

**MANAGEMENT PRACTICES OF  
COORDINATION AND COMMUNICATION AMONG  
STAKEHOLDERS IN COMPLEX PROJECTS & THEIR  
IMPLICATIONS**

By

**MUHAMMAD OSAMA SHAHBAZ AMIN**

2012-NUST-MS-CE&M-04

A thesis submitted in partial fulfillment of

the requirements for the degree of

**Masters of Science**

in

**Construction Engineering and Management**



Department of Construction Engineering and Management

National Institute of Transportation (NIT)

**School of Civil and Environmental Engineering (SCEE)**

**National University of Sciences and Technology (NUST),**

**Islamabad, Pakistan**

**(2016)**

Certified that the contents and form of thesis entitled

**MANAGEMENT PRACTICES OF COORDINATION AND  
COMMUNICATION AMONG STAKEHOLDERS IN COMPLEX  
PROJECTS & THEIR IMPLICATIONS**

Submitted by

**Muhammad Osama Shahbaz Amin**

(NUST2012-61006-MSCEE15412F)

has been accepted towards the partial fulfillment  
of the requirements for the degree of  
Masters of Science in Construction Engineering and Management

---

**Dr. Muhammad Jamaluddin Thaheem**

Supervisor,

Department of Construction Engineering and Management,  
NIT, National University of Sciences and Technology (NUST), Islamabad

*Dedicated to*

***MY BELOVED FATHER AND MOTHER***

*for their continuous support and prayers*

*&*

***TO MY WIFE, BROTHER AND SISTERS***

*for their everlasting love*

*&*

***TO CAPTAIN ASFANDYAR BOKHARI SHAHEED***

*for sacrificing his life for the motherland*

## ACKNOWLEDGEMENTS

First of all, I would like to thank “**Allah Almighty**” for giving me courage, strength and support to accomplish the required tasks of my thesis work.

Then I would like to express my deepest gratitude for my research study supervisor, **Dr. Muhammad Jamaluddin Thaheem**, who guided me with remarkable kindness and patience throughout my research study with his sound and impressive professional approach. I sincerely appreciate the valuable time, motivation, and personal support accorded by **Engr. Fahim Ullah**. I am eternally grateful to the generosity and compassion of committee members, **Dr. Muhammad Bilal Khurshid** and **Dr. Hamza Farooq Gabriel** for their sincere guidance to complete this research work. I owe my special thanks to **Engr. Zia Ud Din** for his support throughout the course work and in the initial research work for this program.

I am very grateful to those Stakeholders who participated in the survey, shared their experiences and cooperated in completing my thesis.

And in the end I would like to pay my earnest and honest gratitude to my family especially my wife, elder brother and sisters for their unconditional support, encouragement, prayers and patience.

*(Muhammad Osama Shahbaz Amin)*

## **ABSTRACT**

Public sector development projects play a key in development of the country. Different stakeholders show interests in construction projects, every stakeholder has their own agenda and interest which creates a conflict. Implementation of a project is hindered by obstructive attitude of stakeholders. Effective communication and coordination among stakeholders is key to project successful. It is very difficult to manage coordination in complex projects as various interdependent members are required to reach the desired goal.

Communication is a complex domain, encompassing multiple perspectives. Therefore, it is challenging to create an appropriate framework to evaluate its strength among key stakeholders during the project as stakeholder's attribute and position with impact and influence changes with the project life cycle.

This research is particularly related to construction engineering and management practices in the industry from all key stakeholders' perspectives. It assesses the impact of current practices, and highlights the key stakeholders requiring more, moderate or less coordination and communication for successful completion of complex project. Key stakeholders are assessed for both planning and execution phases separately.

Due to lack of available studies in the subject, this research engages a qualitative design to unfold the opinions of the respective key stakeholders' regarding their impact and influence. Their point of view is gathered in order to find their impact on project to know the management practices at present and their implication due to these practices. Stakeholders' impact index and probability impact matrix approach for assessment of current practice and their requirements

for coordination and communication are used. Study also represents the class and position of stakeholders during both phases.

As per results, land owner have high negative impact on complex projects throughout the project life cycle followed by local community/residents, media, institutional forces and politicians. The client has highest positive impact on complex projects followed by consultant, main contractor and government agencies. Efficient communication and coordination is required with negative impact stakeholders for minimizing their influence.

The proposed study is first approach towards communication and coordination management in construction. In this context policy making is recommended.

# TABLE OF CONTENTS

CONTENTS	PAGE
ACKNOWLEDGEMENTS.....	iv
ABSTRACT.....	v
LIST OF TABLES.....	x
LIST OF FIGURES.....	xi
LIST OF ABBREVIATIONS .....	xii
Chapter 1.....	1
INTRODUCTION.....	1
1.1    BACKGROUND.....	1
1.1.1    The Role of Construction Industry.....	1
1.1.2    Communication and Coordination among Stakeholders.....	2
1.1.3    Stakeholder's Influence on Complex project.....	3
1.2    PROBLEM STATEMENT.....	3
1.3    JUSTIFICATION FOR SELECTION OF THE TOPIC.....	4
1.4    IMPORTANCE OF STUDY.....	7
1.5    RESEARCH OBJECTIVES.....	7
1.6    SCOPE AND LIMITATION OF RESEARCH.....	8
1.7    AREAS OF APPLICATION.....	8
1.8    LAYOUT OF THESIS.....	9
Chapter 2.....	11
LITERATURE REVIEW.....	11
2.1    WHAT IS PROJECT.....	11
2.2    DEFINING COMPLEX PROJECT.....	12
2.2.1    Comparison between Simple and Complex Project.....	12
2.2.2    What makes a Project Complex?.....	13
2.2.3    Complex System.....	13
2.2.4    Complexity in Construction.....	13
2.2.5    Project Complexity.....	14
2.2.6    Component of Project Complexity.....	14
2.2.7    Importance of Complexity to Project Management.....	15
2.3    STAKEHOLDERS.....	16

2.3.1	Defining the concept of Stakeholders.....	16
2.3.2	Review of Stakeholder Literature Map.....	17
2.3.3	What are project Stakeholders & their Classification.....	19
2.3.4	Stakeholder's concerns in Construction Projects: .....	20
2.3.5	Key Stakeholders.....	22
2.3.5	Stakeholders Attributes .....	26
2.3.6	Stakeholders Typology .....	29
2.4	THE CHALLENGES OF COMMUNICATION IN THE CONSTRUCTION PROJECT.....	30
2.4.1	The Importance of Effective Communication .....	31
2.4.2	Hurdles to Effective Communication .....	32
2.4.3	The Communication Imperative for Construction Organizations.....	34
2.4.4	The Communication Media.....	36
2.5	MANAGING PRACTICES OF COMMUNICATION & COORDINATION AMONG STAKEHOLDERS.....	37
Chapter 3.....		40
RESEARCH METHODOLOGY .....		40
3.1	INTRODUCTION.....	40
3.2	RESEARCH METHODS.....	40
3.2.1	Surveys .....	40
3.2.2	Advantages of Using Surveys for Research.....	41
3.2.3	Difference between Qualitative & Quantitative Surveys and Questions ...	41
3.2.4	Difference between Open-Ended & Closed-Ended Questions .....	42
3.2.5	Interviews.....	43
3.2.5.1	Forms of Interviews .....	43
3.2.5.2	Advantages of using Interviews in Research.....	43
3.3	RESEARCH STRATEGY .....	44
3.4	SAMPLING .....	46
3.4.1	Stakeholder Impact Index.....	46
3.4.1.1	Process Diagram to calculate Stakeholder Impact Index .....	48
3.4.2	Sampling for Interview Survey .....	48
3.5	INTERVIEW /QUESTIONNAIRE DESIGN AND DESCRIPTION .....	50
3.6	DATA COLLECTION .....	52
3.6.1	Interview Survey .....	52



3.6.2	Interview Sampling Technique.....	54
3.6.3	Limitations.....	55
3.7	DATA ANALYSIS STRATEGY.....	55
Chapter 4.....		57
RESULTS AND ANALYSIS.....		57
4.1	INTRODUCTION.....	57
4.2	SAMPLE CHARACTERISTICS.....	57
4.3	COMPARISON OF RESULTS IN PLANNING PHASE.....	58
4.3.1	Results for Internal Stakeholders.....	59
4.3.2	Results for External Stakeholders.....	60
4.4	COMPARISON OF RESULTS IN EXECUTION PHASE.....	62
4.4.1	Results for Internal Stakeholders.....	64
4.4.2	Results for External Stakeholders.....	65
4.5	COMPARISON OF RESULTS BETWEEN BOTH PHASES.....	67
4.5.1	Results for Internal Stakeholders.....	68
4.5.2	Results for External Stakeholders.....	69
Chapter 5.....		72
CONCLUSIONS & RECOMMENDATIONS.....		72
5.1	CONCLUSIONS.....	72
5.2	LIMITATIONS.....	73
5.3	RECOMMENDATIONS.....	73
5.3.1	Directions for Future Research.....	74
REFERENCES.....		75
APPENDIX-I.....		81
QUESTIONNAIRES FOR INTERVIEW.....		81
APPENDIX-II.....		88
LIST OF INTERVIEWEES.....		88

# LIST OF TABLES

<b>TABLES</b>	<b>PAGE</b>
Table 2-1: Respondents' Professional Experience .....	12
Table 2-2: Stakeholder concerns in Construction Projects.....	21
Table 2-3 Construction Project Stakeholders .....	22
Table 4-1 Number of Interviews from Key Stakeholder .....	57
Table 4-2 Results for Planning Phase .....	58
Table 4-3 Results of Execution Phase .....	63

# LIST OF FIGURES

<b>FIGURES</b>	<b>PAGE</b>
Figure 2-1 Stakeholder Literature map .....	18
Figure 2-2 Stakeholders Typology.....	30
Figure 3-1 Research Strategy .....	45
Figure 3-2 Process to calculate Stakeholder Impact Index .....	48
Figure 4-1 Stakeholder Impact / Probability Matrix .....	59
Figure 4-2 Stakeholder Impact / Probability Matrix .....	64
Figure 4-3 Comparison between both phases .....	68

## **LIST OF ABBREVIATIONS**

C&C	Communication and Coordination
CI	Construction Industry
CP	Construction Projects
PIM	Probability Impact Matrix
SII	Stakeholder Impact Index
PP	Planning Phase
EP	Execution Phase

# **INTRODUCTION**

## **1.1 BACKGROUND**

### **1.1.1 The Role of Construction Industry**

The Construction industry (CI) encompasses diversity of projects and every construction project (CP) has its own way of involving myriads of interrelated endeavors, ventures, tasks and work packages. Considering these complexities, construction is regarded as an unfavorable and always at odds with business in observance with other industries. Therefore, CP usually falls off with clefts and fissures in the matter of voluminous waste, meager yields, cost and time overruns and a continuous struggle with competition around conflicts and disputes within (Zeng, Tian, & Tam, 2005).

CI contributes dynamically in the socio economic development of a country always paving a step forward. The core objectives of socio economic progress are infrastructure, sanctuary and employment (Khan, 2008). In developing countries, where dwells approximately 85.4% of the world's population, governments devise and implement Mega construction projects which are many times complex and unique in their nature to achieve socio-economic development targets (Cohen, 2006) . The targets are achieved through constructing infrastructure such as residential schemes, hospitals, schools, townships, roads, railways, highways, airports, dams, seaports, power systems, irrigation and agriculture systems and telecommunications etc. to meet the needs of societies and come to term with their demands.

### **1.1.2 Communication and Coordination among Stakeholders**

Construction industry concerns a great number of stakeholders. This involvement of multitude stakeholders, common to construction industry in comparison with other industries, has resulted in conceptual fragmentation. Despite this fragmentation, the construction industry actualizes complex projects but with certain limitations. These limitations can be significantly attributed to the struggle faced while bringing about level of coordination and communication necessary for delivering any project efficiently.

CP affects stakeholders positively as well as negatively. The favorable complying effects can be better communication, improved coordination, exceedingly superior housing or desirably surpassed standards of living. The negative resultant of a CP is most often worsening and deterioration of the environment in physical terms for the stakeholders involved (Olander, 2002). The demands vary with different stakeholder groups. A CP might be beneficial and productive to one stakeholder group while negatively impacting the other. To build relationships it is necessary to understand each other's point of view, thus averting intolerant and predetermined opinions (Watson, Osborne-Brown, & Longhurst, 2002). Thus analyzing the diversity of demands put forward by different stakeholders must be done in project management for the facilitation of Communication and Coordination (C&C) among them.

Relationship management is subjected to betterment of C&C among stakeholders which is an effective approach to lessen the potential delays (Meng, 2012). Coordination is actually a well-planned and organized way of managing resources so that a surpassing standard of operation efficiency might be actualized

in any given project (Hossain, 2009). Communication is a process through which one party tries to deliver a message for better understanding. It is a way of conveying information among different sources.

### **1.1.3 Stakeholder's Influence on Complex project**

Project success with regards to cost and time measure, quantity vs quality as well as well-being and security is factually poor in CI. Complexity of design and construction process often leads to poor performance of project. However the ability to judge the complexity at the very beginning during initial stage of a project would definitely result in better more valuable understanding of the project as well as the stakeholders involved and hence holds great importance in successful management of projects together with a marked reduction in the associated risks.

In any project, be in CP or other fields, diverse and most often discrepant interests should be highlighted and taken into account. Community requirements put pressure on organizations for devising new methodology to carry out work and enhance communication among stakeholders. A negative viewpoint of stakeholders can severely cause hindrance to construction's complex project. Unsatisfactory and poor management of the apprehensions of stakeholders oftentimes are the cause of controversial issues and regarding execution of CP.

## **1.2 PROBLEM STATEMENT**

It is recognize that Pakistan's CI is hazardous and poor C&C practices are followed among Stakeholders. Due to poor management practices followed in C&C among variable stakeholders, it results in time and cost overruns and sometimes the execution is not even implemented. This study is aimed at finding

and identifying which stakeholder needs more coordination and communication at different phases of complex projects and to find their implications at each phase.

### **1.3 JUSTIFICATION FOR SELECTION OF THE TOPIC**

Just like other ventures there exist stakeholder same is the case with construction industry, stakeholder plays an essential role. Stakeholders list in construction project is remarkably large and with each influencing the course of the project at some stage. Pakistan is witnessing a boom in construction industry. The Government has also ventured in many complex CP ranging from energy sector to transportations sectors. In such complex projects, the stakeholders present are diverse leading to various problems like communication gap, undefined goals and scope with stakeholder, misunderstanding the needs of stakeholders that can become negative and have immense power, lack of stakeholder engagement within time, power politics, procurement issues etc.

There are many national and international projects that have been delayed due to poor coordination and communication practices among stakeholders. Such as Kalabagh Dam, whose construction has been announced on 1998 by the Federal government but due to political issues, Kalabagh dam underscores fears of command by Punjab province over small provinces and this has severe repercussion for the Federation that to date no progress has been made on it. Other project like Nelum Jehlum hydroelectric power project was started on June 2008 and was planned to finish on November 2016. The expected completion of the project is August 2017. The project cost has gone up due to delay in land acquisition and power interruption. More resources are deployed to finish the project by 2017 resulting in cost and time overrun. The completion of 870-



megawatt Suki Kinari hydroelectric power project, which is part of the China-Pakistan Economic Corridor, may be delayed for at least one year as the Khyber-Pakhtunkhwa (K-P) government has so far failed to resolve the land acquisition issue. The expected completion was 2020.

The N75 know as Islamabad - Murree Expressway or Islamabad - Murree - Muzaffarabad Expressway is a four lane expressway connecting twin cities to Murree and onwards to Muzaffarabad. It started in 1998. Due to land acquisition issues and political issues the project was completed in 2011. Similarly Lai Nallah Expressway situated in District Rawalpindi was planned in 1998 by Rawalpindi Development Authority, which was in 2007 named as Sheikh Rashed Expressway (named on Politician name) is not started to date due to political stakes and issues. The Pakistan Metro Bus Project was delayed up to two to three months in Islamabad part due to non acceptance of the project by Environmental NGO's, local shopkeepers, residents, public and transporters.

Road from Jinnah Chowk to Northern by pass to Multan Public School & Boson road to martial road in District Multan (combination of three sub-projects with total length of 11.44km) was started in December 2011 and was planned to finish on June 2012. The project has been delayed up to one year because the scope was increased and compensation amount to the land owners were not satisfactory due to which these stakeholders stood against the project. Extension of Road from Qadafi chowk to Northern By pass in District Multan length 5.3Km started in May 2010 was expected to complete in December 2011 but was delayed for three years as the Landowners were given fair market price and socio-economic problems were never focused. Only 01 No litigation caused the major delay that can be omitted if

good coordination and communication medium has been established between the stakeholders.

Construction of New Shams Scheme in District Multan, the project faced a delay of 15 years due to Land Acquisition and one Litigation issue due to compensation issue. The cost overrun was about 168 Millions and the main reasons were the inflation and the increased compensation to the land owners. Lund, Sweden, a housing project consisting of 60 Apartments was planned in 1988 and after much resistance by the Stakeholders (Interest group of senior citizens, the residents in the vicinity, Interest groups for the preservation of the cultural and historical image of the city) the planned was approved in 1998. The 12 storey hotel was rejected initially by Interest group of senior citizens and the residents in the vicinity. New plan was made to build two 9 storey apartments for senior citizen that was again rejected by Interest groups for the preservation of the cultural and historical image of the city. Final solution was 5-6 storey buildings. The main consequences were time delay. It took about 12 years for the project from 1st idea to completion. However the developer itself identified that by taking view of majority of stakeholders by good and effective C&C the final solution is better than the original solution.

Lund, Sweden railroad project, the construction of 2 way railway track all the way through the town centre, the plan was delayed for almost 7 years because the idea was to expand the track on both sides of railroad but the residents, National board of Housing and Swedish Rescue Services had a strong opposition. Project was delayed because people who lived in the area had a negative say, unfavorable public opinion, which in turn took to court and time became issue.

Along with it media and press also played negative role and add bad reputation for the project.

In Pakistan, the management practice is such that stakeholder engagement is minimal in initial phase of project (pre-feasibility, feasibility, design and procurement phase) which may lead to time over run and cost overrun. Stakeholder management can help mitigate these problems and consequent issues. This research will identify existing management practices and define stakeholders' power and impact at different phases of complex project in Pakistan.

#### **1.4 IMPORTANCE OF STUDY**

This study is intended to provide research-based data to government agencies, project managers, design engineers, developers, project owners, safety professionals, regulatory agencies, in making meaningful decisions about utilizing the knowledge in managing stakeholders. With work on China Pakistan Economic Corridor already started, the findings of the research can be used in managing stakeholders and their issues in each phase of the project for smooth completion of this project and also other complex projects.

#### **1.5 RESEARCH OBJECTIVES**

The objectives of the study are:

- To identify the degree of influence and impact of each major stakeholder via Interview Survey.
- To determine position and attributes of key stakeholder via Interview Survey.

- To determine stakeholder influence on complex projects, based on (Olander, 2007) model.
- Identification of key stakeholder requiring more coordination and communication.

## **1.6 SCOPE AND LIMITATION OF RESEARCH**

The scope of this research is limited to following:

- a. Complex CP of Pakistan.
- b. Scope of research is limited to management practices of C&C among stakeholders already carried out in Pakistan and their Implications at each phase through interview survey.

## **1.7 AREAS OF APPLICATION**

This Research may be fulfilling for CI of Pakistan that will surely benefit to stakeholders performing/engaged in complex projects. Government of Pakistan has set it priorities in the document titled Vision 2025. The Vision has identified seven pillars as goal key drivers of growth which will pave way for Pakistan to prosper by 2025. Pillar VII of the Vision 2025 is Modernization of Transportation & Greater Regional Connectivity with one of the aims that road density to be increased from 32Km/100 Km<sup>2</sup> to 64Km/ 100Km<sup>2</sup>. Vision 2025 envisions establishing an efficient and integrated transportation system that facilitates the development of the competitive economy. The targets are there to make sure that transportation cost reduces, provides safer travelling, efficient communication between rural centers and urban areas, also the railways should be interconnected with economic hubs (including air, sea and dry ports) and also high capacity transportation corridors connecting major regional partners.

In order to achieve this, Government of Pakistan is investing in infrastructure including construction of mega complex projects like China-Pak Economic Corridor (CPEC), Orange Line in Lahore, Lahore Ring Road Southern Loop, Sialkot-Lahore Motorway, Karachi-Peshawar Motorway etc. Such mega projects are normally in complex in nature requiring management practices of coordination and communication among stakeholders for its timely delivery.

## **1.8 LAYOUT OF THESIS**

The present research study is an effort to identify management practices of coordination and communication among key stakeholder in complex projects and their implications. The study includes Five chapters; Introduction, Literature Review, Research Methodology, Results & Analysis, and Conclusions and Recommendations.

In Chapter 1 the background along with the problem statement and the importance of the research in relation to the national demands is provided. Research objectives and scope is also included in this chapter.

Chapter 2 discusses about the comprehensive review of the past research studies by different researchers around the globe.

Chapter 3 discusses the research methodology adopted for the study. It explains sample size, design of research interview questionnaire, and finally the collection of data.

Chapter 4 covers the analysis of interview survey results. The findings are also discussed with the responses of Stakeholders' interview.

Chapter 5 summarizes the main conclusion. It also includes what type of management practices are adopted in CI at present, and future recommendations are made based on the findings of this study.

## **LITERATURE REVIEW**

### **2.1 WHAT IS PROJECT**

The basic definition of a project states that a project is a strategic set of interrelated tasks to be implemented over a certain time period and within specified cost and other limitations.

Another definition of a project according to PMBok 5th Addition (Guide, 2013), is that a projects is a short termed endeavor fabricated in order to yield a product, service or result which is unique and original and also has a defined beginning as well as end (usually constrained due to the timings or the funding or deliverables), commenced to meet unique objectives and aims, mostly to come out with an advantageous alteration or a value that is added.”

A project is a distinctive practice that consists of a various activities that need to be done within a certain amount of time, with a certain quantity of budget and also with a restricted amount of resources. (Olander, 2006). Moreover, there is no such thing as an archetypal facility development project as, one would be hard press to find two projects that are identical (Ibrahim & Nissen, 2003). The inimitability, in nature, and the limited spell of projects requires supplementary efforts to set up effective project teams, as well as, engender trust, within the team, between the team and the project investors (Grabher, 2002).

CP may be divided into four categories as

- Simple, this is easily comprehensible.
- Complicated, this is not simple but comprehensible.

- Complex, this is not simple and never completely comprehensible.
- Chaotic, this is neither simple nor comprehensible.

## 2.2 DEFINING COMPLEX PROJECT

(Shane, Strong, Gransberg, & Jeong, 2015) states, that an unusual degree of uncertainty and anomaly is found in complex projects. The decisions made by the project manager must be quick since many of the crucial aspects of the decision are out the project team’s direct handle. Usually these kinds of disruptive actions or decisions made by the project manager causes most of the members of the team or the Project Planning Management (PMP) to change their entire plans and manage their activities or jobs according to the new decisions made.

The nature of project complexity is vigorous. The team of the project must cultivate results to please external shareholders, who can influence the agency’s capacity to attain the intricate project’s goals even though the project’s eventual scope may be indeterminate in the initial phases of development of the project.

### 2.2.1 Comparison between Simple and Complex Project

**Table 2-1: Respondents' Professional Experience**

<b>SIMPLE PROJECT</b>	<b>COMPLPLEX PROJECT</b>
Standard Practices can be used <ul style="list-style-type: none"> <li>▪ Design</li> <li>▪ Funding</li> <li>▪ Contracting</li> </ul>	Standard Practices cannot be used <ul style="list-style-type: none"> <li>▪ Design</li> <li>▪ Funding</li> <li>▪ Contracting</li> </ul>
Static Interactions	Dynamic Interactions
High level of resemblance to earlier projects which creates certainty	High level of uncertainty and unpredictability regarding final project scope



### **2.2.2 What makes a Project Complex?**

(Ginger Levin & PgMP, 2014) in his book "Navigating Complexity", explained attributes that make the Project Complex, which are as follow;

- Human Behavior (individual, group, political & organizational behavior, communication and control)
- System Behavior (dependency, connectedness)
- Ambiguity (Uncertainty, emergence)

### **2.2.3 Complex System**

Complexity science and complex systems have numerous kinds of definitions in the literature. (Richardson, Cilliers, & Lissack, 2001) states that intricate (adaptive) system can merely be defined as a system that consists of a great number of entities that exhibit a higher level of interactivity. When we come to the nature of the interactivity, it is mostly found to be nonlinear.

(Bertelsen, 2003) points out that construction is a complex system and further clarifies the statement by explaining how construction is a systematic and linear trend and the planning also the management takes place from the top till bottom. The procedure may not be as predictable as it may look, since the regular failures to complete CP on time and schedule. A detailed study of the construction discloses that it is undoubtedly a nonlinear, complex and dynamic phenomenon, and it often exists on the brink of chaos.

### **2.2.4 Complexity in Construction**

Since complexity has various different connotations, it cannot be easily defined. A definition found in The Collins English Dictionary (2006) terms

complexity as the condition or feature of being complicated or complex”(Wood & Ashton, 2010).

### **2.2.5 Project Complexity**

Project complexity can be operative when it comes to variation and interdependency and it consists of many varied interconnected parts (Baccarini, 1996). Baccarini enlightens that the aforementioned definition can be functional to any project aspect that might be applicable to the process of the project management, for instance institute, equipment, environment, data, decision making and systems, therefore it is significant to testify clearly the kind of complexity being dealt with when referring to project complexity.

(KI Gidado, 1996) suggests that the extent of intricacy of implementing a complex production process is its project complexity, where a complex construction procedure is considered as holding a number of convoluted individual parts brought together in an complicated operational network to form a work flow that is to be finished within a specified manufacture time-period, budget and quality and to achieve a required function without redundant clash between the different parties involved in the construction process. Or in simpler words it can be described as the degree of the difficulty of executing a planned number of quantifiable objectives.

### **2.2.6 Component of Project Complexity**

Listed below are the acknowledged six key mechanisms of project complexity, they are listed by the (Kassim Gidado, 2004). The mechanisms are:

- Inherent complexity
- Uncertainty

- Number of technologies
- Rigidity of sequence
- Overlap of phases or concurrency
- Organizational complexity

### **2.2.7 Importance of Complexity to Project Management**

In the following examples, (Baccarini, 1996) focuses on the significance of complication to the process of project management:

- Regulations of planning, co-ordination and control requirements are supported by the project complexity.
- The distinct documentation of goals and aims of major projects are hindered due to the project complexity.
- During the assortment of a suitable project organizational form, complexity is a substantial condition.
- The choice of project inputs is affected by project complexity e.g. identifying the capability and experience requirements of management employees.
- In the selection of an appropriate project procurement arrangement, complexity is often used as criteria.
- Complexity is commonly used as a standard during the selection of a suitable project procurement arrangement.
- The project goals of time, cost and quality are affected by the complexity. Generally, project complexity is directly proportional to the time and cost, therefore if one is high the other will be high too.

## **2.3 STAKEHOLDERS**

Many different and sometimes discrepant interests must be deliberated in any project; particularly in CP. The project shareholders are the representatives of these interests.

The investors of the project might gain profit or loss from the project which means they take a risk (Crozier & Friedberg, 1977). The investors can positively or negatively inspire the construction project and they generally include financial institutions, clients' customers, clients' partners, pressure groups, etc. (Newcombe, 2003) ; (institute, 2008).

The success of a project and the environment within which the project operates is a vested interest of a project stakeholder (Turner, 2000). It is implicated that a shareholder is a person or a group of people who have the power to be a threat or a valuable asset (Gibson, 2000).

### **2.3.1 Defining the concept of Stakeholders**

Shareholders are the individuals or a group of individuals who have the authority to affect and themselves can be affected by the realizing the corporation's purpose (R. Freeman, 1984). This definition is an improvisation of the first definition of a shareholder, which (R. Freeman, 1984) had outlined from a document from Stanford Research Institute in (1963). The document explains that an organization would cease to exist without the backing of the shareholders.

(Phillips, 2003) gives out an additional information that the shareholder theory needs to be make sure about the people who are involved in the decision making process and also the results that come out of those decisions. Thus, in the case of CP responding to the needs and expectations of the project's shareholders is

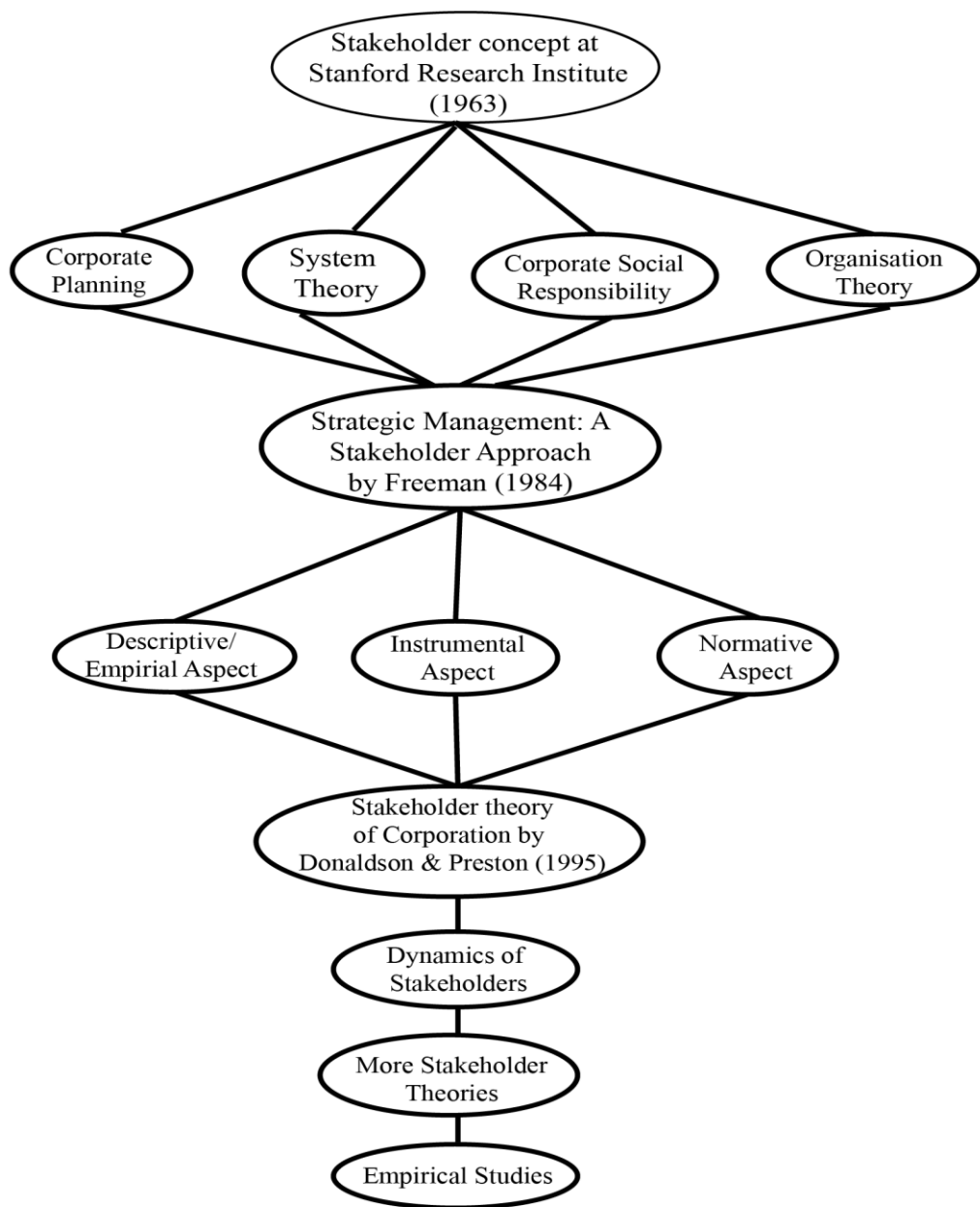
the duty of the project manager and also to be concerned with how the decision-making process is taking place.

It is an essential notion that the shareholders have their own share in the company. Shareholders are the personnel who have right to involve themselves or fund the company whether done voluntarily or involuntarily and these decisions makes them responsible for their own actions and it might make them make profit and they might face loss (Post, Preston, & Sauter-Sachs, 2002). (Donaldson & Preston, 1995) identify shareholders when an outcome of the organization's actions or inactions might possibly be harmful or beneficial but the shareholder regardless of that anticipate and experience all of it.

The (R. Freeman, 1984) definition has been adopted by Project Management Institute (PMI) (2004) and it elaborates that project execution or project completion are major reasons why project shareholders take an interest.

### **2.3.2 Review of Stakeholder Literature Map**

The progress of initiating of Shareholder theory in the literature is categorized into various steps as shown in stakeholder literature map Figure 2-1:



**Figure 2-1 Stakeholder Literature map**

In 1963, the Stakeholder's concept was originated. The concept expanded into four different grounds such as corporate planning, systems theory, corporate social responsibility and organization theory. This stages was called a classical stakeholder literature (Elias, Cavana, & Jackson, 2002).

The following milestone in the growth of stakeholder literature was a book by (Chicago Press & Freeman, 1984), *Strategic Management : a stakeholder approach*. The three aspects of the literature were as follows; descriptive/empirical aspect, instrumental aspect and normative aspect. (Donaldson & Preston, 1995) combined these three aspects in their theory of corporation.

Furthermore, crescendos of stakeholders and stakeholder theories came under the wings of the shareholder theory. In order to validate the claims relating to the stakeholder concepts several empirical studies were also performed.

### **2.3.3 What are project Stakeholders & their Classification**

The shareholders of the project are those entities who are greatly affected by any profit or loss that happens around in the project since they are directly related to either of the situation. Shareholders are grouped into two subdivisions by (Bonke & Winch, 2002), the subdivisions are:

(i) Internal stakeholders, they have legal dealings with the clientele, the ones who have a membership of the project alliance or the ones who give out the funds and also those who because of the demand side (employees, customers, end-users and financiers) and the supply side (architects, engineers, contractors, trade contractors and material suppliers) are clustered around the client; and

(ii) External stakeholders, these consists of private employees (e.g. local residents, landowners, environmentalists, and archaeologists) as well as public employees (such as regulatory agencies, and local and national government) or the ones who are majorly affected by the activities happening in the project.

Similar categorizations are inside and outside shareholders (Newcombe, 2003), as well as direct and indirect shareholders (Smith & Love, 2004). Another

explanation studies primary as opposed to secondary stakeholders (Carroll, 2006). The shareholders that have a major role in the decision making process of the company and are an essential asset for the existence of the company are the primary shareholders, on the other hand the shareholders that have a subtle role in the company are subtly affected by the company and their role has nothing to with existence of the company are the secondary shareholders (Pajunen, 2006). Some of the shareholders have a major role in the company whereas the others have a lesser important role (Bonke & Winch, 2002).

Shareholders could also be juxtaposed amongst those that are commissioned to provide services (e.g. contractors, subcontractors, consultants) that is in a principal or direct association with an organization; in opposition to those that have no contracted duty or formal redress, but are in an indirect or secondary relationship with an organization (Carroll, 2006; Smith & Love, 2004). The un-contracted stakeholders (e.g. members of the community and potential end users who are committed to occupy/use the facilities) can have authority to interrupt projects through their actions, which can be political, but are not easily accountable for their actions.

#### **2.3.4 Stakeholder's concerns in Construction Projects:**

In CP, mostly when social and environmental issues are at risk, the stakeholder groups are more obvious as schemes of this type usually have an influence on the public typically (Manowong & Ogunlana, 2008). (Atkin & Skitmore, 2008) believe that throughout the lifecycle of a project, only when the stakeholder's expectations are met is when the project is successful. Gathered from many government departments in different countries and researchers from all over



the world (Li, Ng, & Skitmore, 2012a) recognized the main stakeholder worries in CP Table 2-2.

**Table 2-2: Stakeholder concerns in Construction Projects.**

<b>SR #</b>	<b>COMPLEX PROJECT</b>
<b>1</b>	Flexibility of development to the altering requirements
<b>2</b>	Accessibility of local job openings
<b>3</b>	Government and local citizens gaining economical advantage
<b>4</b>	Pleasant improvement of different local economic events
<b>5</b>	Value-for-money of the proposed project(s)
<b>6</b>	Admission to work and sites of events
<b>7</b>	Formation of a legible of a pedestrian circulation and transport network that is safe, convenient, and comfortable.
<b>8</b>	Establishment of public open space and accessibility of amenities, community and welfare facilities
<b>9</b>	Being serviceable and adequate in terms of fare to diversified social groups
<b>10</b>	Design and construction needs to be green and sustainable
<b>11</b>	Avoidance and mitigation procedures pollutions (air, water and noise)
<b>12</b>	Designing the building keeping in mind the aesthetics, density, height and visual permeability
<b>13</b>	The project needs to be coordinated with the local nature of the present locality
<b>14</b>	Distinctive local characters
<b>15</b>	Preservation of local cultural and historical heritage
<b>16</b>	Reimbursement and repositioning plan/strategy
<b>17</b>	Character of our city and worldwide status

It has been encouraged by many researchers that the project stakeholders participate in the ongoing activities of the project throughout the different construction stages (e.g. the feasibility, the planning and developmental phases)

(Li, Ng, & Skitmore, 2012b);(Tam, Zeng, & Tong, 2009). Nevertheless, there is more public participation found in the West than the Eastern societies (e.g. China, Pakistan, and India). The downside of public participation is that it can steer into social conflict and disorder. Since each stakeholder group has its own history, character, gender, culture, values, beliefs, and behaviors and they are motivated by it, therefore conflict is predictable (Randeree & El Faramawy, 2011). It may not be advisable to continue the project if the stakeholders fail to reach an agreement during the participation process in the early stage of a project (e.g. feasibility; planning stage), and this could intensify the chance of collapse or even lead to aggression amongst decision-makers and local citizens (Lee & Chan, 2008).

In order to arrive at an agreement and avoid project failures it is necessary to identify and analyze stakeholder concerns in complex CP (Atkin & Skitmore, 2008).

### **2.3.5 Key Stakeholders**

In each particular construction project different kinds of stakeholders are tangled. Clients, consultants, contractors, external public parties and external private parties are five main groups construction key stakeholders are categorized into (Chinyio & Olomolaiye, 2009). The internal shareholders consist of clients, consultants and contractors while external shareholders consist of the rest. The following five titles below in Table 2-3 are some key stakeholders in CP.

**Table 2-3 Construction Project Stakeholders**

SR #	CATEGORIES	INDIVIDUALS / GROUPS	OBJECTIVES AND ROLES
<b>INTERNAL STAKEHOLDERS</b>			
<b>1.</b>	<b>Clients</b>	Public clients	In order to satisfy basic

			<p>and functional needs, the public clients transact with public interest based on the organization's strategic aims and also will consume what is delivered. They dispense stores of the project, will guarantee that state funded finances be utilized appropriately. The completion of a successful project in terms of quality, time and cost is ensured by the relationship between client and consultants.</p>
2.	<p><b>Project professionals (in-house / out-of-house)</b></p>	<p>Consultants</p>	<p>A major role is played by the consultants when it comes to the development of the brief and they also provide help with the special studies. They also supervise surveys for the design and development. They prepare drawings and administer the progresses, specifications and other sensitive documents. Their obligation also includes site monitoring regarding</p>

			<p>the cost, quality and time along with attending commissioning.</p> <p>Consultants make sure relevant work and assist in settlement of accounts</p>
<b>3.</b>	<b>Contractors/suppliers</b>	<b>Main contractor</b>	<p>Their job is to make sure that the work which was designed by the consultants is carried out and is completed under the required cost, time and quality. Supervises the management of operations on site; Co-ordination between all the sub-contract work, materials and suppliers are assisted by them. Sometimes they also assist in design work.</p>
		<b>Sub-contractors</b>	<p>The work which is assigned by the main contractors is carried out by them.</p>
		<b>Laborers</b>	<p>Complete the tasks which were assigned to them alongside they earn living plus an added bonus of skill learning.</p>

		Suppliers	Their task is to supply, install and commission the hardware that constitutes the finished building (e.g. materials suppliers, equipment suppliers and manufacturers)
<b>EXTERNAL STAKEHOLDERS</b>			
<b>4.</b>	<b>External Public Parties</b>	Government authorities	Law abatement is done by them.
		Consultation bodies such as district board	They may be unresponsive to any project as long as it observes with decree and protocols (e.g. planning, transport and highways department, electrical and mechanical services department, etc).
		Labor union/employers' association	Guarantees the local societies' needs will be revealed in the project.
		General public	Impacts the behavior of its associates (i.e. privilege protection function).
		Media	Partake in and add to the requirements by the General Public.
		Politicians	Representative of general public and ensures their right.

<b>5.</b>	<b>External Private Parties</b>	Local residents/community	May fear a fall in pleasantness or attractiveness of the surroundings, thus contrary to the project.
		Local landowners	Own land and ensures that their welfares should not be harmed by the project.
		Archaeologists	They are worried about the loss of main ancient relics.
		Environmentalists	Desires to look after the environment from annihilation or contamination.
		Competitors	Look forward to acquire competitive benefit.
		Others	Their association to the project is not immediately distinct, but their action and backing may be essential to the project success.

### 2.3.5 Stakeholders Attributes

Power, legitimacy and urgency are the three traits that can be useful to identify the class of any investors, only by knowing if he possesses one or all three of the aforementioned attributes (Mitchell, Agle, & Wood, 1997).

## Power

A research done in earlier times by (Weber, 1947) defines power as ‘the probability that one actor within a social relationship would be in a position to carry out his own will despite resistance’. The shareholder’s ability to assemble social and political forces as well as their skill to withdraw resources from the organization is what makes them powerful (Post et al., 2002). The skill to persuade, induce or coerce the events of others is power and it is displayed when one part in an association is able to sanction its will on the other part (Whittington, Johnson, & Scholes, 2005). Power might be demonstrated via (Ihlen & Berntzen, 2007):

- coercive power
- utilitarian power
- normative power

Government organizations and magistrates have a superior type of official power. They can serve as resolver of conflicts or as guarantor of due process, even though they usually do not exercise action (R. E. Freeman, 1984). Physical power; positional power; resource power; expert power; and personal are the five key reasons of power in organizations (Handy, 1993). (Handy, 1993) supports that physical power is rarely tried and it is of little importance to project stakeholder management. Moreover, it is hard to evaluate in a group of people or an organization because it relates to distinct traits, although personal power is central when assessing power level. Hence, three sources decide the power of a stakeholder: positional, resource and expert.

### Legitimacy

The main idea of legitimacy is assumed in terms of normative legitimacy and derivative legitimacy (Phillips, 2003). The shareholders that are responsibility of the organization and it important for the organization to maintain the utmost morality with this shareholder is the normative stakeholder. The shareholders that are the responsibility of the manager since their behavior or any action is related to the normative shareholders are the derivatively genuine stakeholders.

Legitimacy is an thought or more like a hypothesis that any action of a body are either needed, appropriate or suitable within some socially defined system of customs, morals, beliefs and definitions (Suchman, 1995). (Mitchell et al., 1997) explains legitimacy as a social good which means it is bargained differently at many stages of social organization and it is something bigger and more shared than mere self-perception that may be defined. According to (R. E. Freeman, 1984) the adequacy of a shareholder is a requirement for the realization of transactions with stakeholders.

### Urgency

The point to which a shareholder asserts call for immediate attention is urgency. Time sensitivity and criticality are the two characteristics that urgency is based on. The point to which administrative delay in attending to the entitlement or relationship is unacceptable to the stakeholder is time sensitivity and the significance of the claim or the relationship to the stakeholder is criticality (Mitchell et al., 1997).



Hence, the pressure exerted on the project manager to take an action in an emergency situation is the urgency attribute of stakeholders. Urgency is also the point that demands quick attention when there is a claim (Fernández Gago & Nieto Antolín, 2004).

### **2.3.6 Stakeholders Typology**

(Mitchell et al., 1997) define various stakeholder groups that are reliant on the distribution of stakeholder characteristics as shown in Figure 2-2:

Dormant stakeholders do not have any real relationship or urgent claim but possess power to impose their will thus their power remains unused.

Discretionary stakeholders possess the attribute of legitimacy, but they have no power or urgent claim. Although they may choose to do so there is no pressure for managers to involve in an active relationship.

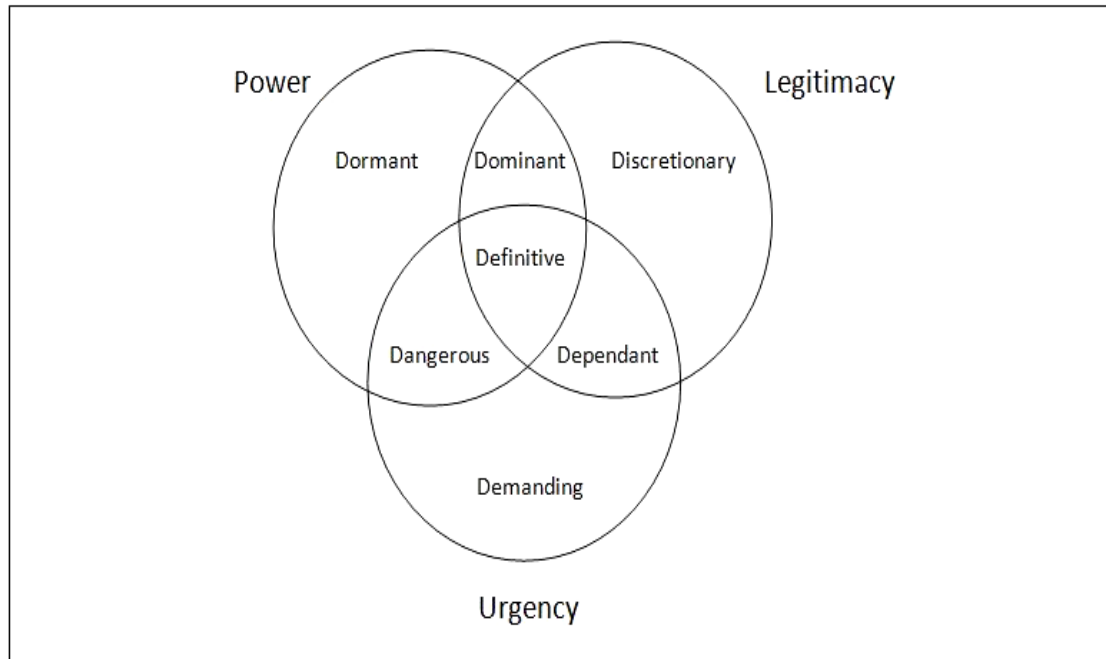
Demanding stakeholders have an urgent claim, but have no power or legitimate relationship. It does not warrant more than passing management attention but this is troublesome.

Dominant stakeholders are both influential and legitimate. It seems clear that the anticipations of any stakeholders observed by managers to have power and acceptability will matter.

Dangerous stakeholders lack legitimacy, but have power and urgency. They will be powerful and perhaps be fierce, making the stakeholder ‘dangerous’.

Dependent stakeholders have crucial and legitimate claims, but retain no power. These stakeholders are dependable upon others for the power needed to convey their will.

Definitive stakeholders are those that possess both power and legitimacy. They will already be associates of an organization's leading alliance. Managers have a clear and instant mandate to attend to and give importance to that claim, when such a stakeholder's claim is crucial.



**Figure 2-2 Stakeholders Typology**

## **2.4 THE CHALLENGES OF COMMUNICATION IN THE CONSTRUCTION PROJECT**

In every organization stakeholder communication is very important for the projects to succeed. To maintain a good relationship between organization and its stakeholders it is important to have an organized communication process.

According to (Huczynski & Buchanan, 2001) a managers' in different sectors majority time is spent in communication although they have diverse activities and task at hand. Communication activities include many things

from networking, the process of collecting information, letter writing or engaging in conversations to the transfer of information through new tech devices : Mobile phones or computers, iPods (Dainty, Moore, & Murray, 2007). In conclusion, performance of managers is defined by their effective communication; Higher-grade needs superior communication.

Everybody involved in construction plays a part in a multifaceted communication network. Project members should be interconnect no matter how small or big the venture is, every venture can be easily completed without the transaction between common man and organizations.

#### **2.4.1 The Importance of Effective Communication**

Communication significance is so important that it cannot be exaggerated to individuals, groups, teams and organizations. If you search on the topic almost every search will provide you with the importance and ways to communicate efficiently with staff (Dainty et al., 2007).

The significance of communication to organizations is briefly summarized by (Armstrong, 2001):

- Achieving coordinated outcomes – Collective efforts of people are required for organizations to function, but if people start working independently it might lead to failure of organization's objectives. Effective communication is therefore needed to produce coordinated.
- Managing reforms – Almost all the organizations need constant change to flourish but this affects their employees. To make your employees comfortable with change you have to first communicate

to them the reason of this change only then it will produce positive outcome.

- Employees' motivation – To keep your employees motivated you have to give them incentive mostly it depends upon how much growth they will have by the tasks you assign them.
- Employee one on one understanding – Effective channel of communication is needed by the organizations if they want to keep their employees happy and to understand their issues and fulfill their needs.

#### **2.4.2 Hurdles to Effective Communication**

Different authors have taken different perspectives on defining hurdles to real communication. (Torrington & Hall, 1998) identify several obstacles to effective communication including:

- The individual's frame of reference – Everyone perceive information according to their foam of reference which leads to diverse views and understanding.
- Stereotyping – A common practice these days to stereotype anyone who according to one minds fall in a particular social group.
- Cognitive dissonance – employees usually have trouble understanding that information which is against their belief system or how they perceive things, this leads to their negative response. Rather, they will distrust or challenge it as a way of dealing with the inherent discomfort of dissonance.
- 'Halo or horns' effect – if somebody is trusted by another individual, they may be predisposed to agree with what they say. Conversely, if someone is

distrusted then what they say may be ignored or treated with cautiousness. This is related to stereotyping, but is more closely related to an individual's insight of another person or organization rather than a discrete societal group.

- Not paying attention – Communication difficulty occur when the information has not been taken properly due to some noise in background or some other commotion. This leads to overlooking of some important information which was communicated.

Within the organizations there is an added set of variables which can act to hamper successful communication. These are the structure of relationships and cultural and communal norms administer the power dynamics which can merge to affect the effectiveness of communication. According to (Huczynski & Buchanan, 2001) five principal barriers to effective communication within the organizational setting which are as follow:

- Hierarchy differences – Subordinates' usually feel their needs are being neglected as superiors don't have an understanding of their issues. This happens due to miscommunication in hierarchy.
- Gender roles – Behavior of both man and women are different, some suggests that women are good listeners whereas men might have a tendency to talk more.
- Physical surroundings – issues such as room layout, noisy equipment and physical proximity affect communication effectiveness.

- Language obstacle – This issue is mostly overlooked but the layout of a room, physical range and area along with noise creating objects also affect communication.
- Cultural diversity – In terms of formal and informal expectation every culture has their own interest and they react differently.

### **2.4.3 The Communication Imperative for Construction Organizations**

Communication failure of some form occurs due a variety of reasons. One of the reasons includes absence of understanding (The medium to deliver information isn't standardized so that the information could be understood ); information overload is also one of the reason (So many continuous submission happen that all this information is beyond the normal capacity of a person ); Other reasons include substandard quality of data (The quality of instruction which one person conveys to other is so poor that they are unfit to the situation when followed) (Williams, 1988); (Wantanakorn, Mawdesley, & Askew, 1999). According to (Baguley, 1994) the few types of factors causing communication difficulties are:

- Unclear objectives – doubt between the transmitter and receiver is created when the intention is not clear.
- Defective transmission – this usually happens when messages are sent through improper means or channel. It may also happen when receiver does not have proper understanding about circumstances around the transmission.

- Perception and attitude problems – this is very common as the transmitter and receiver both have their own understanding of the messages and a common result of understanding is not possible.
- Territory problems – Physical distances creates issues for the project, also noise pollution and disturbance also comes under it.
- Chinese Whispers – this is an old issue which is created when messages are passed in chain from the higher end to lower and they get distorted during the process. In the end proper picture is not delivered to the receiver.

Objectives of a project varies depending upon the stakeholders, they may cause information to be interpreted in different meanings. Problems in transmission occurs commonly when you're in construction phase, such as failure of one party, happens due to incompatible information technologies, to understand the needs of another. Understanding and behavior issues exist whereby circumstances are interpreted in different ways by members from different professional occupational backgrounds, for example whenever a quantity surveyor and an architect will try to establish that there is a need of architectural functionality also keeping in mind that they have to reduce the cost as well. Within an industry environmental issues are usually significant. Sometimes decisions need to be made rapidly regarding many organizations during project's life although the stakeholders are placed at a notable distance from the location of a project.

In construction phase the impact of Chinese Whispers' is more serious, as more personal from different sectors are involved and message chain gets elongated also there are many restriction through which information is suppose to

pass. Think about communicating a design "memo" along a chain. It starts at the basic level which is the client from there it goes through client representative, the design team, the contractor, sub-contractors and individual operatives which implement the task on project site.

#### **2.4.4 The Communication Media**

Communications can take various forms, and for a particular circumstance one of the forms can be appropriate. The mode of communication will depend upon information and recipient type, and what outcome is desired from the communication.

(Dainty et al., 2007) mentioned in their book "Communication in Construction" the following generic types of communications media;

- Speech/verbal – This is the most common form of communication which occurs between groups or individuals. It can either be formal in nature or informal, the can also be done over Skype or any other app or face to face.
- Non-verbal – this is mostly formal is nature, it is used to keep a record of information permanently if desired.
- Written – usually official or formal in nature, written information provides a permanent record of the communication if desired.
- Audiovisual – it means that one can send audio messages online also now one can also send video or picture to deliver a message



- Electronic – this method is very popular which uses innovations for- example E-Mail is used to communicate any disturbance or message among groups or individuals.

## **2.5 MANAGING PRACTICES OF COMMUNICATION & COORDINATION AMONG STAKEHOLDERS**

In Construction Industry, the stakeholders may be divided into two major groups as

- Internal Stakeholders
- External Stakeholders

There is contractual binding within internal stakeholder; therefore the C&C channel is pre-defined in contract agreement. Construction work is executed by the Client and their Consultant by contractors, sub-contractors and suppliers based on the Main Contract Documents and the Sub-contract Documents. Each Major Internal Stakeholder is bound to follow the precise medium as defined in agreement and plenty are applied if those channels are followed by any stakeholder.

The literature tells more about internal stakeholder's C&C techniques and practices whereas less effort is put to appreciate the C&C practices among External Stakeholders.

External public parties are community/public organizations that are involved in CP. They include government authorities, trade associations, NGOs, labor unions, media, politicians and nationalized industries. The influences of these parties on a project are mixed. Some government authorities, for example planning and building departments, have a real authority within the project as CP have to be

designed and built according to the rules & regulations and have to be agreed by government authorities. Associations like trade associations and labor unions are not directly involved in a project, but they often protect the interests and benefits of their members through their plans or through regular meetings with employers or developers. Hence, it would be risky to ignore their existence when managing a construction project especially complex project.

External Stakeholders have no contractual association with the construction client and no authority over CP, but failure to identify them or their concerns in the construction project may also create risks. As CP always involve permanent changes to the direct environment, local residents and other interest groups, will thus be very sensitive to a project. If their interests are trespassed, they can create a powerful resistance to a project.

As the application of a construction project (such as the development of a new road/ bridge/ Metro dedicated corridors) always involves lasting changes in the environment. The local people will have their own feelings on the project. The owners of the Land (whose land is to be acquired by the Government), for example, will be keen in any ensuing increase in the land price, residents may be worried about a possible increase in noise pollution and local communities will be concerned in any possible enhancement of tourism development. The politicians and media will make full use of the entire condition on favor or against the new progress in order to get good attention among public.

Legally key stakeholders may not have any authority to influence a project, but they will still play an important role between the stakeholders in CP. If the development in society is to be sustained, the consultation of external stakeholders

cannot be neglected. In CP multi-stakeholders are included from the preparation and development stage through the construction process to the operation stage. Due to difference in objectives of each party there may come disagreement between the situation and actual goals, it is essential to identify the risks involved in CP and the stakeholders linked with them. This can only be done through some communication or coordination medium.

Hence the research will be prone more towards C&C practices between key external stakeholders as not much research is carried in this field. By knowing communication and coordination applies among stakeholders in complex projects, the danger of stakeholders can be managed within time and project can move forward without hurdles.

## **RESEARCH METHODOLOGY**

### **3.1 INTRODUCTION**

In this chapter, the research methodology of this research has been reviewed and explained. Involvement of study tools like data collection and data analysis tools were taken place in this study. The strategy of the research exhibits the methods that took place in order to carry out the study and further coming up with proof to the objectives of the research (Saunders, Lewis, & Thornhill, 2007). The main method for gathering and assembling research data is through interviews from experts.

This chapter describes the necessary steps required to carry out the research and to meet its key objectives. The chapter discusses about the research strategy, research design, Interview questionnaire design and its contents and the method of analysis used for this research.

### **3.2 RESEARCH METHODS**

#### **3.2.1 Surveys**

In order to collect valuable and valid information, surveys are done. These surveys comprise of data, values, behavior, likings and facts on an individual as well as a societal scale (Fink, 2015). Fink (2015) demonstrates that surveys are conducted for three basic reasons. First of all, if a policy needs to be assembled or a policy needs to be passed, a survey is in order. Second of all, surveys also take place to assess the value of program if the program can alter people's knowledge, behavior or wellbeing. The last reason for a survey's conduction is to attain data

about the guidance of research studies and programs.

### **3.2.2 Advantages of Using Surveys for Research**

- a. Surveys are able to simplify an amount of entire populace by illustrating inferences based on concluded from a portion of that populace (Real. a. P., 2005).
- b. Surveys can be applied in a certain period of time. In order to gather information in relatively short a time period, the survey project can be prearranged (Real. a. P., 2005).
- c. Surveys are comparatively inexpensive especially those that are self-administered (CSU, 2010) .
- d. Flexibility is a key aspect of survey. A certain topic can have numerous of countless questions and substantial flexibility is given to the analysis. Furthermore, flexibility to be provided while conducting face-to-face interviews over Skype, (CSU, 2010).
- e. Usage of mail, email or telephone can be a key tool in order to conduct a survey from a remote area. Therefore, great samples are achievable, which make the results statistically noteworthy even when investigating various variables (CSU, 2010).
- f. By enforcing uniform definitions upon participants, the measurements that are found are more precise and accurate (CSU, 2010).

### **3.2.3 Difference between Qualitative & Quantitative Surveys and Questions**

- Qualitative method consists of a researcher who does not compare the any measurements or amounts however describes the

characteristics of individuals and events (Thomas, 2003). Quantitative data requires numbers in order to describe the existence (Gray, Williamson, Karp, & Dalphin, 2007).

- Quantitative method concentrates on the quantity as well as the measurement of the characteristics exhibited by the individuals and the events that researcher examines (Thomas, 2003). Qualitative data on the other hand, relies on words, particularly nouns and adjectives that communicates the existence (Gray et al., 2007).

Qualitative data's significant benefit is that it can apprehend delicacies of meaning and interpretation that numbers cannot convey (Gray et al., 2007).

#### **3.2.4 Difference between Open-Ended & Closed-Ended Questions**

Open-ended questions is more like essay questions that require the respondents to explain themselves or their ideas in a paragraph or a few lines, they're not given an option of a multiple choice where they can pick a suitable answer. This method of questions allow the participants to give out more data, also it makes sure the participant does not just pick nay random answer and fill the questionnaire for just the sake of it, instead he/she really think about what they have to answer. Surveys that have open-ended questions are more better for the usage of secondary analysis (Bello, 2012).

However, closed-ended questions are multiple choices, so the participant has to choose his answer from the provided few answers. This kind of survey restricts the possibilities of different kinds of opinions and answers since it is either a multiple choice, a set of dichotomous answers or ranking scale response options. Close-ended questions are easy to analyze. Closed-ended questions can be more

precise, consequently more likely to communicate comparable meanings (Bello, 2012).

### **3.2.5 Interviews**

Other than survey, another technique to collect information is by the means of interview. By the means of an interview, the researcher can find out experiences, opinions or beliefs of the participant on a specific given research topic or matter (McCracken, 1988). Interviews might be the only source of data collection but it can also be one of many other data collection techniques. There are a certain common rules applied when it comes to taking an interview but there is no hard and fast protocol that must be followed like the law (King & Horrocks, 2010). To convey the attitude that the participant's views are valuable and useful is the most important aspect of the researcher's approach (Marshall & Rossman, 2014).

#### **3.2.5.1 Forms of Interviews**

There are three forms of interviews: unstructured, structured and semi-structured. There are 'open-ended' or 'open' questions in the 'unstructured' interview and the offered questionnaire is at a very typical level. In 'structured' interviews, the questions at the beginning are 'open' but soon move towards 'closed' format, and the interviewer controls the entire process. 'Semi-structured' is more formal than the other two forms of interview; it employs 'open' and 'closed-ended' questioning. It follows the interview guide determining areas associated with the research propositions. It concentrates on the respondents' encounters about the situations under study (Naoum, 2012)

#### **3.2.5.2 Advantages of using Interviews in Research**

- a. A great quantity of data can be evaluated rather quickly from the

interviews (Marshall & Rossman, 2014).

- b. During planning, interviews deliver flexibility to discover new ideas and issues that were not estimated (McNamara, 2007).
- c. Interviews provide chances for investigations. They permit instant follow-up and explanation of replies (Marshall & Rossman, 2014).
- d. Highly personalized information can be found out through the interviews (McNamara, 2007).
- e. Interviews can be easily conducted (McNamara, 2007).
- f. Interviews can tackle the subject of context for participant's replies (McNamara, 2007).

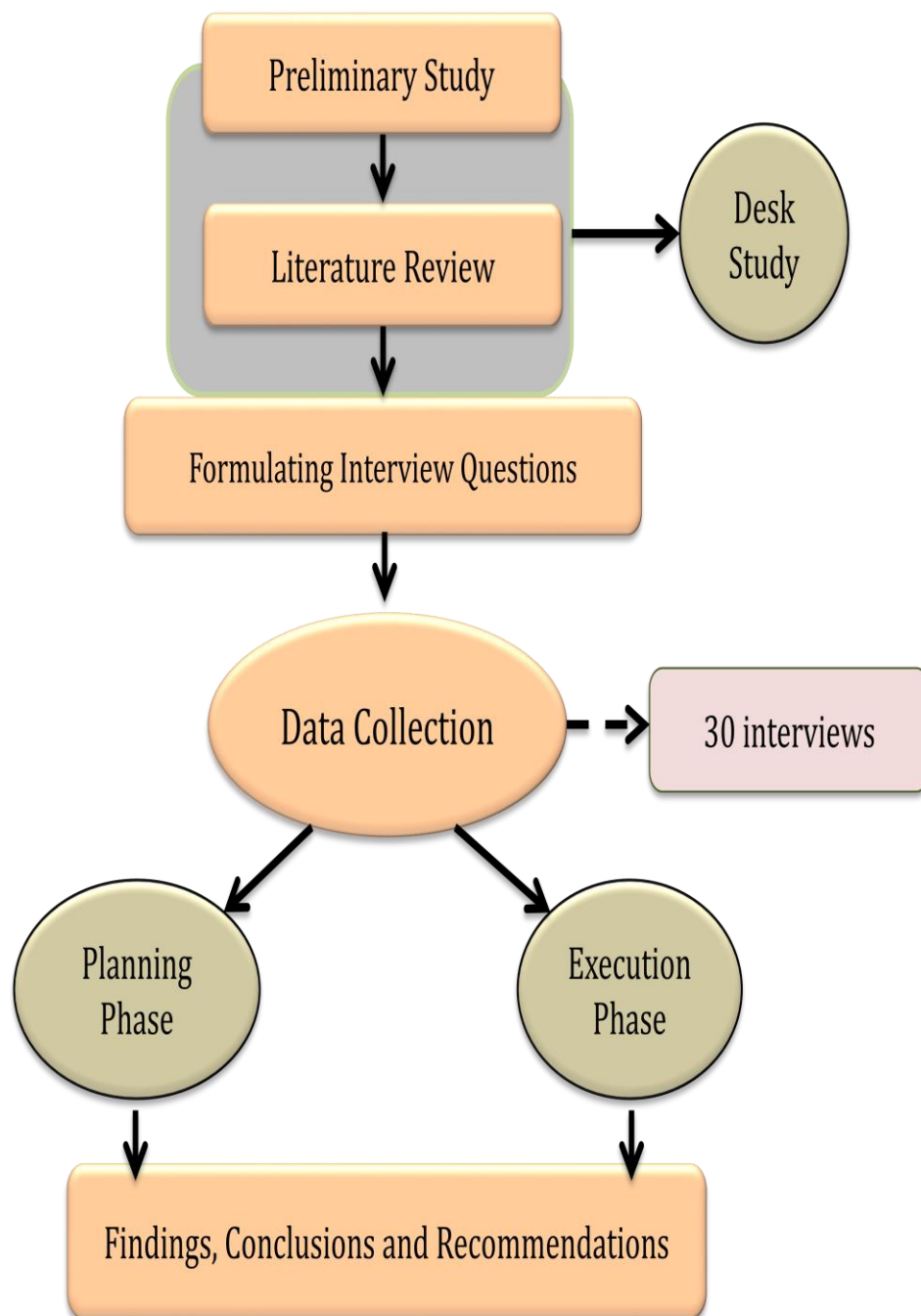
### **3.3 RESEARCH STRATEGY**

This study was conducted to know the management practices of coordination and communication among stakeholders in complex projects and their implications. Interviews, along with questionnaire, are the main source of information gathering. Through questionnaire survey Probability of Impact and Level of Impact of different Key Stakeholders in different phases are gathered. Interviews are then carried to know the C&C practices applied to manage these Key stakeholders.

The representation of the research methodology is shown in Figure 3-1. As per the plan, an introductory study of the topic was performed at the beginning, followed by a comprehensive literature review. Different questionnaires and interview guides from the studies related to this topic were explored and studied. Based on extensive literature review, questionnaire and formulated interview questions were developed, as described in the Section 3.5. The survey



was conducted from the expert from legal fields (like contractors and consultants) and executing agencies. Based on the data interviews were conducted from all Key Stakeholders (Both external and internal). Then frequency and descriptive analysis on collected data were performed.



**Figure 3-1 Research Strategy**

## 3.4 SAMPLING

### 3.4.1 Stakeholder Impact Index

(Bourne & Walker, 2005) Put forward two parameters to present the vested interest index: vested interest levels that influence impact level and which then, predominantly defines the probability and level of stakeholders impact.

Nevertheless, for a detailed stakeholder analysis the nature of the impact needs to be unified. Hence, the addition of the two concepts achieves: the trait value based on investor classes (Mitchell et al., 1997) and the position value based on the levels of investor position proposed by (McElroy & Mills, 2000).

Combining together the investor attribute value (A), and position value (Pos), with the vested interest–impact index (ViII), project managers can calculate the stakeholder impact index (SII) as a function of A, Pos and ViII.

#### *Vested Interest-Impact Index (ViII)*

(Scholes & Johnson, 2002) propose a investor mapping technique, the power/interest matrix. The Power on Y-axis and Impact on X-axis. (Olander & Landin, 2005) addressed the need to grade these two parameters (power and interest). (Ward & Chapman, 2003) change the power/interest matrix to the impact/probability matrix. (Bourne & Walker, 2005) develop impact/probability matrix concept into the vested interest–impact index (ViII). It consists of the parameter vested interest levels (probability of impact) on Y-axis, and influence impact levels (level of impact) on X-axis.

The vested interest levels (v) and the influence impact levels (i) are qualitatively assessed in the research as 5 very high, 4 high, 3 neutral, 2 low and 1

very low. According to (Bourne & Walker, 2005), the vested interest–impact index is then calculated as  $V_{iII} = \sqrt{(v*i/25)}$ .

#### Position Value (Pos)

The Position Value (Pos) is assessed as active opposition (Pos = -1), passive opposition (Pos = -0.5), not committed (Pos = 0), passive support (Pos = 0.5), and active support (Pos = 1).

#### Stakeholder Attribute Value (A)

The stakeholder attribute value (A) is assessed weighing each attribute (power, legitimacy or urgency) where these are given a weight between 0 and 1, with the total sum of the attribute weights as 1. The stakeholder attribute value depends on the distribution of these three attributes (power (p), legitimacy (l) and urgency (u) that each stakeholder possesses, showing their relative strength with respect to the project. These distributions of weights vary from project to project. In this research, the weights have been determined as  $p=0.4$ ,  $l=0.3$  and  $u=0.3$ , because as per (Olander, 2007) the empirical data implied that these attributes in general were roughly of equal importance, but power was slightly more important than the others. Therefore, power is given 0.4 and legitimacy as 0.3 and urgency as 0.3.

#### Stakeholder Impact Index (SII)

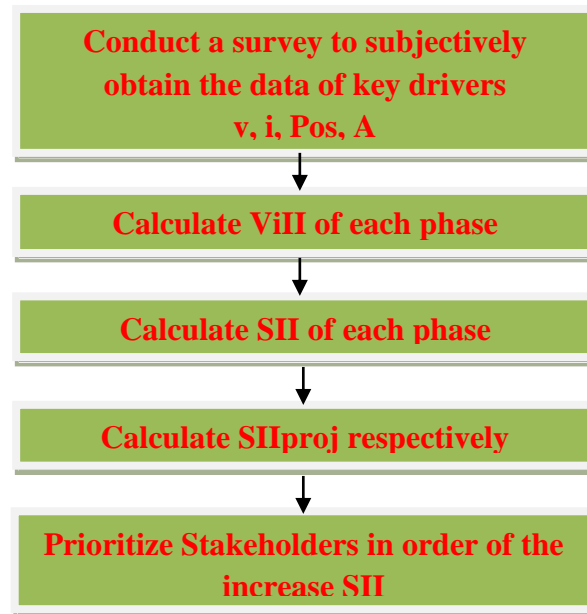
The stakeholder impact index for each construction phase can then be calculated as  $SII = V_{iII} * Pos * A$

For entire project SII can be calculated as

$$\underline{SII_{proj} = \sum (V_{iII} * Pos * A) \text{ each phase}}$$

### 3.4.1.1 Process Diagram to calculate Stakeholder Impact Index

The process diagram to calculate SII is as follow;



**Figure 3-2 Process to calculate Stakeholder Impact Index**

### 3.4.2 Sampling for Interview Survey

To answer the selection of sample size, a study (Baker & Edwards, 2012) was referred which compiled different opinions of scholars and researchers about the question: “*How many qualitative interviews are enough in a qualitative analysis?*”. Some of them are described here: according to *Howard S. Becker*, author of *Tricks of the Trade* (1972), proficient scholars know that there is no reasonable answer to this question. The only possible way is to stop at the number which gives enough data and observations to support the conclusions.

The number of sub-categories included in the study controls the total size of sample needed for guaranteeing statistical validity. Regardless of the possibility that the total population is constant, e.g. the size of the industry is fixed, the larger of sub-population will result in a fairly larger sample size (Naoum, 2012) . This

implies that for keeping the sample size convenient and manageable, a small number of sub-categories should be considered, possibly reducing the scope. Moreover, for different populations, there are different indicators to be utilized. Indicators particular to the project require number of projects as the population, indicators particular to the firm require number of firms as the population, and indicators particular to the industry require number of sub-categories as the population.

Julia Brannen of the University of London replied that there is no rule of thumb for the number of interviews required in a qualitative study. Patricia A. Adler of the University of Colorado and Peter Adler of the University of Denver suggested a sample of roughly around thirty (30); it has the advantage of enquiring a small number of people without forcing the hardship of unending information gathering, particularly when there are time and resource constraints. There are a few sorts of studies where getting a large number of sample is simpler or more desirable. For example research performed on college campuses where an implicit and effectively accessible sample provides a researcher to accumulate interviews from a greater amount of subjects.

Alan Bryman of the University of Leicester stated that in qualitative studies, there are minimum requirements for sample size. For an interview-based qualitative study, the minimum number of interviews must be between twenty (20) and thirty (30). According to Jennifer Mason of the University of Manchester, normally it is better to have a lesser number of interviews, innovatively and interpretively investigated, than a bigger number where the researcher could not have enough time to justifiably analyze them. According to Charles C. Ragin of the

University of Arizona, a common but convincing answer is twenty (20) for Master's thesis and fifty (50) for a Ph.D.

(Mason, 2010) describes that the interview-based qualitative studies for doctoral thesis in Great Britain and Ireland have the range for number of interviews between 1 to 95 (the mean was 31 and the median 28).

(Krejcie & Morgan, 1970) referred the following formula for the calculation of sample size.

$$Sample\ Size = \frac{\left(\frac{Range}{2}\right)^2}{\left(\frac{Accuracy\ level}{Confidence\ level}\right)^2}$$

Where,

Confidence level = 95% or 0.95

Accuracy level = 95% or 0.95

Range = 90 ± 5

Therefore, sample size calculated is 25.

### **3.5 INTERVIEW /QUESTIONNAIRE DESIGN AND DESCRIPTION**

Four main Questions were asked from all 11 Key Stakeholders (Client, Consultant, Main Contractor, Sub Contractor, Government Agencies, Politicians, Media, Institutional Forces / NGO's, Local Community / Residents, Land Owners and Environmentalists) for two important phases of construction i.e Planning and Execution phase, which are;

**A. Prevailing Vested interest level (Impact Potential) of Stakeholders in Complex Projects**

1. This part of the questionnaire inquires about the probability of impact i.e. vested interest level of each stakeholder in complex project both in Planning and Execution Phase Separately.
2. Vested Interest level helps in two main findings i.e.
  - Power-Impact Matrix
  - SII
3. Position of Stakeholder in different phases and communication strength required are determined with the help of Vested interest level.

**B. Prevailing Influence Impact level (Level of Influence) of Stakeholders in Complex Projects**

1. This part of the questionnaire inquires about the level of impact i.e Influence Impact level of each stakeholder in complex project both in Planning and Execution Phase Separately.
2. Influence Impact level helps in two main findings i.e.
  - Power-Impact Matrix
  - SII
3. Position of Stakeholder in different phases and communication strength required are determined with the help of Influence Impact level.

**C. Prevailing Position of Stakeholders in Complex Projects**

1. This part of the questionnaire inquires about the Position of each stakeholder (active opposition, passive opposition, neutral, passive support, active support) in complex project both in Planning and Execution Phase Separately.

2. Position of stakeholders determines about the mind set of stakeholder.

#### **D. Prevailing Attributes of Stakeholders in Complex Projects**

1. This part of the questionnaire inquires about the Attributes of each stakeholder (Dormant, Discretionary, Demanding, Dominant, Dangerous, Dependent, Definitive) in complex project both in Planning and Execution Phase Separately.
2. Position of stakeholders determines about the character/personality of a stakeholder.

### **3.6 DATA COLLECTION**

After defining the choice of approach, setting the scope and sample size, the following step is to select the method for data collection. As this stage, theory and plans meet reality. The general tools for data collection are:

- Interviews Surveys/questionnaires
- Focus groups

#### **3.6.1 Interview Survey**

Following (Porter, 1990) methodology, which was also followed in (Öz, 2001) and (Flanagan, 2005), the analysis in this research is based on un-structured interviews. Total Thirty (30) individuals from all type of Stakeholders were interviewed. All the Professional interviewees had more than 10 years of professionals' experience whereas Non-professional interviewees were well educated. Interviewees were reached first by a phone call introducing a short description of the study and the motivation behind why the person has been selected. In some cases an email was also sent describing the purpose of the study.



The decision of selecting the tool often turns into a compromise between what was defined in theory (ideal information) and restrictions forced by reality, e.g. time, expense, access to information and the dedication of participants to contribute (reasonable information) (Flanagan, 2005). The strategy for this research is to collect qualitative data, supporting the evaluation of opinion or perception of the respondents towards practices of coordination and communication among key stakeholders in complex projects of Pakistan. Therefore, personal interview technique is adopted for collecting the factual information along with opinions as interpersonal contact is necessary to clarify and illustrate the questions asked in the survey.

Interviews turned out to be extremely helpful in gathering information on an extensive variety of Key Stakeholder's vested interest, influence impact, position and attributes, in terms of reasons as well as results. The interviews were organized around various headings, which are inferred from the definition and are related to the criteria of evaluating management practices. The respondents were requested to score each of these criteria on a scale from one to five and in case of attributes from one to seven, utilizing different criteria for different factors. The initial scoring on the particular factors set off an extremely productive conversation on results.

It was ensured that all the respondents really addressed the questions in the same way, as it was difficult that they all share similar understanding of what the factor was all about. It is not expected from every interviewee having an illustrative view of all the factors. An opinion is a matter of subjectivity; therefore there is a chance that the respondent replies from the point of view of his/her company, his/her agenda and his/her experience, even if the questions were about the whole

industry.

A few interviewees were exceptionally insightful; others were more spontaneous in their replies. Also, some were very positive in nature, while others were less forthcoming partly due to lack of confidence on such research studies and partly due to the dearth of research culture, which results in meager industry-academia collaboration. Hopefully this bias is controlled by gathering opinions from an extensive variety of perspectives. Regardless of being a standard method, there are ambiguities about the interviewee expressing their view on a scale. As explained above, interviewees reply a particular question from alternate perspectives, with distinct mentality and awareness. For a comparatively small sample, as in this study, the scale can definitely be utilized to demonstrate a standing point, yet not for comprehensive statistical exercises (Flanagan, 2005). It was ensured that experience of interviewees regarding coordinating and communicating with different key stakeholders may be noted. The duration for each interview was about (25-35) minutes on average. The interview data was transcribed and after that utilized as the basis for analysis.

### **3.6.2 Interview Sampling Technique**

I used purposive sampling to select the Key Stakeholders professionals & Non-professional for my interviews. Purposive sampling also known as judgmental, selective or subjective sampling, is a type of non-probability sampling technique (Given, 2008) . Non-probability sampling focuses on sampling techniques where the units that are investigated are based on the judgment of the researcher (Given, 2008). The main goal to choose purposive sampling is that it focuses on particular characteristics of a population that are of interest, which is the best enable me to

answer the objective of this research.

Expert sampling is a type of purposive sampling technique which I used to collect knowledge from individuals that have either worked in complex projects in case of professional or are a part of complex project in case of non-professional. As this study is exploratory in nature so expert sampling is very effective to highlighting potential views, obtaining need / Intensity of C&C among Key Stakeholders.

### **3.6.3 Limitations**

Key External Stakeholders generally did not know the actual concept of Stakeholder's relationship with each other's and with the complex project. They mostly thought it is client and contractor only behind every project. The consultant has nothing to do with CP. Hence, the idea, role and responsibility of each Key stakeholder in both phases were explained in detail to them in interviews. Now, this all explanation could only be done physically. Hence, mostly the views obtained by respondents depict their understanding of the concept, the best to which one could explain it to them and what they understood out of it.

## **3.7 DATA ANALYSIS STRATEGY**

Once data was collected, it was analyzed to produce descriptive statistics. The results were based duly from inference drawn through descriptive statistics using MS Excel. Since the research is exploratory in nature, so the data obtained from interview was a comprising of current status, attitude and position of Key Stakeholders in complex project, which reveal respondents perception on management practices of C&C among stakeholders.. After the extensive literature review and according to the findings of Key Stakeholders' interviews, SII and their

position in terms of vested interest and influence impact level in both planning and execution phases are proposed in Chapter 4.

## **RESULTS AND ANALYSIS**

### **4.1 INTRODUCTION**

In this chapter data analysis and its results are discussed in detail. Interviews are the main source of gathering and developing the research data. The study was conducted to obtain the vested impact-interest, position and attributes of key stakeholders. A series interviews have been organized, apprehending the current attitudes of each key stakeholder towards project success, so that a mechanism can be develop to transform unfavorable (negative) impact to favorable (positive) impact of key stakeholder. The following sections provide the details of the analysis employed in this thesis.

### **4.2 SAMPLE CHARACTERISTICS**

Total thirty (30) individuals, were interviewed from all Key Stakeholders. The list and number of interviewees are as shown in Table 4-1.

**Table 4-1 Number of Interviews from Key Stakeholder**

<b>SR #</b>	<b>KEY STAKEHOLDER</b>	<b>NUMBER OF INTERVIEWEES</b>
1.	CLIENT	4
2.	CONSULTANT	4
3.	MAIN CONTRACTOR	4
4.	SUB. CONTRACTOR	3
5.	GOVERNMENT AGENCIES	2
6.	POLITICIANS	2
7.	MEDIA	2
8.	INSTITUTIONAL FORCES / NGOs	2

9.	LOCAL COMMUNITY / RESIDENTS	2
10.	LAND OWNERS	3
11.	ENVIRONMENTALIST	2

### 4.3 COMPARISON OF RESULTS IN PLANNING PHASE

Planning phase (PP) includes combination of feasibility, inception and detailed design phase. The results of key stakeholders' position, attributes, class, their vested interest level, influence impact level, vested interest index and SII are shown in Table 4-2

**Table 4-2 Results for Planning Phase**

Stakeholder	Attributes (A)	Class	Impact Potential (v)	Influence Level (i)	Vested Interest Index (ViII)	Position (Pos)	Stakeholder Impact Index (SII)	Normalize Score
CLIENT	0.64	Dominant	3.69	4.10	0.78	0.88	0.44	0.25
CONSULTANT	0.51	Dependent	3.62	4.03	0.76	0.78	0.30	0.18
MAIN CONTRACTOR	0.33	Discretionary	1.45	1.45	0.29	0.14	0.01	0.01
SUB. CONTRACTOR	0.33	Discretionary	1.17	1.52	0.27	0.09	0.01	0.004
GOVERNMENT AGENCIES	0.67	Dominant	3.00	3.48	0.65	0.36	0.16	0.09
POLITICIANS	0.58	Dangerous	3.10	3.76	0.68	-0.14	-0.05	-0.03
MEDIA	0.47	Demanding	2.34	3.00	0.53	-0.19	-0.05	-0.03
INSTITUTIONAL FORCES / NGOs	0.46	Demanding	2.59	2.83	0.54	-0.33	-0.08	-0.05
LOCAL COMMUNITY / RESIDENTS	0.50	Dependent	2.72	3.21	0.59	-0.31	-0.09	-0.05
LAND OWNERS	0.76	Definitive	3.86	3.76	0.76	-0.79	-0.46	-0.26
ENVIRONMENTALIST	0.49	Demanding	3.03	3.07	0.61	-0.29	-0.09	-0.05

The Stakeholder impact/probability matrix showing what action of coordination is required at PP is shown as (Figure 4-1).

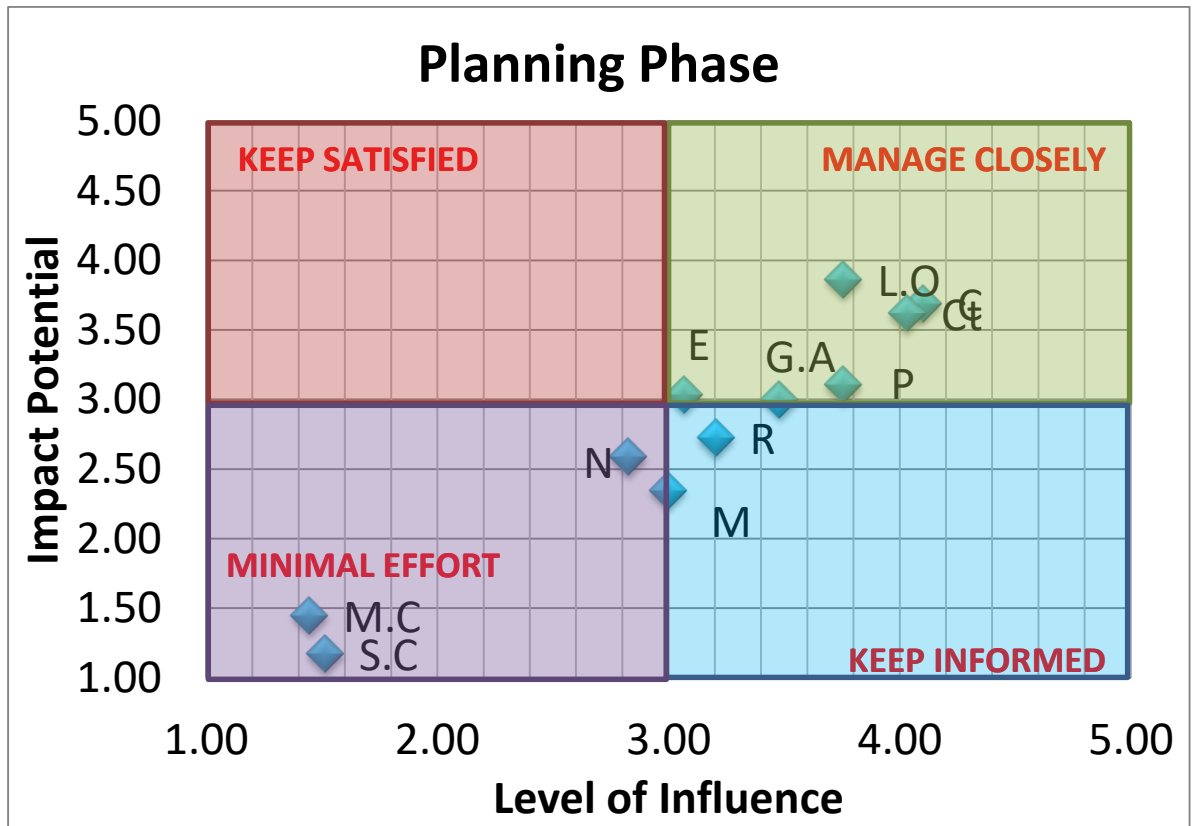


Figure 4-1 Stakeholder Impact / Probability Matrix

#### 4.3.1 Results for Internal Stakeholders

##### Client (C):

The result shows that for PP the class of client is *Dominant* as they exhibit both power and legitimacy. The client's impact is 0.25 on the project, showing that they have strong favorable (positive) impact on the project's PP. Being the owner/sponsor of the project, their influence on the project is highest.

##### Consultant (Ct):

The result shows that for PP the class of consultant is *Dependent* as they exhibit both urgency and legitimacy. At PP the consultant has to design as per the requirement of the client, hence it depends solely on client. The consultant's impact

is 0.18 on the project showing that they have second most favorable (positive) impact on the project's PP. The consultant brings into form the concept of client and is therefore dependent on client's demand.

**Main Contractor (M.C):**

The result shows that for PP the class of main contractor is *Discretionary* as they exhibit legitimacy only. The impact of main contractor is 0.01 on the project showing that the main contractor has negligible favorable (positive) impact on the project's PP.

**Sub Contractor (S.C):**

The result shows that for PP the class of sub contractor is *Discretionary* as they exhibit legitimacy only. The sub contractor has no impact on project's PP as they are not involved during PP. However their inputs are only required by some consultant or client in order to prepare bill of quantities or if some new innovation is to be introduced. The sub contractor is normally engaged in execution phase (EP) only.

**4.3.2 Results for External Stakeholders**

**Government Agencies (G.A):**

The result shows that for PP the class of government agencies is *Dominant* as they exhibit both power and legitimacy. Their impact is 0.09 on the project showing that they have moderate favorable (positive) impact on the project's PP. The Probability Impact Matrix (PIM) shows that government agencies have to be kept well informed all the time therefore strong and effective communication is required. Their favorable impact helps the client to bring his concept into form. Disbursement of funds and negotiations regarding rates of land with land owners



are done during PP.

**Politicians (P):**

The result shows that for PP the class of politicians is *Dangerous* as they exhibit both power and urgency. Their impact is 0.03 on the project showing that they have unfavorable (negative) impact on the project's PP. The PIM shows that politicians have to be managed closely therefore good coordination and effective communication is required.

**Media (M):**

The result shows that for PP the class of media is *Demanding* as they exhibit urgency only. Their impact is 0.03 on the project showing that they have slightly unfavorable (negative) impact on the project's PP just like politicians. The PIM shows that media have to be kept well informed all the time therefore good and effective communication is required in order to decrease their unfavorable impact on project.

**Institutional Forces / NGOs (N):**

The result shows that for PP the class of institutional forces / NGOs is *Demanding* like media, as they exhibit urgency only. Their impact is 0.05 on the project showing that they have unfavorable (negative) impact on the project's PP. Their role is to oppose the project if it harms the environment, culture, heritage etc of the vicinity. The PIM shows unlike media less effort of C&C is required as their influence is slightly less than media but having impact slightly higher than that.

**Local Community / Residents (R):**

The result shows that for PP the class of local community/ Residents is *Dependent* as they exhibit both urgency and legitimacy. Their impact is 0.05 on the

project showing that they have unfavorable (negative) impact on the project's PP. The PIM shows that local community / Residents have to be kept in confident all the time therefore good and effective communication is required. If not informed properly regarding project, their opposition can increase time or cost overrun of the project.

**Land Owners (L.O):**

The result shows that for PP the class of land owners is *Definitive* as they exhibit power, urgency and legitimacy. They have 0.26 of impact on the project showing that they have strongly unfavorable (negative) impact on the project's PP. The PIM shows that Land Owners have to be managed very closely therefore high-quality coordination and effective / strong communication is required all the time. The land owners' impact can increase time and cost overruns. Due to their high negative influence they are watched by client and other government agencies very closely in order to reduce their unfavorable impact.

**Environmentalism (E):**

The result shows that for PP the class of environmentalist is *Dominant* as they exhibit both power and legitimacy. They have 0.05 of impact on the project showing that they have slightly unfavorable (negative) impact on the project's PP. The PIM shows that environmentalist has to be kept up to date all the time therefore good and efficient communication is required. Without prior approval from environmentalist the project cannot be executed.

#### **4.4 COMPARISON OF RESULTS IN EXECUTION PHASE**

EP includes construction phase. The results of key stakeholders' position, attributes, class, their vested interest level, influence impact level, vested interest

index and SII are shown in Table 4-3

**Table 4-3 Results of Execution Phase**

Stakeholder	Attributes (A)	Class	Impact Potential (v)	Influence Level (i)	Vested Interest Index (viii)	Position (Pos)	Stakeholder Impact Index (SII)	Normalized Score
CLIENT	0.79	Dominant	4.17	4.48	0.86	0.93	0.64	0.24
CONSULTANT	0.69	Dominant	4.10	4.03	0.81	0.78	0.43	0.16
MAIN CONTRACTOR	0.65	Discretionary	3.90	4.00	0.79	1.00	0.51	0.19
SUB. CONTRACTOR	0.46	Dependent	2.55	3.00	0.55	0.71	0.18	0.07
GOVERNMENT AGENCIES	0.71	Definitive	3.31	3.76	0.71	0.43	0.22	0.08
POLITICIANS	0.63	Dangerous	3.52	4.07	0.76	-0.07	-0.03	-0.01
MEDIA	0.48	Demanding	3.38	3.66	0.70	-0.38	-0.13	-0.05
INSTITUTIONAL FORCES / NGOs	0.39	Demanding	2.69	2.86	0.55	-0.22	-0.05	-0.02
LOCAL COMMUNITY / RESIDENTS	0.57	Dependent	3.69	4.10	0.78	-0.29	-0.13	-0.05
LAND OWNERS	0.64	Dominant	3.62	3.79	0.74	-0.74	-0.31	-0.12
ENVIRONMENTALIST	0.36	Demanding	2.31	2.45	0.48	-0.05	-0.01	-0.003

The Stakeholder impact/probability matrix showing what action of coordination is required at EP is shown in Figure 4-2.

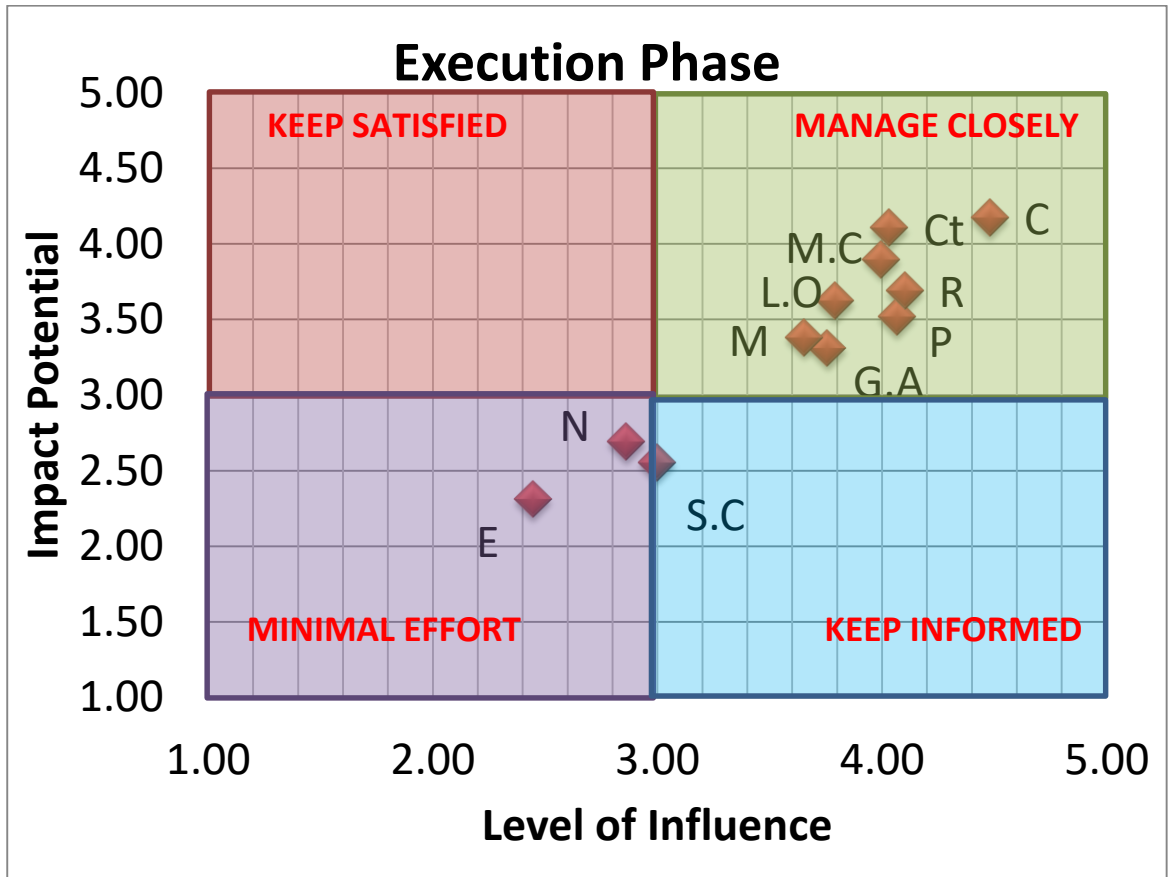


Figure 4-2 Stakeholder Impact / Probability Matrix

#### 4.4.1 Results for Internal Stakeholders

##### Client (C):

The result shows that for EP the class of client is *Dominant* as they exhibit both power and legitimacy. They exhibit 0.24 of impact on the project, showing that they have strong favorable (positive) impact on the project execution phase. The influence increases slightly from PP as more risks are involved in EP.

##### Consultant (Ct):

The result shows that for EP the class of consultant is *Dominant* as they exhibit both power and legitimacy. At EP the consultant has to supervise as per the design and specification requirement of the project, hence the consultant ensures that the contractor performs accordingly. The consultant's impact is 0.16 on the

project showing that they exhibit third most favorable (positive) impact on the project during EP.

**Main Contractor (M.C):**

The result shows that for EP the class of main contractor is *Discretionary* as they exhibit legitimacy only. Their impact is 0.19 on the project showing that the main contractor has second most favorable (positive) impact on the project's EP because main execution tasks have to be performed by contractor on ground. More risk is always involved during execution.

**Sub Contractor (S.C):**

The result shows that for EP the class of sub contractor is *Dependent* as they exhibit both urgency and legitimacy. They have to perform different tasks/activities of project assigned by main contractor. Their impact is 0.07 on the project showing that the sub contractor has moderate favorable (positive) impact on the project EP.

**4.4.2 Results for External Stakeholders**

**Government Agencies (G.A):**

The result shows that for EP the class of government agencies is *Definitive* as they exhibit power, urgency and legitimacy. They have an impact of 0.08 on the project showing that they have moderate favorable (positive) impact on the project EP. Government Agencies whose utilities come across the project area have to be re-located during execution or project area has to be re-shifted because to that. The PIM shows that government agencies have to be managed closely all the time therefore strong and effective communication with efficient coordination is required.

**Politicians (P):**

The result shows that for EP the class of politicians is *Dangerous* as they exhibit both power and urgency. Their impact is 0.01 on the project showing that they have slightly unfavorable (negative) impact on the project EP. The PIM shows that politicians have to be managed closely therefore good coordination and effective communication is required. Dangerous stakeholders are always a threat to the project.

**Media (M):**

The result shows that for EP the class of media is *Demanding* as they exhibit urgency only. Their impact is 0.05 on the project showing that they have unfavorable (negative) impact on the project's EP. The PIM shows that media have to be managed closely all the time therefore good and effective communication is required. If not managed properly they can propagate negative image of the project and will create doubts in the mind of public regarding the project.

**Institutional Forces / NGOs (N):**

The result shows that for EP the class of institutional forces / NGOs is *Demanding* as they exhibit urgency only. Their impact is 0.02 on the project showing that they have slightly unfavorable (negative) impact on the project EP. The PIM shows that minimal effort of C&C is required. Hence they must be kept informed and satisfied regarding project all the time, otherwise their unfavorable impact create hurdles in execution of project.

**Local Community / Residents (R):**

The result shows that for EP the class of local community / Residents is *Dependent* as they exhibit both urgency and legitimacy. Although they lack power,

they can form coalitions with other powerful stakeholders to achieve power to influence the project. Their impact is 0.05 on the project showing that they have slightly unfavorable (negative) impact on the project EP. The PIM shows that local community / Residents have to be kept in confident all the time and manage closely, therefore good and effective communication is required in order to decrease their negativity.

**Land Owners (L.O):**

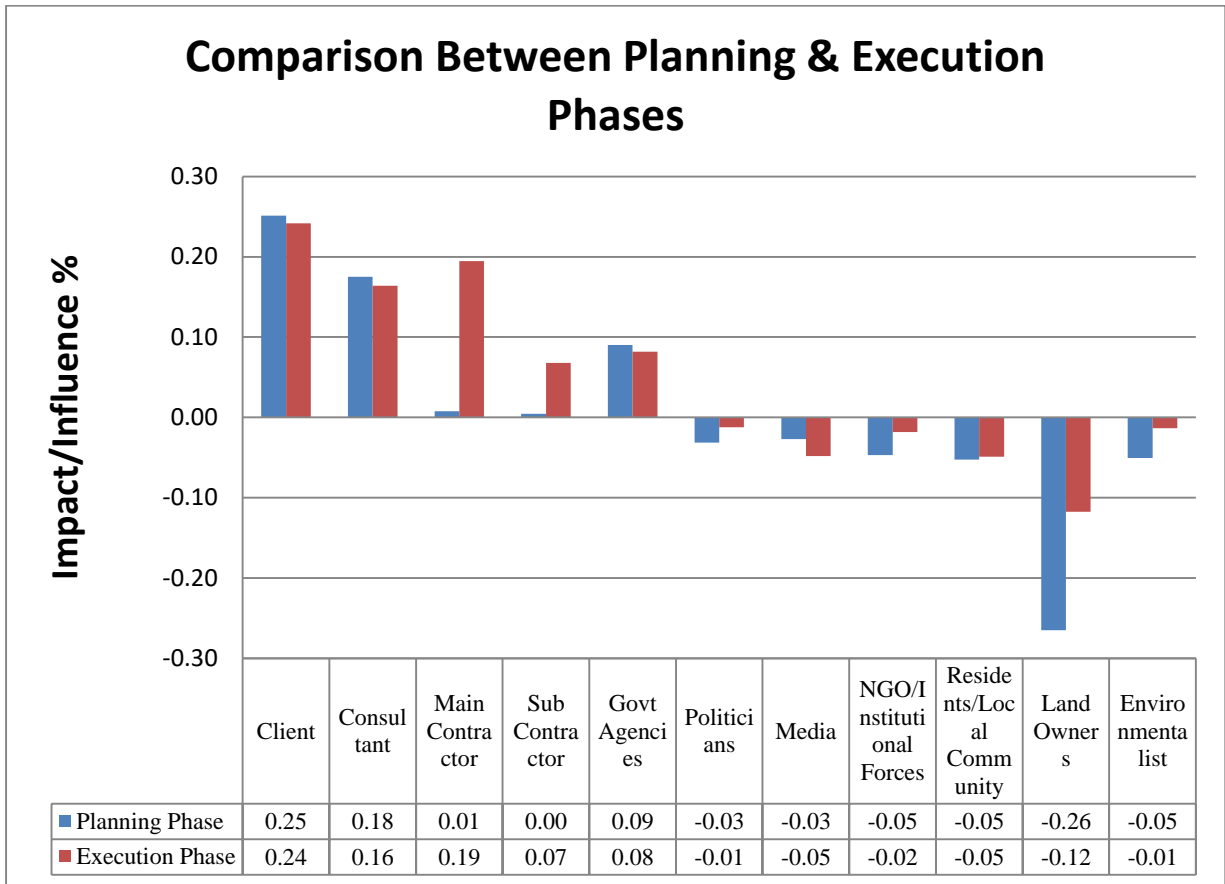
The result shows that for EP the class of land owners is *Dominant* as they exhibit power and legitimacy. Although they lack urgency in EP, yet they have to be kept well informed. Their impact is 0.12 on the project showing that they have strong unfavorable (negative) impact on the project EP just like PP. The PIM shows that Land Owners have to be managed very closely therefore high-quality coordination and effective / strong communication is required all the time.

**Environmentalism (E):**

The result shows that for EP the class of environmentalism is *Dominant* as they exhibit both power and legitimacy. Their impact is 0.003 on the project showing that they have slightly unfavorable (negative) impact on the project EP. The PIM shows that minimal efforts are required therefore less coordination is needed.

**4.5 COMPARISON OF RESULTS BETWEEN BOTH PHASES**

The comparison of results between planning and execution phases of key stakeholders is shown in Figure 4-3.



**Figure 4-3 Comparison between both phases**

#### 4.5.1 Results for Internal Stakeholders

##### **Main Contractor:**

The result shows that for both phases the class of main contractor is *Discretionary*, lacking the power and urgency. The main contractor resides insignificant impact during PP whereas their impact is 0.19 on the project EP showing that the main contractor has second most favorable (positive) impact on the project because all tasks on ground have to be implemented by them. In traditional contract there is no involvement of main contractor in PP as they are selected after designing phase is completed and before execution. Whereas, in engineering procurement and construction contract the main contractor impact is still negligible in PP as the main contractor has to plan and build drawings as per



client requirements and needs. In EP the main contractor impact and influence is high as they have to cater all risks associated with the project.

**Sub Contractor:**

The result shows that the sub contractor remains *Discretionary* in planning and lack the power and urgent claim to influence, whereas they are *Dependent* to main contractor in EP. The sub contractor resides insignificant impact during PP whereas their impact is 0.07 of on the project EP. The sub contractor is not involved in PP whereas at EP there favorable impact is moderately high as they have to complete the on ground tasks given by main contractor.

**4.5.2 Results for External Stakeholders**

**Politician, Media & NGOs:**

The politician class is *Dangerous*, whereas media and NGOs/Institutional forces class is *Demanding* in both phases. It shows there attributes remains the same throughout the project lifecycle. The unfavorable impact of politician and NGOs/Institutional forces decreases from 0.03 to 0.01 and 0.05 to 0.02 respectively while unfavorable impact of media increase from 0.03 to 0.05, due to the reason, at PP they all are not fully involved. Politician and NGOs/Institutional forces believes on all gossips or data/concept leaked during this phase as they are unaware of project goals and objectives. Due to isolation and not involving or taking advice from them, they unfavorably impact the project being representative of general public and common people. Media in order case tends to impact the project less adversely as unless something doesn't comes at ground they can't debate with full zeal and zest. During EP, Politician and NGOs/Institutional forces use this media as their influence and are dependent on media therefore media's adverse impact

increases. The media is mainly an oppositional in nature. The opponents use the media effectively to express their opinions. Politician must be managed closely while NGOs/Institutional forces and media must be kept informed all the time during project lifecycle in order to control their adverse impact.

**Land Owners:**

The result reflects that at PP their class *Definitive* whereas as *Dominant* in EP. Their impact is 0.26 and 0.12 on the project in both phases respectively showing that they have strongest unfavorable (negative) impact on the project throughout the cycle. The PIM shows that Land Owners have to be managed very closely therefore high-quality coordination and effective / strong communication is required all the time. At PP their land is acquired and payment is made before execution. If desire compensation of land is not given or relocation of property with same benefits is not given, their impact will be adverse on project. Land Owners must be watched closely and proper communication channel may be used in order to communicate and respond to their needs. Similarly during designing phase they are not involved which creates anxiety in their minds. They have the strongest negative impact on project in terms of external stakeholders. In EP their adverse impact is less than PP yet high as in case of agriculture land if desire water passage/culverts are not given or area of land/property is increased or decreased during execution they tend to oppose the project adversely. Poor land cost estimation, insufficient records, change of scope and other planning failure tends to force the land owners to take stay orders from courts and these stay orders are not subject to time limit. The PIM shows that land owners have to manage closely with effective and efficient C&C.

### **Environmentalists:**

Like media and Institutional forces / NGOs, environmentalists are *Demanding* in both phases and are always in strong position to have negative impact on project. Their impact is 0.05 and 0.004 on the project in both phases respectively showing that they have only moderate impact on the project's PP. Environmental Impact Assessment report is mandatory in all projects. Therefore at PP before execution its approval is necessary. For that client and consultant have to fulfill all the possible requirements asked by them. They have the power to stop the project at any stage if specifications are not followed but due to high government agencies influence Environmental Protection Agencies tends to keep them less effective in EP. The PIM shows that they have to manage closely in PP with best coordination, whereas minimal efforts are required for EP as their impact gets negligible.

## **CONCLUSIONS & RECOMMENDATIONS**

### **5.1 CONCLUSIONS**

The objectives of this research study were to identify management practices of C&C among stakeholders in complex projects and their implications during two phases (planning and execution), and to suggest measures for its improvement. Based on the study results, the conclusions are drawn and recommendations are made in light of extensive literature review and interview survey selected for both phases. The data was collected from all key stakeholders.

The study results reveal that internal stakeholders in both phases of project have positive impact on the project whereas external stakeholders other than government agencies have negative impact on the project. To cater this impact high coordination and effective communication is required.

For internal stakeholder, client has the most positive impact followed by consultant and main contractor respectively. The class of client remains *Dominant* in both phases whereas class of consultant changes from *Dependent* to *Dominant* as the project proceeds. For external stakeholder, land owner has the most negative impact throughout the project followed by local community, media, institutional forces/ NGOs and politician respectively. The class of land owner changes from *Definitive* to *Dominant* whereas class of local community, media, institutional forces/ NGOs and politician remains same as *Dependent*, *Demanding*, *Demanding* and *Dangerous* respectively throughout the project.

Overall the result shows that since there is no contractual binding between external stakeholders and project sponsor, they face the maximum communication gap. There is no proper mean to establish coordination and communication among external stakeholders throughout the project.

## **5.2 LIMITATIONS**

The limitations of this study are:

- The interview survey conducted was close - ended.
- The interviews were limited to key stakeholder of Pakistan only.

## **5.3 RECOMMENDATIONS**

In order to enhance efficiency of communication and coordination among stakeholders in future and reduce their negative impact in complex projects of Pakistan, a few recommendations are:

- a. Proper framework of communication and coordination for external stakeholders must be developed in accordance with their class at each phase of project.
- b. Key stakeholders that exhibit strong positive impact on the project such as client, consultant and government agencies should utilize their impact to reduce the negative impact of other key stakeholders like land owner, media, politician, institutional forces/NGOs and local community/residents..
- c. For land owner, the structure of land should be compensated on the basis of present construction cost of similar project, rather than net present value of the project.

- d. The land should be compensated above the market value keeping in view availability of land in similar location in case of shop keepers. House owners increase in cost of the adjacent land due to involuntary displacement and provision of water passage as per requirement of owner in case of agriculture land.
- e. Land owners as well as other key stakeholders like politician, local community/ resident and institutional forces/NGOs should be consider in planning phase. Their suggestions, needs and requirements must be considered and special task of consoling those regarding benefits of project should be of top priority.
- f. Special committee must be established for communication and coordination with dangerous, dominant and definitive class stakeholders having negative impact on project.
- g. Land owners should be given free consultancy service and other departmental fees may be waved off in case of displacement of property involuntary.

### **5.3.1 Directions for Future Research**

- a. In future current study should be extended to developed countries in order to learn from their experience.
- b. A comprehensive policy framework can be developed using the results of current study.

## REFERENCES

- Armstrong, M. (2001). *A handbook of MANAGEMENT techniques: the best-selling guide to modern management methods*: Kogan Page Publishers.
- Atkin, B., & Skitmore, M. (2008). Editorial: stakeholder management in construction. *Construction Management and Economics*, 26(6), 549-552.
- Baccarini, D. (1996). The concept of project complexity—a review. *International journal of project management*, 14(4), 201-204.
- Baguley, P. (1994). *Effective communication for modern business*: McGraw-Hill.
- Baker, S., & Edwards, R. (2012). How many qualitative interviews is enough? Expert voices and early career reflections on sampling and cases in qualitative research, 2012.
- Bello, M. A. (2012). *Minimizing Impediments to Design for Construction Safety (Dfcs) Implementation on Capital Projects*. Carnegie Mellon University.
- Bertelsen, S. (2003). Complexity—Construction in a new Perspective. *Iglc-11, Blacksburg, Virginia*.
- Bonke, S., & Winch, G. (2002). Project stakeholder mapping: analyzing the interests of project stakeholders *Frontiers of Project Management Research*: Project Management Institute, Pmi.
- Bourne, L., & Walker, D. H. (2005). Visualising and mapping stakeholder influence. *Management decision*, 43(5), 649-660.
- Carroll, A. B. A. B., A.K. (2006). Ethics and Stakeholder Management. [Business & Society]. (Mason: Thomson South-Western.).
- Chicago Press, C., & Freeman, E. (1984). Strategic Management. A Stakeholder Approach: Pitman, Boston.
- Chinyio, E., & Olomolaiye, P. (2009). *Construction stakeholder management*: John Wiley & Sons.
- Cohen, B. (2006). Urbanization In Developing Countries: Current Trends, Future Projections, And Key Challenges For Sustainability. *Technology In Society*, 28(1), 63-80.
- Crozier, M., & Friedberg, E. (1977). L'acteur et le système.
- Csu. (2010). Colorado State University:Writing Studio.

- Dainty, A., Moore, D., & Murray, M. (2007). *Communication in construction: Theory and practice*: Routledge.
- Donaldson, T., & Preston, L. E. (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of management review*, 20(1), 65-91.
- Elias, A. A., Cavana, R. Y., & Jackson, L. S. (2002). Stakeholder analysis for R&D project management. *R&D Management*, 32(4), 301-310.
- Fernández Gago, R., & Nieto Antolín, M. (2004). Stakeholder salience in corporate environmental strategy. *Corporate Governance: The international journal of business in society*, 4(3), 65-76.
- Fink, A. (2015). *How to conduct surveys: a step-by-step guide*: Sage Publications.
- Flanagan, R. J., Carol Ericsson, Stefan Henricsson, Patrik. (2005). Measuring construction competitiveness in selected countries (S. O. C. M. A. Engineering, Trans.). Uk: Univ. of Reading.
- Freeman, R. (1984). Strategic management: A stakeholder approach. Pitman, Boston  
 Freeman R (1994) The politics of stakeholder theory: some future directions. *Bus Ethics Q*, 4(4), 409-421.
- Freeman, R. E. (1984). Strategic management: A stakeholder perspective. Boston: Pitman.
- Gibson, K. (2000). The moral basis of stakeholder theory. *Journal of business ethics*, 26(3), 245-257.
- Gidado, K. (1996). Project complexity: The focal point of construction production planning. *Construction Management & Economics*, 14(3), 213-225.
- Gidado, K. (2004). Enhancing the prime contractor's pre-construction planning. *Journal of Construction Research*, 5(01), 87-106.
- Ginger Levin, P., & Pgmp, O. (2014). NAVIGATING COMPLEXITY.
- Given, L. M. (2008). *The Sage encyclopedia of qualitative research methods*: Sage Publications.
- Grabher, G. (2002). Cool projects, boring institutions: temporary collaboration in social context. *Regional studies*, 36(3), 205-214.
- Gray, P. S., Williamson, J. B., Karp, D. A., & Dalphin, J. R. (2007). *The research imagination: An introduction to qualitative and quantitative methods*: Cambridge University Press.



- Guide, A. (2013). Project Management Body of Knowledge (Pmbok (R) Guide). [Conference Proceedings]. *Project Management Institute*.
- Handy, C. B. (1993). *Understanding Organizations*.
- Hossain, L. (2009). Communications and coordination in construction projects. *Construction Management and Economics*, 27(1), 25-39.
- Huczynski, A., & Buchanan, D. (2001). *Organizational Behaviour: An Introductory Text (Instructor's Manual)*: Financial Times/Prentice Hall.
- Ibrahim, R., & Nissen, M. (2003). *Emerging technology to model dynamic knowledge creation and flow among construction industry stakeholders during the critical feasibility-entitlements phase*. Paper presented at the Proceedings of the 4th Joint International Symposium on Information Technology in Civil Engineering, Nashville, Tennessee, Usa.
- Ihlen, Ø., & Berntzen, Ø. (2007). When lobbying backfires: balancing lobby efforts with insights from stakeholder theory. *Journal of Communication Management*, 11(3), 235-246.
- Institute, P. M. (2008). *A guide to the project management body of knowledge*.
- Khan, R. A. (2008). *Role Of Construction Sector In Economic Growth: Empirical Evidence From Pakistan Economy*. Paper Presented At The Proceedings Of The First International Conference On Construction In Developing Countries (Iccidc), Karachi, Pakistan.
- King, N., & Horrocks, C. (2010). *Interviews in qualitative research*: Sage.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educ psychol meas*.
- Lee, G. K., & Chan, E. H. (2008). The analytic hierarchy process (AHP) approach for assessment of urban renewal proposals. *Social Indicators Research*, 89(1), 155-168.
- Li, T. H., Ng, S. T., & Skitmore, M. (2012a). Conflict or consensus: An investigation of stakeholder concerns during the participation process of major infrastructure and construction projects in Hong Kong. *Habitat international*, 36(2), 333-342.
- Li, T. H., Ng, S. T., & Skitmore, M. (2012b). Public participation in infrastructure and construction projects in China: From an EIA-based to a whole-cycle process. *Habitat international*, 36(1), 47-56.

- Manowong, E., & Ogunlana, S. O. (2008). Critical factors for successful public hearing in infrastructure development projects: a case study of the On Nuch waste disposal plant project. *International Journal of Construction Management*, 8(1), 37-51.
- Marshall, C., & Rossman, G. B. (2014). *Designing qualitative research*: Sage publications.
- Mason, M. (2010). *Sample size and saturation in PhD studies using qualitative interviews*. Paper presented at the Forum qualitative Sozialforschung/Forum: qualitative social research.
- Mccracken, G. (1988). The long interview. Sqaq University Paper Series on Qualitative Research Methods, Vol. 13. Beverly Hills: Ca: Sage.
- Mcelroy, B., & Mills, C. (2000). Managing stakeholders. *Gower handbook of project management*, 757-775.
- Mcnamara, C. (2007). General guidelines for conducting interviews. Retrieved September 26, 2011.
- Meng, X. (2012). The effect of relationship management on project performance in construction. *International journal of project management*, 30(2), 188-198.
- Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. *Academy of management review*, 22(4), 853-886.
- Naoum, S. G. (2012). *Dissertation research and writing for construction students*: Routledge.
- Newcombe, R. (2003). From client to project stakeholders: a stakeholder mapping approach. *Construction Management and Economics*, 21(8), 841-848.
- Olander, S. (2002). *Consensual approaches to siting controversy*. Paper presented at the The Organization and Management of Construction, 10th International Symposium, Construction Innovation and Global Competitiveness.
- Olander, S. (2006). *External stakeholder analysis in construction project management*: Lund University.
- Olander, S. (2007). Stakeholder impact analysis in construction project management. *Construction Management and Economics*, 25(3), 277-287.

- Olander, S., & Landin, A. (2005). Evaluation of stakeholder influence in the implementation of construction projects. *International journal of project management*, 23(4), 321-328.
- Öz, Ö. (2001). Sources of competitive advantage of Turkish construction companies in international markets. *Construction Management & Economics*, 19(2), 135-144.
- Pajunen, K. (2006). Stakeholder influences in organizational survival\*. *Journal of Management Studies*, 43(6), 1261-1288.
- Phillips, R. (2003). *Stakeholder theory and organizational Ethics*: Berrett-Koehler Publishers.
- Porter, M. E. (1990). The competitive advantage of notions. *Harvard business review*, 68(2), 73-93.
- Post, J. E., Preston, L. E., & Sauter-Sachs, S. (2002). *Redefining the corporation: Stakeholder management and organizational wealth*: Stanford University Press.
- Randeree, K., & El Faramawy, A. T. (2011). Islamic perspectives on conflict management within project managed environments. *International Journal of project management*, 29(1), 26-32.
- Real. A. P., R. (2005). *Designing and Conducting Survey*.
- Richardson, K. A., Cilliers, P., & Lissack, M. (2001). Complexity Science. *Emergence*, 3(2), 6-18.
- Saunders, M., Lewis, P., & Thornhill, A. (2007). Formulating the Research Design. *Research Methods For Business Students*, 130-161.
- Scholes, K., & Johnson, G. (2002). *Exploring corporate strategy*: Prentice Hall International.
- Shane, J., Strong, K., Gransberg, D., & Jeong, D. (2015). *Guide to Project Management Strategies for Complex Projects*.
- Smith, J., & Love, P. E. (2004). Stakeholder management during project inception: Strategic needs analysis. *Journal of architectural engineering*, 10(1), 22-33.
- Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of management Review*, 20(3), 571-610.

- Tam, C. M., Zeng, S., & Tong, T. K. (2009). Conflict analysis in public engagement program of urban planning in Hong Kong. *Journal of Urban Planning and Development*, 135(2), 51-55.
- Thomas, R. M. (2003). *Blending qualitative and quantitative research methods in theses and dissertations*: Corwin Press.
- Torrington, D., & Hall, S. (1998). *Human resource management and the personnel function*: london: Routledge.
- Turner, J. R. (2000). Gower Handbook of Project Management.
- Wantanakorn, D., Mawdesley, M., & Askew, W. (1999). Management errors in construction. *Engineering, Construction and Architectural Management*, 6(2), 112-120.
- Ward, S., & Chapman, C. (2003). Transforming project risk management into project uncertainty management. *International journal of project management*, 21(2), 97-105.
- Watson, T., Osborne-Brown, S., & Longhurst, M. (2002). Issues Negotiation™-investing in stakeholders. *Corporate Communications: An International Journal*, 7(1), 54-61.
- Weber, M. (1947). *The Theory of Social and Economic Organization*. [Free Press, New York.]. [A.M. Henderson and T. Parsons].
- Whittington, R., Johnson, G., & Scholes, K. (2005). "Exploring Corporate Strategy. *Prentice Hall, Harlow*.
- Williams, J. (1988). A human factors data-base to influence safety and reliability *Human factors and decision making: their influence on safety and reliability*.
- Wood, H., & Ashton, P. (2010). *The factors of project complexity*.
- Zeng, S., Tian, P., & Tam, C. (2005). Quality Assurance In Design Organizations: A Case Study In China. *Managerial Auditing Journal*, 20(7), 679-690.

## APPENDIX-I

### MANAGEMENT PRACTICES OF COORDINATION AND COMMUNICATION AMONG STAKEHOLDERS IN COMPLEX PROJECTS & THEIR IMPLICATIONS

### QUESTIONNAIRES FOR INTERVIEW

CONSTRUCTION ENGINEERING AND MANAGEMENT, NIT,  
NATIONAL UNIVERSITY OF SCIENCES & TECHNOLOGY  
H-12 CAMPUS, ISLAMABAD

In order to assess Management Practices of Coordination and Communication among stakeholders in complex projects and their implications, the Key Stakeholders must be known according to priority level. To assess the priority the Stakeholder Impact Index of each stakeholder in A) Planning & B) Execution phase must be known. Your valuable contributions will a go long way in establishing Key Stakeholders Priority wise.

Following data is being compiled for academic purposes only. Personal information will not be shared.	
Please answer these questions:	
1	Name: _____
2	Gender: Male / Female
3	Qualification: _____
4	Company Name: _____
5	Designation: _____
6	Experience (Years): _____
7	Level of Management: Top/Middle/First
8	Stakeholder Type: _____

Part A	Kindly encircle your option.	Very Low	Low	Medium	High	Very High
	③					
1.	According to your Knowledge and Experience what is the prevailing (Impact Potential) of the following Stakeholders in Complex Projects اثرات کا امکان، ذاتی دلچسپی					
a	Client					
	PLANNING PHASE	1	2	3	4	5

	EXECUTION PHASE	1	2	3	4	5
<b>b</b>	<b>Consultants (Design + Supervision)</b>					
	PLANNING PHASE	1	2	3	4	5
	EXECUTION PHASE	1	2	3	4	5
<b>c</b>	<b>Main Contractor</b>					
	PLANNING PHASE	1	2	3	4	5
	EXECUTION PHASE	1	2	3	4	5
<b>d</b>	<b>Sub-Contractor</b>					
	PLANNING PHASE	1	2	3	4	5
	EXECUTION PHASE	1	2	3	4	5
<b>e</b>	<b>Government Agencies ( District Government, Federal Government Departments, Provisional Government Departments Housing Department, , Etc)</b>					
	PLANNING PHASE	1	2	3	4	5
	EXECUTION PHASE	1	2	3	4	5
<b>f</b>	<b>Politicians</b>					
	PLANNING PHASE	1	2	3	4	5
	EXECUTION PHASE	1	2	3	4	5
<b>g</b>	<b>Media</b>					
	PLANNING PHASE	1	2	3	4	5
	EXECUTION PHASE	1	2	3	4	5
<b>h</b>	<b>Institutional Forces/NGOs</b>					
	PLANNING PHASE	1	2	3	4	5
	EXECUTION PHASE	1	2	3	4	5
<b>i</b>	<b>Local Community/Residents</b>					
	PLANNING PHASE	1	2	3	4	5
	EXECUTION PHASE	1	2	3	4	5
<b>j</b>	<b>Land Owners</b>					
	PLANNING PHASE	1	2	3	4	5
	EXECUTION PHASE	1	2	3	4	5
<b>k</b>	<b>Environmentalists</b>					
	PLANNING PHASE	1	2	3	4	5
	EXECUTION PHASE	1	2	3	4	5
<b>2.</b>	<b>According to your Knowledge and Experience what is the prevailing Level (Level of Influence) of the following Stakeholders in Complex Projects.</b> اثر و رسوخ کے اثرات، اثر کی سطح					

<b>a</b>	<b>Client</b>					
	PLANNING PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	EXECUTION PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>b</b>	<b>Consultants (Design + Supervision)</b>					
	PLANNING PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	EXECUTION PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>c</b>	<b>Main Contractor</b>					
	PLANNING PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	EXECUTION PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>d</b>	<b>Sub-Contractor</b>					
	PLANNING PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	EXECUTION PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>e</b>	<b>Government Agencies ( District Government, Federal Government Departments, Provisional Government Departments Housing Department, Etc)</b>					
	PLANNING PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	EXECUTION PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>f</b>	<b>Politicians</b>					
	PLANNING PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	EXECUTION PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>g</b>	<b>Media</b>					
	PLANNING PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	EXECUTION PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>h</b>	<b>Institutional Forces/NGOs</b>					
	PLANNING PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	EXECUTION PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>i</b>	<b>Local Community/Residents</b>					
	PLANNING PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	EXECUTION PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>j</b>	<b>Land Owners</b>					
	PLANNING PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	EXECUTION PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>k</b>	<b>Environmentalists</b>					
	PLANNING PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	EXECUTION PHASE	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

<b>Part B</b>	<b>Kindly encircle your option.</b> <b>3</b>	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
<b>1.</b>	<b>According to your Knowledge and Experience , what is the prevailing POSITION of following Stakeholders in complex projects</b>					
<b>a</b>	<b>Client</b>					
	PLANNING PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
	EXECUTION PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
<b>b</b>	<b>Consultants (Design + Supervision)</b>					
	PLANNING PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
	EXECUTION PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
<b>c</b>	<b>Main Contractor</b>					
	PLANNING PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
	EXECUTION PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
<b>d</b>	<b>Sub-Contractor</b>					
	PLANNING PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
	EXECUTION PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
<b>e</b>	<b>Government Agencies ( District Government, Federal Government Departments, Provisional Government Departments</b>					



	<b>Housing Department, , Etc)</b>					
	PLANNING PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
	EXECUTION PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
<b>f</b>	<b>Politicians</b>					
	PLANNING PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
	EXECUTION PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
<b>g</b>	<b>Media</b>					
	PLANNING PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
	EXECUTION PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
<b>h</b>	<b>Institutional Forces/NGOs</b>					
	PLANNING PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
	EXECUTION PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
<b>i</b>	<b>Local Community/Residents</b>					
	PLANNING PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
	EXECUTION PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
<b>j</b>	<b>Land Owners</b>					
	PLANNING PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
	EXECUTION PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
<b>k</b>	<b>Environmentalists</b>					
	PLANNING PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>
	EXECUTION PHASE	<b>Active Opposition</b>	<b>Passive Opposition</b>	<b>Not Committed</b>	<b>Passive Support</b>	<b>Active Support</b>

<b><u>EXPLANATION/DEFINATION OF POWER, LEGITIMACY AND URGENCY</u></b>								
<p><b>i. Power ( P )</b> is defined as the extent to which a party has or can gain access to coercive (physical means), utilitarian (material means) or normative (prestige, esteem and social) means to impose their will or briefly power is influence the firm</p> <p><b>ii. Legitimacy ( L )</b> defined as relationships with the firm / Is the authority, level of involvement project stakeholders have on a project.</p> <p><b>iii. Urgency ( U )</b> defined as claim on the firm / is the time expected by project stakeholders for responses to their expectations.</p>								
Part C	Kindly encircle your option. <b>3</b>	Dormant	Discretionary	Demanding	Dominant	Dangerous	Dependent	Definitive
<b>1.</b>	<b>According to your Knowledge and Experience , what is/are the prevailing Attributes صفات of following Stakeholders in complex projects</b>							
<b>a</b>	<b>Client</b>							
	PLANNING PHASE	P	L	U	P+L	P+ U	L+ U	P+L+U
	EXECUTION PHASE	P	L	U	P+L	P+ U	L+ U	P+L+U
<b>b</b>	<b>Consultants (Design + Supervision)</b>							
	PLANNING PHASE	P	L	U	P+L	P+ U	L+ U	P+L+U
	EXECUTION PHASE	P	L	U	P+L	P+ U	L+ U	P+L+U
<b>c</b>	<b>Main Contractor</b>							
	PLANNING PHASE	P	L	U	P+L	P+ U	L+ U	P+L+U
	EXECUTION PHASE	P	L	U	P+L	P+ U	L+ U	P+L+U
<b>d</b>	<b>Sub-Contractor</b>							
	PLANNING PHASE	P	L	U	P+L	P+ U	L+ U	P+L+U
	EXECUTION PHASE	P	L	U	P+L	P+ U	L+ U	P+L+U

<b>e</b>	<b>Government Agencies ( District Government, Federal Government Departments, Provisional Government Departments Housing Department, High/Supreme Court, Etc)</b>							
	PLANNING PHASE	<b>P</b>	<b>L</b>	<b>U</b>	<b>P+L</b>	<b>P+ U</b>	<b>L+ U</b>	<b>P+L+U</b>
	EXECUTION PHASE	<b>P</b>	<b>L</b>	<b>U</b>	<b>P+L</b>	<b>P+ U</b>	<b>L+ U</b>	<b>P+L+U</b>
<b>f</b>	<b>Politicians</b>							
	PLANNING PHASE	<b>P</b>	<b>L</b>	<b>U</b>	<b>P+L</b>	<b>P+ U</b>	<b>L+ U</b>	<b>P+L+U</b>
	EXECUTION PHASE	<b>P</b>	<b>L</b>	<b>U</b>	<b>P+L</b>	<b>P+ U</b>	<b>L+ U</b>	<b>P+L+U</b>
<b>g</b>	<b>Media</b>							
	PLANNING PHASE	<b>P</b>	<b>L</b>	<b>U</b>	<b>P+L</b>	<b>P+ U</b>	<b>L+ U</b>	<b>P+L+U</b>
	EXECUTION PHASE	<b>P</b>	<b>L</b>	<b>U</b>	<b>P+L</b>	<b>P+ U</b>	<b>L+ U</b>	<b>P+L+U</b>
<b>h</b>	<b>Institutional Forces/NGOs</b>							
	PLANNING PHASE	<b>P</b>	<b>L</b>	<b>U</b>	<b>P+L</b>	<b>P+ U</b>	<b>L+ U</b>	<b>P+L+U</b>
	EXECUTION PHASE	<b>P</b>	<b>L</b>	<b>U</b>	<b>P+L</b>	<b>P+ U</b>	<b>L+ U</b>	<b>P+L+U</b>
<b>i</b>	<b>Local Community/Residents</b>							
	PLANNING PHASE	<b>P</b>	<b>L</b>	<b>U</b>	<b>P+L</b>	<b>P+ U</b>	<b>L+ U</b>	<b>P+L+U</b>
	EXECUTION PHASE	<b>P</b>	<b>L</b>	<b>U</b>	<b>P+L</b>	<b>P+ U</b>	<b>L+ U</b>	<b>P+L+U</b>
<b>j</b>	<b>Land Owners</b>							
	PLANNING PHASE	<b>P</b>	<b>L</b>	<b>U</b>	<b>P+L</b>	<b>P+ U</b>	<b>L+ U</b>	<b>P+L+U</b>
	EXECUTION PHASE	<b>P</b>	<b>L</b>	<b>U</b>	<b>P+L</b>	<b>P+ U</b>	<b>L+ U</b>	<b>P+L+U</b>
<b>k</b>	<b>Environmentalists</b>							
	PLANNING PHASE	<b>P</b>	<b>L</b>	<b>U</b>	<b>P+L</b>	<b>P+ U</b>	<b>L+ U</b>	<b>P+L+U</b>
	EXECUTION PHASE	<b>P</b>	<b>L</b>	<b>U</b>	<b>P+L</b>	<b>P+ U</b>	<b>L+ U</b>	<b>P+L+U</b>

## **APPENDIX-II**

### **LIST OF INTERVIEWEES**

<b>S. No</b>	<b>NAME</b>	<b>STAKEHOLDER TYPE</b>	<b>CITY</b>
01	Al Nasir Hanif	Client	Lahore
02	Qamar Ali Saquib	Client	Jehlum
03	Khalid Farooq	Client	Islamabad
04	Maj(r)Javed Iqbal Gondal	Client	Islamabad
05	Qazi Ifthikar Ahmed	Consultant	Islamabad
06	Ch. Muhammad Hanif	Consultant	Lahore
07	M.Siddiq Sulemani	Consultant	Karachi
08	Hashim Hanif	Consultant	Lahore
09	Peng Xhaun	Main Contractor	Lahore
10	Lt Gen(r)Shahid Niaz	Main Contractor	Islamabad
11	Zahir Khan	Main Contractor	Lahore
12	Muhammad Shabbir	Main Contractor	Islamabad
13	Jawad Amjad	Sub Contractor	Islamabad
14	Ibrahim Shahid	Sub Contractor	Lahore
15	Shafat Ansari	Sub Contractor	Lahore
16	Atif Ayub	Government Agencies	Islamabad
17	Taimoor Nasir	Government Agencies	Islamabad
18	Sheikh Rashid Hafeez	Politicians	Rawalpindi
19	Sardar Naseem	Politicians	Rawalpindi
20	Ayaz Syed	Media	Islamabad
21	Johar Majeed	Media	Rawalpindi
22	Razia Attique	Institutional Forces/NGOs	Muzaffarabad
23	Kashif Iqbal	Institutional Forces/NGOs	Islamabad
24	Hafiz Muhammad Umer	Local Community/Residents	Multan
25	Muhammad Bukhari	Local Community/Residents	Rawalpindi
26	Muhammad Azfal	Land Owners	Rawalpindi
27	Ch Muhammad Amin	Land Owners	Lahore
28	Dr Jamal Nasir	Land Owners	Rawalpindi
29	Adeel Pervaiz	Environmentalism	Lahore
30	Ali Mehtab	Environmentalism	Lahore