

Practises and Impact of Risk Management in the Construction Industry of  
Pakistan.



**Final Year Project (2016-17)**

**By:**

Hayyan Ahmed Khalid

NUST2011-BE-CE-33

**Project Advisor: Dr. Jamalludin Thaheem**

NUST Institute of Civil Engineering (NICE)

School of Civil and Environmental Engineering (SCEE)

National University of Sciences and Technology (NUST)

Islamabad, Pakistan

(2017)

This is to certify that the  
Report entitled  
**Practises and Impact of Risk Management on the Construction Industry of  
Pakistan.**

**Submitted by:**

Hayyan Ahmed Khalid

NUST2011-BE-CE-33

Has been accepted towards the partial fulfilment for the requirements for

**Bachelors of Engineering in Civil Engineering**

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**Dr. Jamalludin Thaheem**  
**Assistant Professor,**  
**Department of Construction Engineering and Management,**  
**National Institute of Transportation (NIT),**  
**School of Civil and Environmental Engineering (SCEE),**  
**National University of Sciences & Technology, Islamabad, Pakistan.**

## Abstract

The construction sector in Pakistan is exceptionally risk-inclined, with flexible and dynamic project conditions. Risks essentially influence execution to the extent of project finances, time division and quality. With increment of expanse and the complications of projects, the capacity to oversee risks all through the project lifecycle has turned into a focal component in averting undesirable results. Management is essential to address potential risks exposed to all actors in the industry. As a result of the increasing risks and their identification in most of developed countries, the field of risk management was introduced as a new separate discipline in the construction industry to avert possible risks in every kind of construction projects. In light of these expanding uncertainties in developed nations, risk administration was presented as another different area in the construction sector to successfully oversee risks. In any case, construction industry in developing nations like Pakistan has notoriety for adapting to risks. With quick progressions in the construction business of Pakistan, numerous uncertainties will undoubtedly happen and one might say that a viable framework of risk appraisal and administration for construction is most vital.

The main focus and goal of this research is to underscore the role of actors for successful risk administration in construction industry and their inclinations in Procurement strategies, Contract sort, Resource allocation, Risk Aversion strategy and identification of more crucial risks. More profound comprehension is relied upon to add to a very successful risk Management, hence, an improved project outcome and a better profit for all three: clients, consultants and contractors. The study involves Eight Pakistan Engineering Council Categories C-A and C-B Construction Contracting companies, Two Kuwaiti Construction Contracting Companies, Three Construction Consulting Companies and Four Clients. It further comprises a chain of interviews with these clients, contractors and consultants. Furthermore, ten contemporary or old were taken into account to understand and depict a better picture of the data retrieved from the interviews. Two contemporary mass transit projects, in Lahore and in New York were then analysed using Cost-Benefit Analysis and a comparison was drawn to analyse the impact/severity of the risks the Project in Lahore was facing.

The findings of this work unveil three critical risks (Financial, Political and Resource Scarcity) Construction industry is facing and their effects on the project cycle. They also highlight preferences of actors in different procurement options and contract types and their roles in Effective Risk Management. In light of these findings, various recommendations encouraging effective and better risk management have been developed and presented for the industry practitioners and Future Researchers.

## **LIST OF ABBREVIATIONS**

<b>BOT</b>	Build – Operate - Transfer
<b>DB</b>	Design - Build
<b>DBB</b>	Design – Bid - Build
<b>EPC</b>	Engineering, Procurement, Construction
<b>JRM</b>	Joint Risk Management
<b>JVs</b>	Joint Ventures
<b>PMI</b>	Project Management Institute
<b>PPP</b>	Public Private Partnership
<b>ROR</b>	Rate of Return

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### Introduction

#### 1.1 Background and Problem Description

Construction sector plays a vital role in development and economic activities. One of the major roles that it plays as an industry is providing employment to almost every kind of labour, whether it's skilled or semi-skilled or unskilled. It helps people to gain employment at every level. The sector has huge role in the development of Pakistan's economy, it covers both formal and informal sectors of our society and hence deserves a due importance and consideration. The industry can bloom well if some attention is paid to the risk aversion, for example in fiscal year 2016 this sector grew to 287569 PKR Million from 254251 PKR Million of 2015, majorly because of government investment. With the sector growing at such a pace it becomes vulnerable to various technical, socio-political and business risks.

There are no construction projects that are free of risk. Every Project carries a variety of risks and their impacts. Impacts may include: Cost over-budget, Time Over-run or poor Quality. The first research in construction and project risk management began in 1960's in consideration of scope of management and decision theory[Guilin et al, 2004].

The term risk management is used to cover the phenomenon of identification of risk in time and taking all the precautionary steps to avert it at all costs [Economic Times]. It can also be defined as structured set of processes aimed at identifying, analysing and responding to project risks [PMBOK].

During the last few years, the Pakistani construction industry has been under a lot of criticism regarding financial losses, quality issues, low productivity and the unprecedented delays in the construction processes. Several studies highlight the issues that the construction sector experiences and highlight the need for improvement. Especially, the process of risk management has been defined as a very essential part of project management and should be given its due importance.

A construction procedure can be divided into a number of stages: program, design, procurement and production. In the first stage, the program stage the client has a clear

idea regarding the given project and calculations of conditions for its execution. In the design stage design and construction drawings are delivered by the engineers as per the client's demands. Dependent upon the choices of procurement, the design stage takes after either the program stage or, on the other hand the procurement stage. In the procurement stage a contractor is picked by the client and a legal agreement is established between the two parties. Finally, at the production stage the contractor starts the construction of the project. Generally, a construction procedure is successive; numerous performers are included just in a few project stages and concentrate all alone on piece of their own work as opposed to all in all project.

With the increasing size of the construction projects and the diversity in them, the identification of risk and its timely management has become extremely important to the construction industry (Maytorena et al. 2007). Distinctive risks in a project must be apportioned to capabilities of the project participants depending upon who has the best ability to foresee and manage risks. . Be that as it may, in many projects, there is an effort by the contractor to foresee and manage the risk as soon as possible. There are a number of examples present in the construction industry which show that risk aversion has save contractor from major time and financial losses.

According to a report that highlights more than 3000 construction risk, in case of poor calculations i.e. poor calculations, the cost can increase up to 20% that of original (Josephson and Larsson 2001). Also, at least 70% of the problems can be identified and solved at very early stages and so the poor quality cost can be decreased by 60%

There are a number of projects not fortunate enough to see their completion. A road project over river Soan is a perfect example. The Project was delayed and is still on hold due to occurred geographical risk. The case study shows that Risk analysis is either ignored or done subjectively by simply adding a contingency.

The division of risk between client and contractor is mainly dependent upon the chosen procurement options and the terms of the contract between both parties .Every procurement option has a different set of requirements and liabilities so, choosing the appropriate and most suitable form of procurement is very important in the process of construction project management and risk aversion. The two basic types of procurement options in Pakistani construction industry are design-bid-build (DBB) contracts and design-build (DB) contracts. In DBB contracts the client is responsible for the design and

the contractor for the execution. In DB contracts the contractor is responsible for both design and production. However, the traditional form of contracts have not been proved very useful in the effective project management (Kadefors 2004). Subsequently, an issue specifically compelling for the clients and contractors in the Pakistani construction industry is the plan of action by which project is created additionally, construct more with respect to openness, liable and coordinated effort instead of on sharp contract plans.

To sum it all up, this section of the chapter helped to build a background of the undertaken research. The focus of the research is opting different procurement options for effective risk management in construction industry, contract options and identifying the major risks being faced.

## **1.2 Aims and Objectives:**

The objectives of the study are explanations that make an interpretation of the vital point into lucid statements and work on their implementation. There are four major goals of this study:

- Identification of Major Risks in the Industry and their effects.
- Analysis of management and sharing of risks.
- Identification of most crucial risks in the construction industry.
- Identification of preferences of the actor of this industry when it comes to Procurement Methods and Contract Sort for a better risk management.
- Drawing of Conclusion.

On the basis above given points following research questions are formulated.

- Questions Regarding What, Why & How ?
- Practises in different types of Contract
- Risk Response Method
- Preferred Method of Procurement

The research focuses on three major groups of actors on the supply side of the project, i.e. The study concentrates on three fundamental set of performers on the supply side of the

project, i.e. clients, contractors and consultants. The relationship of actors on demand side with client, consultant and contractor was not included in the research. Same is the case with Sub contactors and their relationship with the main group of actors.

### Literature Review

#### 2.1 Introduction

The field of risk management has gained a lot of attention especially in the past two decades due to the promising prospects of this practice in every kind of construction project. With a growing knowledge of risk management, both client and contractor tend to avoid any unpleasant surprises during construction of a project. Risk management focuses on the proper management of time, quality as well as the finances associated to a construction project. This chapter focuses upon the literature review of all kinds of risks faced by construction industry in real time.

#### 2.2 What is Risk?

Risk and Uncertainty are two diverse yet closely related terms many people fail to differentiate between two. According to *Winch 2002* 'Risk' is a situation where there is an uncertainty due to the lack of information and we can predict the outcomes on the basis of past experiences. While he defined 'Uncertainty' as the lack of information here we cannot learn from past experiences and a clearer picture of the project can be predicted as the project progresses.

Risk is a term that defines the gaps with respect to time, construction or finances that can effectively hinder a construction project. The predictability of a risk is its most important feature and is one of the reasons why it has gained so much importance since the last two decades of the 20<sup>th</sup> century. (**Webb 2003**) (**Smith et al. 2003**). Although risk highlights both positive and the negative outcomes but the negative outcomes are given more importance than the positive ones. In another definition **Cooper et al. (2005)** defines it as 'Risk is the exposure to the consequences of uncertainty'.

Another remarkable definition of risk as provided by **Cleden 2009** according to whom the lack of information becomes a constant threat to the construction project. This attribute of risk makes it more important and noteworthy for both the client and the constructor. Cleden has argued upon the fact that most risks can be defined as uncertain rather than predictable. **Darnell and Preston 2009** have also argued upon the fact that some risks are more likely to be foreseen than others while others are less likely to be foreseen and may present greater losses than others.

### 2.2.1 Dynamic vs Static Risk:

There are two basic types of risks. First is dynamic risk which comes with a lot of positive and negative possibilities and continue to prevails till the completion of the project while static risks tend to be present with a negative impacts at all times. Assistance is required to minimize the static risk throughout the project.

### 2.3 Causes of risks:

Despite of the huge importance of risk management, there aren't a very high number of research related to the causes of risk. According to **Kangari (cited in Rwelamila & Lobelo, 1997)** following are the major causes of risk in construction industry

- An exceptionally divided industry.
- Industry exceptionally sensitive to monetary cycles.
- Huge competition as consequence of saturated market.
- Administrative Causes.
- Aggressive citing.
- Outsize undertakings.
- High equipping.
- Resistance to change.
- Accounting, where irregularities happen in the money related information created for administration.
- Increase in venture estimate.
- Transfer/ rotation of key staff.

### 2.4 Sources of Risk

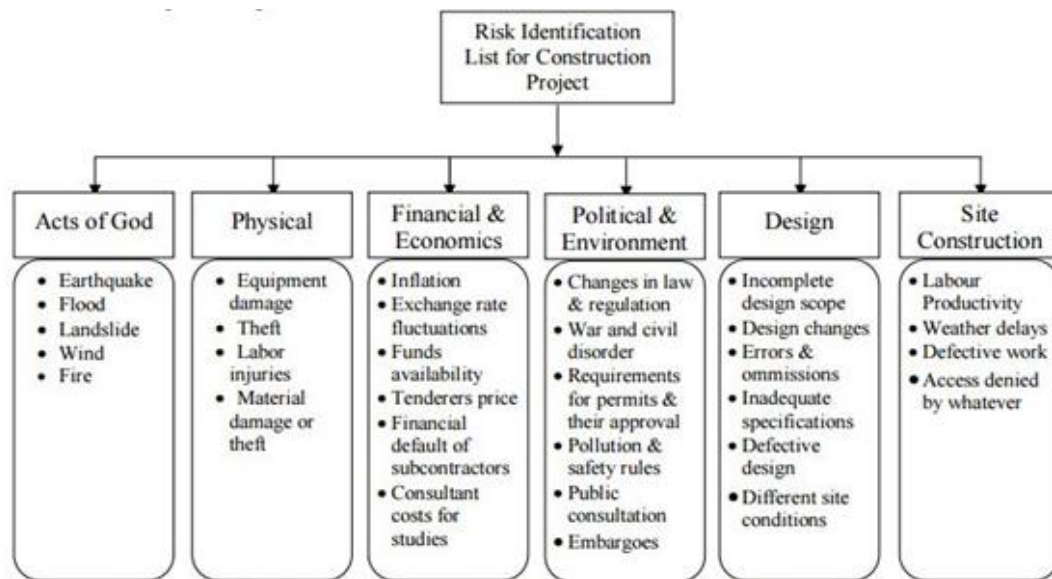
Sources of risk are classified into two types i.e. project-specific and non-project-specific risks, and both risks should be considered while recognizing the risks in a construction project. Construction firm or client needs to characterize the limits of these sources and to separate these sources into itemized risk components. This will permit a typical understanding among those endeavouring to recognize the risks in a project.

Following are the risk drivers (Estimate Management manual 2001)

- Commercial risk.
- Financial risk.
- Legal risks.

- Political risks.
- Social risks.
- Environmental risks.
- Communications risks.
- Geographical risks.
- Geotechnical risks.
- Construction risks.
- Technological risks.
- Operational risks.
- Demand/product risks.
- Management risks.

The characterization of risks into sources is not an easy task.. It can also increase the likelihood of "double-counting" a few risks that are somewhat similar to the other sources. This can be helpful in order to understand the connections between risk sources and components (**Estate Management Manual, 2001**) Table 2.1 illustrates the potential types of risks. These basic factors that cause risk can be characterized in 6 domains i.e. financial and economic, political and environment, design, site construction, physical and Environmental factors. While the definitions of potential risks in each type/classification is not really comprehensive, it represents that the larger part of regular project risks and also exhibits the benefits of an intelligently created characterization scheme.



**Figure 2.1 Risk Categorization**

### 2.5 Risk Management Process

The process of Risk management can be categorized into two steps i.e. risk assessment and risk control. The term risk assessment refers to identification of risk , analysis of risk and prioritization, and risk control which incorporates administration planning, risk determination and risk monitoring, tracking and restorative activity.

**Chapman and Ward 1999** distinguished risk administration approach as a multistep `risk analysis' technique which includes distinguishing proof, assessment and administration of risks. **Simmons 2002** defined risk administration as the sum of all active administration coordinated exercises, inside a project that is expected to face any kind of risks. However according to any company's viewpoint a disappointment under risk is anything achieved with not as much as satisfactory outcome. According to **Al-Bahar** referred to in **Ahmed et al, 1999** characterized the risk administration as a methodical process for deliberately realizing, finding solutions , and making exit strategies to risk occasions for the lifetime of a project in order to acquire the ideal or worthy level of control on risk.



A lot of risks come up during a construction project but the important point to focus is that how the administration is going to accommodate the risks and handle them. According to **Simmons 1998** as soon as the administration identifies a risk, it is obligated to use following strategies.

- Identification of concerns.
- Identify the risks and also risk proprietors.
- Evaluation of risks subjected to probability and results.
- Assessing the alternatives for managing the risks.
- Prioritizing the risk management endeavors.
- Development of the risk management plans. 7
- Authorizing the usage of these plans.
- Tracking the risk management plans.

**Chapman and Ward 1999** characterized the risk management process into following 9 crucial steps

1. Characterize the key parts of the project.
2. Concentrate on a vital way to deal with risk administration.
3. Identify the points where risks might emerge.
4. Compile the data about the risk suspicions.
5. Relegate responsibility.
6. Gauge the amount of instability.
7. Assess the relative harms of the different risks.
8. Planning a timely response.
9. Manage by observing and controlling execution.

## **2.6 Risk Identification**

Identification of risk is an important stage in the process of risk management and it involves identifying all the potential risks that could emerge. Risk identification generally has considerable number of phases of risk management process, this stage has the biggest effect

on the accurate measurement of a risk (Chapman, 1998). Controllable risks are the risks which attempts deliberately and whose result is, to some degree, inside our immediate control; while uncontrollable risks as those risks which we are unable to impact. The process of Risk identification comprises of figuring out the risks which are probably going to influence the project. Risk identification is not a once in a while occasion in a project; it is supposed to be performed on a normal construction premise during the project (**PMI, 1996**).

## 2.7 Risk Analysis

Risk analysis is an important part of the process of risk management. In risk analysis step we analyze the harms caused by a risk and the reason behind it. The basic objective of the analysis is to create a fair decision making process with respect to the risk and take better step for the betterment. (**Estate Management Manual, 2002**)

This process includes a number of steps which analyze the risk with reference to time, quality and revenue. Although the client is mostly interested in revenue so these steps analyze the risk with economic perspective. There are generally three strategies that are used to avert risk that are mentioned below.

1. Risk avoidance
2. Risk transfer
3. Risk retention

These strategies provide us a clear insight to the steps that should be taken in order to help the project proceed at a normal pace without any major risks.

### 2.7.1 Methods of Risk Analysis

There are two methods for risk analysis i.e. qualitative and quantitative risk analysis. (**APM 2000**) According to **Chapman 2000** Qualitative analysis focuses on identification together with assessment of risk, and quantitative analysis focuses on the evaluation of risk. There are also certain risks where there is no analysis possible at all.

#### A: Quantitative Analysis

**Lowe (2002)** defined the subjective evaluation of risk includes the recognizable proof of a chain of command of risk and their further extension. The chain of commands is dependent upon the likelihood of the occasion and the resultant effect on the project. In the subjective risk investigation, the risk administration goes about to enrolling the properties of every risk (**Kuismanen et al, 2002**). Examination of Subjective risk evaluates the significance of the

distinguished risks and creates organized arrangements of these risks for further investigation or direct relief. The administration group evaluates each distinguished risk for its likelihood of happening and its effect on venture targets. Parts of risk examination were presented by **Kindinger and Darby (2000)**:

- Enlist the components that make up a project
- Identification of the risk factors
- Rank each risk with respect to its hazard
- Rank each risk activity
- Determine the action which can help minimizing a risk

## **B: Qualitative Risk**

Quantitative risk investigation is a method for the assessment of likelihood if the project will be completed in given time and resources.. The outcome is a likelihood circulation of the venture's cost and fruition date in light of the risks in the venture (**Office of Project Management Process Improvement, 2003**). These techniques are dependent upon the likelihood of dispersion of risks and may provide us better results than the conventional subjective techniques, if adequate amount of information is available. Also, subjective strategies are always relying upon the individual's judgment and past experience of the expert. Subsequently the quantitative strategies are more reliable according to the experts.

## **2.8 Risk Response**

According to **PMI 1999** there are three strategies to respond a risk

- **Avoidance:** This is the process of elimination of the cause of risk. Avoidance includes a thorough study of the scenario and their possible elimination. Although, 100% elimination of risks is not possible but some part of risk is avoided.
- **Mitigation:** This focuses on the money matters and helps in the maintenance of the monetary cycles in a project. There are multiple strategies that are applied in this case for example insurance or usage of new technology.
- **Acceptance:** This is the acceptance of the scenario, it can be passive or active acceptance.

### **2.8.1 Risk Avoidance**

There are a number of risk that come on the way of construction. Risk avoidance is generally taken as an impractical approach as it makes the construction impossible to start

but the management comes up with ways to cope up with it. For example placing high bids or placing conditions on bids r getting insurance. ( **Flanagan & Norman, 1993**).

### **2.8.2 Risk Transfer**

The term risk transfer is defined as transferring the risk in a construction project to another entity as insurance cannot be the only way to get over all the risk. Two of the most popular strategies include

- Transferring the project to another entity for example subcontractor
- Transferring the fiscal load on another entity for example insurance companies.

### **2.8.3 Risk Retention**

Risk retention is the process where the management tends to use different strategies in order to minimize the risk. It can include the aversion of risk by reducing the fiscal loses or time losses. Risk retention is either categorized as passive or active risk retention.

### **2.8.4 Risk reduction**

This is a general term used to decrease the likelihood of occurrence of loss due to risk. In some cases, this can prompt dispose of altogether, as found in "risk avoidance". In some cases, the importance of risk reduction increases so much that it can eliminate the 'risk avoidance' (**Piney, 2002**).

### Methodology

#### 3.1 Introduction

In this section, the strategy, instruments, and systems received to lead this research are talked about in detail. This is a subjective research in light of semi structured Interviews focused at a few actors in Pakistani development Industry.

As the goal of this exploration was to reveal the Risks and Vulnerability of Construction Sector, the Literature was the most noteworthy segment of the study. Hence thorough literature review was conducted to highlight the different Risk Response methods and their impacts on the outcomes of projects.

Built up standards of directing subjective research were embraced to meet the Objectives. In light of the Scope and impediment of the study, real accentuation was given to the literature which was pretty much a persistent movement. All together for the review to wind up plainly particular with the nearby setting, specialists with applicable experience in Construction were targeted. For information assembling, a series of interviews were conducted, Identifying Major Risk and openings from the experience of these specialists. Contrasts in the watched sentiment were profoundly inspected and looked at.

#### 3.2 Qualitative, Quantitative, and Mixed Methods Approaches.

The aim of research approaches is to create a strategy for carrying out effective research questions by data collection and its analysis. After a careful analysis of all factors and the available research methods we can decide upon a single strategy for carrying out the research project. Analysing the research methodology helps the researcher to review the strategies of strategies of inquiry; and particular research techniques for data collection, analysis, and interpretation. The selection of a research methodology depends upon the research problem, Three research approaches Considered are qualitative, quantitative and Mixed Techniques. Unquestionably, the three approaches are completely discreet.. A review tends to be more qualitative than quantitative or the other way around. Blended techniques research lives

amidst this continuum because it incorporates components of both qualitative and quantitative approaches.

Frequently the distinction between qualitative research and quantitative research is framed as far as utilizing words (qualitative) rather than numbers (quantitative) or utilizing shut finished questions (quantitative theories) rather than open-finished questions (qualitative inquiries questions). an entire way to see the gradations of contrasts between them is in the basic philosophical assumptions researchers convey to the review, the sorts of research strategies utilized as a part of the research (e.g. quantitative examinations or qualitative case thinks about), and the particular techniques utilized in conducting these strategies (e.g., gathering data quantitatively on instruments as opposed to gathering qualitative data through watching a setting).

- Qualitative research could be described as a method for investigating and comprehending the meaning individuals or gatherings ascribe to a social or human issue. The method of research includes developing questions and methods, data typically gathered in the participant's setting, data analysis inductively working from particulars to general topics, and the researcher making interpretations of the meaning of the data. The final composed report has an adaptable structure. The individuals who engage in this type of request bolster a way of taking a gander at research that honors an inductive style, an attention on individual meaning, and the importance of rendering the unpredictability of a situation.

- Quantitative research could be described as a method for testing target speculations by examining the relationship among variables. These variables, thusly, can be measured, typically on instruments, so that numbered data can be analyzed utilizing statistical systems. The final composed report has a set structure consisting of introduction, literature, and hypothesis, techniques, results, and discussion. Like qualitative researchers, the individuals who engage in this type of request have assumptions about testing speculations deductively, working in protections against bias, controlling for alternative explanations, and having the capacity to generalize and replicate the discoveries.

- Mixed techniques research is an approach to a request Inquiry gathering both quantitative and qualitative data, integrating the two types of data, and utilizing particular plans that may include philosophical assumptions and theoretical frameworks. The centre assumption of this type of request is that the combination of qualitative and quantitative approaches gives an entire understanding of a research issue than either approach alone.

### 3.3 Suitable Approach

After analysing the objectives and realising that depth of the research is more importance than its breath, the approach decided consists of an essence of both, Qualitative and Quantitative; i.e “Mixed Technique”. The mode of the data collection was entirely Qualitative (semi-structured interviews, participant observation, diaries). Data collection Qualitatively allows a deeper investigation. Later the Collected data was analysed using Qualitative Content Analysis (Miles and Huberman,1994). An essence of case study method was incorporated to compare two projects by Cost Benefit Analysis.

- Content Analysis: “any qualitative data reduction and sense-making effort that takes a volume of qualitative material and attempts to identify core consistencies and meanings” (Patton, 2002, p.453).
- Case Study: an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used (Yin, 1984, p. 23).

### 3.4 Research Procedure

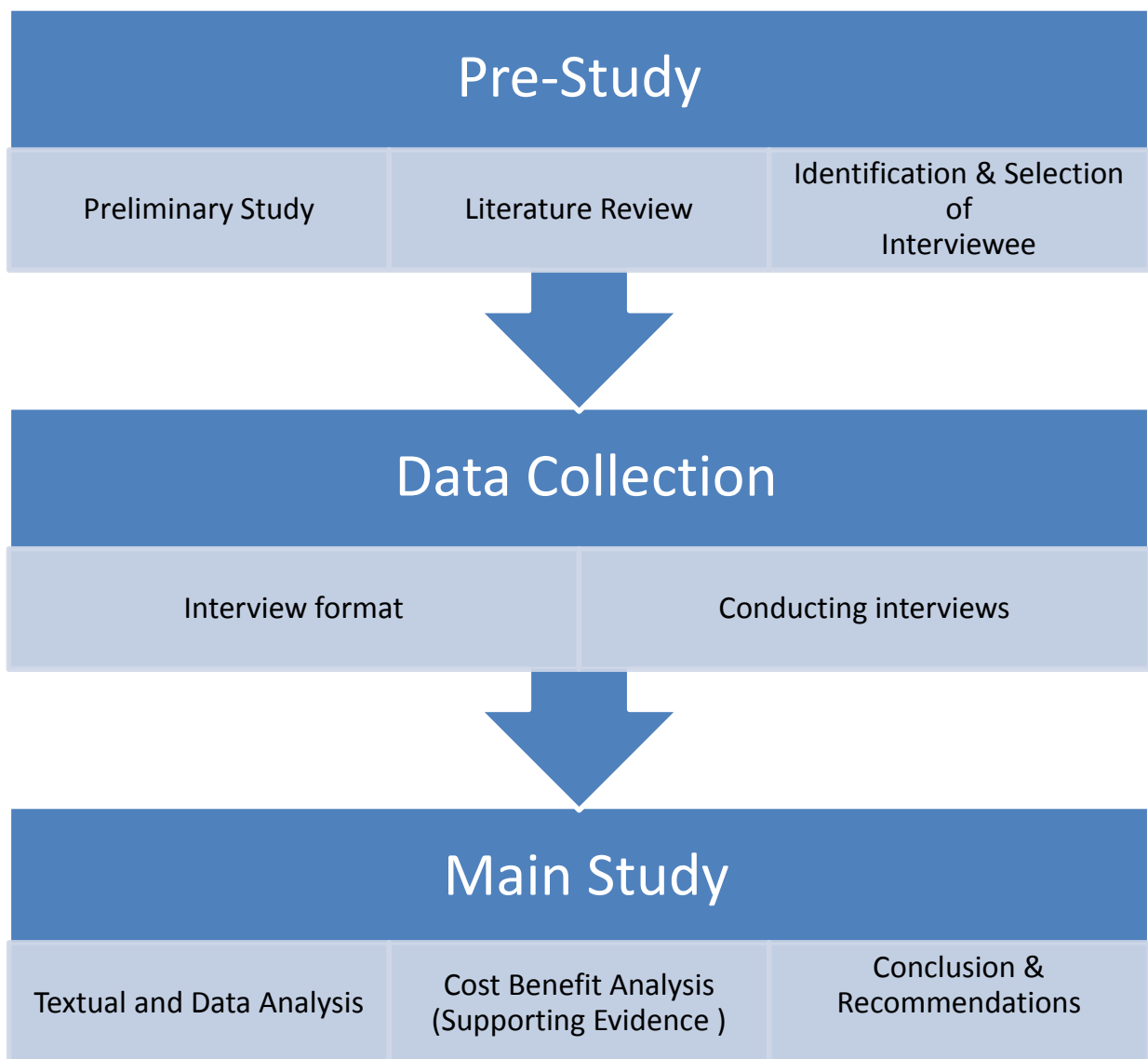


Figure 3.1 Research Route



- First stage, Pre-study, defined the theoretical basis, devising the research questions and consisted of three steps:
  - Preliminary study was conducted to understand the scope and objective of this study.
  - Literature review incorporated a stock of existing examination and hypothesis development in the pertinent zones. The point was to get a theoretical reason for further work and illuminate in more prominent detail the examination inquiries and portions.
  - Choosing criteria of selection and Selecting sufficient number of Companies (Contracting, Consulting, and Client) to be included in the main study.
  
- Second Stage, Data Collection, A number of potential interviewees were identified across the construction sector and were later short listed.
  - A format on which interviews were supposed to be based upon, was formed. Interviews started with relatively open ended question, eg: Name, Experience, Education etc. It later included a few clarifying question followed close ended Questions.
  - After finalising the format a few interviews were conducted to check the format and then finally there came a line of interviews.
  
- Third Stage, Main Study, all the information gathered during interviews was then processed and filtered.
  - Textual and Data Analysis was performed. For this purpose Content Analysis((Miles and Huberman,1994) and Case Study Method was used
  - In order to identify the most critical risks a reference projects cost was analysed against its benefits and was then compared to another project of its sort.

Project Type: Mass Transit

Most Crucial Risk Identified: Political

-Finally building the case on the extracts provided by different Analyses Most Crucial Risks were Identified and Conclusion was made. Furthermore, a bunch of recommendations were presented for remedying the problems identified.

### Results and Discussion

#### 4.1 Introduction

This Part mainly portrays the data collected and information extracted using the data. The data went through several analyses during the process to give a conclusion. During the process the choices of actors involved in the industry regarding: contract type, Procurement type, etc and their impact on the risk administration were identified. Furthermore, The Risks the actors of Construction Industry are facing were also identified. As mentioned earlier, this data was collected by recording 16 interviews. Out of those 16 sixteen 2 interviews were recorded in Kuwait to get a better picture of practises of Risk Management and their Impact on the international construction industry. Finally, making number and emphasis the base, 3 most crucial risks were highlighted.

**Table 4.1 Interviews**

Actors	Interviewees	Experience	Education
<b>Contractor</b>	1	28 years	B.Tech
	2	16 years	BSc Engineering
	3	17 Years	MSc Engineering
	4	15 Years	DAE
	5	11 Years	BSc Engineering
	6	10 years	MSc Engineering
	7	14 Years	DAE
	8	18 Years	MSc Engineering
	9	5 Years	MSc Engineering
	10	9 Years	Ph.D.
<b>Clients</b>	11	5 Years	BSc Engineering
	12	8 Years	MBA
	13	9 Years	MSc Engineering
	14	3 Years	MBA
<b>Consultants</b>	15	20 Years	MSc Engineering
	16	12 Years	MSc Engineering
	17	10 Years	BSc Engineering

#### 4.2 Contract Types

Based on the response of interviewees, Two Types of Contracts were incorporated in the study.

-EPC: "Engineering, Procurement, and Construction" (EPC) is a particular form of contracting arrangement used in some industries where the EPC Contractor is made responsible for all the activities from design, procurement, construction, to commissioning and handover of the project to the End-User or Owner. This form of contract is covered by the FIDIC Silver Book containing the title words "EPC/Turnkey". Other abbreviations used for this type of contract are "LSTK" for "Lump Sum Turn Key", and sometimes also "EPCC" which is short for "Engineering, Procurement, Construction and Commissioning".

-Measurement Contract: Where the price to be paid for the whole work is ascertained by measurement and valuation related to a schedule of prices included in the contract.

Type of Chosen contract has a great deal while talking about the factors affecting Risk Management. During the study Actors preferred type of contract in order to manage risks effectively was considered.

**Table 4.2 Interviewees Preference over Contract type**

Type of Contract	Preference
EPC	8
Measurement	10

More number of interviewees, Majorly Contractors, mentioned Measurement to be their preferred contract type, few reasons are as follow:

“We prefer getting paid as our work progress, it somehow protects us from a lot of extra responsibilities.” Interviewee 1(Contractor)

“Our Clients tend to exploit us when it comes to Risk Identification and Response, i.e we are usually expected to be the only one responsible. Thus we end up paying damages in terms of both, cost and time. With Measurement Contract Client bears some responsibility too.”

Interviewee 5(Contractor)

While most Contractors spoke in the favour, there were few who preferred EPC.

“We do not feel the need to respond to small risks in EPC Projects, since the rate of return is so high.”-Interviewee 3 (Contractor)

Out of all the interviewees there was one whose preference would change from situation to situation.

“In my 20+ Year experience there came a bunch of situations where Measurement was the only best choice, similarly many a times EPC was preferred.” Interviewee 9 (Contractor)

When it came to Clients, they responded differently. Most of the clients preferred EPC, the size of the project still mattered though. When asked, out of four, two Clients stated that despite the contractor’s preference they still let no opportunity go to submit their bids for an EPC Project.

“While Measurement Contract brings that much ease with it, Contractors still effectively respond to our invitation to bid on EPC Projects”. Interviewee 5 (Client)

#### **4.2.1 Allocation of Risk in the Contract**

Basic choices require to be made in regards to allotment of risks to one gathering or the other in the construction contract. These risk distribution choices will dramatically affect the cost of the project, the construction strategies utilized to fabricate it and the proficiency of the whole construction cycle, from the beginning of the work through to fulfilment. Given the differing interests and objectives of the parties involved, effective risk allocation can be done by deciding upon the right contract type.

#### **4.3 Risk Response**

Preferred Technique to respond to identified risks plays a great role in risk allocation among actors. During the interviews one of the standard format questions was about their strategies

of Risk Aversion. Responding to the question all these consultants and a three, out of four, Clients stated that they believe in transferring the risk.

“We tend to foresee several risks ourselves and inform our contractors. How seriously they observe our forecast is up to them.”-Interviewee 5(Client)

**Table 4.3 Risk Response Strategies opted by the actors.**

<b>Response type</b>	<b>Client</b>	<b>Consultant</b>	<b>Contractor</b>
Avoidance	2		2
Reduction			5
Transference	3	3	
Retention			4

On the Contrary to Clients and Consultants, The Contractors in most cases don't find the option of Transference open for themselves, which they complain about the most. Thus most Contractors relied on the Reduction and Retention to be their Aversion Techniques. Risk Avoidance was the least preferred Technique. According to the data recorded one of the Major reason for Avoidance to be least preferred is that it requires extra effort. For e.g “ We can only avoid risks if we foresee them well before time and that is something which requires extra efforts and resources”. Interviewee 8 (Consultant)

Risk Reduction and Retention on the other hand turns out to be the most preferred methods among Contractors. According to the collected Data there is a concept in the construction industry that Reduction somehow relies on street smartness and conventional work experience.

“Risks might be there, but most of them can be reduced by simple negotiation”.

Interviewee 13 (Contractor).

“Risks are mostly foreseen by the Consultants which are then transferred to us with instructions to reduce them.”-Interviewee 7( Contractor)

### 4.3 Procurement Methods

After Preliminary studies two types of procurement methods were decided upon to be incorporated in study.

- Design-Bid-Build (DBB)
- Design-Build (DB)

During the interviews contractors were asked about their preferred Procurement Method with respect to effective risk management. The results are as follow:

**Table 4.4 Procurement Methods**

Procurement Methods	
D/B/B	6
D/B	4

60 % of the contractors agreed upon DBB to be their preferred method of Procurement for an effective risk management.

“We prefer D/B/B as transferred risks are less. Less responsibility.”-Interviewee 1

“Designing phase carry its own risks, which, when combined with execution phase ones makes it much more difficult to ensure an effective management of those risks.”-Interviewee 4

“Designs are provided by the consultants along with their expertise throughout the project lifecycle, which make Risk Management easier.”-Interviewee 7

Majorly, due to more transference, contractors try to avoid more responsibilities.



The rest 40 % chose D/B to be their favourite method of Procurement. Majority of these 40 % were the risk seekers with their ability to mitigate it. Out of these four, two are the Kuwaiti Contractors which were interviewed.

“With our efficient communications with the consultants and our clients when it comes to Risk administration, D/B Procurement becomes an opportunity”-Interviewee 9 (Contractor)

Out of these four contractors, one had a different reason. Interviewee 7 stated “in our previous experiences, getting the design from another place actually contributes to increasing risks. In this project (Reference Project) there were multiple errors in the designs which yielded in terms of delays.”

#### 4.4 Risks Identified

**Table 4.5 Risks Identified**

Actors	Interviewees	Notable Risks
<b>Contractor</b>	1	Political , Organisational(Managerial), Weather
	2	Security, Contractual, Political
	3	Financial(Cash Flow), Contractual
	4	Financial, Resource Distribution(Material and Machinery)
	5	Political, Performance
	6	Resource Distribution(Material), Technical(Design Process)
	7	Weather, Political
	8	Contractual(Legal),Resource Distribution
	9	Financial, Political
	10	Political
<b>Clients</b>	11	Contractual, Technical
	12	Security, Political
	13	Resource Distribution, Political
	14	Organizational, Political
<b>Consultants</b>	15	Contractual Relations, Financial
	16	Political, Resource Distribution
	17	Financial, Political

Out of all the Mentioned risks, three most crucial risks are: Political Risks

Financial Risks

Resource Distribution

#### **4.4.1 Political Risks**

Political Risks were mentioned the most during the interviews. Although such risks were discussed by contractor, Consultants were the ones who emphasised the most on political scenarios.

“Political interference and Pressure is one the major risks which yield in terms of delays”- Interviewee 16(Consultant)

During the interviews one of the consultants complained that Contractors personal relations with the political leaders keep them from maintaining a Quality control, the interviewee said “How are we supposed to do our Job when there is political interference and pressure at every other stage?” –Interviewee 17 (Consultant)

While going through details of a reference project, gathered by interview and case study, it was discovered that Faulty design process contributed largely to projects escalated cost. When the findings were revealed before the concerning consultant, he said “a thorough Geographical survey wasn’t conducted, as we were facing continuous political pressure to take shortcuts.”-Interviewee 16(Consultants)

Points like these gather-up to be blunders. A Cost-Benefit analysis was performed to highlight the severity of effects such risk have on the Projects budget.

#### **4.4.2 Financial Risks**

At various points it was rather difficult to draw line between the repercussions of Political risks and financial risks, i.e in many cases Financial risks are generated by the political ones. Financial risks somehow were mentioned as most conflict creating. Infrastructure

Development is extremely vital for a country like this, yet it somehow has been among the areas of less interest. The probable cause, during the study, seemed to be lack of finances. Having that said, Risks associated with finances carried a great deal to the actors of the construction industry.

“With the growing prices and our limited budget it is becoming difficult each day for us to initiate new projects.” Interviewee 12 (Client).

Budget is not the only problem mentioned by the interviewees. Other concerned mentioned were:

- Off-Budget Financing
- Incoherent bids
- Discontinuity in Cash flow

### **Off-Budget Financing**

According to NHA(2016) “The GOP has set an ambitious road development portfolio and fiscal budget allocations alone would be sufficient to meet almost 50% of the set target demands, the rest has to come from Off-Budget Financing.” The Off-Budget Financing, in this case, comes from Public Private Partnership (PPP), which comes with several other risks. According to Interviewee 6, “Like many other risks, financial risks mostly are also transferred down to us.” With Transference being the most popular technique of risk aversion among clients and consultants, Off-Budget Financing didn’t seem to be a very favourable idea for the contractors.

### **Discontinuity in Cash Flow**

With the Growing trend of importing the construction materials instead of using the local ones, Discontinuity in Cash flow is becoming more common. It basically depicts the delay Importer experiences between the payment and delivery which causes delays to the whole Project.

“We Import most of our construction Material which results in frequent delays. As a remedy we usually place order way before it is needed.”-Interviewee 7(Contractor)  
Reason for import Materials from abroad varied from Material scarcity to Requirement of Luxury from the Client, but Discontinuity in the cash flow was found out to be a common problem.

“We recently attained a higher PEC Category, with our increased capacity to opt for projects we had no other option except import of extra Material”-Interviewee 4(Contractor)

#### **4.4.3 Resource Distribution**

CPEC opened new doors of opportunity for Pakistani Construction Industry, but with opportunities came some risks. One of the Major risks being foreseen by the stakeholders of the industry is scarcity of Construction Material in near future.

“We have informed our Contractors about the situation, some of them have come up with strategies to deal with the situation”-Interviewee 11(Client)

As mentioned before, Transference is the most preferred method of Risk Response among clients. Most of the interviewed Clients foresaw the Material Scarcity and categorized it as a major risk. After which they transferred it down to Contractors and asked them to respond. Some of Contractors did respond to the risk, but in different ways.

“We have received a quotation of construction material worth a billion dollars, our financial teams are currently analysing the quotation and making a feasibility”-Interviewee 3(Contractor)

When the Consultant was informed about the Quotation, The response was: “this would have been a great solution only if the Contracting Company’s own worth was more than 3 Billion Dollars!” i.e The company is looking forward to import material worth one third of their total worth. Commenting on the Consultants response, The Contracting Company said:

“Feasibility report is being built based on our Credit limits”. Not to mention, Loan is a liability and hence carry a series of financial risks.

Another Contractor Responded to the forecast of the client, yet in a different way.

“We are looking forward to purchase a lot of extra Materials and keep in our storage facility for future use.”-Interviewee 4(Contractor)

Although a few contractors have come up with remedies, but in every case the cost was escalated.

#### **4.5 Cost-Benefit Analysis**

A reference project From Lahore, facing political risks, was analysed using Cost-Benefit Analysis to estimate the impact such risks can have on a project. To get a better picture another project from New York was analysed simultaneously which was then compared to the reference project.

The Two projects were:

- Orang line Metro Train, Lahore
- Second Ave. Subway Phase 2, New York

The data used for this analysis was gathered from case studies and the Interview of Interviewee 5

Sources: NY Planning Association

Punjab Government

**Table 4.6 Data of Orange Train**

Orange Line Metro Train	
Length	27 km
Cost	\$54.5 Million /km
	\$1.6 Billion
Interest Rate	5.75% (Pakistan State Bank)
Economic Benefit	\$4.28 Million/year
Benefit Present Worth Analysis ( $P=A/i$ )	4.28/0.0575
	\$74.43 Million

**Table 4.7 Data from Second Ave. Subway Phase 2.**

Second Ave. Subway Phase 2	
Length	2.7 km
Cost	\$2.2 Billion /km
	\$6 Billion
Interest Rate	1.5% (Federal Reserve System USA)
Economic Benefit	Wages \$ 7 Billion
	Gross City Products \$14.4 Billion
	Pedestrian Occupation \$1.26 Billion/km
Benefit Present Worth Analysis ( $P=A/i$ )	7 Billion + 14.4 Billion+ (1.26/0.015)
	\$105.4 Billion

➤ Cost Benefit Analysis =  $\frac{\Delta B}{\Delta C}$

➤  $\frac{\Delta B}{\Delta C} = \frac{\$105400000000 - \$74430000}{\$6000000000 - \$1600000000}$  The Costs are arranged in descending order

➤  $\frac{\$105400000000 - \$74430000}{\$6000000000 - \$1600000000} = 23.93 > 1$



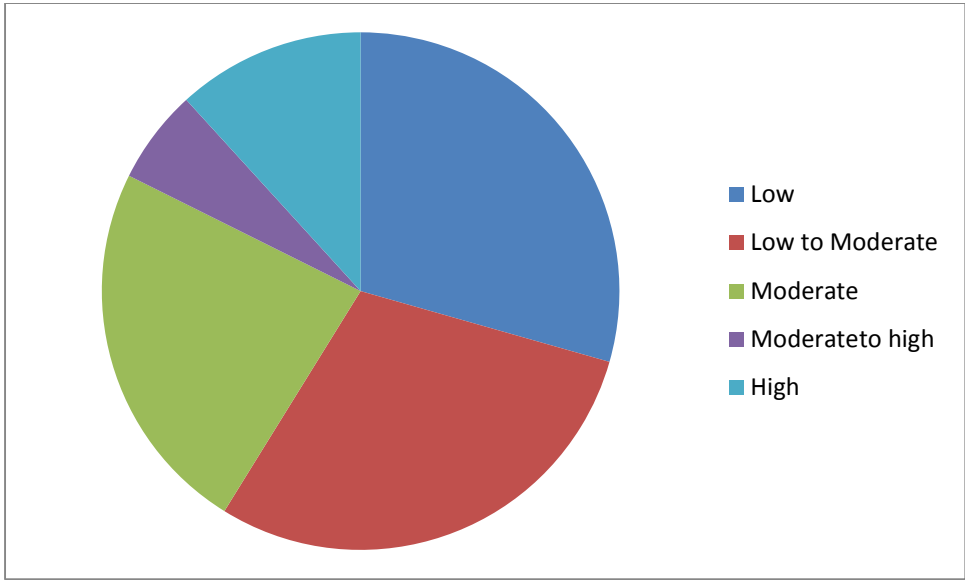
23.93 is way greater 1 which tells that despite the huge cost, Second Ave. Subway is 23.93 times more beneficial than Orange Line Metro Train.

According to Interviewee 5 the Current cost was escalated from a much lower cost and He greatly blames the political Risks for it. In addition to Political Risks, a few other factors contributed as well but at a minor level.

**Table 4.8 Extent to which Risk Management is being practised in the industry**

Actors	Interviewees	Risk Management Practise(Low, Low to Moderate, Moderate, Moderate to High, High)
<b>Contractor</b>	1	Moderate
	2	Low
	3	Low
	4	Low to Moderate
	5	Moderate
	6	Low to Moderate
	7	Low
	8	Low
	9(Kuwait)	High
	10(Kuwait)	Moderate to High
<b>Clients</b>	11	Moderate
	12	Low to Moderate
	13	Moderate
	14	Low
<b>Consultants</b>	15	Low to Moderate
	16	Moderate
	17	Low to Moderate

Out of 15 interviewees in Pakistan, 10 stated that in their view Risk Management Practice in Pakistan is either Low or Low to Moderate.



**Figure 4.1 Practise of Risk Management in the industry**

#### **4.7 Practise of Risk Management in Kuwait**

Two construction companies from Kuwait were interviewed to get a better picture on International practise of Risk Management. The companies were responsible for several major projects of the country. When asked about their Risk Management Practises they mentioned some exercised which were either missing or were found at a very small scale.

##### **Joint Risk Management**

JRM was known to be a common practise in Kuwait construction Industry. As indicated by the interviewees. “Joint Risk Management implies that every on-screen character knows about all risks in the project and assumes liability for them. It is essential to begin Risk Management right on time in the venture and uncertainties are talked about ceaselessly. Known dangers ought to be conveyed at a nitty gritty level between the on-screen characters and the venture's stages. Reasonable conveying both risks is a critical prerequisite for joint Management of Risks.” -Interviewee 9

##### **Safety Departments**

Basic Safety precautions are defined by Ministry of Public Work which are also incorporated as basic requirements in the contracts. “We are bound by the government to enforce safety laws onto our Construction Projects. To ensure that, we get regular inspectional visits from the ministry.”-Interviewee 10

##### **Weather Department**

Respondents stated that they regularly receive weather reports and forecasts from the national department, which are highly considered during the planning phase of the project. Not only the incorporate the weather reports into their planning, but also decide their working hours on the them, for Example, during the summers most of their outdoor works are done during the night shift. Interviewees mentioned during the interviews that such actions increase their productivity.

**With just a few mentioned practises it is easy to make a clear comparison between Kuwaiti and Pakistani Construction Industries when it comes to Effective Risk Management.**

### Conclusion and Recommendations

#### 5.1 Achieved Objectives

- Finding out about the Preferences of Construction Sector's Members for an effective risk management when it comes to Procurement options.
- Allocations of Risks in different contract types.
- Exploration of the most crucial risks the industry is facing.
- Estimation of the impact the most crucial risk can have.
- Drawing of a comparison between Pakistani and Kuwait Construction Industry and based on the comparison generation of better Suggested Remedies.

#### 5.2 Conclusion

- Practise of Risk Management in the construction Industry is Low to Moderate. This was decided based on the opinion of the interviewees. Most of the interviewees admitted the vitality of effective risk management, yet Practicing it for real was a whole other story for them
- Most preferred method of risk aversion among Clients and Consultants is Risk Transference. This finding depicts a general behaviour of Pakistani Construction Industry when it comes to Managing risks. With the constant practice of passing on the responsibility it would be hard for the companies to realise that an effective risk management process allow them to distinguish and quantify risks and to consider strategies to control them. Companies that manage risk effectually and proficiently are blessed with investment funds, and more noteworthy profitability, enhanced achievement rates of new ventures and better basic leadership.
- Based on the contractors preference when it comes to Contract sort, it was found out that more number of contractors look forward to get into Measurement contracts instead of EPC. Most of the contractors hesitated to take more responsibilities unless

the profit is huge. Same is the reason that six out of ten contractors preferred DBB as their procurement type.

- During the Interviews a bunch of risks were mentioned by the interviewees. Three most crucial risks were picked based on the number of times they were mentioned.
  - Political
  - Financial
  - Resource Distribution (Scarcity of Construction Materials)
- Most mentioned risk by the interviewees was Political. To assess the statement a reference project, facing political risks, was analysed using Cost-Benefit Analysis. Another project, with an effective risk management, from USA was also analysed, simultaneously to get a better picture. The results of the analysis show that such risks affect not only cost and time of a project but also its benefits.  
It wasn't just Cost-Benefit analysis which highlighted the impacts of Political Risks. The comments of a Kuwaiti Construction company personal also supported the argument when he revealed that by not foreseeing and analysing a few political situations, they suffered major setbacks. Setbacks like reduced Credit limit, Loss of Credibility in the market, Financial losses etc.
- From the extracted information of the Kuwaiti Interviews it was estimated that one of the reason the Kuwaiti Construction Industry is blooming is their practise of Joint Risk Management. Risks are better foreseen with JRM, which brings me to the practise of Joint Risk Management in Pakistan. When asked, interviewees in Pakistan had very limited knowledge about this concept. As mentioned before, transference of risk is considered to be the easiest method for getting rid of not only the forecasted risks but foreseeing them at the first place as well.

### 5.3 Recommendations

Based on the conclusions a few recommendations were made:

- JRM: In the given Scenario, introducing Joint Risk Management to the industry would be a right thing to do
- Risk Management training: as mentioned previously, there is lack of awareness in the industry when it comes to Risk management. Hence training and short courses of Risk Management should be introduced
- Specific Effective Model: as Indicated previously in the report, there is a lack of Effective Risk Models specifically designed for Pakistan. Hence a country specific Risk Models should be introduced
- Participation of Clients and Consultants throughout the lifecycle.
- Forecasting of Political risks well in time : Since Political risks was found to be the most crucial Risk

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