

ASSESSMENT OF CONSTRUCTION DISPUTES AND RESOLUTION MECHANISMS  
ON ROAD CONSTRUCTION PROJECTS: THE CASE OF ARSI ZONE ROAD PROJECTS



GETACHEW MIDEKSA BORENA

A THESIS SUBMITTED TO THE DEPARTMENT OF CIVIL ENGINEERING

SCHOOL OF CIVIL AND ARCHITECTURAL ENGINEERING

PRESENTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE

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(CONSTRUCTION ENGINEERING AND MANAGEMENT)

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ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY

JUNE, 2022 G.C

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## DECLARATION

I hereby declare that this Master Thesis entitled “ASSESSMENT OF CONSTRUCTION DISPUTES AND RESOLUTION MECHANISMS ON ROAD CONSTRUCTION PROJECTS: THE CASE OF ARSI ZONE ROAD PROJECTS” is my original work. That is, it has not been submitted for the award of any academic degree, diploma or certificate in any other university. All sources of materials that are used for this thesis have been duly acknowledged through citation.

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Date

## RECOMMENDATION OF ADVISOR/ SUPERVISOR

I/we, the advisor(s) of this thesis, hereby certify that I/we have read the revised version of the thesis entitled “ASSESSMENT OF CONSTRUCTION DISPUTES AND RESOLUTION MECHANISMS ON ROAD CONSTRUCTION PROJECTS: THE CASE OF ARSI ZONE ROAD PROJECTS” prepared under my/our guidance by GETACHEW MIDEKSA BORENA submitted in partial fulfillment of the requirements for the degree of Master’s of Science in Civil Engineering. Therefore, I/we recommend the submission of revised version of the thesis to the department following the applicable procedures.

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Co-advisor	Signature	Date



## **APPROVAL OF BOARD OF REVIEWERS**

We, the undersigned, members of the Board of Examiners of the thesis by GETACHEW MIDEKSA BORENA have read and evaluated the thesis entitled “ASSESSMENT OF CONSTRUCTION DISPUTES AND RESOLUTION MECHANISMS ON ROAD CONSTRUCTION PROJECTS: THE CASE OF ARSI ZONE ROAD PROJECTS” and examined the candidate during open defense. This is, therefore, to certify that the thesis is accepted for partial fulfillment of the requirement of the degree of Master of Science in Civil Engineering.

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Finally, approval and acceptance of the thesis is contingent upon submission of its final copy to the Office of Postgraduate Studies (OPGS) through the Department Graduate Council (DGC) and School Graduate Committee (SGC).

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## **LISTS OF ACRONYMS**

ADR	Alternative Dispute Resolution
AHP	Analytical Hierarchical Process
DRB	Dispute Review Board
CSC	Central Statistical Agency
ERA	Ethiopian Roads Authority
FIDIC	Federation International des Ingeneurs Conseils
MoWUD	Ministry of Works and Urban Development
SPSS	Statistical Software for Social Sciences
FPPA	Federal Public Procurement and Property Administration Agency

## ABSTRACT

*Construction of road projects is becoming very complex which increases the complication of contracts and the disputes that might arise at any stage in the project lifecycle. Therefore, disputes are almost unavoidable in construction projects. This study considered external factors like interferences from government body (project committee), non-government bodies and end users (peoples) Additional causes of construction dispute has been identified and Analytical Hierarchical Process based model has been used as tool for systematic selection for an appropriate dispute resolution method. The objective of this study is to assess construction disputes and resolution mechanisms on road construction projects. Systematic purposive sampling used as Sampling method and Methods of data collection for the research was both qualitative and quantitative Primary data sources was from focus group discussion and questioners collected and secondary data sources was literature review. Main causes of construction disputes identified by the study are Price fluctuation of, construction materials, Price escalation, Shortage in materials, Time extensions, Project committee interference, Payment delays, Financial failure of the contractor, Delays in work progress, Government regulations and Slow decision-making process where as the major consequences of construction dispute being Time delay, Cost overrun, Minimize quality of construction, Termination of contracts, Loss of professional reputation, Political instability. According to Arsi Zone Construction Sector from Litigation, Arbitration, Negotiation and Dispute review Board, negotiation is preferred as suitable Alternative dispute resolving mechanism for construction dispute resolution.*

***Keywords: cause, consequence, disputes resolution mechanism***

# CHAPTER ONE

## INTRODUCTION

### 1. 1. Background of the Study

According to 2021 Global Construction Disputes Report, the overall volume of disputes stayed relatively the same in 2020 as in 2019, while the average value of disputes increased significantly. The time taken to resolve disputes decreased slightly, continuing the downward trend from 2019 (Arcadis, 2021).

The complexity of construction projects is continuously increasing which increases the complication of contracts and the disputes probability that might arise at any stage in the project lifecycle. It is normally trusted that owners' initial choices regarding the selection of delivery methods, procurement methods, and contract types influence the recurrence and seriousness of project disputes (Alaloul et al., 2019). Construction disputes vary in their nature, size, and complexity. Furthermore, the complexity of a contemporary construction project, which requires the orchestration of numerous interdependent components including information, materials, tools, equipment and a large number of personnel working for independent engineers, contractors, and suppliers, add to the complexity of the disputes arising out of or in relation to them (Alexander & Partner, 2015) .

The road construction projects are unique in the sense that these affect the social, financial and political life of the country. These are specific kind of projects in which a big funding is involved and the participants from different technical backgrounds, views, and opinions work together. However, due to the complex and competitive nature of the road construction projects, disputes are inevitable and adversely affect the infrastructure development of the country (Malik & Ali, 2019). As in any other construction works, road construction contracts are liable to various kinds of disputes. The disputes may be between the client and the contractor, the main contractor and sub-contractor over payment, performance of the contract, delay and disruption of works, design changes, price escalation, quality of works (Getahun,2016). Litigation, which is the final binding method of resolving disputes, is considered as the last resort for dispute resolution by many construction professionals due to lengthy delays, high associated costs and the strained relationship between the parties which can definitely affect any repeat business chances.

This led to exploring other dispute resolution processes by industry experts that could replace litigation successfully, thus giving rise to alternate dispute resolution (ADR). Alternate dispute resolution can be defined as methods by which conflicts and disputes can be resolved privately without going through litigation in courts (Yousif *et al.*, 2018).

## **1.2. Statement of the Problem**

Construction disputes may generally happen often during every construction project and could take place at any time during the design and construction phase of the project. It is necessary to know the causes of dispute in the field, to avoid delays since majority of the money is locked in the construction sector to avoid these reasons one should know the reasons of dispute happening on the field and between the client, contractor, and consultant (Yadav & Shelorkar, 2021). As disputes in construction projects have become the major concern to the parties, construction industry is striving on developing long lasting relationships among various parties to resolve disputes appropriately and expediently. Thus, it is paramount to have an insight into the various causes and impact of disputes and dispute resolution approaches in order to complete construction projects in time, within budget and according to specifications (Malik & Ali, 2019).

Disputes have to be resolved as soon as possible. If not so, they may get worsen that causes project delays, leads to claim for lawsuit. There are various factors like owner, consultant, third party etc. as they affect the effectiveness, productivity of work, and also interrupt with the perpetual completion of the project. Thus, it is very essential to manage such factors for the smooth running or operation of a construction project without any occurrences of conflicts and disputes for better profit, and rate of return as well as on time completion of project (Aryal & Dahal, 2018).

Study shows that in Ethiopia only 8.25% projects have been finished to the original targeted completion date. The remaining 91.75% delayed 352% of its contractual time (Hareru et al., 2016). The study carried out on thirteen projects from 1985 to 1995 showed a delay of up to 460 % in foreign construction projects in Ethiopia and case studies on selected sites. In line with these financial claims, 200 %- 300 % of total road construction projects are raging in Ethiopia's projects constructed by foreign contractors (ESHETU, 2021).

According to Arsi Zone Road Authority report 43.75% of road projects terminated from 2011 to 2014 and the report show 42% road projects termination from 2015 to 2021.

Construction contract termination, cost overrun and delay are consequences of construction dispute, so aim of this study was to assess real causes, consequences of construction dispute, determine criteria for selection of suitable dispute resolution method and finally, find suitable ADR method using AHP model for road construction projects.

### **1.3. Research Questions**

- ✓ What are the causes of construction dispute in construction of road projects in Arsi Zone?
- ✓ What are major consequences of construction dispute in construction of road projects in Arsi Zone?
- ✓ What are criteria for selection of dispute resolution method?
- ✓ How AHP model is used to find out suitable ADR method?

### **1.4. Objectives of the Study**

#### **1.4.1 General Objective**

The main objective of the study was to assess construction disputes and resolution mechanisms in Arsi zone road construction projects.

#### **1.4.2 Specific Objectives**

- ✓ To identify causes of dispute in Arsi Zone road construction projects.
- ✓ To investigate major consequences of construction dispute in Arsi Zone construction of road projects.
- ✓ To determine criteria for selection of dispute resolution method in Arsi Zone construction of road projects.
- ✓ To find suitable ADR method using AHP based model as tool for systematic selection for an appropriate dispute resolution method for the current practice.

### **1.5. Significance of the Study**

In this study, after identifying causes of construction dispute, their consequences on construction road projects were investigated, criteria for selection of dispute resolution method were determined and finally, find suitable ADR method using AHP based model as tool for systematic selection for an appropriate dispute resolution method. On other side, the study might create awareness to stockholders of construction projects about causes of construction disputes and their major consequences on construction. This study also summarized certain criteria for selection of dispute resolution method from different literatures and lastly, finds suitable ADR method using AHP based model as tool for systematic selection for an appropriate dispute resolution mechanisms. The study might serve as reference for researchers of similar area and also for further search.

### **1.6. Delimitations of the Study**

The research dealt with cause, consequences of disputes in construction projects, criteria for selection of dispute resolution method and also finds suitable ADR method using AHP based model as tool for systematic selection for an appropriate dispute resolution method of selected projects with these problems in Arsi zones in Ethiopia. Arsi Zone has 25 weredas which are grouped in to 4 clusters namely South chilalo cluster, North Chilalo cluster, Ticho cluster and Gololcha cluster.

### **1.7. Limitations of the Study**

Data collection covered only samples of road projects in Arsi Zone from the four Clusters purposively after Pilate survey has been conducted. There were security problems around Gololcha and Shanan Kolu werdas which affected distribution and collection of questioners. The other problem is limitation of financial resources or funding constraints

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1. Introduction

In a perfect construction world, there would be no conflicts, but there is no perfect construction world, therefore, it is clear that conflicts in construction projects are inevitable, exactly like in any other form of human relationship, and disputes in the construction industry as an endemic problem. Construction projects involve a variety of different participant groups including owners, designers, general contractors and subcontractors among others. Each of these groups has their individual objectives and concerns in terms of interest conflicts and disputes. Based on Figure 2.1, it can clearly be seen that conflict and conflict management is an essential ingredient in construction management. Thus, in order to reduce the negative impact of claims and disputes on construction projects, there is a need to identify causes of disputes in construction projects (Aryal & Dahal, 2018).

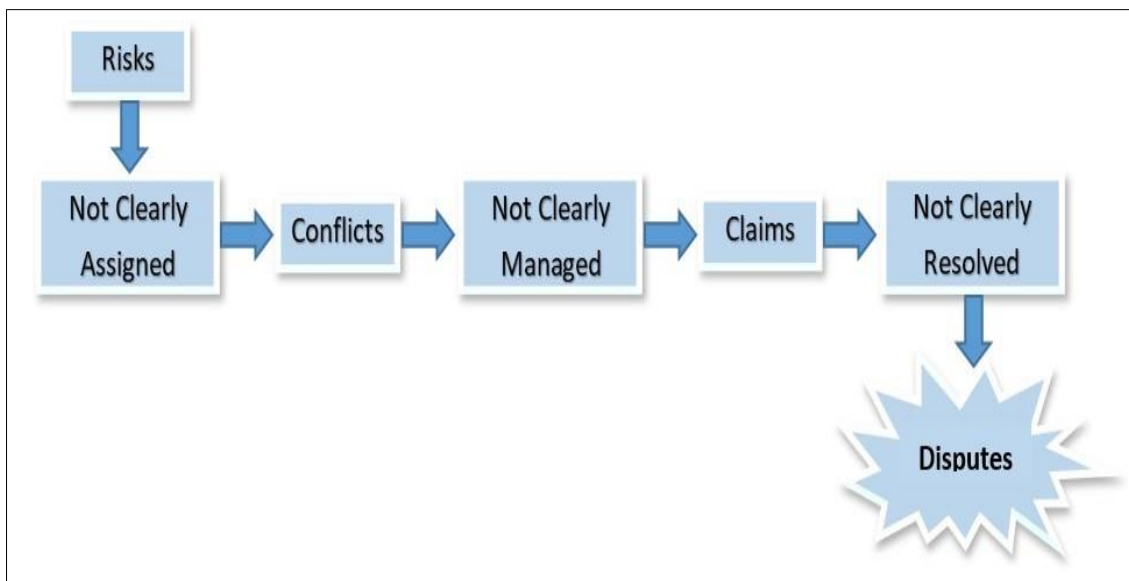


Figure 2.1 Risk, conflict claim and dispute

Source: (Aryal & Dahal, 2018)

‘Conflict’ is ‘the process which begins when one party perceives that another has frustrated, or is about to frustrate, some concern of his’. The definition of a claim in FIDIC (2017) confirms that they are made under the contract: “Claim means a request or assertion

by one Party to the other Party for an entitlement or relief under any Clause of these Conditions or otherwise in connection with or arising out of, the Contract or the execution of the Works”. A ‘dispute’ can also be defined as a situation where two parties differ in the assertion of a contractual right which results in a contractual decision being given, which consequently becomes a formal dispute.

Disputes are very common in the construction industry. As the name suggests, disputes occur due to the disagreement among parties to the contract. Once there is a disagreement, the parties, to the contract focus on resolving it based on the conditions of the contract. However, if still the parties could not research an agreement, the matter escalates to ADR. Litigation is the last step for resolving disputes in construction. ADR acts as an ‘alternative’ to litigation. Different countries have different mechanism for ADR, such as mediation, adjudication and arbitration. Each of these ADR methods has different procedures (Illankoon et al., 2022).

## **2.2. Causes of Construction Dispute**

According to 2021 Global Construction Disputes Report, owner/contractor/subcontractor failing to understand and/or comply with its contractual obligation became the top cause of construction disputes for 2020, moving up from the third highest cause in 2019. The impacts of COVID-19 on the industry notably impacted the most common dispute causes, with third-party or force majeure events moving into the top three (Arcadis, 2021).

Plenty of factors contribute to the development of disputes in construction projects, among these are: adversarial nature of contracts; poor communication between the parties, ineffective communication on site, inability to understand terms of contract, different expectations of the parties, fragmented nature of the industry, improper contractual documentation, tender systems and government policy on tendering, the inability or reluctance to pay, and unforeseen effect of third party interests (Alaloul et al., 2019). The process of the construction is affected by complexity of the work, limited time, the amount of resources used, and many things that. If these constraints are not addressed immediately then it can result in losses and will lead to conflict. Factors that cause conflicts in construction projects based on previous research can be seen as follows:

Table 2.1 Factors of conflict and disputes in construction projects

Variables	Indicators	Authors
Owner	Failure of respond to issues in a timely	Fenn, Lowe and Speck(1997)
	Lack of communication among the team members	Fenn, Lowe and Speck(1997)
	The mechanism is not clear in providing information	Fenn, Lowe and Speck(1997)
	Poor management, control and coordination	Fenn, Lowe and Speck(1997)
Consultant	Failure to determine responsibility in accordance with the contract	Hall(2002)
	Estimation error	Hall(2002)
	Delayed in providing information	Hall(2002)
	Design errors and specifications	Hall(2002)
	Pictures and specifications are incomplete	Hall(2002)
	Calculation of incorrect work progress	Kissiedu(2009)
	Lack of experience of consultants	Fenn, Lowe and Speck(1997)
	Lack of contractor management, supervision, and coordination	Carmicheal(2002)
	Delay of jobs	Carmicheal(2002)
	Failure of plan and implement change of work	Carmicheal(2002)
	The failure to understand the price of the work or the offer price correctly	Carmicheal(2002)
Lack of understanding of the existing agreement in the contract	Carmicheal(2002)	
Contracts and specifications	Employment contracts and the complete lack of construction documents	Poerdiyatmono (2007)
	The lack of clarity of document the distribution of workflow	Poerdiyatmono (2007)
	There is a confusing of terms in the contract documents	Poerdiyatmono (2007)
	There are terms that can cause a double meaning in the contract documents	Poerdiyatmono (2007)
	The big difference in understanding of contracts in foreign languages with the same contract and the Indonesian language	Poerdiyatmono (2007)

Source: (Rauzana, 2016)

Some researchers concluded the following reasons of disputes in the construction projects: ambiguities in specifications and drawings, vague contract documents, award of contract at low bid criteria, changes in design, issues of variations, and late payment issues resulted into claims. Others revealed that variation in site conditions, clients requested variations, variations due to design errors, unanticipated ground conditions, vague contract documents, external events, interferences with utility lines, delay in site possession, delay in design information, and unexpected weather conditions are among the major causes of disputes in the construction industry (Malik & Ali, 2019).

Review of causes of construction dispute can be summarized in the following table 2.2 below.

Table 2.2 summary causes of construction dispute from different literatures

Causes of Construction Disputes		Authors
Main Categories	Sub-categories	
Consultant related (1)	1. design errors	(Malik&Ali,2019), (Getahun, 2016),(Rauzana, 2016),(Aryal & Dahal, 2018)
	2.inadequate / incomplete specifications	»»
	3. inadequate quality design	(Malik & Ali, 2019),(Aryal & Dahal, 2018),(Getahun, 2016)
	4.inavailabilityof information	(Malik & Ali, 2019), (Aryal & Dahal, 2018),(Getahun, 2016
	5.Poor Contract management & Supervision	(Aryal & Dahal, 2018)
	6. Delay in preparation and approval of drawings	»»
	7.Frequent Changes in orders & Designs	»»
	8.Incompleteness of drawing and specification	»»
	9.Variations due to design errors	»»
	10.Waiting time for approval of tests and inspection	»»
	if other	
Contractor related(2)	1. delays in work progress	(Malik & Ali, 2019),(Aryal & Dahal, 2018),(Getahun, 2016)
	2. time extensions	(Malik & Ali, 2019),(Aryal & Dahal, 2018) Getahun, 2016),
	3. financial failure of the contractor	(Malik & Ali, 2019),(Aryal & Dahal, 2018), Getahun, 2016),(Yousif et al., 2018)
	4.technical inadequacy of the contractor	(Malik & Ali, 2019),(Aryal & Dahal, 2018)
	5. inadequate investigation before bidding	(Aryal & Dahal, 2018)
	6. poor quality of work	(Aryal & Dahal, 2018), Getahun, 2016),(Yousif et al., 2018)
Owner related (3)	1. variations initiated by the owner	(Malik & Ali, 2019),(Aryal & Dahal, 2018) Getahun, 2016),
	2. change of scope	»»
	3. late giving of possession	»»
	4. unrealistic expectations	(Malik & Ali, 2019),(Aryal & Dahal, 2018)
	5.payment delays	(Malik & Ali, 2019),(Aryal &

		Dahal, 2018), Getahun, 2016)
	6. Slow decision-making process	(Aryal & Dahal, 2018)
	if other	
Contract related(4)	1. ambiguities in contract documents	(Malik & Ali, 2019),(Aryal & Dahal, 2018), Getahun, 2016)
	2. different interpretations of the contract provisions	(Aryal & Dahal, 2018), Getahun, 2016),(Malik & Ali, 2019)
	3. risk allocation	»»
	4. other contractual problems	»»
	if other	
Material, labor and equipment related factors (5)	1. quality of material	(Aryal & Dahal, 2018)
	2. price fluctuation of construction materials	»»
	3. government regulations	»»
	4. shortage in materials	»»
	5. shortage in labor supply	»»
	6. labor productivity	»»
	7. equipment availability and failure	»»
if other		
External factors(6)	1. unexpected weather condition	»»
	2. legal and economic factors	»»
	3. fragmented structure of the sector	»»
	4. institutional interference	»»
	8. Price escalation	»»
	9. Force majeure	»»
	if other	

According to ESHETU ( 2021), Disputes in Projects are:-Owner related: - difficulty of construction projects is a reality, so it is very difficult to avoid even minor mistakes that lead to owner arguments that result in disputes as many researchers conclude that the key triggers are delay of payment, Contractor related, Consultant related: - consultant-related disputes are due to drawing and planning, design modifications and corrections, inadequate / unfinished requirements, resulting in a delay on the whole project that leads to disagreements and disputes. Third Party & Human Behavior Related:-This entails two large controllable and uncontrollable variables. Controllable factors are those that can be managed in any possible manner, including human-related factors such as lack of team

spirit of players, lack of effective communication, whereas the third party outrage, act of God, etc. are uncontrollable. Conflicts and controversies over it are also therefore possible, Design & Contract Related:-Using vague words in the contract text, the use of double meaning terms in these contracts could result in contract-related conflicts.

### **2.3. Consequences of Dispute in the Construction Projects**

Dispute in the project brings breakdown of relationships between project participants and results to project delays, claims and disputes which are the main shortcomings in completion of the project within objectives and goal. Construction dispute affects the interests of many stakeholders in connection with big investments; they reduce profits and are therefore very expensive and unprofitable. The project is said to be success when it is completed to meet customer needs without any issues and problems in terms of time, quality and budget allocation. Successful closing is categorized as resolved at the stipulated time without any problems in the dispute (Aryal & Dahal, 2018).

Disputes affect quality and punctuality of the construction project progress. Disputes always affect the productivity and performance of a project. The history of construction points out that almost all projects face variation or poor performance with many projects failing to exceed to the expectation of the client thus, affecting time, cost and quality of the projects. Direct costs associated with disputes range from 0.5 to 5% of the projects contract value. The indirect costs, on the other hand, resulting from lost productivity, stress, fatigue, loss of future work, the cost of strained business relationships among the various parties and tarnished reputation may cause even more damages to the parties involved (Aryal & Dahal, 2018). According to Maswama et al. (2013), major impacts of construction dispute were additional expense in managerial and administration, possibility of litigation, loss of company reputation, loss of profitability and perhaps business viability, loss of productivity, time delays and cost overruns, extended and or more complex award process, loss of professional reputation, break down in cooperation between parties, diminution of respect between parties and deterioration of relation ship and break down in cooperation, high tender prices, rework and relocation cost for men, equipment and materials and cash flow (dispute affect insurance coverage and liability risk exposure)

## **2.4. Criteria for Selection of Dispute Resolution Method**

The stakeholders of construction projects treat their disputes at different levels. It does not mean that if there are no institutions or no clause of Alternative Dispute Resolution (ADR) on conditions of contract there is no mechanism of dispute resolution. Ongoing miss understanding is resolved amicably on job- site as deemed necessary. Differences of opinions on contract documents are also entertained accordingly. However, when the conflict escalates to unresolved claims, which are disputes, the resolution mechanism is not as easy as it is before its maturity (GETAHUN, 2016). Regarding conditions of contracts, MoWUD Clause 67 conditions of contract does not give option for ADR method, Amicable and Arbitration but according to FPPA (2011) clause 26 dispute can be resolved amicably.

Different countries have different mechanism for ADR, such as mediation, adjudication and arbitration. Each of these ADR methods has different procedures. Mediation is a voluntary, non-confrontational, informal, private, and non-binding dispute resolution process in which an impartial and independent person, called a mediator, helps the parties to try to reach a settlement. Arbitration is a process where in opposing parties submit their dispute or conflict for a binding determination by one or more third parties Arbitration usually follows rigid rules compared to mediation and also it is binding in court of law (Illankoon et al., 2022). Dispute resolution procedures such as litigation, arbitration, mediation, dispute adviser and negotiation are widely practiced. However, frequently the question is how to systematically determine which dispute resolution strategy to adopt given the nature of disputes. Even though the topic of dispute resolution has been widely discussed and heavily researched, few studies have been conducted with respect to this question. Researchers identified several factors that could be considered when making decisions concerning the selection of dispute resolution strategies to develop decision-making model using the analytical hierarchy process (AHP) (Cheung & Suen, 2002).

According to Cheung & Suen ( 2002) on their study “A multi-attribute utility model for dispute resolution strategy selection” identified 16 possible factors affecting the dispute resolution selection using published data in the literature which are Confidentiality, Degree of control by parties, Choice over the identity of neutral, Power imbalance, Flexibility in issues, strategy and settlement, Available remedies, Binding decision and enforcement, Degree of formality, Liability for opponent’s costs, Cost of tribunal, Relative cost, Time

required of parties, Preservation of relationship, Voluntary, Degree of control by third party neutral.

Table.2.4 Summary of Criteria for selection of suitable ADR method

Factors affecting the selection	Goldberg <i>et al.</i> (1992)	Brown and Marriott (1999)	Cheung (1999)	York (1996)	David (1988)	S.-O. Cheung (1999)	S.-O. Cheung and Suen (2002)	Chan et al. (2006)	Chong and Mohamad Zin (2012)	Awwad et al. (2016)
Confidentiality	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Degree of control by parties	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Third party control on the process	✓	-	✓	-	-	-	✓	✓	✓	-
Flexibility in implementation	✓	✓	✓	✓	-	✓	-	-	✓	✓
Enforceability of the method	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Binding decision	✓	-	✓	✓	✓	✓	-	-	✓	✓
Ability to appeal if not satisfied with the result	-	-	-	-	-	-	✓	✓	✓	-
Degree of formality	✓	-	-	-	-	-	-	-	✓	-
Cost of implementing the methods	-	✓	✓	✓	✓	✓	✓	✓	✓	✓

Time to reach a settlement	-	✓	✓	✓	✓	✓	✓	✓	✓	✓
Type of contract	-	-	-	-	-	-	-	-	✓	-
Preservation of relationship between parties	-	✓	✓	✓	✓	✓	✓	✓	✓	✓
Suitability in local law system	-	-	-	-	-	-	-	-	✓	-
Complexity of the dispute	-	-	-	-	-	-	-	-	✓	-

After reviewing different literatures , Illankoon et al. ( 2022) on their research identified 14 possible factors affecting the dispute resolution selection which are: Confidentiality, Degree of control by parties, Third party control on the process, Flexibility in implementation, Enforceability of the method, Binding decision, Ability to appeal if not satisfied with the result, Degree of formality, Cost of implementing the methods, Time to reach a settlement, Type of contract, Preservation of relationship between parties, Suitability in local law system and Complexity of the dispute which are summarized in table 2.5 below.

Table 2.5 Factors affecting the selection of ADR method.

Factors affecting the selection	S.-O. Cheung (1999)	S.-O. Cheung and Suen (2002)	Chan et al. (2006)	Chong and Mohamad Zin (2012)	Awwad et al. (2016)
Confidentiality	✓	✓	✓	✓	✓
Degree of control by parties	✓	✓	✓	✓	✓
Third party control on the process	-	✓	✓	✓	-
Flexibility in implementation	✓	-	-	✓	✓
Enforceability of the method	✓	✓	✓	✓	✓
Binding decision	✓	-	-	✓	✓
Ability to appeal if not satisfied with the result	-	✓	✓	✓	-
Degree of formality	-			✓	-
Cost of implementing the methods	✓	✓	✓	✓	✓
Time to reach a settlement	✓	✓	✓	✓	✓
Type of contract	-	-	-	✓	-
Preservation of relationship between parties	✓	✓	✓	✓	✓
Suitability in local law system	-	-	-	✓	-
Complexity of the dispute	-	-	-	✓	-

Source: (Illankoon et al., 2022)

## **2.5 AHP Based Model as Tool for Systematic Selection for an Appropriate Dispute Resolution Method**

This AHP method helps solve complex problems by structuring a hierarchy of criteria, stakeholders of results, and by drawing various considerations to develop weight or priorities. This method also combines the strengths of the feelings and logic concerned on various issues, and then synthesizes various considerations into the results that match our estimates intuitively as presented in the consideration already made (Zuraidi et al., 2018).

Steps in the Methodology: the methodology used in this study is described in the following steps: 1. Identify the critical selection criteria: a. Undertake a pairwise comparison. 2. Take the results from the pairwise comparison and apply it to the AHP: a. calculate the geometric mean and obtain normalized weights for assigning weights to the criteria. 3. Multiply the normalized weights by the raw points to obtain weighted scores; 4. Add all weighted scores for each dispute resolution strategy to arrive at the total weighted score; 5. Compare the total weighted score for each strategy, and select the ADR method having the highest weighted score (Serediak et al., 2002).

## **2.6. Research Gap**

According to Razana (2016), study on “Causes of Conflicts and Disputes in Construction Projects “, causes of construction dispute are owner related, consultant related, contracts and specification related whereas the study conducted by Eshete (2021) on “*Assessment of the practices and challenges of dispute resolution on road projects in Ethiopia*” added two more factors of construction dispute which are contractor related and third party and human behavior related. On the other hand, Malik and Ali (2019) on their study “Investigating the Major Causes and Impacts of Disputes in the Road Construction Projects” included un expected weather conditions as external factor.

These studies missed to consider external factors like interferences from government body (project committee), non-government bodies and end users (peoples) .The study needs to identify additional causes of construction dispute and finally, search criteria for selection of suitable ADR method and find suitable ADR method using AHP based model as tool for systematic selection for an appropriate dispute resolution mechanism from *Litigation, Arbitration, Negotiation and Dispute review Board*.

## **CHAPTER THREE**

### **MATERIALS AND METHODS**

#### **3.1. Description of Study Area**

Arsi is one of the zones in Oromia Regional states in Ethiopia and has 25 weredas which are grouped in to 4 clusters namely South chilalo cluster, North Chilalo cluster, Ticho cluster and Gololcha cluster.

Arsi is bordered on the south by Bale, on the southwest by the West Arsi Zone, on the northwest by East Shewa, on the north by the Afar Region and on the east by West Hararge and Bale Zone. The administrative center of this zone is in Asella.

Based on the 2007 Census conducted by the CSA, this Zone has a total population of 2,637,657 with an area of 19,825.22 square kilometers; Arsi has a population density of 133.05. While 305,701 or 11.59% are urban inhabitants, a further 7,098 or 0.27% are pastoralists. According to a May 24, 2004 World Bank memorandum, 4% of the inhabitants of Arsi have access to electricity, this zone has a road density of 45.0 kilometers per 1000 square kilometers (compared to the national average of 30 kilometers).

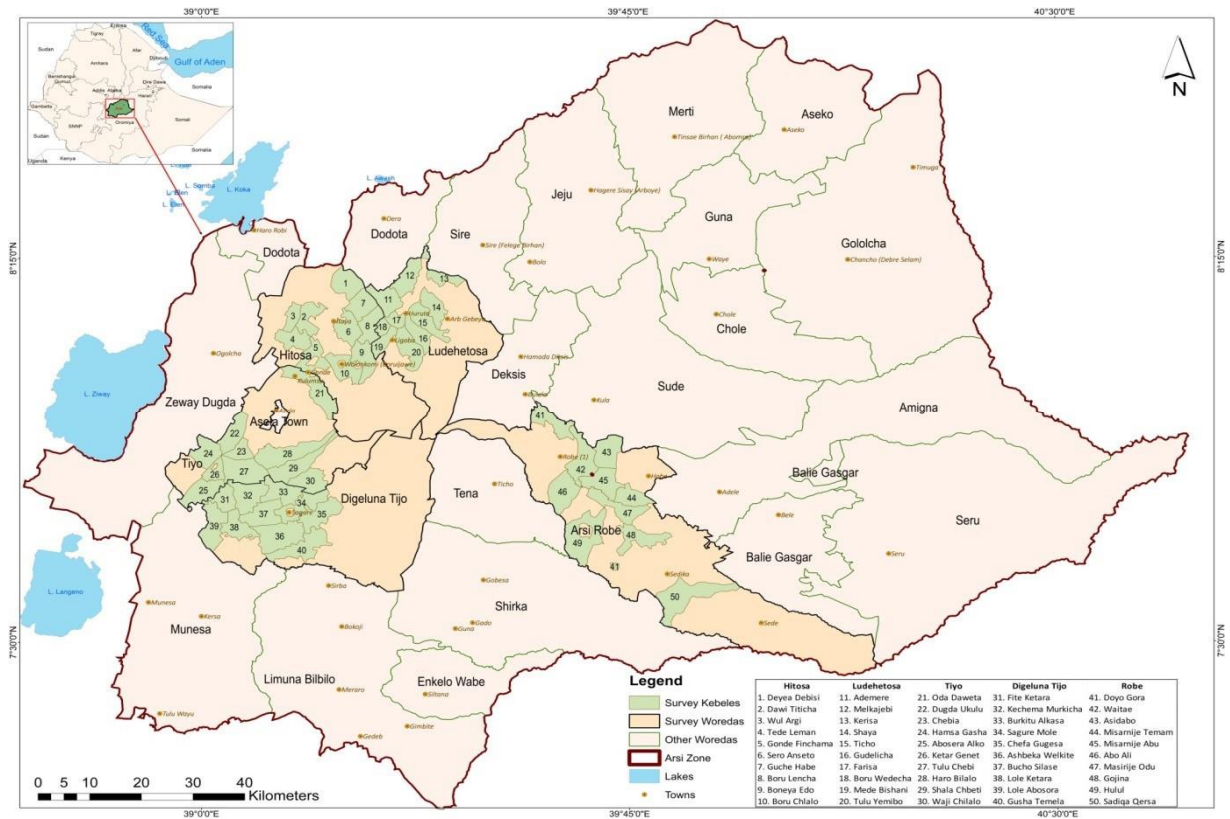


Figure 3.1 Arsi zone map

Source: (GIZ/IP-consult, 2016)

### 3.2. Study Design

Descriptive research design was applied due to the descriptive nature of this study and its research questions. According to Malik & Ali (2019), a descriptive research design is suitable in situations when research questions start with what, how, who and when key words. A descriptive research determines and reports the way things are actually exist.

### 3.3. Population

The population of the study was Arsi Zone Road Construction projects, and Contractors, Clients, Consultants and Regulatory bodies were sources of data.

### 3.4. Determination of Sample Size

Purposive or judgmental sampling is a strategy in which particular settings persons or events are selected deliberately in order to provide important information that cannot be obtained from other choices. It is where the researcher includes cases or participants in the

sample because they believe that they warrant inclusion (Taherdoost, 2018). In this study, the researcher used Purposive or judgmental sampling to select those respondents who shall best suit the purposes of the study and those believed to have the information being required. The study has a total number of 116 ongoing gravel road construction projects in Arsi zone. For the reason discussed in the description of selection process below, all 8 projects facing dispute were taken purposively as sample. The questionnaires were distributed to professionals who have a direct contractual relation which has been selected from contractors, client, consultants and professionals from Regulatory body that are considered familiar to the road Construction projects.

Total of 48 professionals from the Contractor side were selected purposefully for the main reason that the data collected from professional who have a close relation with claim and dispute in each Cluster's projects can represent the same person in the Arsi Zone because of homogenous claim and dispute. The questionnaire survey also included 32 clients, 8 Consultants and 14 Regulatory body's respondents. Generally, a total of 102 questionnaires were distributed for the three contracting parties and Regulatory Body which were and still engaged in Road Construction of Arsi Zone according sampling process below.

### **3.5. Description of Selection Process (Sampling Method)**

From the Pilate survey conducted, After 2017 Budget year, 25 Wereda Road Authority (Clients) terminated contracts with 12 Consultant firms and starting from 2018 budget year, Arsi Zone Road Authority is acting as Consultant. The study has covered 8 gravel road projects faced dispute and whose full information can be gathered from Arsi zone Road Authority (Consultant). These 8 identified road projects by Pilate survey were Sole Madaro –Sole waliye road project and Halila-Meti-Bego sengo road project from Ticho Cluster in Ticho and Sude Wereda , Mine-Gora –Kela road project and Umuga-Unke road project from Gololcha Cluster in Gololcha and Shanan Kolu weredas, Gonde river bridge project, Dabaya-Adare road project and Bosha river bridge project from North Chilalo Cluster in Lode Hetosa, Hetosa and Tiyo weredas respectively and lastly Ulule-Kara road project from South Chilalo Cluster in Lemu Bilbilu weredas were purposively selected. Total number of professionals were purposively selected from these 8 weredas is 32 from Client, 48 from Contractor, 8 from Consultants, 14 from regulatory body professional and total number of professionals became 102.

### **3.6. Methods of Data Collection**

Methods of data collection for the research were both qualitative and quantitative. Multiple methods such as questionnaire, focus group discussion, and literature review were the techniques and methods that were used in collecting and analyzing data on the causes of construction disputes, consequences, criteria for selection of dispute resolution method and find suitable ADR method using AHP based model as tool for systematic selection for an appropriate dispute resolution method. Closed-ended questionnaires as well as focus group discussion were conducted among Clients, contractors, consultants, Regulatory body and their representatives.

The data collection approach for conducting this research included both primary and secondary sources. Questionnaires and focus group provides the primary data for this research while reviewing related literatures of various authors and documents like FIDIC 2010, FPPA 2011, MoWUD, ERA manual, civil code form part of the secondary data.

#### **3.6.1. Questionnaire (Closed-ended type)**

A total of 102 questionnaires were distributed for the three contracting parties and Regulatory Body i.e. 48 for Contractors, 32 for Client's 8 Consultants and 14 Regulatory body's respondents for causes of construction disputes (objective one) and their consequences (objective two) but additional section for objective four i.e. selecting suitable ADR method was attached for 15 senior experts (five from contractors, five from consultants three from clients and two from Regulatory) pre-determined during Pilate survey.

#### **3.6.2. Desk study**

All relevant secondary data was collected from review of related literature, available documents like FIDIC 2010, PPA 2011, MoWUD, ERA manual and civil code for objective three.

#### **3.6.3 Focus Group Discussion**

A focus group discussion involves gathering people from similar backgrounds or experiences together to discuss a specific topic of interest. It is a form of qualitative research where questions are asked about their perceptions attitudes, beliefs, opinion or

ideas. In focus group discussion participants are free to talk with other group members; unlike other research methods it encourages discussions with other participants. It generally involves group interviewing in which a small group of usually 8 to 12 people (Manoranjitham & Jacob, 2007). The ideal size of a focus group for most noncommercial topics is five to eight participants. Doesn't plan focus groups with more than 10 participants because large groups are difficult to control and they limit each person's opportunity to share insights and observations? Small focus groups, or mini-focus groups, with four to six participants are becoming increasingly popular because the smaller groups are easier to recruit and host and are more comfortable for participants(Lim et al., 1997).

In this research 4 groups were identified from clients, contractors, and consultants and regulatory with members in each group 6.

### **3.7. Data Analysis**

Analysis techniques for quantitative data were descriptive statistics, analysis of relationships, and comparative analysis. In this study, the quantitative data collected was analyzed with Statistical Package which is Statistical Package for Social Science (SPSS). The software used to generate various statistical information including descriptive statistic, which provides a basic summary of all variables in the data. The benefits of using SPSS is that it allows for scoring and analyzing quantitative data at speed and it can also be used to perform multivariate analysis and additionally, MS Excel was also be used to analyze the collected data due to its ability for quantitative data analysis and presenting data in terms of tables, graphs and charts. Furthermore, a 5-point Likert type scale was used to evaluate the effects of construction dispute and the use of ADR construction industry with regard to the identified factors from the reviewed literature. The responses from the 86 questionnaires were subjected to statistical analysis. The contribution of each of the causes of construction dispute and consequences of disputes examined and the ranking of the attributes in terms of their criticality as perceived by the respondents was done by use of Relative Importance Index (RII) which was computed using the following equation and the results of the analysis are presented in the next chapter.

$$RII = \frac{\sum W}{A*N} (0 \leq RII \leq 1) \text{ ----- Equation (1)}$$

Where:

W – is the weight given to each factor by the respondents and ranges from 1 to 5, (where 5 represents very high ,4 for high,3 for moderate 2 for low and 1 is never));

A – is the highest weight (i.e. 5 in this case) and; N – is the total number of respondents.

### 3.7.1. Conceptual Framework for AHP Method

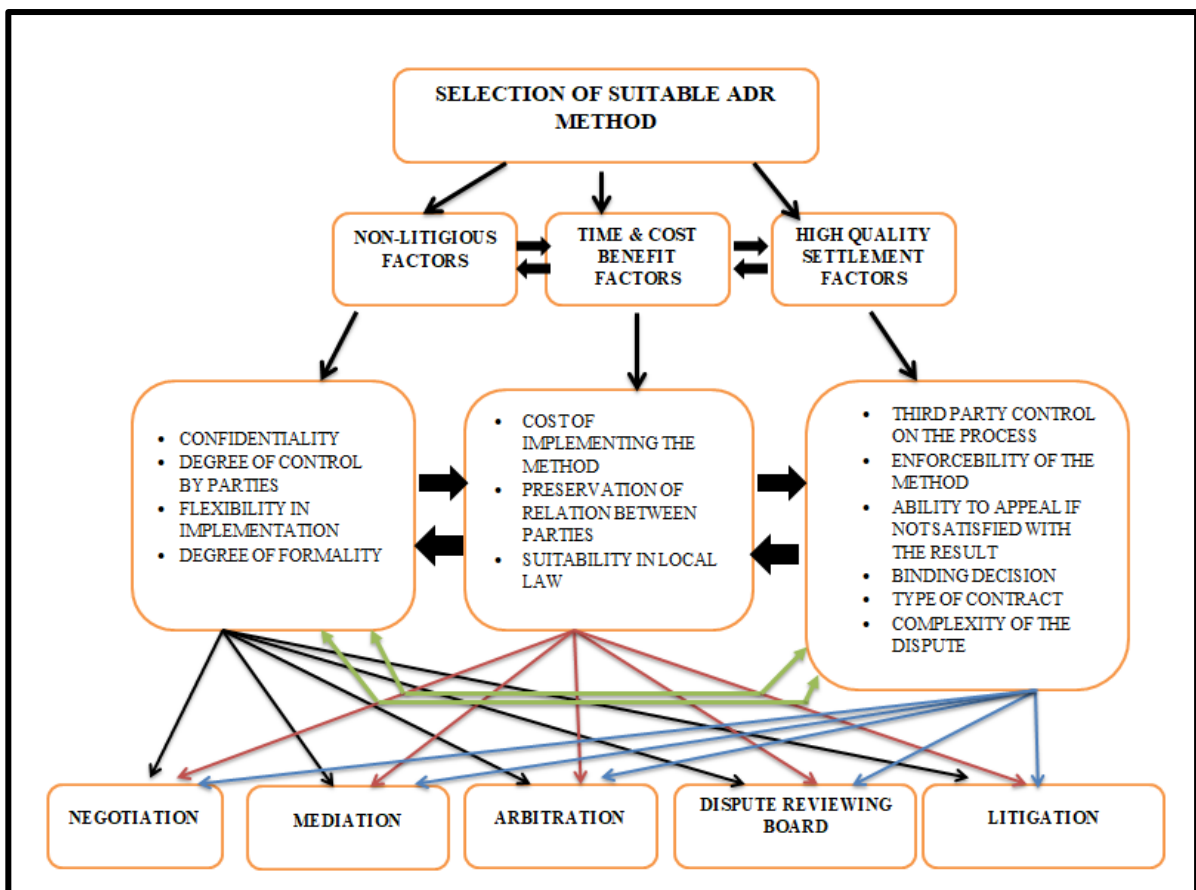


Figure 3.2. Conceptual Framework for AHP Method

### 3.8. Validity and Reliability

#### 3.8.1 Validity

Validity tests were conducted to select and assess the final items the construct that are finally used for statistical testing. Pilot tests were conducted for the instrument similar to population of the study. The purpose of pre-testing was to refine questioners and assess validity of measures.

#### 3.8.2 Reliability

The reliability of the study data has been tested using formula by Excel to calculate the Cronbach's alpha coefficient of internal consistency of the variables which were used in the questionnaire. The Cronbach Alpha test is used to show reliability and reveals the effect of measurement error on the observed score of all respondents. It was used to calculate the effect of measurement error on the observed score of an individual respondent using the standard error of measurement. Further, Cronbach Alpha shows the correlation of items testing the same concept. According to Pallant, (2011) Cronbach's alpha values greater than 0.7 is acceptable index, so all the items used in the questioner were within the acceptable range as shown in table 3.1 below.

Table 3.1 Reliability test of questioners by Cronbach's Alpha value

Cusses of construction dispute related to	Number of items	Cronbach's Alpha value
Consultants	10	.827
Contractors	6	0.725
Clients	6	0.728
Contracts	4	0.731
Material, labor and equipment	7	0.719
External factors	10	0.723

### **3.9. Ethical Consideration**

The confidentiality of the voluntary respondents was ensured. This independent and impartial project work considered not causing harm to respondents in any way. one page sheet explaining about the purpose and anticipated benefit of the study has been attached. Furthermore, data collector has informed respondents on benefit of the study. Full right of respondents withdraw from the study is reserved.

## CHAPTER FOUR

### RESULTS AND DISCUSSIONS

#### 4.1. Respondent's Profile and Response Rate

Total number of questioner distributed was 102 (100%), returned 91 (89.2%) but only 86 (84.3%) was valid.

Table 4.1. Respondent's rate

Group	Distribution in number	Returned in number	Returned (%)	Valid in number	Valid (%)
Client/Owner	32	24	75	23	71.9
Contractor	48	46	95.8	44	91.7
Consultant	8	8	100	8	100
Regulatory	14	13	92.9	13	92.9
Total	102	91	89.2	86	84.3

#### 4.1.1. Respondent's Profile

##### a) Educational status

79.1% of respondents were BSC holders where as 16.3% MSC and only 4.7% were diploma/Level.

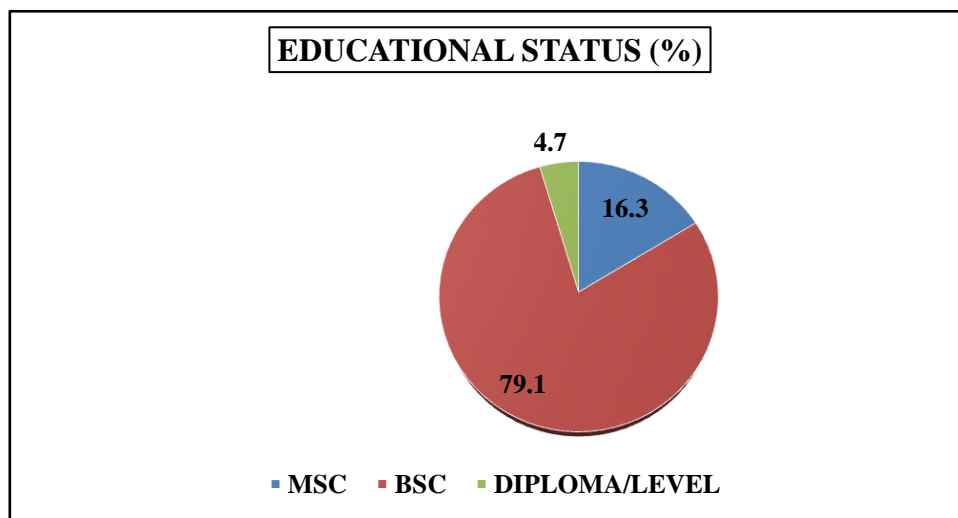


Figure 4.1 Educational status

b) Position in the firm

The majority of respondents were site engineer (34.9%) with project manager (29.1%) and office engineer (19.8%) in the second and third place respectively.

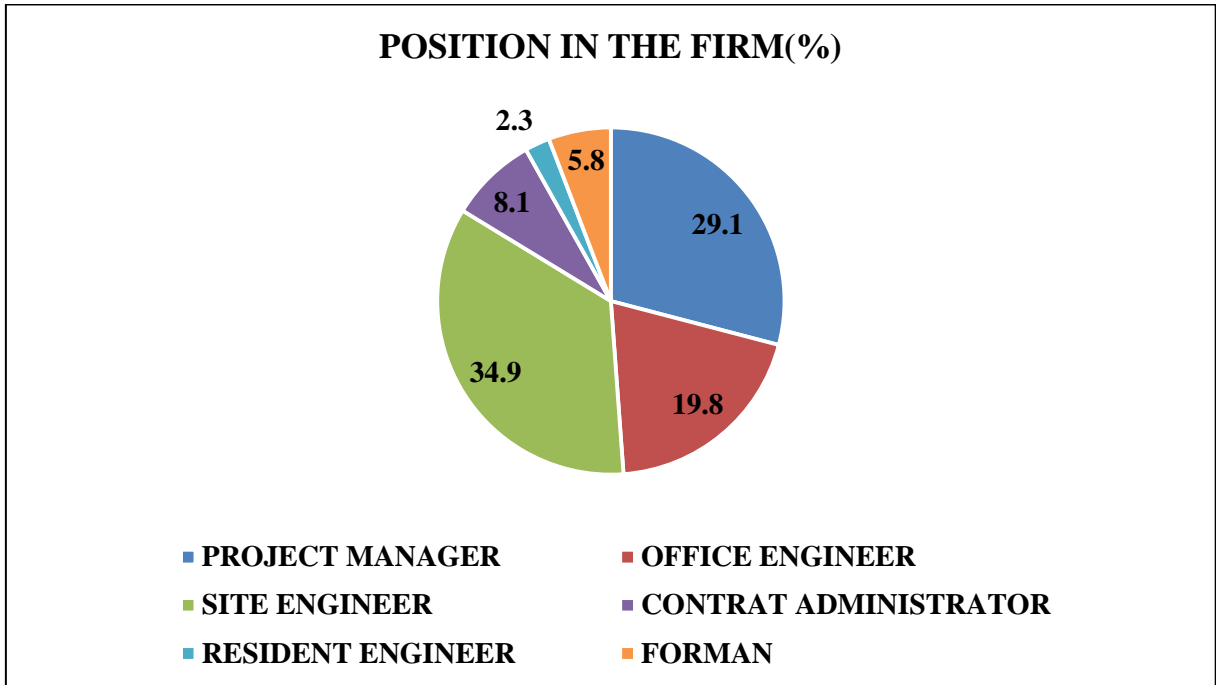


Figure 4.2 Position in the firm

c) Type of organization

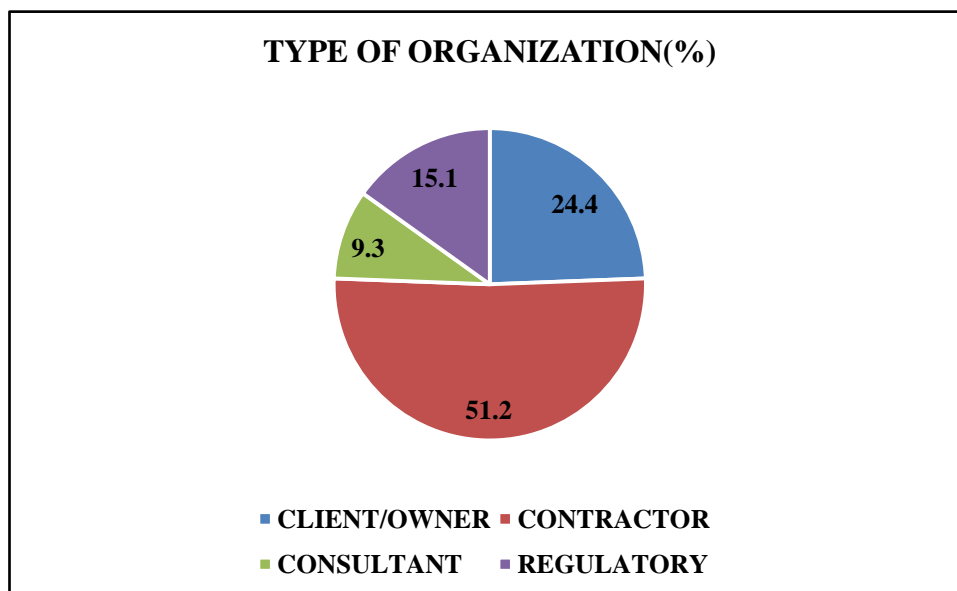


Figure 4.3 Type of organization

d) Work experience

48.8% of the respondents were with experience 0-5 years, 27.9% with 6-10 years, 17.4% with 11-15 years, 4.7% in 16-20 years and 1.2% with greater than 20 years.

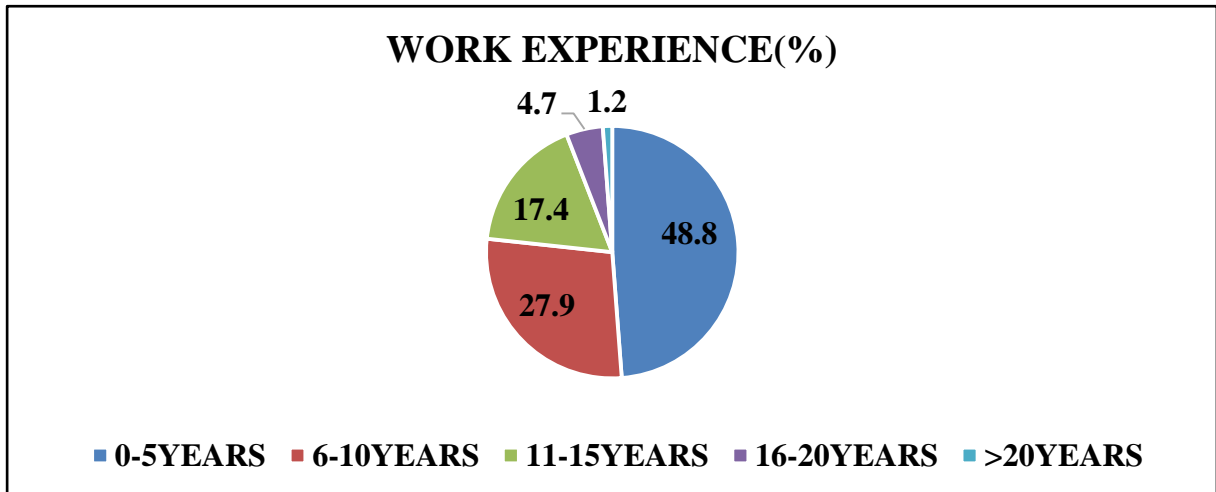


Figure 4.4 Work experience

#### 4.2. Cause of Construction Dispute

The result from summary of Likert scale and RII shows design errors (RII=0.637) as leading factor in Causes of Construction Disputes for Consultant related, Variations due to design errors (RII= 0.633) and Incompleteness of drawing and specification (RII=0.630) the second and third places as shown on Table 4.2 below..

Table.4.2.Consultant related Causes of Construction Disputes

Sub-categories	RII	Rank
1. Design errors	0.637	1
2.Inadequate / incomplete specifications	0.628	4
3. Inadequate quality design	0.623	5
4.Inavailabilityof information	0.574	9
5.Poor Contract management & Supervision	0.621	6
6.Delay in preparation and approval of drawings	0.623	5
7.Frequent Changes in orders & Designs	0.607	7
8.Incompleteness of drawing and specification	0.630	3
9.Variations due to design errors	0.633	2
10.Waiting time for approval of tests and inspection	0.588	8

In case of Contractor related Causes of Construction disputes: Financial failure of the contractor, delays in work progress and time extensions ranked from first to third respectively as shown on Table 4.3 below.

Table 4.3. Contractor related Causes of Construction Dispute

<b>Sub-categories</b>	<b>RII</b>	<b>Rank</b>
1. Delays in work progress	0.700	2
2. Time extensions	0.670	3
3. Financial failure of the contractor	0.702	1
4. Technical inadequacy of the contractor	0.647	4
5. Inadequate investigation before bidding	0.637	5
6. Poor quality of work	0.586	6

Slow decision-making process, Payment delays and late giving of possession became leading factors of causes of construction dispute related to client/owner from Table 4.4 below.

Table 4.4. Client/Owner related Causes of Construction Disputes

<b>Sub-categories</b>	<b>RII</b>	<b>Rank</b>
1. Variations initiated by the owner	0.616	4
2. Change of scope	0.607	5
3. Late giving of possession	0.628	3
4. Unrealistic expectations	0.598	6
5. Payment delays	0.705	2
6. Slow decision-making process	0.726	1

On the other hand, causes of construction disputes related to contract became: other contractual problems, different interpretation of the contract and ambiguities in contract documents from first priority to third as shown on Table 4.5 below.

Table 4.5 Contract related Causes of Construction Disputes

<b>Sub-categories</b>	<b>RII</b>	<b>Rank</b>
1. Ambiguities in contract documents	0.598	3
2. Different interpretations of the contract provisions	0.600	2
3. Risk allocation	0.593	4
4. Other contractual problems	0.605	1

On the other hand, causes of construction disputes related to material, labor and equipment became: price fluctuation of construction materials, shortage in materials and government regulations from first priority to third as shown on Table 4.6 below.

Table 4.6 Causes of Construction Disputes related to Material, labor and equipment

<b>Sub-categories</b>	<b>RII</b>	<b>Rank</b>
1. Quality of material	0.665	4
2. Price fluctuation of construction materials	0.828	1
3. Government regulations	0.681	3
4. Shortage in materials	0.730	2
5. Shortage in labor supply	0.537	7
6. Labor productivity	0.584	6
7. Equipment availability and failure	0.637	5

Lastly, causes of construction disputes related to external factors are price escalation, project committee interference and technical committee interference ranked from first to third as shown on Table 4.7 below.

Table 4.7 Causes of Construction Disputes Related to External factors

<b>Sub-categories</b>	<b>RII</b>	<b>Rank</b>
1. Unexpected weather condition	0.623	8
2. Legal and economic factors	0.651	4
3. Fragmented structure of the sector	0.612	9
4. Institutional interference	0.635	6
5. Project committee interference	0.716	2
6. Technical committee interference	0.656	3
7. Project area community interference	0.649	5
8. Impact of COVID-19	0.598	10
9. Price escalation	0.812	1
10. Force majeure	0.633	7

Results from focus group discussion on appendix 2 shows that causes of construction dispute in the region from high frequently occurring to low are shortage in construction materials, Price escalation the country, fragmented structure of the sector, financial failure of the contractor, poor quality of work, poor quality of material, inadequate quality design, design errors, incomplete specifications, Variations due to design errors, price fluctuation of construction materials.

In the case of Arsi zone, from 43 identified causes of construction dispute, the study shows : price fluctuation of construction materials, price escalation ,shortage in materials ,slow decision-making process, project committee interference, payment delays, financial failure of the contractor, delays in work progress, government regulations and time extensions ranked from first to tenths as shown on Table 4.8 below.

Table.4.8 Summary of top 10 causes of construction dispute in the case of Arsi zone, RII values and ranks

<b>Sub-categories</b>	<b>RII</b>	<b>Rank</b>
1.. Price fluctuation of construction materials	0.828	1
2. Price escalation	0.812	2
3. Shortage in materials	0.730	3
4. Slow decision-making process	0.726	4
5. Project committee interference	0.716	5
6.Payment delays	0.705	6
7. Financial failure of the contractor	0.702	7
8. Delays in work progress	0.700	8
9. Government regulations	0.681	9
10. Time extensions	0.670	10

According to Getahun (2016), 23 identified causes of construction dispute ranked from 1 to 11 were Design errors (1), Inadequate/incomplete specifications (2), Quality of design (3), Availability of information (3), Delays in work progress (4), Time extensions (4), Financial failure of the contractor(4), Tendering (5), Technical inadequacy of the contractor (5), Quality of works (5), Late giving of possession(6), Payment delay (7), Variations initiated by the owner (7), Unrealistic expectations (7), Change of scope (7), Risk allocation (8), Different interpretations of the contract provisions(9), Ambiguities in contract documents (9), Other contractual problems (9), Weather (10), Legal and economic factors (11), Security (11) and Fragmented structure of the sector (11).

If results of top 5 ranked causes of construction dispute for the two studies compared, no one output becomes similar. Only Payment delays (6), financial failure of the contractor (7) and Delays in work progress (8) of this study identified on the seventh, fourth and fourth places respectively in the study described above.

### 4.3. Consequences of Construction Dispute

Top 5 major consequences of construction disputes Related to Contractor are Time delay, Cost overrun, Minimize quality of construction, Termination of contracts and Poor performance ranked from first to fifth respectively as shown on Table 4.9 below.

Table 4.9. Major consequences of construction disputes Related to Contractor

<b>No.</b>	<b>Sub-categories</b>	<b>RII</b>	<b>Rank</b>
1	Reduce profits/Benefit	0.635	6
2	Additional expense in managerial and administration.	0.588	9
3	Cost overrun	0.705	2
4	Termination of contracts	0.670	4
5	Poor performance.	0.656	5
6	Loss of company reputation.	0.626	7
7	Time delay.	0.714	1
8	Minimize quality of construction.	0.691	3
9	Deterioration of relationships and break down in cooperation of stakeholders.	0.621	8
10	Insecurity of project area.	0.581	10
11	Political instability	0.560	12
12	High turnover of leaders/Administrators/Cabinet/Workers	0.567	11
13	Extended and/ or more complex award process	0.581	10
14	Loss of professional reputation	0.670	4

Abera Bekele (2005), on his study on “alternative dispute resolution methods in construction industry: an assessment of Ethiopian situation” listed the following factors as consequences of construction disputes related to contractors: reputation is very much affected irrespective of who is at fault, additional cost if decision is made against the contractor, loss of reputation, loss of profit, high overhead expenses, bankruptcy may arise, development of negative attitude by both owner and consultant, not getting the benefit of the project, possible withholding of payments by clients/consultants on completed works- ruinous to the contractor’s financial status, possible foreclosure of contractor’s collateral given for performance bond, negative points on future bids unless litigation is settled in favor of the contractor, and failure of the client to go into arbitration would mean endless litigations at courts.

Comparing the two studies, Minimize quality of construction, Termination of contracts and Poor performance are only included consequences of construction dispute in the current findings.

Major Consequences of construction disputes Related to Consultant ranked from first to fifth are Time delay, Deterioration of relationships and break down in cooperation of stakeholders reduce profits/benefit, cost overrun and Loss of professional reputation as shown on Table 4.10 below.

Table 4.10. Major Consequences of construction disputes Related to Consultant

No	Sub-categories	RII	Rank
1	Reduce profits/Benefit	0.616	3
2	Additional expense in managerial and administration.	0.581	9
3	Cost overrun	0.614	4
4	Termination of contracts	0.519	12
5	Poor performance.	0.591	7
6	Loss of company reputation.	0.586	8
7	Time delay.	0.628	1
8	Minimize quality of construction.	0.600	6
9	Deterioration of relationships and break down in cooperation of stakeholders.	0.619	2
10	Insecurity of project area.	0.542	11
11	Political instability	0.519	13
12	High turnover of leaders/Administrators/Cabinet/Workers	0.535	12
13	Extended and/ or more complex award process	0.563	10
14	Loss of professional reputation	0.602	5

But according to the research by Abera Bekele (2005) with title indicated above consequences of construction dispute were 1) reputation is very much affected irrespective of who is at fault, 2) may lose future clients and jobs, 3) additional cost, additional time, 4) defame of the company in case of corruption, and 5) affects healthy progress of works .

This research finds deterioration of relationships and break down in cooperation of stakeholders as consequence not covered in the study indicated above.

Major consequences of construction disputes related to client ranked from 1-5 are termination of contracts, cost overrun, political instability, time delay and deterioration of

relationships and break down in cooperation of stakeholders as shown on Table 4.11 below.

Table 4.11. Major consequences of construction disputes Related to Client

No	Sub-categories	RII	Rank
1	Reduce profits/Benefit	0.600	10
2	Additional expense in managerial and administration.	0.628	6
3	Cost overrun	0.670	2
4	Termination of contracts	0.681	1
5	Poor performance.	0.605	9
6	Loss of company reputation.	0.551	14
7	Time delay.	0.658	4
8	Minimize quality of construction.	0.614	7
9	Deterioration of relationships and break down in cooperation of stakeholders.	0.633	5
10	Insecurity of project area.	0.588	11
11	Political instability	0.660	3
12	High turnover of leaders/Administrators/Cabinet/Workers	0.570	12
13	Extended and/ or more complex award process	0.612	8
14	Loss of professional reputation	0.560	13

Abera Bekele (2005) identified the following as impacts of construction dispute: mainly additional cost (as a result of litigation process, if award is made against the client, etc.), it might have direct impact on the following projects (the client may cancel due to lack of adequate financing), the projects are not completed on time, time extension claims, financial claims, lower annual performance of its plan, budget allocated is tied up, resulting in poor financial performance, involving in legal cases, spending a lot of time and energy, affecting the progress of the works, resulting in down time of machineries and man power to be claimed by the contractor from the client, not getting the benefit of the project, and lack of smooth progress of the project but political instability and termination of contracts included in new study.

Results from focus group discussion on appendix 2 shows that main consequences of construction dispute in road construction sector in decreasing frequency of happening are termination of contracts by contractors, high cost overrun for contractors because of time delay and high cost overrun for clients because of rebidding after termination of contracts, time delay by contractors, minimize quality of construction by contractors, reduce profits

of contractors and clients lose benefit after completion of the projects, deterioration of relationships and break down in cooperation of stakeholders.

In the case of Arsi zone, from 14 identified consequences of construction dispute, the study shows; time delay, cost overrun, minimize quality of construction, termination of contracts, loss of professional reputation, political instability, poor performance, reduce profits/benefit, loss of company reputation, deterioration of relationships and break down in cooperation of stakeholders, insecurity of project area, additional expense in managerial and administration, extended and/ or more complex award process, and high turnover of leaders/administrators/cabinet/workers ranked from 1 to 14. As shown on Table 4.12 below.

Table.4.12 Summary of Major Consequences of construction disputes in the case of Arsi zone, RII values and ranks

<b>No.</b>	<b>Sub-categories</b>	<b>RII</b>	<b>Rank</b>
1	Time delay.	0.714	1
2	Cost overrun	0.705	2
3	Minimize quality of construction.	0.691	3
4	Termination of contracts	0.681	4
5	Loss of professional reputation	0.670	5
6	Political instability	0.660	6
7	Poor performance.	0.656	7
8	Reduce profits/Benefit	0.635	8
9	Loss of company reputation.	0.626	9
10	Deterioration of relationships and break down in cooperation of stakeholders.	0.621	10
11	Insecurity of project area.	0.588	11
12	Additional expense in managerial and administration.	0.588	11
13	Extended and/ or more complex award process	0.581	13
14	High turnover of leaders/Administrators/Cabinet/Workers	0.574	14

#### **4.4. Criteria for Selection of Suitable ADR Method**

There are various ADR methods available in the construction industry. Each of these ADR methods has different advantages, disadvantages, which are valid under specific conditions. Empirical studies have identified that in selecting a suitable dispute resolution method, the disputants are mostly concerned with the benefits such as a speedy resolution, low cost and preservation of relationship. After a thorough review of the literature, 14 factors have been shortlisted. These are: confidentiality, degree of control by parties, third party control on the process, flexibility in implementation, enforceability of the method, binding decision, ability to appeal if not satisfied with the result, degree of formality, cost of implementing the methods, time to reach a settlement, type of contract, preservation of relationship between parties, suitability in local law system and complexity of the dispute which is same with, Illankoon et al. (2022) and so adapted as Criteria for selection of suitable ADR method for this study.

#### **4.5 Selection of Suitable ADR Method for Construction Dispute Based on AHP Method**

In Selection of suitable ADR method for construction dispute based on AHP method, first each of the 14 criteria pair wisely compared, and then each the 5 ADR methods compared with respect to the criteria and then get priority in each step as shown on appendix 5. cost of implementing the methods, complexity of the dispute, time to reach a settlement, confidentiality, degree of control by parties, flexibility in implementation, enforceability of the method, ability to appeal if not satisfied with the result, third party control on the process, binding decision, contract type, preservation of relationship between parties, degree of formality and suitability in local laws are ranked from first to fourteen priority as shown on Table 4.13 below.

Table 4.13 Priorities and rank of 14 selection criteria for ADR methods

Criteria	Priorities	Rank
Confidentiality	0.109	4
Degree of control by parties	0.071	5
Flexibility in implementation	0.068	6
Degree of formality	0.025	13
Cost of implementing the methods	0.161	1
Time to reach a settlement	0.126	3
Preservation of relationship between parties	0.029	12
Suitability in local laws	0.021	14
Third party control on the process	0.052	9
Enforceability of the method	0.068	7
Binding decision	0.035	10
Ability to appeal if not satisfied with the result	0.056	8
Contract Type	0.030	11
Complexity of the dispute	0.150	2

The result for this study shows that: negotiation, mediation, arbitration, dispute resolution board and litigation are ranked from first to five priorities, so assuring that negotiation be suitable construction dispute resolution method as shown on Table 4.14 below.

Table 4.14 Priorities and rank of ADR methods

ADR methods	Priorities	Rank
Negotiation	0.423	1
Mediation	0.161	2
Arbitration	0.136	4
Dispute Review Board	0.152	3
Litigation	0.128	5

According to FPPA, 2011, part 3 sub-article 26.2, "the public body and the contractor shall make every effort to resolve amicably by direct informal negotiation any disagreement, controversy or dispute arising between them under or in connection with the Contract or interpretation thereof" and FIDIC-2010, sub-article 20.5 "Where a notice of dissatisfaction has been given under sub-clause 20.4 above, both parties shall attempt to settle the dispute amicably before the commencement of 20.4 obtaining dispute board's decision. However, unless both parties agree otherwise, the party giving a notice of dissatisfaction in accordance with sub-clause 20.4 above should move to commence arbitration after the fifty-sixth day from the day on which a notice of dissatisfaction was given, even if no attempt at an amicable settlement has been made" both confirms negotiation as first priority for dispute resolution which is in parallel with the result of this study.

## CHAPTER FIVE

### CONCLUSION AND RECOMMENDATIONS

#### 5.1. Conclusion

The findings of this study confirms consequences of the world wide phenomena i.e. consequences of Russia and Ukraine war and impacts of COVID-19 which resulted in price escalation, price fluctuation and shortage of construction material.

In the case of Arsi zone, from 43 identified causes of construction dispute, the study shows : price fluctuation of construction materials, price escalation ,shortage in materials ,slow decision-making process, project committee interference ,payment delays ,financial failure of the contractor, delays in work progress, government regulations and time extensions ranked from first to tenths place. The study shows; time delay, cost overrun, minimize quality of construction, termination of contracts, loss of professional reputation, political instability, poor performance, reduce profits/benefit, loss of company reputation, deterioration of relationships and break down in cooperation of stakeholders, insecurity of project area, additional expense in managerial and administration, extended and/ or more complex award process, and high turnover of leaders/administrators/cabinet/workers ranked from 1 to 14.

Criteria for selection of suitable ADR method used for this study are: confidentiality, degree of control by parties, third, party control on the process, flexibility in implementation, enforceability of the method, binding decision, ability to appeal if not satisfied with the result, degree of formality, cost of implementing the methods, time to reach a settlement, type of contract, preservation of relationship between parties, suitability in local law system and complexity of the dispute.

According to Arsi Zone construction road construction sector, negotiation is preferred as suitable construction dispute resolution method as compared to mediation, arbitration, dispute review board and litigation.

## **5.2. Recommendations**

- ✓ Government need to revise its regulation system to control and at least minimize artificial price fluctuation of construction materials, price escalation and shortage in materials.
- ✓ Further price fluctuations will lead to increases in construction costs, delays in the construction schedule, and/or disputes with contractors and material suppliers. However, these risks can be reduced or avoided by including provisions in the contract that fairly allocate responsibility in a manner that is mutually agreeable to the parties.
- ✓ There must be continuous training awareness creation programs for clients to minimize slow decision-making process and payment delays.
- ✓ There must be local law revision to avoid project committee interference on construction projects.
- ✓ Strict and proper schedules must prepare and managed to minimize/avoid delays in work progress and time extensions problems by contractors.

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## **APPENDICES**

### **APPENDIX- 1**

**ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY  
FACULTY OF TECHNOLOGY  
DEPARTMENT OF CIVIL ENGINEERING**

#### **QUESTIONNAIRE COVER LETTER**

Dear Sir/Madam,

I am undertaking a research survey on **ASSESSMENT OF CONSTRUCTION DISPUTE AND RESOLUTION IN OROMIA REGION ROAD PROJECTS: THE CASE OF ARSI ZONE ROAD PROJECTS**. The research is an individual research project as part of my study for Master's Degree in Construction Engineering and Management.

The attached questionnaire attempts to survey the causes of dispute, the consequences of dispute and dispute resolution methods on construction of road projects in Arsi Zone.

The findings of this study will provide a substantial input to the new and currently adopted contract procedure considering the development stage of the construction industry in Ethiopia.

I would be very grateful if you could kindly take your invaluable time to complete and return this questionnaire.

Regards,

Getachew Mideksa (0912218699, 0911533984)

## QUESTIONNAIRE

### Section I. Profile of the Respondents

1. What is your educational status? Mark (✓)  
Ph.D.  MSc.  BSc.  Diploma/level
2. What is your position in the firm/project? Mark (✓)  
Project manager  Office engineer  Site engineer  Contract administrator   
 Resident engineer  Forman
3. Mark your organization. Mark (✓)  
Client/Owner  Contractor  Consultant  Regulatory
4. If your answer is a contractor for question number 3, what is the grade of the company? Mark (✓)  
RC 1  RC2  RC3  below RC4   
GC 1  GC 2  GC 3  below GC 4   
BC 1  BC 2  BC3  below BC 4
5. Work experience in the construction sector .Mark (✓)  
0-5years  6-10 years  11-15years  16-20years  greater than 20 years

**Section II. Questions Related to Causes of Construction Dispute, their Major Consequences, and dispute resolution method**

**6. Main categories of causes of dispute in road construction industries**

The following table consists of possible causes of dispute construction projects identified from literatures. Based on your experience, among the following lists (1-42) please indicate the most frequent cause of dispute (Each under its main category) in your area Arsi Zone Road construction sector as ranked from 1-5 (when 5 represents very high ,4 for high,3 for moderate 2 for low and 1 is never) by marking (✓) under each preference. Please also specify possible measures to be taken in order to minimize effect causes of dispute

Causes of Construction Disputes		please indicate the most frequent causes of disputes ranked from 1-5 by marking (✓) under each preference					Please enumerate possible remedial measures to be taken to minimize the effect of causes of construction disputes
Main Categories	Sub-categories	1	2	3	4	5	
Consultant related (1)	1. Design errors						
	2. Inadequate / incomplete specifications						
	3. Inadequate quality design						
	4. Inavailability of information						
	5. Poor Contract management & Supervision						
	6. Delay in preparation and approval of drawings						
	7. Frequent Changes in orders & Designs						
	8. Incompleteness of drawing and specification						
	9. Variations due to design errors						
	10. Waiting time for approval of tests and inspection						
Contractor related(2)	1. Delays in work progress						
	2. Time extensions						
	3. Financial failure of the contractor						
	4. Technical inadequacy of the contractor						
	5. Inadequate investigation before bidding						
	6. Poor quality of work						

Client/Owner related (3)	1. Variations initiated by the owner								
	2. Change of scope								
	3. Late giving of possession								
	4. Unrealistic expectations								
	5. Payment delays								
	6. Slow decision-making process								
Contract related(4)	1. Ambiguities in contract documents								
	2. Different interpretations of the contract provisions								
	3. Risk allocation								
	4. Other contractual problems								
Material, labor and equipment related factors (5)	1. Quality of material								
	2. Price fluctuation of construction materials								
	3. Government regulations								
	4. Shortage in materials								
	5. Shortage in labor supply								
	6. Labor productivity								
	7. Equipment availability and failure								
External factors(6)	1. Unexpected weather condition								
	2. Legal and economic factors								
	3. Fragmented structure of the sector								
	4. Institutional interference								
	5. Project committee interference								
	6. Technical committee interference								
	7. Project area community interference								
	8. Impact of COVID-19								
	9. Price escalation								
	10. Force majeure								

### ***7. Major consequences of construction dispute in road construction projects***

The following table consists of possible consequences of construction dispute on projects identified from literatures. Based on your experience, among the following lists (1-14) please indicate the most frequent consequences of construction dispute) in your area Arsi

Zone Road construction sector as ranked from 1-5 (when 5 represents very high ,4 for high,3 for moderate 2 for low and 1 is never) by marking (✓) under each preference.

No	Major consequences of construction disputes	Related to Consultant (1)					Related to the contractor(2)					Related to Client Owner (3)					Related to the public authorities (4)					Related to financial institutions (5)				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1	Reduce profits/Benefit																									
2	Additional expense in managerial and administration.																									
3	Cost overrun																									
4	Termination of contracts																									
5	Poor performance.																									
6	Loss of company reputation.																									
7	Time delay.																									
8	Minimize quality of construction.																									
9	Deterioration of relationships and break down in cooperation of stakeholders.																									
10	Insecurity of project area.																									
11	Political instability																									
12	High turnover of leaders/Administrators/Cabinet/Workers																									
13	Extended and/ or more complex award process																									
14	Loss of professional reputation																									

8. The following table consists of possible Factors affecting the selection of ADR method on projects identified from literatures. Based on your experience, among the following lists (1-14) please indicate the most frequent Factors affecting the selection of ADR method) in your area Arsi Zone Road construction sector as ranked from 1-5 (when 5 represents very high ,4 for high,3 for moderate 2 for low and 1 is never) by marking (✓) under each preference.

**Performance rating**

N o.		Negotiation (1)					Mediation (2)					Arbitration (3)					Dispute Reviewing Board (4)					Litigation (5)				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1	Confidentiality																									
2	Degree of control by parties																									
3	Third party control on the process																									
4	Flexibility in implementation																									
5	Enforceability of the method																									
6	Binding decision																									
7	Ability to appeal if not satisfied with the result																									
8	Degree of formality																									
9	Cost of implementing the methods																									
10	Time to reach a settlement																									
11	Type of contract																									
12	Preservation of relationship between parties																									
13	Suitability in local law system																									
14	Complexity of the dispute																									

**Section III. Questions Related to Criteria for selection of ADR Method and AHP Model.**

**9. Selection of ADR methods**

Define the importance level

In this section, 14 factors affecting Criteria for selection of ADR Method are categorized into three main categories which are non-litigious factors, time and cost/benefit factors and high quality settlement factors. Confidentiality, Degree of control by parties, Flexibility in implementation, Degree of formality is grouped under non-litigious factors, Cost of implementing the methods, Time to reach a settlement, Preservation of relationship between parties, Suitability in local law system are sub- factors of time and cost/benefit factors and Third party control on the process, Enforceability of the method, Binding decision, Ability to appeal if not satisfied with the result, Type of contract and Complexity of the dispute are under high quality settlement factors Therefore, respondents compare the importance level (pair-wise comparison) by ticking (X). The comparison scales are 1,3,5,7 and 9.

Definition of scales

Variables	Fuzzy number defined	Membership function
1	Equally Important	(1, 1, 3)
3	Weak Important	(1, 3, 5)
5	Strong Important	(3, 5, 7)
7	Very strong Important	(5, 7, 9)
9	Extremely strong Important	(7, 9, 10)

9.1. In this section, respondents compare a group of factors with another group of factors affecting Criteria for selection of ADR Method.

Left factors are affecting more					Equ al	Right factors are affecting more				
	9	7	5	3	1	3	5	7	9	
non-litigious factors										time and cost/benefit factors
non-litigious factors										high quality settlement factors
time and cost/benefit factors										high quality settlement factors

**9.2.** In this section, respondents compare factors affecting Criteria for selection of ADR Method within the same categories.

A. Non-litigious factors

Left factors are affecting more					Equal	Right factors are affecting more				
	9	7	5	3	1	3	5	7	9	
Confidentiality										Degree of control by parties
Confidentiality										Flexibility in implementation
Confidentiality										Degree of formality
	9	7	5	3	1	3	5	7	9	
Degree of control by parties										Flexibility in implementation
Degree of control by parties										Degree of formality
	9	7	5	3	1	3	5	7	9	
Flexibility in implementation										Degree of formality

B. time and cost/benefit factors

Left factors are affecting more					Equal	Right factors are affecting more				
	9	7	5	3	1	3	5	7	9	
Cost of implementing the methods										Time to reach a settlement
Cost of implementing the methods										Preservation of relationship between parties
Cost of implementing the methods										Suitability in local law system
	9	7	5	3	1	3	5	7	9	
Time to reach a settlement										Preservation of relationship between parties
Time to reach a settlement										Suitability in local law system
	9	7	5	3	1	3	5	7	9	
Preservation of relationship between parties										Suitability in local law system

C. High quality settlement

Left factors are affecting more					Equal	Right factors are affecting more				
	9	7	5	3	1	3	5	7	9	
Third party control on the process										Enforceability of the method
Third party control on the process										Binding decision
Third party control on the process										Ability to appeal if not satisfied with the result
Third party control on the process										Type of contract
Third party control on the process										Complexity of the dispute
	9	7	5	3	1	3	5	7	9	
Enforceability of the method										Binding decision
Enforceability of the method										Ability to appeal if not satisfied with the result
Enforceability of the method										Type of contract
Enforceability of the method										Complexity of the dispute
	9	7	5	3	1	3	5	7	9	
Binding decision										Ability to appeal if not satisfied with the result
Binding decision										Type of contract
Binding decision										Complexity of the dispute
	9	7	5	3	1	3	5	7	9	
Ability to appeal if not satisfied with the result										Type of contract
Ability to appeal if not satisfied with the result										Complexity of the dispute
	9	7	5	3	1	3	5	7	9	
Type of contract										Complexity of the dispute

## **Focus group discussion**

Please, widely discuss on the following questions in your group

Rank in order their higher frequency to lower, occurrences for cause and consequences.

*1. What are the main causes of construction disputes in Arsi Zone which are related to*

A) Consultants?

B) Contractors?

C) Owners/Clients?

D) Contract?

E) Material, labor and equipment?

F) External factors?

*2. In general, what are the main causes of construction disputes in Arsi Zone from high frequency to low?*

*3. What are the major consequences of construction disputes?*

*4. What type of construction dispute resolution mechanism is being practiced in Arsi Zone and what type of ADR method do you prefer?*

**APPENDIX 2**

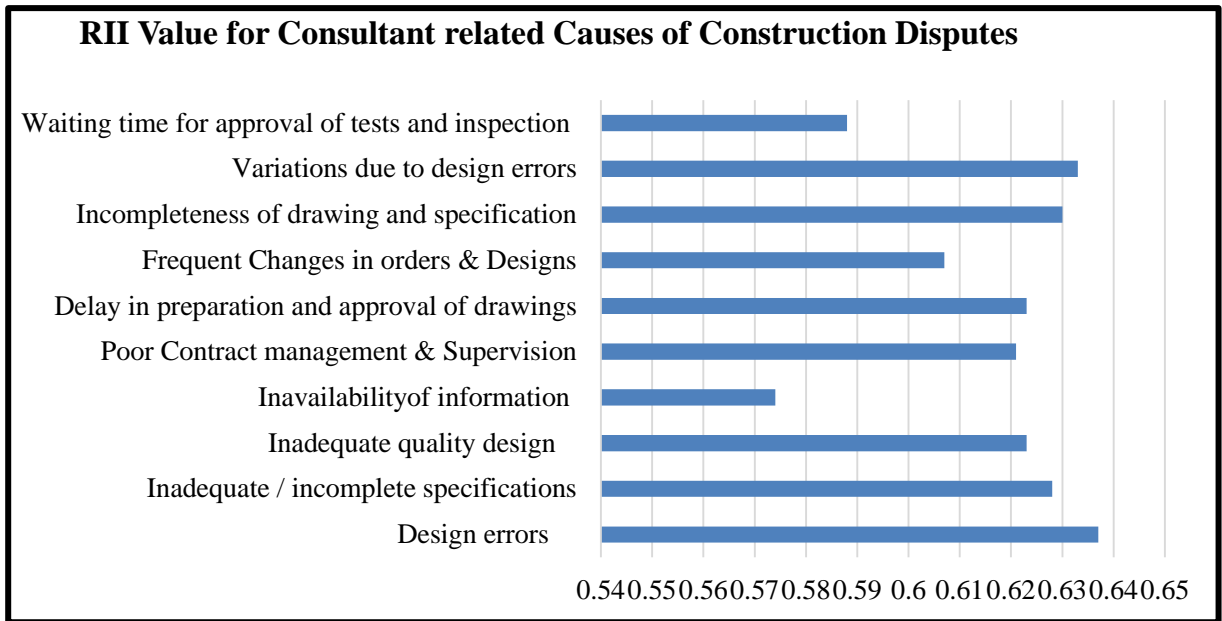


Figure.1. Consultant related Causes of Construction Disputes

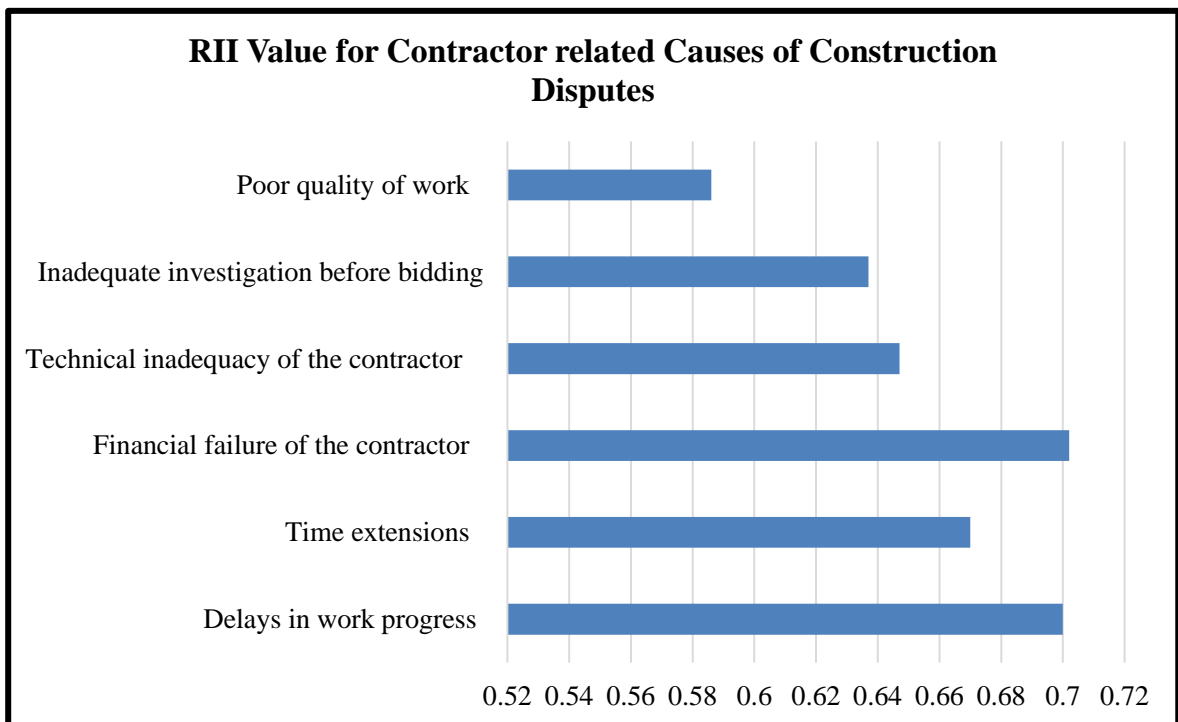


Figure.2. Contractor related Causes of Construction Disputes

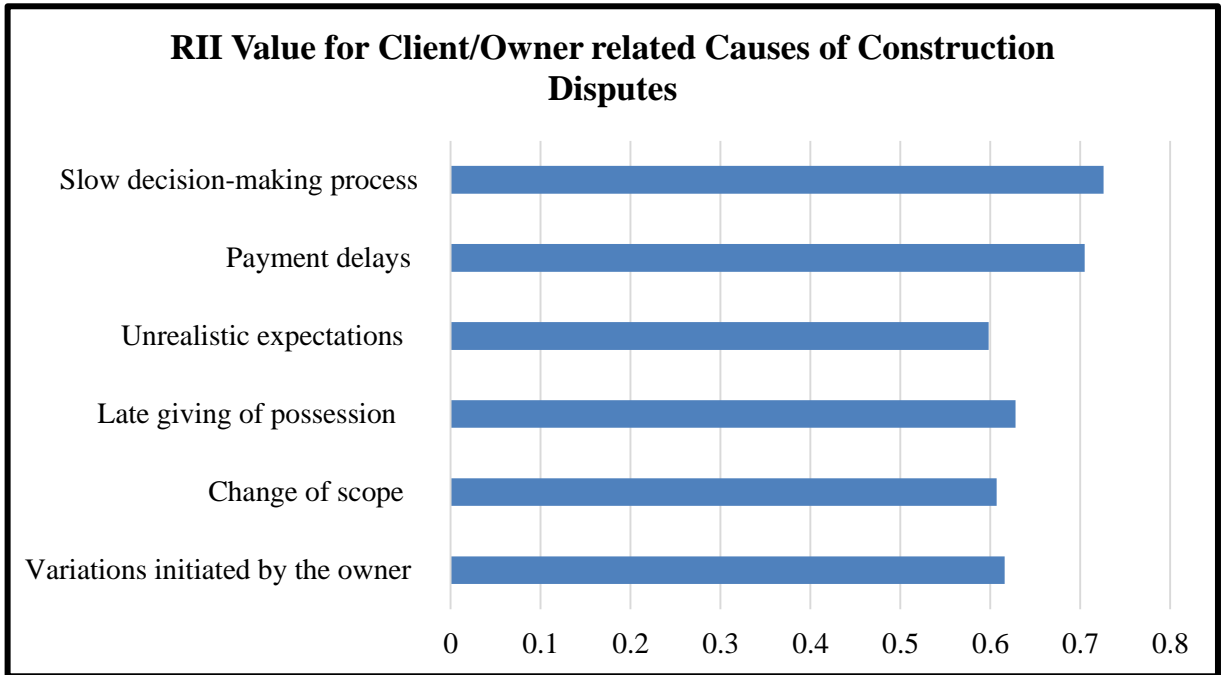


Figure.3. Client/Owner related Causes of Construction Disputes

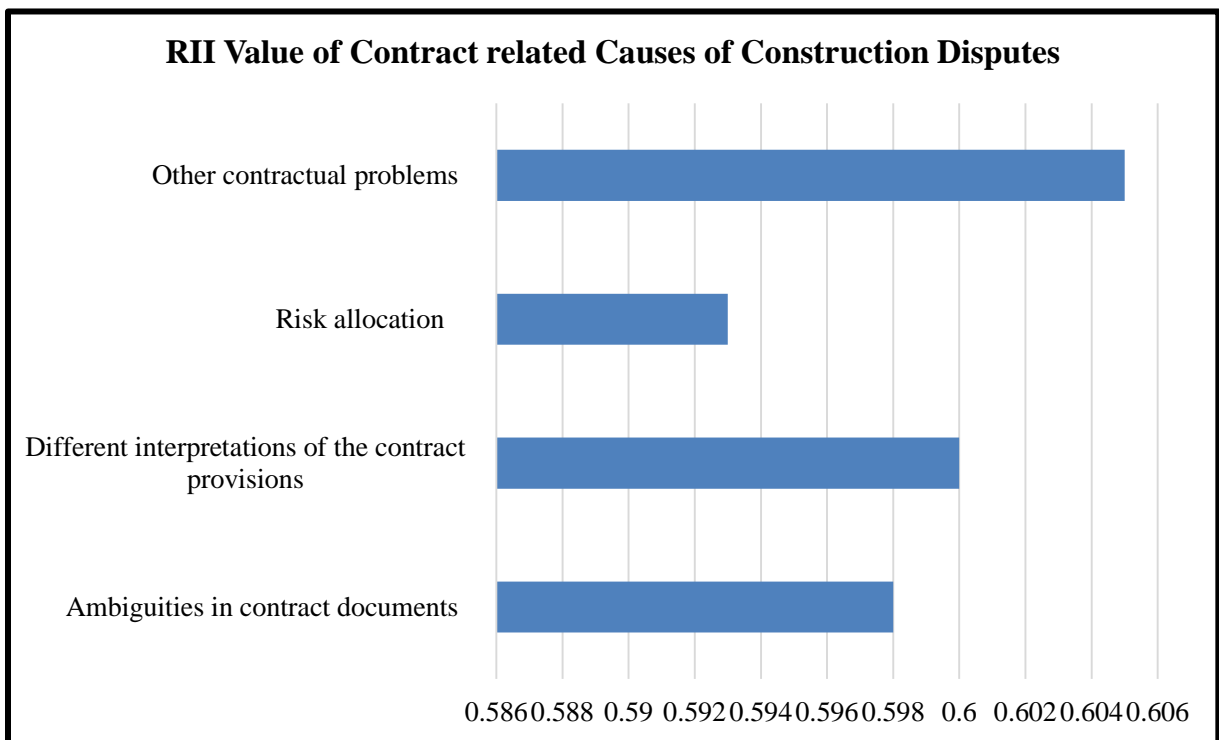


Figure.4. Contract related Causes of Construction Disputes

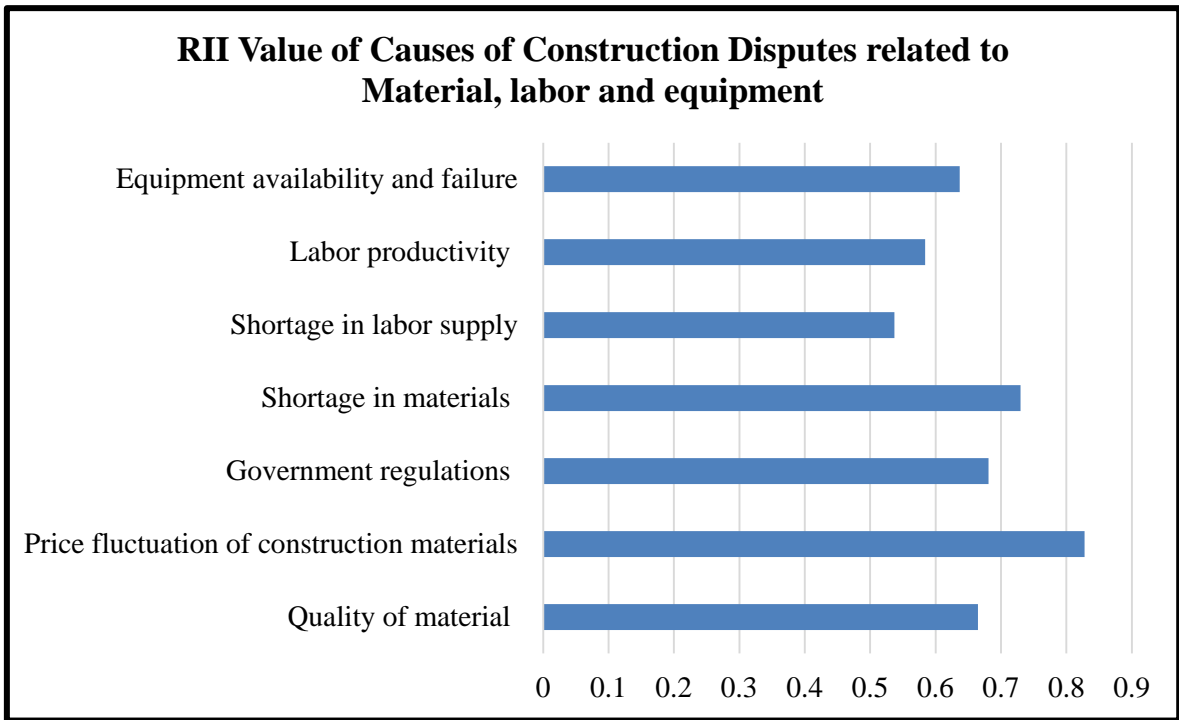


Figure.5. Causes of Construction Disputes related to Material, labor and equipment

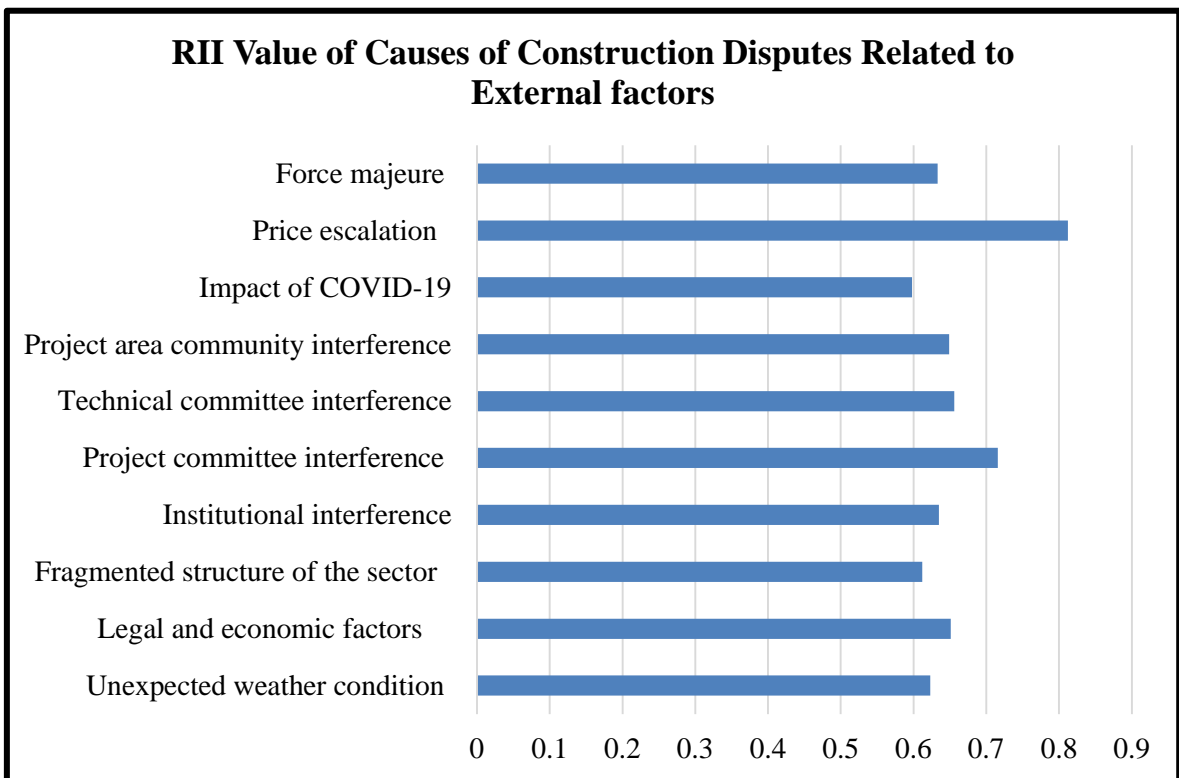


Figure.6. Causes of Construction Disputes Related to External factors

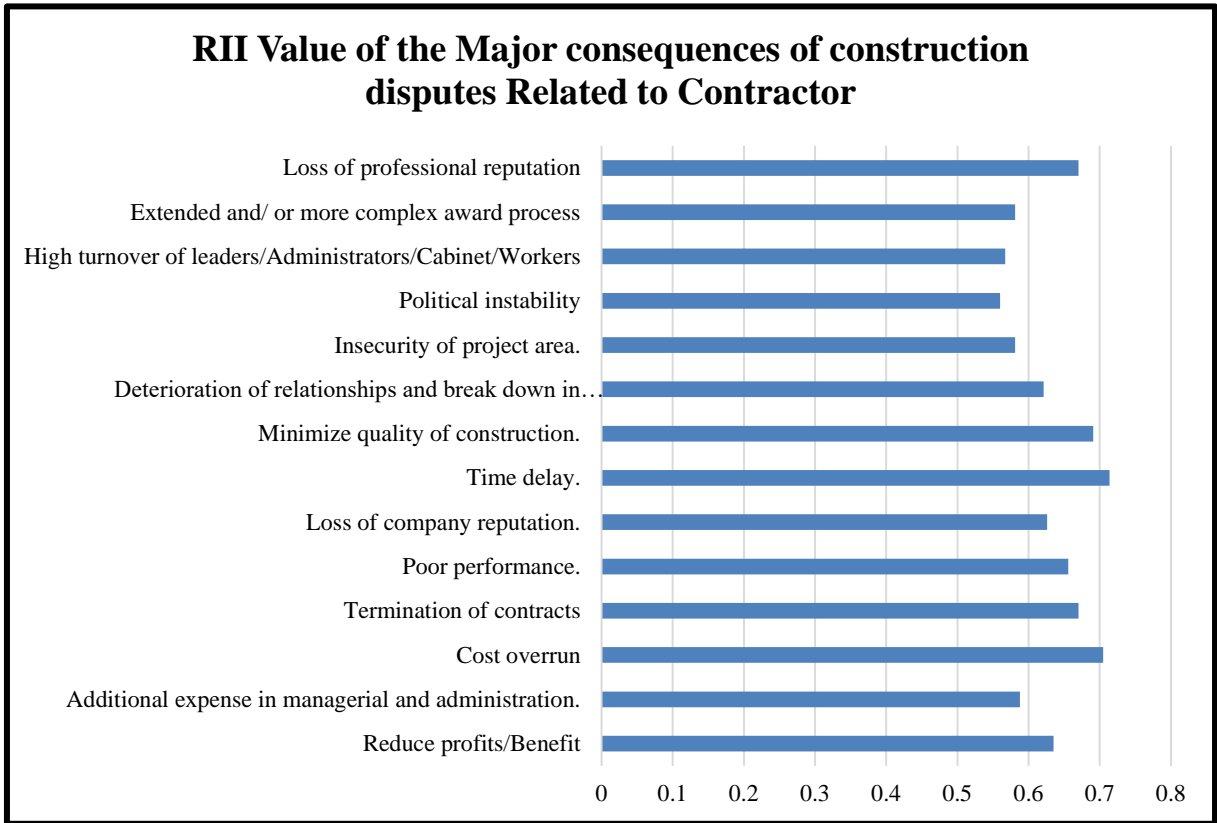


Figure.7. Major Consequences of construction disputes Related to Contractor

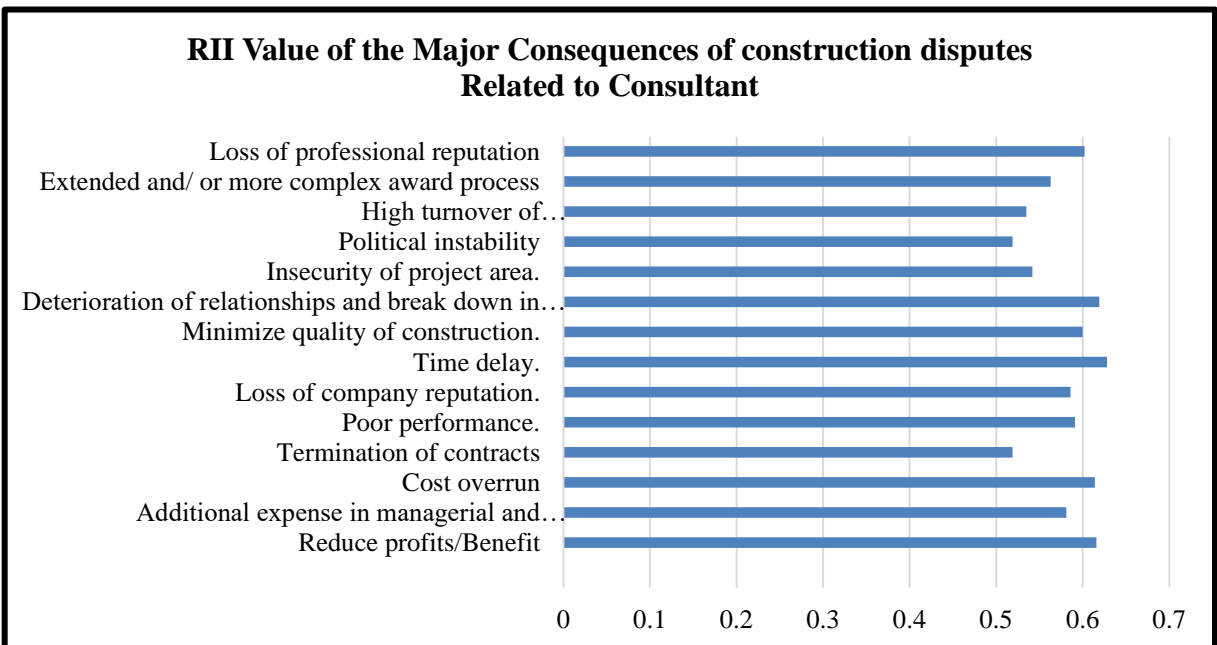


Figure.8. Major consequences of construction disputes Related to Consultant

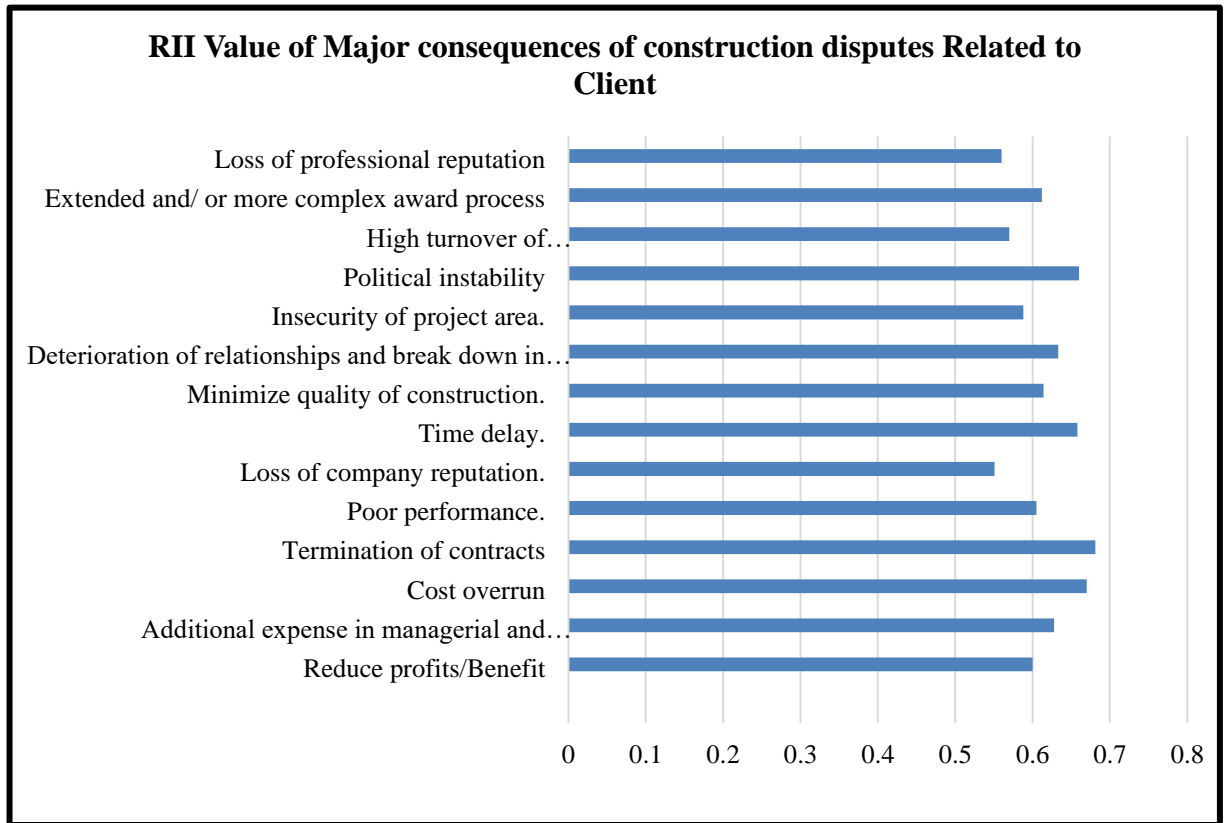


Figure 9. Major consequences of construction disputes Related to Client

Table.1. Major Consequences of construction disputes Related to financial institutions

No	Sub-categories	RII	Rank
1	Reduce profits/Benefit	0.584	5
2	Additional expense in managerial and administration.	0.577	6
3	Cost overrun	0.621	2
4	Termination of contracts	0.574	7
5	Poor performance.	0.553	12
6	Loss of company reputation.	0.551	13
7	Time delay.	0.647	1
8	Minimize quality of construction.	0.558	10
9	Deterioration of relationships and break down in cooperation of stakeholders.	0.572	8
10	Insecurity of project area.	0.565	9
11	Political instability	0.588	4
12	High turnover of leaders/Administrators/Cabinet/Workers	0.556	11
13	Extended and/ or more complex award process	0.616	3
14	Loss of professional reputation	0.514	14

Table.2. Major Consequences of construction disputes Related to public Authorities

<b>No</b>	<b>Sub-categories</b>	<b>RII</b>	<b>Rank</b>
1	Reduce profits/Benefit	0.540	10
2	Additional expense in managerial and administration.	0.551	8
3	Cost overrun	0.558	6
4	Termination of contracts	0.558	6
5	Poor performance.	0.544	9
6	Loss of company reputation.	0.509	12
7	Time delay.	0.600	1
8	Minimize quality of construction.	0.556	7
9	Deterioration of relationships and break down in cooperation of stakeholders.	0.598	2
10	Insecurity of project area.	0.584	3
11	Political instability	0.379	13
12	High turnover of leaders/Administrators/Cabinet/Workers	0.574	4
13	Extended and/ or more complex award process	0.560	5
14	Loss of professional reputation	0.514	11

## Summary of focus group discussions

Major Causes of construction disputes in general are related to contractors, client and external factors with different weights. Construction dispute related to each stake holders are listed below from major to minor contributions.

- 1) Dispute related to clients are payment delay, long steps of decision making, variations initiated by the owner, change of scope, late giving of the site.
- 2) Dispute related to contractors are technical inadequacy of the contractor, delays in work progress, time extensions, financial failure of the contractor, poor quality of work.
- 3) Disputes related to consultants are inadequate quality design, design errors, inadequate / incomplete specifications, in availability of information Poor Contract management & Supervision, Delay in preparation and approval of drawings and Variations due to design errors.
- 4) Construction dispute due to external factors are unexpected weather condition, fragmented structure of the sector and Price escalation the country.
- 5) Lastly, dispute related to Material, labor and equipment related factors are shortage in construction materials, poor quality of material and price fluctuation of construction materials in the country in general.

As a general, causes of construction dispute in the region from high frequently occurring to low are shortage in construction materials, Price escalation the country, fragmented structure of the sector, financial failure of the contractor, poor quality of work, poor quality of material, inadequate quality design, design errors, incomplete specifications, Variations due to design errors, price fluctuation of construction materials.

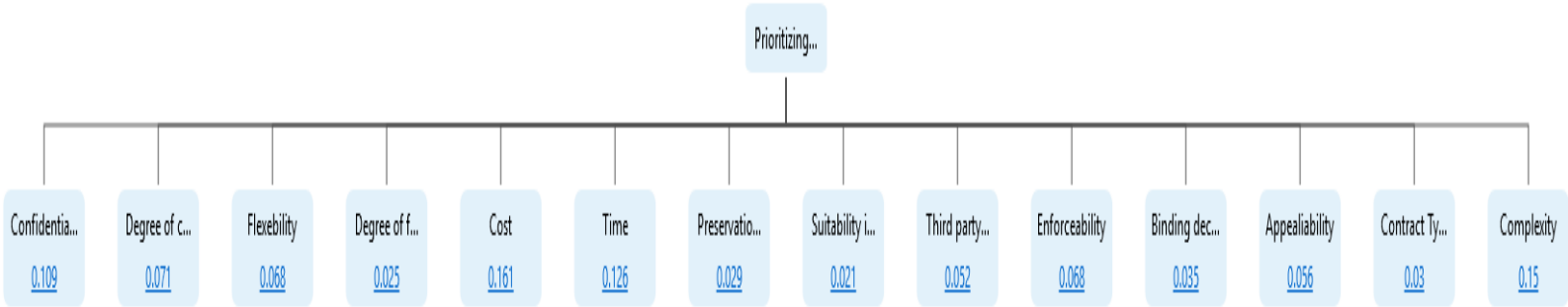
Main consequences of construction dispute in road construction sector in decreasing frequency of happening are Termination of contracts by contractors, high Cost overrun for contractors because of time delay and high Cost overrun for clients because of rebidding after termination of contracts, Time delay by contractors, Minimize quality of construction by contractors ,Reduce profits of contractors and clients lose Benefit after completion of the projects, deterioration of relationships and break down in cooperation of stakeholders.

Negotiation mostly practiced in this region as both contractors and clients need their future good relations but sometimes contractors forced to accept this method by higher Authorities in the region.

**APPENDIX 3**

Software Outputs

Analytic Hierarchy Process - Prioritizing the suitable DRM for road construction sector



## Priority Trade-offs

	Confidentiality	Degree of control by parties	of Flexibility	Degree of formality	of Cost	Time
Confidentiality	1	1	5	5	0.33333333	0.33333333
Degree of control by parties	1	1	0.33333333	3	0.33333333	0.33333333
Flexibility	0.2	3	1	1	1	1
Degree of formality	0.2	0.33333333	1	1	0.33333333	0.33333333
Cost	3	3	1	3	1	1
Time	3	3	1	3	1	1
Preservation of relationship between parties	0.2	0.2	1	2	0.14285714	0.25
Suitability in local laws	0.11111111	0.2	0.5	1	0.33333333	0.14285714
Third party control	1	1	1	3	0.5	0.2
Enforceability	0.33333333	0.5	1	2	0.2	1
Binding decision	0.33333333	0.5	1	2	0.2	0.33333333
Appeal ability	0.33333333	1	1	3	0.2	0.33333333
Contract Type	0.33333333	0.5	1	3	0.14285714	0.2

Complexity 3 1 1 7 0.5 2

\* Consistency Ratio calculated as 0.092

## Pairwise Comparisons of Options for Criteria

\* Transitivity rule is enforced.

## Confidentiality' from all Options

Confidentiality	Negotiation	Mediation	Arbitration	Dispute Resolution Board	Litigation	Priorities
0.108533303140236						
Negotiation	1	5	5	1	5	0.384615385
Mediation	0.2	1	1	0.2	1	0.076923077
Arbitration	0.2	1	1	0.2	1	0.076923077
Dispute Resolution Board	1	5	5	1	5	0.384615385
Litigation	0.2	1	1	0.2	1	0.076923077

\* Consistency Ratio calculated as 0

# Degree of control by parties' from all Options

Degree of control by parties	Negotiation	Mediation	Arbitration	Dispute Resolution Board	Litigation	Priorities
0.0709996202915907						
Negotiation	1	6	3	7	7	0.56
Mediation	0.16666667	1	0.5	1.16666667	1.16666667	0.09333333
Arbitration	0.33333333	2	1	2.33333333	2.33333333	0.18666667
Dispute Resolution Board	0.14285714	0.85714285	0.4285714	1	1	0.08
Litigation	0.14285714	0.85714285	0.4285714	1	1	0.08
* Consistency Ratio calculated as	0					

# Flexibility' from all Options

Flexibility 0.0684348813110028	Negotiation	Mediation	Arbitration	Dispute Resolution Board	Litigation	Priorities
Negotiation	1	6	4	7	3	0.5283018 87
Mediation	0.1666666 67	1	0.6666666 67	1.1666666 7	0.5	0.0880503 14
Arbitration	0.25	1.5	1	1.75	0.75	0.1320754 72
Dispute Resolution Board	0.1428571 43	0.857142857	0.5714285 71	1	0.4285714 29	0.0754716 98
Litigation	0.3333333 33	2	1.3333333 33	2.3333333 3	1	0.1761006 29

\* Consistency Ratio calculated as

0

### Degree of formality' from all Options

Degree of formality	Negotiation	Mediation	Arbitration	Dispute Resolution Board	Litigation	Priorities
0.0247521955693971						
Negotiation	1	0.2	0.25	0.2	0.11111111 11	0.0416666 67
Mediation	5	1	1.25	1	0.5555555 56	0.2083333 33
Arbitration	4	0.8	1	0.8	0.4444444 44	0.1666666 67
Dispute Resolution Board	5	1	1.25	1	0.5555555 56	0.2083333 33
Litigation	9	1.8	2.25	1.8	1	0.375

\* Consistency Ratio calculated as 0

# Cost' from all Options

Cost	Negotiation	Mediation	Arbitration	Dispute Resolution Board	Litigation	Priorities
0.160848207191807						
Negotiation	1	3	5	5	8	0.538116592
Mediation	0.33333333	1	1.66666667	1.66666667	2.66666667	0.179372197
Arbitration	0.2	0.6	1	1	1.6	0.107623318
Dispute Resolution Board	0.2	0.6	1	1	1.6	0.107623318
Litigation	0.125	0.375	0.625	0.625	1	0.067264574

\* Consistency Ratio calculated as 0

## Time' from all Options

Time	Negotiation	Mediation	Arbitration	Dispute Resolution Board	Litigation	Priorities
0.126485115886754						
Negotiation	1	3	5	6	7	0.542635659
Mediation	0.3333333333	1	1.6666666667	2	2.3333333333	0.180878553
Arbitration	0.2	0.6	1	1.2	1.4	0.108527132
Dispute Resolution Board	0.1666666667	0.5	0.8333333333	1	1.1666666667	0.090439276
Litigation	0.142857143	0.428571429	0.714285714	0.857142857	1	0.07751938
* Consistency Ratio calculated as	0					

# Preservation of relationship between parties' from all Options

Preservation of relationship between parties	Negotiation	Mediation	Arbitration	Dispute Resolution Board	Litigation	Priorities
0.0286162868524704						
Negotiation	1	3	5	5	9	0.542168675
Mediation	0.3333333333	1	1.6666666667	1.6666666666	3	0.180722892
Arbitration	0.2	0.6	1	1	1.8	0.108433735
Dispute Resolution Board	0.2	0.6	1	1	1.8	0.108433735
Litigation	0.1111111111	0.3333333333	0.5555555555	0.5555555555	1	0.060240964

\* Consistency Ratio calculated as 0

# Suitability in local laws' from all Options

Suitability in local laws	Negotiation	Mediation	Arbitration	Dispute Resolution Board	Litigation	Priorities
0.0212391904590113						
Negotiation	1	2	3	7	5	0.4595186
Mediation	0.5	1	1.5	3.5	2.5	0.2297593
Arbitration	0.3333333333	0.6666666667	1	2.3333333333	1.6666666667	0.153172867
Dispute Resolution Board	0.142857143	0.285714286	0.428571429	1	0.714285714	0.065645514
Litigation	0.2	0.4	0.6	1.4	1	0.09190372

\* Consistency Ratio calculated as 0

### Third party control' from all Options

Third party control	Negotiation	Mediation	Arbitration	Dispute Resolution Board	Litigation	Priorities
0.0521932513007919						
Negotiation	1	3	0.3333333333	0.5	0.5	0.12
Mediation	0.3333333333	1	0.1111111111	0.1666666666	0.1666666666	0.04
Arbitration	3	9	1	1.5	1.5	0.36
Dispute Resolution Board	2	6	0.6666666666	1	1	0.24
Litigation	2	6	0.6666666666	1	1	0.24

\* Consistency Ratio calculated as 0

# Enforceability' from all Options

Enforceability	Negotiation	Mediation	Arbitration	Dispute Resolution Board	Litigation	Priorities
0.0677303963692923						
Negotiation	1	0.3333333333	0.2	0.2	0.2	0.052631579
Mediation	3	1	0.6	0.6	0.6	0.157894737
Arbitration	5	1.666666667	1	1	1	0.263157895
Dispute Resolution Board	5	1.666666667	1	1	1	0.263157895
Litigation	5	1.666666667	1	1	1	0.263157895

\* Consistency Ratio calculated as 0

# Binding decision' from all Options

Binding decision						Dispute	Litigation	Priorities
	Negotiation	Mediation	Arbitration	Resolution Board				
0.0346780751750757								
Negotiation	1	1	5	3	3		0.348837209	
Mediation	1	1	5	3	3		0.348837209	
Arbitration	0.2	0.2	1	0.6	0.6		0.069767442	
Dispute Resolution Board	0.3333333333	0.3333333333	1.6666666667	1	1		0.11627907	
Litigation	0.3333333333	0.3333333333	1.6666666667	1	1		0.11627907	

\* Consistency Ratio calculated as 0

## Appeal ability' from all Options

Appealability	Negotiation	Mediation	Arbitration	Dispute Resolution Board	Litigation	Priorities
0.0560358813622576						
Negotiation	1	1	3	5	3	0.348837209
Mediation	1	1	3	5	3	0.348837209
Arbitration	0.3333333333	0.3333333333	1	1.6666666667	1	0.11627907
Dispute Resolution Board	0.2	0.2	0.6	1	0.6	0.069767442
Litigation	0.3333333333	0.3333333333	1	1.6666666667	1	0.11627907
* Consistency Ratio calculated as	0					

## Contract Type' from all Options

Contract	Type			Dispute		Litigation	Priorities
	Negotiation	Mediation	Arbitration	Resolution Board			
0.0298222691477218							
Negotiation	1	1	0.3333333 33	0.333333333 3	0.2	0.0769230 77	
Mediation	1	1	0.3333333 33	0.333333333 3	0.2	0.0769230 77	
Arbitration	3	3	1	1	0.6	0.2307692 31	
Dispute Resolution Board	3	3	1	1	0.6	0.2307692 31	
Litigation	5	5	1.6666666 67	1.66666666 7	1	0.3846153 85	
* Consistency Ratio calculated as	0						

# Complexity' from all Options

Complexity	Negotiation	Mediation	Arbitration	Dispute Resolution Board	Litigation	Priorities
0.149631325942591						
Negotiation	1	3	7	5	5	0.532994924
Mediation	0.3333333333	1	2.333333333	1.666666666	1.666666666	0.177664975
Arbitration	0.142857143	0.428571429	1	0.714285714	0.714285714	0.076142132
Dispute Resolution Board	0.2	0.6	1.4	1	1	0.106598985
Litigation	0.2	0.6	1.4	1	1	0.106598985

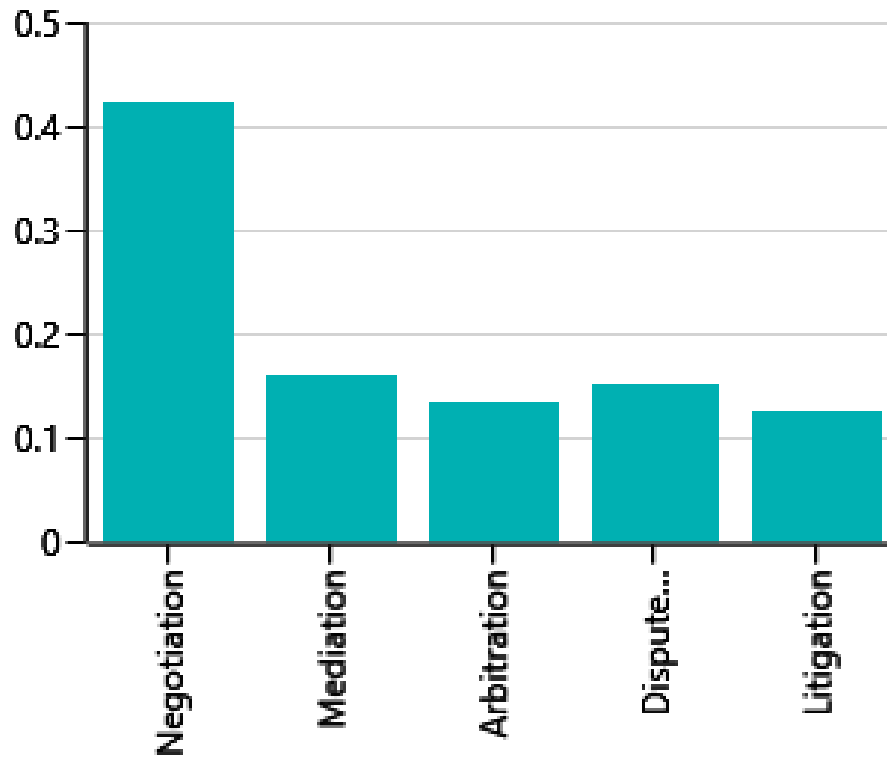
\* Consistency Ratio calculated as 0

• Multi-Criteria Utility Function = 0.11 \* [Confidentiality] + 0.07 \* [Degree of control by parties] + 0.07 \* [Flexibility] + 0.02 \* [Degree of formality] + 0.16 \* [Cost] + 0.13 \* [Time] + 0.03 \* [Preservation of relationship between parties] + 0.02 \* [Suitability in local laws] + 0.05 \* [Third party control] + 0.07 \* [Enforceability] + 0.03 \* [Binding decision] + 0.06 \* [Appealability] + 0.03 \* [Contract Type] + 0.15 \* [Complexity]

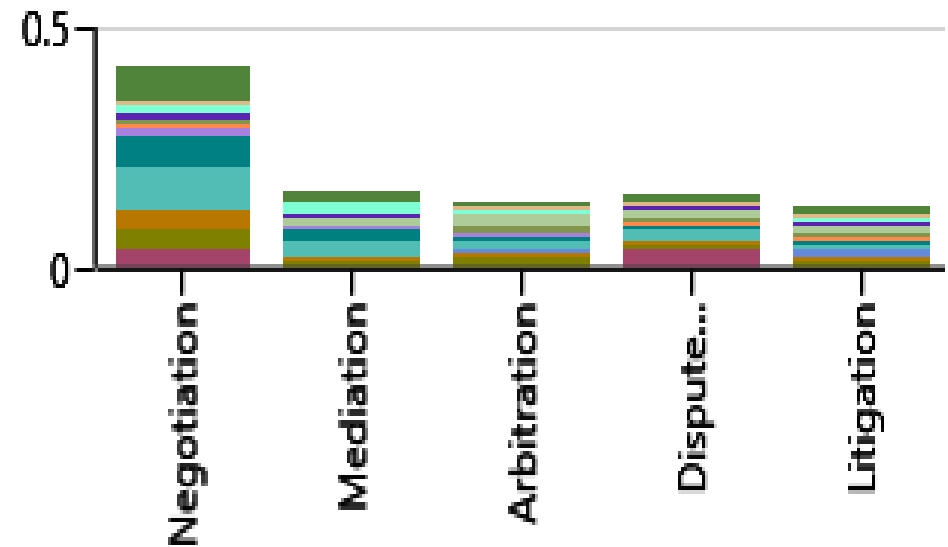
## Metrics

Option Name	Priorities
Negotiation	0.423
Mediation	0.161
Arbitration	0.136
Dispute Resolution Board	0.152
Litigation	0.128

Priorities



Weighted Attributes



- Confidentiality
- Flexibility
- Time
- Suitability in local laws
- Enforceability
- Appealiability
- Degree of control by parties
- Degree of formality
- Preservation of...
- Third party control
- Binding decision
- Contract Type
- Complexity
- Cost