).

The analysis for the case study was done based on considering PPA and FIDIC condition of contracts PPA 2006 says that the employer shall pay the Contractor the amounts certified by the Engineer within 30 days of the date of each certificate. FIDIC 2006 say that the amount certified in each interim payment certificate within 56 days after the engineer receives the statement and supporting documents.

## CHAPTER FOUR

### 4. ANALYSIS AND DISCUSSION OF RESULTS

#### 4.1. Introduction

This chapter describes the results and discussion of case study and questionnaire concerning the extent problems of delayed payment in public building projects in Gondar city. The analysis is based on Contractors, Consultants and Clients view of points.

#### 4.2. Result of Questionnaire

To successfully achieve the objective of the study, one of the most important phases is collection of accurate data. Data collection is a procedure of collecting a crucial data records from a certain sample or population of observation. The reliability of questionnaires returned from the respondents should be seen carefully before starting analysis. Based on the research approach explained in Chapter three, the analysis of data collected by questionnaire was undertaken using statistical analysis software (SPSS) and Microsoft excel.

##### 4.2.1. Analysis of General Information

From fifty questionnaires distributed 46 questionnaires were collected and 2 questionnaires were reject which are not fully answered. From questionnaires collected only 44 were found suitable for my data analysis. From the table (4-5); fifty questionnaires were targeted to be collected and out of these 44 which is 88% are successfully responded, and it was believed to be adequate for this study.

Table 4-1: General information

<b>Questionnaire</b>	<b>No of questionnaire</b>	<b>Percentage of total</b>
Total questionnaires distributed	50	100%
Total questionnaires received	46	92%
Questionnaires not received	4	8%
Invalid questionnaires	2	4%
questionnaires used for the study	44	88%

#### 4.2.1.1. Section A: General Information About the Respondents

##### 4.2.1.1.1. Type of Organization

Table 4-2: Type of organizations

Type of organization	Frequency	Percentage
Contractor	23	52.27 %
Consultant	10	22.73 %
Client	11	25 %

Table (4-6) shows that the frequency and percent of each type of organization or company where the response rate for clients was (25%) from the sample size, the response rate for contractors was (52.27%) from the sample size and the response rate for consultants was (22.73%) from the sample size. The majority are contractors because delayed payment mostly affects the contractor.

##### 4.2.1.1.2. Experience of the Company in the Sector

Table 4-3: Experience of the company

Experience of the company	Frequency	Percentage
0-5	3	6.8 %
5-10	17	38.6 %
11-15	15	34.1 %
Above 15	9	20.5 %

Table (4-7) shows that the frequency and percent of each respondent's company experience years in the construction industry, where the response rate for "0 – 5years" was (6.8%) from the sample size, response rate for "5 - 10 years " was (38.6 %) from the sample size, response rate for "11 - 15 years " was (34.1%) from the sample size and response rate for " More than 15 years " was (20.5%) from the sample size. The fact that more than (54.6%) of the respondent's organization or company have more than 10years' experience was reflected in the level of consistency and precision of the information provided and provides further validity for the survey results.

#### 4.2.1.1.3. Respondents Working Position/Profession

Table 4-4: Respondents Profession

<b>Profession</b>	<b>Frequency</b>	<b>Percentage</b>
Project manager	11	25%
Office engineer	12	27.3%
Site engineer	10	22.7%
Cost engineer	5	11.4%
Other	6	13.6%

Table (4-8) shows that the frequency and percent of respondents working position in the company. Where the response rate for project manager was (25%) from the sample size, response rate for site engineer was (22.7%) from the sample size, response rate for office engineer was (27.3%) from the sample size, response rate for others was (13.6%) from the sample size and response rate for cost engineer was (11.4%).

#### 4.2.1.1.4. Respondent's Year of Experience

Table 4-5: Respondents year of experience

<b>Year of Experience</b>	<b>Frequency</b>	<b>Percentage</b>
0-5	13	29.5%
5-10	16	36.4%
11-15	7	15.9%
Above 15	8	18.2%

Table (4-9) shows that the frequency and percent of each respondent's experience in the construction industry, where the response rate for "0 - 5 years" was (29.5%) from the sample size, response rate for "5 – 10 years " was (36.4%) from the sample size, response rate for "11 – 15 years " was (15.9%) from the sample size and response rate for " More than 15 years " was (18.2 %) from the sample size. It is clear that about a third of the respondents have experience more than 10 years, this gives strength to the data collected.

### 4.3. Reliability and Validity of Results

#### 4.3.1. Cronbach's Coefficient Alpha

This method is used to check the reliability of the result between each field and the mean of the whole fields of the result. The normal range of Cronbach's coefficient alpha value between 0.0 and + 1.0, and the higher values reflects a higher degree of internal consistency (Al-Najjar, 2008).

Table (3-1) shows the values of Chronbach's Alpha for each fields of the questionnaire and the entire questionnaire. For the fields, values of Chronbach's Alpha were in the range from 0.991 and 0.995.

Table 4-6 : Reliability statistics

Cronbach's Alpha	Items	Number of factors
0.995	Improper practice related questions	17
0.991	Impact related questions	10
0.993	Solution related questions	10
0.993	Total	37

From the table (4-1) Chronbach's Alpha equals 0.993 for the entire questionnaire which indicates a very high reliability of the result. And for each items it is between 0.991 and 0.995 which a very high reliability of each group of questionnaires. There for the result was reliable.

#### 4.3.2. Spearman Correlation Coefficient of the Result

This method is used to check the validity of the result. This method depends on finding spearman correlation coefficient between the means of odd rank questions and even rank questions of each field of the questionnaire. Then, correcting the Pearson correlation coefficients can be done by using Spearman correlation coefficient of correction. For each group of questions spearman correlation coefficient was calculated. It was calculated by using the following formula.

$$rs = 1 - \frac{6}{n(n^2-1)} \sum d^2$$

Where

rs = spearman rank correlation coefficient

d= the different in ranking between each pair of factors

n= number of data

#### Spearman Correlation Coefficient of Causes in Payment Group Question

Table 4-7: Spearman correlation coefficient of causes

Respondents	Contractor	Consultant	Client
Contractor	1	0.51	0.69
Consultant	---	1	0.71
Client	---	---	1
Number of variables = 17			



**Spearman Correlation Coefficient of Impacts of Delayed Payment Group of Question**

Table 4-8: Spearman correlation coefficient of impacts

<b>Respondents</b>	Contractor	Consultant	Client
Contractor	1	0.66	0.73
Consultant	---	1	0.67
Client	---	---	1
Number of variables = 10			

**Spearman Correlation Coefficient of Solutions for Delayed Payment Group of Question**

Table 4-9: Spearman correlation coefficient of potential solutions

<b>Respondents</b>	Contractor	Consultant	Client
Contractor	1	0.61	0.66
Consultant	---	1	0.57
Client	---	---	1
Number of variables = 10			

In statistics, correlation coefficient  $r_s$  measures the strength and direction of a linear relationship between two variables. The value is always between +1 and -1. The interpretation is based on the following three values.

- If the values is between 0.5 and 0.69, it has a positive relationship.
- If the values is between 0.7 and 0.99, it has a strong positive linear relationship.
- If the values is 1, it has a perfect linear relationship.

In the above tables 4-2, 4-3 and 4-4 values are from 0.51 to 1 which has a correlation from moderate to perfect relationship. Therefore it was valid.

**4.4. Relative Index of Questionnaires**

**4.4.1. Average Relative Importance Index of Causes of Delayed Payment**

Table (4-6) shows that the relative index and its ranks of causes that contribute to payment delay in construction projects and the mean value which is calculated by using SPSS. It contains 17 major improper activities that cause of delayed payment.

Table 4-10: average relative importance index of causes of delayed payment

No	Causes	Mean	RII	Rank
1.	Employers poor financial management	3.8	0.77	2
2.	Employers withholding payment	3.8	0.75	3
3.	Delays in certification	3.1	0.61	16
4.	Disagreement on valuation of work done	3.1	0.64	13
5.	Cultural attitude	3.5	0.70	6
6.	Budget deficient	3.9	0.88	1
7.	Poor communication between parties	3.4	0.68	9
8.	Delay in submitting payment claims	3.3	0.66	10
9.	Lack of control and follow up	3.0	0.60	17
10.	Administration/bureaucracy	3.2	0.65	11
11.	Having too much work at a time	3.4	0.69	7
12.	Lack of knowledge and experience in the field	3.2	0.64	13
13.	Poor planning system	3.5	0.71	5
14.	Disputes over quality of work	3.4	0.69	7
15.	Procurement problem	3.6	0.73	4
16.	Disputes with debtors/creditors	3.2	0.65	11
17.	Lack of unity among parties	3.2	0.64	13

From table (4-6) budget deficient was the first cause with an RII Value of 0.88 that contribute for delay in payment, it is true that in public projects there was shortage of budget most of the time. Employer's poor financial management was the second improper practice that contributes for delay in payment with an RII value of 0.77. The third causes in payment are Employers withholding payment with an RII value of 0.75. The fourth improper practice in payment was Procurement problem used with an RII value of 0.73. The fifth improper practice in payment was poor planning system with an RII value of 0.71. The sixth improper practice in payment was cultural attitude of projects with an RII value of 0.70. The seventh causes in payment are Disputes over quality of work and having too much work at a time with an RII value of 0.69. The ninth improper practice in payment was Poor communication between parties with an RII value of 0.68. The tenth the improper practice in payment was Delay in submitting payment claims with an RII value of 0.66. The eleventh causes in payment were disputes with debtors/creditors and Administration/bureaucracy with an RII value of 0.65. The thirteenth causes in payment are Disagreement on valuation of work done, Lack of unity among parties and Lack of knowledge and experience in the field with an RII value of 0.64. The sixteenth improper practice in payment was Delays in certification with an RII value of 0.61. The seventeenth improper practice in payment was Lack of control and follows up with an RII value of 0.60.

#### 4.4.1.1. Relative Index of Causes Given by Respondents

Table 4-11: Relative index of causes given by respondents

No	Causes	Contractor		Consultant		Client	
		RII	Rank	RII	Rank	RII	Rank
1.	Employers poor financial management	0.88	1	0.73	1	0.80	2
2.	Employers withholding payment	0.55	13	0.63	5	0.97	1
3.	Delays in certification	0.70	3	0.48	16	0.40	17
4.	Disagreement on valuation of work	0.63	8	0.58	8	0.60	12
5.	Cultural attitude	0.63	8	0.55	11	0.77	4
6.	Budget deficient	0.55	13	0.65	3	0.43	16
7.	Poor communication between parties	0.70	3	0.50	13	0.73	6
8.	Delay in submitting payment claims	0.53	16	0.50	13	0.60	12
9.	Lack of control and follow up	0.45	17	0.48	16	0.57	14
10.	Administration/bureaucracy	0.63	8	0.63	5	0.67	9
11.	Having too much work at a time	0.70	3	0.58	8	0.73	6
12.	Lack of knowledge and experience	0.70	3	0.53	12	0.63	10
13.	Poor planning system	0.65	7	0.65	3	0.63	10
14.	Disputes over quality of work	0.63	8	0.58	8	0.80	2
15.	Procurement problem	0.55	13	0.60	7	0.77	4
16.	Disputes with debtors/creditors	0.75	2	0.68	2	0.53	15
17.	Lack of unity among parties	0.58	12	0.50	13	0.73	6

#### Contractors View

Table (4-11) shows the RII value of causes ranked by contractor. The result of contractors' response about causes indicated that Employers poor financial management ranked first and disputes with debtors/creditors was ranked second and have RII value of 0.88 and 0.75 respectively. Delays in certification, poor communication between parties, having too much work at a time, lack of knowledge and experience in the field are the third rank with RII value 0.70. Poor planning system was the seventh with RII value 0.65. Disagreement on valuation of work done, cultural attitude, administration/bureaucracy and disputes over quality of work are the eighth with RII value of 0.63. Lack of unity among parties the twelfth with 0.58 RII value. Employers withholding payment, budget deficient and Procurement problem have thirteenth rank with an RIII value of 0.55. Delay in submitting payment claims are the sixteenth with an RII value of 0.53. The last improper practice was Lack of control and follow up with an RII value of 0.45.

### **Consultants View**

Table (4-11) shows that the RII value of causes ranked by consultant. The result of consultants response about causes indicated that Employers poor financial management ranked first and Disputes with debtors/creditors was ranked second and have RII value of 0.73 and 0.68 respectively. Budget deficient and poor planning system are the third rank with RII value 0.65. Administration/bureaucracy is the fifth with RII value 0.63. Procurement problem was the seventh with RII value 0.60. Disagreement on valuation of work done, having too much work at a time and disputes over quality of work are the eighth with 0.58. Lack of knowledge and experience in the field was the twelfth with 0.53. Poor communication between parties, delay in submitting payment claims and lack of unity among parties are the thirteenth improper practice with 0.50. Delays in certification and lack of control and follow up are the sixteenth improper practice with RII value of 0.48.

### **Clients View**

Table (4-11) that shows the RII value of causes ranked by client. The result of client's response about causes indicated that Employers withholding payment ranked first and Employers poor financial management and disputes over quality of work were ranked second and have RII value of 0.97 and 0.80 respectively. Cultural attitude and procurement problem were ranked fourth with RII value 0.65. Poor communication between parties, having too much work at a time and Lack of unity among parties were ranked sixth with RII value 0.73. Administration/bureaucracy was the ninth with RII value 0.67. Lack of knowledge and experience in the field and poor planning system were the tenth with 0.63 RII value. Disagreement on valuation of work done and delay in submitting payment claims were the twelfth with 0.60. Lack of control and follow up was the fourteenth with 0.57. Disputes with debtors/creditors was the fifteenth with 0.53 RII value. Budget deficient was the sixteenth improper practice with RII value of 0.43. The last improper practice was Delays in certification with 0.40 RII value.

#### **4.4.2. Average Relative Importance Index of Impacts of Delayed Payment**

Table (4-12) shows the relative index and its ranks of impacts of delayed payment on construction projects and the mean value which was calculated by using SPSS. It contains 10 major factors that cause of delayed payment.

Table 4-12: Average relative important index of impacts of delayed payment

No	Impacts	RII	Rank
1.	Cash flow problems	0.76	1
2.	Disputes among parties	0.72	4
3.	Construction delays	0.75	2
4.	Construction productivity reduction	0.69	7
5.	Reduced employment in construction projects	0.70	5
6.	Creates negative chain impact on other parties	0.74	3
7.	Leads to abandonment of projects	0.70	5
8.	Creates negative social impacts	0.67	8
9.	Construction costs are higher	0.65	10
10.	Delivery of equipment's and materials are delayed	0.67	8

From the table (4-12) budget Cash flow problems was the first impact with an RII Value of 0.76 that caused by delayed in payment it was true that in public projects if there is payment delay there will be cash flow problem because payment delay affects the inflow of money to the organization. Construction delay was the second impact with an RII Value of 0.75 caused by delayed in payment. Delay in payment for the contractor creates cash flow problems which can affect the whole project progress of works and could result in construction delay. The third impact it creates negative chain impact on other parties with an RII Value of 0.74 caused by delayed in payment. If there is delay in payment in one of the parties involved it may affect the supply chain of payment of the project. For example if the client delays giving payment for the contractor this will make contractors delay in making payment to the sub-contractors and workers.

The fourth impact was Disputes among parties with an RII Value of 0.7 caused by delayed in payment. The fifth impact was reduced employment in construction projects and Leads to abandonment of projects with an RII Value of 0.70 caused by delayed in payment. Delayed in payment affects the cash flow of the contractor it leads to abandonment and because Contractors must limit their payroll commitments to reflect the amount of payment risk that they can afford to take on. The seventh impact was Construction productivity reduction with an RII Value of 0.69 caused by delayed in payment. If payment for the contractor delayed, it results making payment for the workers if workers doesn't paid at time their productivity may reduce. The eighth impacts are Creates negative social impacts and Delivery of equipment's and materials are delayed with an RII Value of 0.67 caused by delayed in payment. The tenth impact was

Construction costs are higher with an RII Value of 0.65 caused by delayed in payment. It is true that if the client doesn't make payment at a time it is difficult to purchase material if materials doesn't purchase at a time the cost may increase due to increase material cost from time to time.

#### 4.4.2.1. Relative index of Impacts of Delayed Payment Given by Respondents

Table 4-13: Relative index of impacts of delayed payment given by respondents

No	Impacts	Contractor		Consultant		Client	
		RII	Rank	RII	Rank	RII	Rank
1.	Cash flow problems	0.73	4	0.60	3	0.83	2
2.	Disputes among parties	0.80	2	0.68	1	0.63	7
3.	Construction delays	0.73	4	0.53	7	0.93	1
4.	Construction productivity reduction	0.58	10	0.60	3	0.67	6
5.	Reduced employment in construction projects	0.68	8	0.65	2	0.63	7
6.	Creates negative chain impact on other parties	0.93	1	0.60	3	0.77	4
7.	Leads to abandonment of projects	0.80	2	0.55	6	0.60	10
8.	Creates negative social impacts	0.70	7	0.53	7	0.83	2
9.	Construction costs are higher	0.60	9	0.50	9	0.63	7
10.	Delivery of equipment's and materials are delayed	0.73	4	0.45	10	0.73	5

#### Contractors View

Table (4-13) shows the RII value of impacts of delayed payments ranked by contractor. The result of contractor's response about impacts indicated that Creates negative chain impact on other parties ranked first and Disputes among parties and leads to abandonment of projects were ranked second and have RII value of 0.93 and 0.80 respectively. Construction delays, Delivery of equipment's and materials are delayed and Cash flow problems were ranked fourth with RII value 0.73. Creates negative social impacts was ranked seventh with RII value 0.70. Reduced employment in construction projects was the eighth with RII value 0.68. Construction costs are higher was the ninth with 0.60 RII value. Construction productivity reduction was the tenth with 0.58 RII value.

#### Consultants View

Table (4-13) shows the RII value of impacts of delayed payments ranked by consultant. The result of consultant's response about impacts indicated that Disputes among parties ranked first and reduced employment in construction projects was ranked second and have RII value of 0.68

and 0.65 respectively. Cash flow problems, construction productivity reduction and creates negative chain impact on other parties were ranked third with RII value 0.60. Leads to abandonment of projects was ranked sixth with RII value 0.55. Creates negative social impacts and Construction delays were ranked seventh with RII value 0.53. Construction costs are higher was the ninth with RII value 0.50. Delivery of equipment's and materials are delayed was the tenth with 0.45 RII value.

### **Clients View**

Table (4-13) shows that the RII value of impacts of delayed payments ranked by clients. The result of client's response about impacts indicated that Construction delays ranked first and Cash flow problems and creates negative social impacts were ranked second and have RII value of 0.93 and 0.83 respectively. Creates negative chain impact on other parties was ranked fourth with RII value 0.77. Delivery of equipment's and materials are delayed was ranked fifth with RII value 0.73. Construction productivity reduction was ranked sixth with RII value 0.67. Construction costs are higher, disputes among parties and reduced employment in construction projects were ranked seventh with RII value 0.63. Leads to abandonment of projects was the tenth with 0.60 RII value.

#### **4.4.3. Average Relative Importance Index of Potential Solutions**

Table (4-14) shows the relative index and its ranks factors that contribute to reduce the impacts of delayed payment on construction projects and the mean value which was calculated by using SPSS. It contains 10 major factors that cause of delayed payment.

Table 4-14: average relative importance index of potential Solutions

<b>No</b>	<b>solutions</b>	<b>RII</b>	<b>Rank</b>
1.	Payment of stipulated interest	0.72	2
2.	Suspension of work	0.75	1
3.	Setup trust with bank prior to work start to get paid	0.72	2
4.	Better communication	0.70	4
5.	Automatic penalties charged to client for delayed payment	0.68	6
6.	Create maximum time to pay	0.62	10
7.	Prompt payment legislation	0.68	6
8.	Better specifications prior to start work	0.69	5
9.	Better management of change orders	0.63	9
10.	Risk should share among all parties involved	0.65	8

From table (4-14) Suspension of work was the first solution to be taken to reduce the impact of delayed payment public projects with an RII Value of 0.75. The second solution to be taken to reduce the impact of delayed payment public projects are payment of stipulated interest and Setup trust with bank prior to work start to get paid with an RII Value of 0.72. The fourth solution to be taken to reduce the impact of delayed payment public projects was Better communication with an RII Value of 0.70. The fifth solution to be taken to reduce the impact of delayed payment public projects was Better specifications prior to start work with an RII Value of 0.69. The sixth solution to be taken to reduce the impact of delayed payment public projects was automatic penalties charged to client for delayed payment and Prompt payment legislation with an RII Value of 0.68. The eighth solution to be taken to reduce the impact of delayed payment public projects was Risk should share among all parties involved with an RII Value of 0.65. The ninth solution to be taken to reduce the impact of delayed payment public projects was Better management of change orders with an RII Value of 0.63. The tenth solution to be taken to reduce the impact of delayed payment public projects was Create maximum time to pay with an RII Value of 0.62.

#### 4.4.3.1. Relative Importance Index of Solutions Given by Respondents

Table 4-15: Relative importance index of potential solutions given by respondents

No	Solutions	Contractor		Consultant		Client	
		RII	Rank	RII	Rank	RII	Rank
1.	Payment of stipulated interest	0.75	4	0.75	4	0.58	1
2.	Suspension of work	0.80	3	0.78	3	0.50	3
3.	Setup trust with bank prior to work start to get paid	0.73	5	0.70	5	0.38	9
4.	Better communication	0.58	10	0.85	1	0.35	10
5.	Automatic penalties charged to client for delayed payment	0.68	8	0.85	1	0.45	6
6.	Create maximum time to pay	0.88	1	0.63	7	0.53	2
7.	Prompt payment legislation	0.83	2	0.60	8	0.45	6
8.	Better specifications prior to start work	0.73	5	0.60	8	0.45	6
9.	Better management of change orders	0.63	9	0.70	5	0.50	3
10.	Risk should share among all parties involved	0.73	5	0.58	10	0.48	5

#### Contractors View



Table (4-15) below shows the RII value of potential solutions of impacts of delayed payments ranked by contractor. The result of contractor's response about potential solutions indicated that Create maximum time to pay ranked first and prompt payment legislation was ranked second and have RII value of 0.88 and 0.83 respectively. Suspension of work was ranked third with RII value 0.80. Payment of stipulated interest was ranked fourth with RII value 0.75. Setup trust with bank prior to work start to get paid, better specifications prior to start work and risk should share among all parties involved were the fifth with RII value 0.73. Automatic penalties charged to client for delayed payment was ranked eighth with RII value 0.68. Better management of change orders was the ninth with 0.63 RII value. Better communication was the tenth with 0.58 RII value.

### **Consultants View**

Table (4-15) shows the RII value of potential solutions of impacts of delayed payments ranked by consultant. The result of consultant's response about potential solutions indicated that Better communication automatic penalties charged to client for delayed payment were ranked first and Suspension of work was ranked third and have RII value of 0.85 and 0.78 respectively. Payment of stipulated interest was ranked fourth with RII value 0.75. Setup trust with bank prior to work start to get paid and better management of change orders was ranked fifth with RII value 0.70. Create maximum time to pay was the seventh with RII value 0.63. Prompt payment legislation and better specifications prior to start work was ranked eighth with RII value 0.60. Risk should share among all parties involved was the tenth with 0.58 RII value.

### **Clients View**

Table (4-15) shows the RII value of potential solutions of impacts of delayed payments ranked by client. The result of client's response about potential solutions indicated that Payment of stipulated interest was ranked first and Create maximum time to pay was ranked second and have RII value of 0.58 and 0.53 respectively. Suspension of work and better management of change orders were ranked third with RII value 0.50. Risk should share among all parties involved was ranked fifth with RII value 0.48. Automatic penalties charged to client for delayed payment, prompt payment legislation and better specifications prior to start work were the sixth with RII

value 0.45. Setup trust with bank prior to work start to get paid was ranked ninth with RII value 0.38. Better communication was the tenth with 0.58 RII value.

#### **4.5. One Way Analysis of Variance (ANOVA)**

##### **4.5.1. One Way Analysis of Variance for Causes of Delayed Payment**

There could be a significant difference about causes of delayed payment by the respondents (contractor, consultant and client) at a significant level = 0.05. The hypothesis was done using ANOVA using SPSS which is presented in table (4-16) which has the P-value (0.441) that is greater than 0.05 and the value of F test equal to 0.935 which is less than the value of critical value which is (3.06), this shows that are no statistical difference about causes of delayed by respondents at significant level of =0.05.

Table 4-16: One way analysis of variance for causes of delayed payment

<b>Field</b>	<b>Source</b>	<b>Sum of squares</b>	<b>df</b>	<b>Mean square</b>	<b>F value</b>	<b>P value</b>
Causes for delayed payment	Between groups	0.059	16	0.000	0.935	0.441
	Within groups	83.100	27	2.599		
	Total	83.159	43			

Critical value of F at df (16, 27) and significance level (0.05) equal to (3.06)

##### **4.5.2. One Way Analysis of Variance for Impact of Delayed Payment**

There could be a significant difference about causes of delayed payment by the respondents (contractor, consultant and client) at a significant level = 0.05. The hypothesis was done using ANOVA using SPSS which is presented in table (4-17) which has the P-value (0.981) that is greater than 0.05 and the value of F test equal to 0.334 which is less than the value of critical value which is (3.06), this shows that are no statistical difference about causes of delayed by respondents at significant level of =0.05.

Table 4-17: One way analysis of variance for impacts of delayed payment

Field	Source	Sum of squares	Df	Mean square	F value	P value
Solutions for delayed payment	Between groups	0.635	16	0.001	0.334	0.981
	Within groups	72.342	27	2.703		
	Total	72.977	43			

Critical value of F at df (16, 27) and significance level (0.05) equal to (3.06)

#### 4.5.3. One Way Analysis of Variance for Solutions of Effects of Delayed Payment

There could be a significant difference about causes of delayed payment by the respondents (contractor, consultant and client) at a significant level = 0.05. The hypothesis was done using ANOVA using SPSS which is presented in table (4-16) which has the P-value (0.621) that is greater than 0.05 and the value of F test equal to 0.562 which is less than the value of critical value which is (3.06), this shows that are no statistical difference about causes of delayed by respondents at significant level of =0.05.

Table 4-18: One way analysis of variance for solutions of delayed payment

Field	Source	Sum of squares	Df	Mean square	F value	P value
Solution for the effects of delayed payment	Between groups	0.727	16	0.727	0.562	0.621
	Within groups	79.000	27	3.000		
	Total	79.727	43			

Critical value of F at df (16, 27) and significance level (0.05) equal to (3.06)

#### 4.6. Case Study

In this regard, three building projects have been selected randomly and certified payment, certified date, certified amount, released date, released amount and time delayed were studied by reviewing Contract documents, Project documents, Progress reports, Contractor's Payment Certificates. To know how much the payment are delayed I was used PPA and FIDIC condition of contracts.

#### **4.6.1. Case One: Natural and Computational Science Laboratory Building**

The name of the project was natural and computational science laboratory building center that is found in Tewodros campus. The procurement was open tendering and ZAMRA construction PLC was awarded. The contract agreement was signed on June 8, 2007 E.C. The construction was beginning on June 23, 2007 E.C. According to the Ethiopian calendar the duration of the project was all most two years. As I have seen from the bid document the initial cost estimation of the project was 333,437,567.74 Birr. But the cost increase due to many factors.

##### **A. Location of The Project**

This project was located in Tewodros campus in front of University stadium and at the back of mean registrar office. The site can be accessed from a main street of the city which is from azezo to Gondar. The accessibility to the construction site is easy because the street road is wide enough for large vehicles to run side by side. The vehicle needed to wait until another vehicle passed before it proceed so additional personnel not needed to control the traffic around the site during the construction.

##### **B. Benefit of The Project**

The benefit of the project issued for student's laboratory testes center and to perform different studies which is good for the societies outside the university. This laboratory is used for giving any kinds of training for campus staffs and other external Gondar city communities. It is very important center that will enhance the skill and the knowledge of students, teachers, administrative staffs other external Gondar city communities.

##### **C. Stakeholder of The Project**

The stakeholder of the project is contractors, sub-contractors, clients, consultants, regulatory bodies and daily laborer. In the case study, many parties played a crucial role throughout the course of construction.

##### **D. The Owner**

The owner of this project is university of Gondar that invested in many huge projects. Most of the projects handled by the Gondar University were class room buildings, offices and other facility center. This university had developed many projects when the case study was under

taken. University of Gondar played a critical role during the construction with a different perspective toward project completion.

#### **E. General Contractor**

The general contractor for this project was a ZAMRA construction PLC which was developed primarily to construct the projects for this development company. Most personnel working for the company had three to ten years' experience and the project manager had ten years' experience in construction. The general contractor was responsible for the structural and architectural work and prepared the site for landscaping but hired subcontractors to perform electrical and mechanical work. And there are sub-contractors like Electrical Subcontractor, Mechanical Subcontractor and Sanitary Subcontractor These subcontractor had been in the business for more than five years.

#### **F. Consultant**

The Ethiopian Construction Design and Supervision Works Corporation (ECDSWC) responsible for this project is the consultant company, an affiliate of a famous architectural firm in Ethiopia. This architectural firm was established more than 30 years ago, while the construction management company had been established for almost three years by the time the case study was being constructed. Most personnel working for the company had five to fifteen years' experience in design and construction, since they had worked for the architectural firm before. The construction management company provided a variety of services to the owner. It was authorized by the owner to prepare design drawings and construction drawings in response to the modifications required by the owner and purchasers.

#### **G. Type of The Contract**

The types of contract are unit rate type of contract. The project used unit rate type of contract which is widely used in Ethiopian construction industry. However, the procedure to award the contract to the general contractor is different from other projects. The construction supervisor company stepped into the project after the owner awarded the contract to the general contractor. As a result, the construction supervisor company was not involved with the bidding process, but served as a project supervisor providing advice to the owner and monitoring the construction. All of the changes had to be approved by the owner.

However, the procedure to award the contract to the general contractor is different from other projects. Because the general contractor is an affiliate of the developer, it was awarded with the bidding process. The construction costs of the project were negotiated to meet the budget. In this case study, the general contractor was responsible for preparing and awarding contracts to subcontractors and reporting to the owner.

## H. Payment Delayed

Table 4-19 : Payment in laboratory building

Certified payments	Certified date(EC)	Certified amount	Released / paid date(EC)	Released / paid amount	Delayed time	Remark
Payment certificate No-13	12/07/2010	22,779,642.29	07/12/2010	19,412,216.91	145 days	Paid in different days
Payment certificate No-14	07/10/2010	20,539,714.07	23/04/2011	6,000,000	315 days	Partially paid
			17/08/2011	11,468,236.83		The remaining is paid
Payment certificate No-15	16/11/2010	21,176,350.11	24/11/2011	10,161,710.85	470 days	Partially paid
			13/02/2012	500,000		Partially paid
				7,341,900.45		Net unpaid
Payment certificate No-16	17/03/2011	11,194,673.07	29/10/2011	9,520,638.92	222 days	Paid

### 4.6.2. Case Two: ICT Center Building

The name of the project is ICT center that is found in the main entrance of Tewodros campus. The procurement was open tendering and Unity Engineering PLC was awarded. The contract agreement was signed on June 8, 2007 E.C. The construction was beginning on June 23, 2007 E.C. According to the Ethiopian calendar the duration of the project is all most two years that is 600 days. As I have seen from the bid document the initial cost estimation of the ICT project was 459,497,202.89Birr. But the cost increase due to many factors.

### **A. Location of The Project**

This project is located in Tewodros campus close to main Maraki entrance. The site can be accessed from a street connected to a main campus road which is an important to gaining simply. The accessibility to the construction site is easy because the street road is wide enough for large vehicles to run side by side. The vehicle needed to wait until another vehicle passed before it proceed so additional personnel not needed to control the traffic around the site during the construction.

### **B. Benefit of The Project**

The benefit of the project issued for student's computer skill training center and for controlling the overall Gondar university work processes. This ICT center is used for giving any kinds of training for campus staffs and other external Gondar city communities. It is very important center that will enhance the skill and the knowledge of students, teachers, administrative staffs other external Gondar city communities. Mainly the project will used for facility control of all university work.

### **C. Stakeholder of The Project**

The stakeholder of the project is contractors, sub-contractors, clients, consultants, regulatory bodies and daily laborer. In the case study, many parties played a crucial role throughout the course of construction. The Sales Department, representing the owner, stepped into the construction and played a significant role after the main construction work had been completed.

### **D. The Owner**

The owner of this project is university of Gondar that invested in many huge projects. Most of the projects handled by the Gondar University were class room buildings, offices and other facility center. This university had developed many projects when the case study was under taken. University of Gondar owner played a critical role during the construction with a different perspective toward project completion. These strategies were to reduce the project budget and allow for certain changes during the construction. In order to cut some of the project expenses, the owner hired the architect and engineer to provide only the primary design and prepare only the sufficient architectural and structural drawings to receive the building permit. As a result, the details of drawings and specification were sufficient to file for the building permit, but not sufficient for construction.

### **E. General Contractor**

The general contractor for this project was a Unity engineering PLC company which was developed primarily to construct the projects for this development company. The case study was the third project built by this general contractor. Most personnel working for the company had three to ten years' experience and the project manager had ten years' experience in construction.

The general contractor was responsible for the structural and architectural work and prepared the site for landscaping but hired subcontractors to perform electrical and mechanical work. And there are sub-contractors like Electrical Subcontractor, Mechanical Subcontractor and Sanitary Subcontractor These subcontractor had been in the business for more than five years.

### **F. Consultant**

The Ethiopian Construction Design and Supervision Works Corporation (ECDSWC) responsible for this project is the consultant company, an affiliate of a famous architectural firm in Ethiopia. This architectural firm was established more than 30 years ago, while the construction management company had been established for almost three years by the time the case study was being constructed. Most personnel working for the company had five to fifteen years' experience in design and construction, since they had worked for the architectural firm before. The construction management company provided a variety of services to the owner. It was authorized by the owner to prepare design drawings and construction drawings in response to the modifications required by the owner and purchasers.

### **G. Type of The Contract**

The types of contract are unit rate type of contract. The project used unit rate type of contract which is widely used in Ethiopian construction industry. However, the procedure to award the contract to the general contractor is different from other projects. Because the general contractor is an affiliate of the developer, it was awarded with the bidding process. The construction supervisor company stepped into the project after the owner awarded the contract to the general contractor. As a result, the construction supervisor company was not involved with the bidding process, but served as a project supervisor providing advice to the owner and monitoring the construction. All of the changes had to be approved by the owner.



However, the procedure to award the contract to the general contractor is different from other projects. Because the general contractor is an affiliate of the developer, it was awarded with the bidding process. The construction costs of the project were negotiated to meet the budget. In this case study, the general contractor was responsible for preparing and awarding contracts to subcontractors and reporting to the owner.

## H. Delayed Payment

Table 4-20: payment in ICT

Certified payments	Certified date(EC)	Certified amount	Released / paid date(EC)	Released / paid amount	Delayed time	Remark
Payment	17/10/2008	26,820,861.29	30/02/2009	11,622,781.28	133 days	The remaining is paid
Payment	30/12/2008	20,115,645.97	18/04/2009	17,593,941	108 days	The remaining is paid
Payment	11/04/2010	20,115,645.97	27/10/2010	18,907,423.71	166 days	The remaining is paid

### 4.6.3. Case Three: Lab and Workshop

The name of the project is lab and workshop center that is found in institute of technology in fassil campus. The procurement was open tendering and yirgalem construction PLC was awarded. The construction was beginning in 2007 E.C. According to the Ethiopian calendar the completion period the project was 17/05 2009 still now not completed. As I have seen from the bid document the initial cost estimation of the project was 769,583,999 Birr. But the cost increase by 118,923,152 birr due variation.

#### A. Location of The Project

This project is located in fassil campus in the institute of technology. The site can be accessed from a street connected to a main campus road which is an important to gaining simply. The accessibility to the construction site is easy because the street road is wide enough for large vehicles to run side by side. The vehicle needed to wait until another vehicle passed before it proceed so additional personnel not needed to control the traffic around the site during the construction.

### **B. Benefit of The Project**

The project will be used for different workshops and training centers for students and used as a research center for teachers and students and will give different laboratory tests for different sectors outside the university communities. This workshop center is used for giving any kinds of training for campus staffs and communities. It is a very important center that will enhance the skill and the knowledge of students, teachers, and other external Gondar city communities.

### **C. Stakeholder of The Project**

The stakeholder of the project is contractors, sub-contractors, clients, consultants, regulatory bodies and daily laborer. In the case study, many parties played a crucial role throughout the course of construction.

### **D. The Owner**

The owner of this project is the University of Gondar that invested in many huge projects. This university had developed many projects when the case study was undertaken. The University of Gondar owner played a critical role during the construction with a different perspective toward project completion. These strategies were to reduce the project budget and allow for certain changes during the construction. In order to cut some of the project expenses, the owner hired the architect and engineer to provide only the primary design and prepare only the sufficient architectural and structural drawings to receive the building permit. As a result, the details of drawings and specifications were sufficient to file for the building permit, but not sufficient for construction. The drawings lacked data necessary for construction including the proper data for the general contractor to prepare for the project estimate.

### **E. General Contractor**

The general contractor for this project was a Yirgalem General Contractor PLC Company which was developed primarily to construct the projects for this development company. The case study was the third project built by this general contractor. Most personnel working for the company had three to ten years' experience and the project manager had ten years' experience in construction. The general contractor was responsible for the structural and architectural work and prepared the site for landscaping but hired subcontractors to perform electrical and mechanical work. And there are sub-contractors like Electrical Subcontractor, Mechanical Subcontractor and Sanitary Subcontractor. These subcontractors had been in the business for more than five years.

## F. Consultant

The Ethiopian Construction Design and Supervision Works Corporation (ECDSWC) responsible for this project is the consultant company, an affiliate of a famous architectural firm in Ethiopia. This architectural firm was established more than 30 years ago, while the construction management company had been established for almost three years by the time the case study was being constructed. Most personnel working for the company had five to fifteen years' experience in design and construction, since they had worked for the architectural firm before. The construction management company provided a variety of services to the owner. It was authorized by the owner to prepare design drawings and construction drawings in response to the modifications required by the owner and purchasers.

## G. Type of The Contract

The types of contract are unit rate type of contract. The project used unit rate type of contract which is widely used in Ethiopian construction industry. However, the procedure to award the contract to the general contractor is different from other projects. Because the general contractor is an affiliate of the developer, it was awarded with the bidding process. The construction supervisor company stepped into the project after the owner awarded the contract to the general contractor. As a result, the construction supervisor company was not involved with the bidding process, but served as a project supervisor providing advice to the owner and monitoring the construction. All of the changes had to be approved by the owner.

## H. Delayed Payment

Table 4-21: Payment in workshop building

Certified payments	Certified date(EC)	Certified amount	Released / paid date(EC)	Released / paid amount	Delayed time	Remark
Payment	30/9/2009	25,752,354	07/02/2010	25,752,354	127 days	Paid
Payment	28/08/2010	23,825,522.97	22/01/2011	19,125,321.29	74 days	The remaining paid
Payment	17/06/2011	22,256,456	18/10/2011	18,526,363.29	95 days	The remaining paid

#### 4.7. Analysis of Case Studies

The results obtained from each case was analyzed and discussed as the following. The data obtained was analyzed by using micro soft excel. Three different projects were considered in the analysis. The number of days that payment was delayed is presented in the table below.

Table 4-22: Case study analysis

Project	Delayed time for payment					Project delays until now	Original project period
	P1	P2	P3	P4	Total		
Laboratory building	145	315	459	222	1141	1058	660
ICT building	133	108	166		407	1617	600
Laboratory & workshop	127	74	95		296	798	660

It is clear that from the table (4-19) all projects were delayed when compared with the original contract period. It can be also noticed in some payments the total number of days taken for payments are higher when we compared with project delays and project period. Each case is separately analyzed based on the data collected. The analysis was done based on considering PPA and FIDIC condition of contracts. PPA 2006 says that the employer shall pay the Contractor the amounts certified by the Engineer within 30 days of the date of each certificate. FIDIC 2006 say that the amount certified in each interim payment certificate within 56 days after the engineer receives the statement and supporting documents. That means based on two scenarios payment delays beyond 30 days and payment delays beyond 56 days.

##### 4.7.1. Analysis of Case One

Table (4-20) shows Percentage of project delay was 160.3%. Payment delays are high compared with considerations of limits in PPA and FIDIC condition of contracts with 174.5%.

Table 4-23: Analysis of case one

Case one	Days	% compared with original contract period
Original contract period	660	
project delay until now	1058	160.3%
Cumulative payment delays beyond 30 days	1141	174.5%
Cumulative payment delays beyond 56 days	1141	174.5%

#### 4.7.2. Analysis of Case Two

Percentage of project delay was 269.5%. Payment delays are high compared with considerations of limits in PPA and FIDIC condition of contracts which is 67.8%.

Table 4-24: Analysis of case two

	Days	% compared with original contract period
Original contract period	600	
project delay until now	1617	269.5%
Cumulative payment delays beyond 30 days	407	67.8%
Cumulative payment delays beyond 56 days	407	67.8%

#### 4.7.3. Analysis of Case Three

Percentage of project delay was 221%. Payment delays are high compared with considerations of limits in PPA and FIDIC condition of contracts with 44.85%.

Table 4-25: Analysis of case three

	Days	% compared with original contract period
Original contract period	660	
project delay until now	798	221%
Cumulative payment delays beyond 30 days	296	44.85%
Cumulative payment delays beyond 56 days	296	44.85%

### 4.8. Discussion of the Case Studies

Here I was try to see the frequency of payments either it is paid on time or not. And also I am try to see the impact of payment delays on public building projects under two different PPA and FIDIC condition of contacts ,that was 30 days limitation and 56 days limitations.

#### 4.8.1. Payment Considering 30 Days Limitation

Ten payments were considered in the analysis. Out of the ten payments ten payments are delayed based on PPA condition of contact. There was no payment made on time based the comparison

of PPA condition of contact. Therefore 100% of payment were delayed for the contractors to be paid. The data analyzed is explained in the table below.

Table 4-26: Summary of payment by considering 30 days limit

Project	Payment before 30 days					Existence	
	P1	P2	P3	P4	Total Payment	Yes	No
Laboratory building	No	No	No	No	4		4
ICT building	No	No	No		3		3
Laboratory & workshop	No	No	No		3		3
Total					10	-----	10

Significance of delays with 30 days limitation

Table 4-27: Payment considering 30 days

Project	Existence in number		Existence in percentage	
	Yes	No	Yes	No
Laboratory building		4	0%	100 %
ICT building		3	0%	100 %
Laboratory building		3	0%	100 %
Total	0	10	0%	100 %

#### 4.8.2. Payment Considering 56 Days Limitation

Ten payments were considered in the analysis. Out of the ten payments 10 payments are delayed based on FIDIC condition of contact. There was no payment made on time based the comparison of FIDIC condition of contact. Therefore 100% of payment were delayed for the contractors to be paid. The data analyzed is explained in the table below.

Table 4-28: Summary of payment considering 56 days

Project	Payment before 56 days					Existence	
	P1	P2	P3	P4	Total Payment	Yes	No
Laboratory building	No	No	No	No	4		4
ICT building	No	No	No		3		3
Laboratory & workshop	No	No	No		3		3
Total					10	-----	10

Significance of delays with 56 days limitation

Table 4-29: Payment considering 56 days limitation

Project	Existence in number		Existence in percentage	
	Yes	No	Yes	No
Laboratory building		4	0 %	100 %
ICT building		3	0 %	100 %
Laboratory building		3	0 %	100 %
Total	0	10	0%	100%

#### 4.8.3. Summary

From the analysis the percentage of delayed payment was very high by considering PAP and FIDIC condition of contract guide lines. There was no any payment done on time, therefore timely payments should be improved and should give great concern by stakeholders.

#### 4.8.4. Reasons for Delayed in Payment

Some of the reasons that contribute for the delayed payment.

- ✓ Due to internal system of the client (No of layers passing the bill) the bill is normally subjected to pass through several individual officers for checking, certifying, recommending, approving or authorizing and paying in the alternative several sub divisions. Accordingly wastage of time is unpreventable.
- ✓ Cash problems of the client (Non availability of Funds) Cash is not physically available in clients Bank Accounts or in their hands to issue checks or transfer money or pay in cash.

Ultimately payments are delayed due to this issue even though checking, certifying, recommending and approving of bills have been already finalized.

- ✓ Time taken to check the bill by client Clients take their own time without considering the periods specified for payments in the Contract Document or Agreement.
- ✓ Additional works requested by client after submission of Final Bill After checking Final Bills if there is any balance amounts against originally approved cost, client requests to carry out some additional works prior to processing or paying of Final Bill.
- ✓ Non adherence of correct formats by Contractor there are separate billing formats for each project. Contractor should follow the specific formats when preparing his bill.
- ✓ Improper submission by Contractor(less documentation) Contractor should submit all and necessary supporting documents with his bills. Such as measurement sheets, bar schedules, sketch drawings, warranties, photos, log notes, rate break downs, variation orders, etc.

#### **4.8.5. Problems Happen in The Projects Due to Delayed Payment**

I was tried to investigate problems happen in each projects are much with the questionnaire filled here almost all impacts are happened. See in table (4-29). Therefore it can be used as validation for the questionnaire.

Table 4-30: Problems happen in the projects

<b>Impacts/Problems happened</b>	<b>Laboratory building</b>	<b>ICT building</b>	<b>Laboratory building</b>
Cash flow problem	Yes	yes	yes
Disputes among parties	Yes	yes	yes
Construction delays	Yes	yes	yes
Construction productivity reduction	Yes	yes	yes
Reduced employment in construction projects	Yes	yes	yes
Creates negative chain impact on other parties	Yes	yes	yes
Leads to abandonment of projects	No	no	No
Creates negative social impacts	Yes	yes	Yes
Delivery of equipment's and materials are delayed	Yes	yes	Yes



## CHAPTER FIVE

### 5. CONCLUSIONS AND RECOMMENDATIONS

This chapter summarized the findings from the above chapters and draw conclusions and recommendations of my study.

#### 5.1. CONCLUSIONS

The aim of the research was to study about the extent of problems caused by delayed payment on public building projects in Gondar city. And identify causes in construction payment system, identify the impacts of delayed payment, Study potential solutions to mitigate delayed payment. This study is useful for different parties of the construction industry.

From the case studies that I did we can see that all payments are delayed when we compare with the provisions of PPA and FIDIC condition of contracts. And payment in the first case is the most delayed with 459 days which more than one year. The least delayed payment is in case three with 74 days , even if it the least but it is greater than the guide lines of PPA and FIDIC that 30 and 56 days respectively.

From the questionnaire result employer's poor financial management, employers withholding payment, budget deficient, poor planning system and procurement problem are identified as top five causes in construction payment system.

Among the studied different impacts of delayed payment cash flow problems, construction delays, creates negative chain impact on other parties, disputes among parties and reduced employment in construction projects are the top five impacts of payment delays.

Among several potential solutions to mitigate delayed payment suspension of work, setup trust with bank prior to work start to get paid, payment of stipulated interest, better communication and better specifications prior to start work are top five solution for the effect of delayed payment.

## **5.2. RECOMMENDATIONS**

Recommendations are listed as follows for stakeholders participated in the construction industry in public building projects.

1. Clients should start work with budget in their pocket or with budget from the abide sources.
2. The clients should setup trust with bank prior to work start to get paid for the contractors.
3. Owners should pay any payment to the contractor on time because it weakens the contractor's ability to finance the work.
4. Clients are recommended to review the bid documents such as technical specifications, drawings, bill of quantities and the design of the project in a good way. It helps to reduce disputes and payment delay.
5. Stakeholders in the construction projects are recommended to have a record and documentation system for performed projects and disputes between project parties due to payment delay to develop a mitigation methods for payment delay effects and risks.
6. Contractors are recommended to have enough cash before beginning in any project to avoid the financial problems.
7. Contractors are advised to follow correct billing formats which are specified for each project and submit all necessary supporting documents with bills to avoid unnecessary delays in their payments.
8. Consultants should review and approve design documents and the payments schedule of contractor to avoid any delay or cost overruns at the project.
9. It is necessary to give the contractor the right to stop or suspend the work until the payment is made.

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## APPENDIX

### 6. APPENDIX A: QUESTIONNAIRE

Dear Respondents,

As part of my M.Sc. study in Construction Technology and Management at Bahir Dar University, I am undertaking a research on the title “**Study the extent of problems caused by delayed payment on public building projects in Gondar City.**”

The objectives of the study are:

- To Study payment practices in public building construction projects in Gondar
- To Study the impacts of delayed payment in public building construction projects in Gondar
- To Study the potential solutions to mitigate delayed payment in public building construction projects in Gondar
- Develop a conceptual frame work to solve delay in payment.

I have developed this questionnaire to collect views of professionals working for employer, contractors and consultants for completeness of my research. It is my belief that the research, in addition to its academic significance, will have a practical significance. Your response, in this regard, is highly valuable and contributory to the outcome of the research. All feedback will be kept strictly confidential, and utilized for this academic research only.

Best Regards,

**SAMSON WORKU**

Post Graduate Student, Construction Technology and Management Bahir Dar University,  
Institute of Technology, School of Civil and Environmental Engineering.

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**SECTION A**

1. Please indicate your type of organization

Contractor

Client

Consultant

2. Level of your company.....

3. Experience of your company in the sector .please select.

- a. 0-5
- b. 5-10
- c. 11-15
- d. above 15

4. Your profession

Project manager

Office engineer

Site engineer

Cost engineer

Other

5. Your year of experience .please select.

- a. 0-5
- b. 5-10
- c. 11-15
- d. above 15

**SECTION B**

6. Below are the common types of factor that cause payment delay in public building projects in Gondar city. Please rank on a scale of 1-5 the level of contribution of these causes by ticking (✓) in the column representing your selection.

Degree of influence of parameters could be indicated as follows.

Very high contribution=5

High contribution=4

Medium contribution=3

Low contribution=2

Very low contribution=1

No	Causes	5	4	3	2	1
1.	Employers poor financial management					
2.	Employers withholding payment					
3.	Delays in certification					
4.	Disagreement on valuation of work done					
5.	Cultural attitude					
6.	Budget deficient					
7.	Poor communication between parties					
8.	Delay in submitting payment claims					
9.	Lack of control and follow up					
10.	Administration/bureaucracy					
11.	Having too much work at a time					
12.	Lack of knowledge and experience in the field					
13.	Poor planning system					
14.	Disputes over quality of work					
15.	Procurement problem					
16.	Disputes with debtors/creditors					
17.	Lack of unity among parties					

Please specify if there are any other possible factors that cause payment delays on public building projects in Gondar.

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7. For each of the following, please indicate the importance of the impact of payment delays on your company by ticking (✓) in the column representing your selection.

Degree of influence of parameters could be indicated as follows

Significantly high impact =5

High impact =4

Medium impact =3

Low impact =2

No impact =1

No	Impacts	5	4	3	2	1
1.	Cash flow problems					
2.	Disputes among parties					
3.	Construction delays					
4.	Construction productivity reduction					
5.	Reduced employment in construction projects					
6.	Creates negative chain impact on other parties					
7.	Leads to abandonment of projects					
8.	Creates negative social impacts					
9.	Construction costs are higher					
10.	Delivery of equipment's and materials are delayed					

Please specify if there are any other possible impacts or impacts on construction projects payment delays in Gondar public building projects.

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8. Below are possible solutions that contribute to the minimization the impacts of delayed payment in building construction projects. Please rank on a scale of 1-5 the level of contribution of these solutions for minimization of payment delays in Gondar public building projects by ticking (√) in the box representing your selection.

Degree of influence of parameters could be indicated as follows.

Very high contribution=5

High contribution=4

Medium contribution=3

Low contribution=2

Very low contribution=1

No	Potential Solutions	5	4	3	2	1
1.	Payment of stipulated interest					
2.	Suspension of work					
3.	Setup trust with bank prior to work start to get paid					
4.	Better communication					
5.	Automatic penalties charged to client for delayed payment					
6.	Create maximum time to pay					
7.	Prompt payment legislation					
8.	Better specifications prior to start work					
9.	Better management of change orders					
10.	Risk should share among all parties involved					

Please specify if there are any other possible solutions/solutions to decrease payment delays in Gondar public building projects

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## 7. APPENDIX B: MONTHLY REPORT

REPORT No \_\_\_\_\_

MONTH: Hidar, 2012 E.C

CONT. AGR. No. \_\_\_\_\_

DATE OF REPORT: 23-03-2012E.C

PROJECT : ICT

LOCATION : UNIVERSITY OF GONDAR TEWODROS CAMPUS

EMPLOYER : UNIVERSITY OF GONDAR

CONSULTANT: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_

### CONTRACT SUMMARY

DATE OF SIGNING OF CONTRACT Sene 08,2007E.C

CONTRACT VALUE/ MAIN AGREEMENT BIRR: 335,260,766.15

SUPPLEMENTARY AGREEMENT/ BIRR: 90,276,999.46

VARIATIONS BIRR: 33,959,437.28

TOTAL AMOUNT BIRR: 459,497,202.89

CONTRACT TIME: 600 Calendar Days

MOBILIZATION TIME: 14 Calendar Days

COMMENCEMENT DATE: Sene 23, 2007 E.C

COMPLETION DATE: Yekatit 12,2009E.C

ADDITIONAL TIME GIVEN: 238 Calendar Days

EXTENSION OF TIME APPROVED: 678 Calendar Days

REVISED COMPLETION DATE: Nehase 07, 2011 E.C

PERCENTAGE OF WORK PLANNED: 137.06

PERCENTAGE OF WORK DONE:	<u>93.27</u>
ADVANCE SUM TAKEN /BIRR:	<u>67,052,153.23</u>
ADVANCE REPAID SUM/BIRR:	<u>67,052,153.23</u>
PAYMENT CERTIFIED IN BIRR:	<u>282,989,602.92</u>
PAYMENT CERTIFIED IN PERCENT:	<u>84.41</u>
TIME ELAPSED IN DAYS:	<u>1617 Calendar Days</u>
TIME ELAPSED IN PERCENT:	<u>269.50</u>
ADVANCE REMANING SUM AMOUNT/BIRR:	<u>Re-Paid</u>
ADVANCE RMAINING AMOUNT IN %:	<u>0%</u>

**DIFFICULTIES ENCOUNTERED DURING THE MONTH UNDER REVIEW**

6. EVALUATION (MARK: - POOR, FAIR, GOOD, EXCELLENT)

- |                                       |      |
|---------------------------------------|------|
| A. QUALITY OF WORKS:                  | Good |
| B. QUALITY OF MATERIALS:              | Good |
| C. PERFORMANCE: (AS PER THE SCHEDULE) | Poor |
| D. QUALITY OF WORKMANSHIP             | Good |
| E. PROGRESS:                          | Poor |
| F. DELIVERY OF MATERIAL:              | Poor |
| G. MOBILIZATION OF MANPOWER:          | Poor |
| H. EQUIPMENT AVALILABILITY:           | Poor |

REMARKS: - Due to shortage of construction Materials, Manpower and Machineries problems the monthly and total to date progress of the project is less as contrast to the remaining works.

7. VARIATION GIVEN OR APPROVED (STATE TYPE OF AMOUNT)

There is no variation given during the month under review.

8. CLAIMS SUBMITTED (REASON & DURATION) IF NOT SUBMITTED

There is no claim submitted during the month under review.

9. PROGRESS EVALUATION:-

- A) MEETING CONDUCTED ON: - 08/03/2012 E.C

B) POINT RAISED AND ACTION TAKEN: (In short) enhancing progress of the Project, resolving shortages of construction materials, man powers and equipment's.

#### 10. PROGRESS STATUS

MONTH	PERCENTAGE PLANNED	PERCENTAGE EXECUTED	PERCENTAGE TIME ELAPSED
1 <sup>ST</sup> LAST MONTH		0.31	5
2 <sup>ND</sup> LAST MONTH		0.16	6
PERVIOUS MONTHS		0.18	5
CURRENT MONTHS		0.01	5
TOTAL TO DATE	137.06	93.27	269.5

GENERAL REMARKS: ACTION TO BE TAKEN, STUDYEMENT PAST MONTH REPORT

As stated on the report the contractor executed only 93.27% of the 137.06% total work including variation and supplementary, while the total elapsed time reach 269.50% of the contract time with revised completion time of the project already completed. This poor progress is recorded due to mainly lack of construction materials, manpower, machineries and coordination problems by the contractor. Site book instructions are given for the contractor to enhance the progress of the project by avoiding these shortages .Additionally the contractor instructed to submit crushed work schedule and to enhance progress of the project.